

'HOW TO MANAGE' SERIES FOR HEALTHCARE TECHNOLOGY

Guide 3 How to Procure and Commission Your Healthcare Technology

*Management Procedures for
Health Facilities and Health Authorities*



Dedicated to baby Nathan and Trevor, for their patience and help.

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‘How to Manage’ Series for Healthcare Technology

Guide 1: How to Organize a System of Healthcare Technology Management

Guide 2: How to Plan and Budget for your Healthcare Technology

Guide 3: How to Procure and Commission your Healthcare Technology

Guide 4: How to Operate your Healthcare Technology Effectively and Safely

Guide 5: How to Organize the Maintenance of your Healthcare Technology

Guide 6: How to Manage the Finances of your Healthcare Technology
Management Teams

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‘How to Manage’ Series for Healthcare Technology

Guide 3

How to Procure and Commission your Healthcare Technology

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Foreword

This Series of Guides is the output from a project funded by the UK government's Department for International Development (DFID) for the benefit of developing countries. The output is the result of an international collaboration that brought together:

- ◆ researchers from Ziken International and ECHO International Health Services in the UK, and FAKT in Germany
 - ◆ an advisory group from WHO, PAHO, GTZ, the Swiss Tropical Institute, and the Medical Research Council of South Africa
 - ◆ reviewers from many countries in the developing world
- in order to identify best practice in the field of healthcare technology management.

The views expressed are not necessarily those of DFID or the other organizations involved.

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Preface

The provision of equitable, quality and efficient healthcare requires an extraordinary array of properly balanced and managed resource inputs. Physical resources such as fixed assets and consumables, often described as healthcare technology, are among the principal types of those inputs. Technology is the platform on which the delivery of healthcare rests, and the basis for provision of all health interventions. Technology generation, acquisition and utilization require massive investment, and related decisions must be made carefully to ensure the best match between the supply of technology and health system needs, the appropriate balance between capital and recurrent costs, and the capacity to manage technology throughout its life.

Healthcare technology has become an increasingly visible policy issue, and healthcare technology management (HTM) strategies have repeatedly come under the spotlight in recent years. While the need for improved HTM practice has long been recognized and addressed at numerous international forums, health facilities in many countries are still burdened with many problems, including non-functioning medical equipment as a result of factors such as inadequate planning, inappropriate procurement, poorly organized and managed healthcare technical services, and a shortage of skilled personnel. The situation is similar for other health system physical assets such as buildings, plant and machinery, furniture and fixtures, communication and information systems, catering and laundry equipment, waste disposal, and vehicles.

Preface (continued)

The (mis-)management of physical assets impacts on the quality, efficiency and sustainability of health services at all levels, be it in a tertiary hospital setting with sophisticated life-support equipment, or at the primary healthcare level where simple equipment is needed for effective diagnosis and safe treatment of patients. What is vital – at all levels and at all times – is a critical mass of affordable, appropriate, and properly functioning equipment used and applied correctly by competent personnel, with minimal risk to their patients and to themselves. Clear policy, technical guidance, and practical tools are needed for effective and efficient management of healthcare technology for it to impact on priority health problems and the health system's capacity to adequately respond to health needs and expectations.

This Series of Guides aims to promote better management of healthcare technology and to provide practical advice on all aspects of its acquisition and utilization, as well as on the organization and financing of healthcare technical services that can deliver effective HTM.

The Guides – individually and collectively – have been written in a way that makes them generally applicable, at all levels of health service delivery, for all types of healthcare provider organizations and encompassing the roles of health workers and all relevant support personnel.

It is hoped that these Guides will be widely used in collaboration with all appropriate stakeholders and as part of broader HTM capacity-building initiatives being developed, promoted and implemented by WHO and its partners, and will therefore contribute to the growing body of evidence-based HTM best practice.

The sponsors, authors and reviewers of this Series of Guides are to be congratulated for what is a comprehensive and timely addition to the global HTM toolkit.

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Abbreviations

ACP	African, Caribbean and Pacific countries
BP	British pharmacopoeia
CD-Rom	compact disc – read only memory
CFR	cost and freight (to a named port of destination)
CIF	cost, insurance and freight
CIP	carriage and insurance paid
CMS	central medical stores
CPT	carriage paid to (a named place of destination)
CT	computed tomography (scanner)
DDP	delivered duty paid
DDU	delivered duty unpaid
DVD	digital versatile disc
ECG	electrocardiograph
EDI	electronic data interchange
EP	European pharmacopoeia
EPI	expanded programme for immunization
Euro	currency of the European Union countries
EDF	European Development Fund
EU	European Union
ExW	ex-works (ex-factory or off-the-shelf) price
FDA	Food and Drug Administration (of the USA)
GMP	good manufacturing practices
HMIS	health management information system
HTM	healthcare technology management
HTMS	healthcare technology management service
HTMWG	healthcare technology management working group
IEC	International Electrotechnical Commission

Incoterms	international commercial terms (for transportation of trade goods)
IP	international pharmacopoeia (of the WHO)
ISO	International Organization for Standardization
K	Kwacha
LOC	letter of credit
MOH	Ministry of Health
MOW	Ministry of Works
MRI	magnetic resonance imaging (scanner)
NGO	non-governmental organization
PPM	planned preventive maintenance
PSI	pre-shipment inspection
SDR	Special Drawing Rights (international currency)
SMART	specific, measurable, achievable, relevant, time-bound (targets)
TIN	trader identification number (of importer)
UN	United Nations
UNICEF	United Nations Children's Fund
UMDNS	universal medical device nomenclature system
US \$	United States dollars
USP	United States pharmacopoeia
V	Volts
VEN/VED	vital, essential, not so essential/desirable (prioritizing categories)
WB	World Bank
WCC	World Council of Churches
WHO	World Health Organization

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1. INTRODUCTION

Why is This Important?

This introduction explains the importance of healthcare technology management (HTM) and its place in the health system.

It also describes:

- ◆ the purpose of the Series of Guides and this Guide in particular
- ◆ the people the Guides are aimed at
- ◆ the names and labels commonly used in HTM, in this Series.

The Series of Guides is introduced in *Section 1.1*, and this particular Guide on procurement and commissioning is introduced in *Section 1.2*.

1.1 INTRODUCTION TO THE SERIES OF GUIDES

Healthcare Technology Management's Place in the Health System

All health service providers want to get the most out of their investments. To enable them to do so, they need to actively manage health service assets, ensuring that they are used efficiently and optimally. All management takes place in the context of your health system's policies and finances. If these are favourable, the management of health service assets can be effective and efficient, and this will lead to improvements in the quality and quantity of healthcare delivered, without an increase in costs.

The health service's most valuable assets which must be managed are its human resources, physical assets, and other resources such as supplies. Physical assets such as facilities and healthcare technology are the greatest capital expenditure in any health sector. Thus it makes financial sense to manage these valuable resources, and to ensure that healthcare technology:

- ◆ is selected appropriately
- ◆ is used correctly and to maximum capacity
- ◆ lasts as long as possible.

Such effective and appropriate management of healthcare technology will contribute to improved efficiency within the health sector. This will result in improved and increased health outcomes, and a more sustainable health service. This is the goal of healthcare technology management – the subject of this Series of Guides.

Figure 1: The Place of Healthcare Technology Management in the Health System

What Do we Mean by Healthcare Technology?

The World Health Organization (WHO) uses the broader term ‘health technology’, which it defines as including:

‘devices, drugs, medical and surgical procedures – and the knowledge associated with these – used in the prevention, diagnosis and treatment of disease as well as in rehabilitation, and the organizational and supportive systems within which care is provided’

(Source: Kwankam, Y, et al, 2001, ‘Health care technology policy framework’, WHO Regional Publications, Eastern Mediterranean Series 24: Health care technology management, No. 1)

However, the phrase ‘healthcare technology’ used in this Series of Guides only refers to the physical pieces of hardware in the WHO definition, that need to be maintained. Drugs and pharmaceuticals are usually covered by separate policy initiatives, frameworks, and colleagues in another department.

Therefore, we use the term healthcare technology to refer to the various equipment and technologies found within health facilities, as shown in *Box 1*.

BOX 1: Categories of Equipment and Technologies Described as ‘Healthcare Technology’

medical equipment	walking aids	health facility furniture
communications equipment	training equipment	office equipment
office furniture	fixtures built into the building	plant for cooling, heating, etc
service supply installations	equipment-specific supplies	fire-fighting equipment
workshop equipment	fabric of the building	vehicles
laundry and kitchen equipment	waste treatment plant	energy sources

For examples of these different categories, see the Glossary in *Annex 1*.

Often, different types of equipment and technologies are the responsibility of different organizations. For example, in the government sector, different ministries may be involved, such as Health, Works, and Supplies. In the non-government sector, different agencies may be involved, such as Health, and Logistics.

The range of healthcare technology which falls under the responsibility of the health service provider varies from country to country and organization to organization. Therefore each country's definition of healthcare technology will vary depending on the range of equipment and technology types that they actually manage.

For simplicity, we often use the term 'equipment' in place of the longer phrase 'healthcare technology' throughout this Series of Guides.

What is Healthcare Technology Management?

First of all, healthcare technology management (HTM) involves the organization and coordination of all of the following activities, which ensure the successful management of physical pieces of hardware:

- ◆ Gathering reliable information about your equipment.
- ◆ Planning your technology needs and allocating sufficient funds for them.
- ◆ Purchasing suitable models and installing them effectively.
- ◆ Providing sufficient resources for their use.
- ◆ Operating them effectively and safely.
- ◆ Maintaining and repairing the equipment.
- ◆ Decommissioning, disposing, and replacing unsafe and obsolete items.
- ◆ Ensuring staff have the right skills to get the best use out of your equipment.

This will require you to have broad skills in the management of a number of areas, including:

- ◆ technical problems
- ◆ finances
- ◆ purchasing procedures
- ◆ stores supply and control
- ◆ workshops
- ◆ staff development.

However, you also need skills to manage the place of healthcare technology in the health system. Therefore, HTM means managing how healthcare technology should interact and balance with your:

- ◆ medical and surgical procedures
- ◆ support services
- ◆ consumable supplies, and
- ◆ facilities

so that the complex whole enables you to provide the health services required.

Thus HTM is a field that requires the involvement of staff from many disciplines – technical, clinical, financial, administrative, etc. It is not just the job of managers, it is the responsibility of all members of staff who deal with healthcare technology.

This Series of Guides provides advice on a wide range of management procedures, which you can use as tools to help you in your daily work. For further clarification of the range of activities involved in HTM and common terms used, refer to the WHO's definition of the technology management hierarchy in *Annex 1*.

Box 2 highlights some of the benefits of HTM.

BOX 2: Benefits of Healthcare Technology Management (HTM)

- ◆ Health facilities can deliver a full service, unimpeded by non-functioning healthcare technology.
- ◆ Equipment is properly utilized, maintained, and safeguarded.
- ◆ Staff make maximum use of equipment, by following written procedures and good practice.
- ◆ Health service providers are given comprehensive, timely, and reliable information on:
 - the functional status of the equipment
 - the performance of the maintenance services
 - the operational skills and practice of equipment-user departments
 - the skills and practice of staff responsible for various equipment-related activities in a range of departments including finance, purchasing, stores, and human resources.
- ◆ Staff control the huge financial investment in equipment, and this can lead to a more effective and efficient healthcare service.

Purpose of the Series of Guides

The titles in this Series are designed to contribute to improved healthcare technology management in the health sectors of developing countries, although they may also be relevant to emerging economies, and other types of country. The Series is designed for any health sector, whether it is run by:

- ◆ government (such as the Ministry of Health or Defence)
- ◆ a non-governmental organization (NGO) (such as a charitable or not-for-profit agency)
- ◆ a faith organization (such as a mission)
- ◆ a corporation (for example, an employer such as a mine, who may subsidize the healthcare)
- ◆ a private company (such as a health insurance company or for-profit agency).

This Series aims to improve healthcare technology at a daily operational level, as well as to provide practical resource materials for equipment users, maintainers, health service managers, and donor organizations.

To manage your technology effectively, you will need suitable and effective procedures in place for all activities which impact on the technology. Your health service provider organization should already have developed a Policy Document setting out the principles for managing your stock of healthcare technology (*Annex 2* provides a number of resources available to help with this). The next step is to develop written organizational procedures, in line with the strategies laid out in the policy, which staff will follow on a daily basis.

The titles in this Series provide a straightforward and practical approach to healthcare technology management procedures:

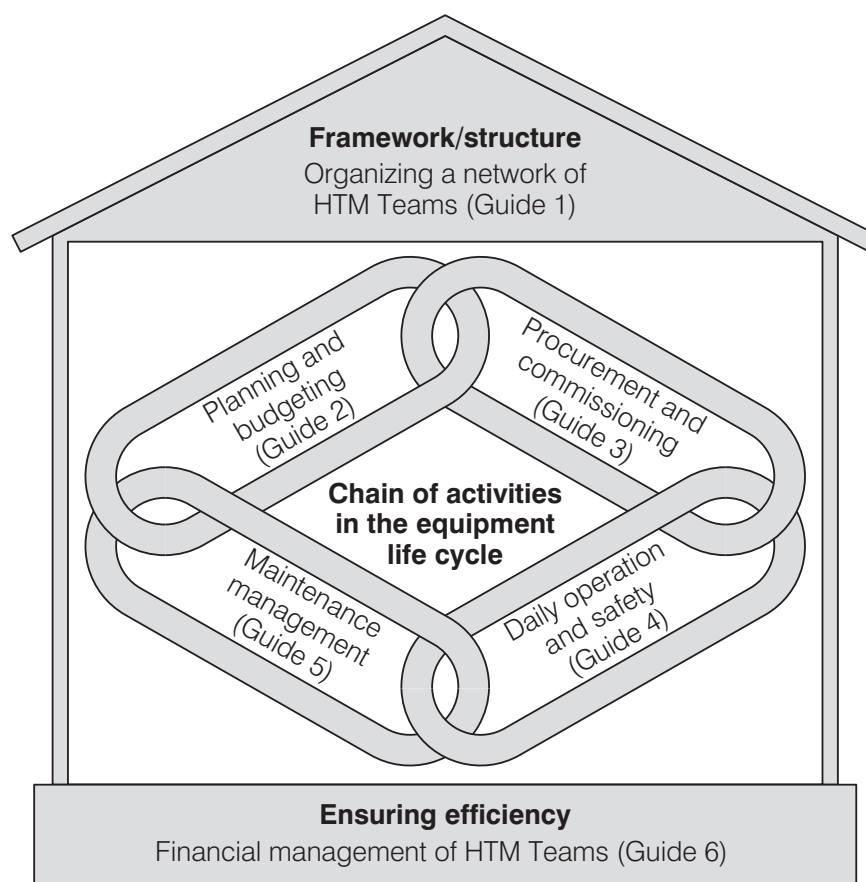
Guide 1 covers the framework in which healthcare technology management (HTM) can take place. It also provides information on how to organize a network of HTM Teams throughout your health service provider organization.

Guides 2 to 5 are resource materials which will help health staff with the daily management of healthcare technology. They cover the chain of activities involved in managing healthcare technology – from planning and budgeting to procurement, daily operation and safety, and maintenance management.

Guide 6 looks at how to ensure your HTM Teams carry out their work in an economical way, by giving advice on financial management.

How the Guides are coordinated is set out in *Figure 2*.

Figure 2: The Relationship Between the Guides in This Series



Who are These Guides Aimed at?

These Guides are aimed at people who work for, or assist, health service provider organizations in developing countries. Though targeted primarily at those working in health facilities or within the decentralized health authorities, many of the principles will also apply to staff in other organizations (for example, those managing health equipment in the Ministry of Works, private maintenance workshops, and head offices).

Depending on the country and organization, some daily tasks will be undertaken by end users while others may be carried out by higher level personnel, such as central level managers. For this reason, the Guides cover a range of tasks for different types of staff, including:

- ◆ equipment users (all types)
- ◆ maintenance staff
- ◆ managers
- ◆ administrative and support staff
- ◆ policy-makers
- ◆ external support agency personnel.

They also describe activities at different operational levels, including:

- ◆ the health facility level
- ◆ the zonal administration level (such as district, region, diocesan)
- ◆ the central/national level
- ◆ by external support agencies.

Many activities require a multi-disciplinary approach; therefore it is important to form mixed teams which include representatives from the planning, financial, clinical, technical, and logistical areas. Allocation of responsibilities will depend upon a number of factors, including:

- ◆ your health service provider
- ◆ the size of the organization
- ◆ the number of decentralized levels of authority
- ◆ the size of your health facility
- ◆ your level of autonomy.

The names and titles given to the people and teams involved will vary depending on the type of health service provider you work with.

For the sake of simplicity, we have used a variety of labels to describe different types of staff and teams involved in HTM.

This Series describes how to introduce healthcare technology management into your organization. The term **Healthcare Technology Management Service (HTMS)** is used to describe the delivery structure required to manage equipment within the health system. This encompasses all levels of the health service, from the central level, through the districts/regions, to facility level.

There should be a referral network of **workshops** where maintenance staff with technical skills are based. However, equipment management should also take place where there are no workshops, by involving general health facility staff. We call these groups of people the **HTM Team**, and we suggest that you have a team at every level whether a workshop exists or not. Throughout this Series, we have called the person who leads that team the **HTM Manager**.

At every level, there should also be a committee which regularly considers all equipment-related matters, and ensures decisions are made that are appropriate to the health system as a whole. We have used the term **HTM Working Group (HTMWG)** for this committee, which will advise the Health Management Teams on all equipment issues.

Due to its role, the HTMWG must be multi-disciplinary. Depending on the operational level of the HTMWG, its members could include the following:

- ◆ Head of medical/clinical services.
- ◆ Head of support services.
- ◆ Purchasing and supplies officer.
- ◆ Finance officer.
- ◆ Representatives from both medical equipment and plant maintenance.
- ◆ Representatives of equipment users from a variety of areas (medical/clinical, nursing, paramedical, support services, etc).
- ◆ Co-opted members (if specific equipment areas are discussed or specific interest or need is shown).

The HTM Working Group prepares the annual plans for equipment purchases, rehabilitation and funding, and prioritizes expenditure across the facility/district as a whole (see *Guide 2* on planning and budgeting). It may have various sub-groups to help consider specific aspects of equipment management, such as pricing, commissioning, safety, etc.

How to Use These Guides

Each Guide has been designed to stand alone, and has been aimed at different types of readers depending on its content (*Section 1.2*). However, since some elements are shared between them, you may need to refer to the other Guides from time to time. Also, if you own the full Series (a set of six Guides) you will find that some sections of the text are repeated.

We appreciate that different countries use different terms. For example, a purchasing officer in one country may be a supplies manager in another; some countries use working groups, while others call them standing committees; and essential service packages may be called basic healthcare packages elsewhere. For the purpose of these Guides it has been necessary to pick one set of terms and define them. You can then modify them for your own situation.

The terms used throughout the text are outlined, with examples, in the Glossary in *Annex 1*.

We appreciate that you may find it hard to pursue the ideas introduced in these Guides. Depending on your socio-economic circumstances, you may face many frustrations on the road to achieving effective healthcare technology management. We recognize that not all of the suggested procedures can be undertaken in all environments. Therefore we recommend that you take a step-by-step approach, rather than trying to achieve everything at once (*Section 2*).

These Guides have been developed to offer advice and recommendations only, therefore you may wish to adapt them to meet the needs of your particular situation. For example, you can choose to focus on those management procedures which best suit your position, the size of your organization, and your level of autonomy.

For more information about reference materials and contacts for healthcare technology management, see *Annex 2*.

1.2 INTRODUCTION TO THIS SPECIFIC GUIDE

The Importance of Procurement and Commissioning Activities

Healthcare and patient management have changed dramatically in recent years and continue to do so, mainly as a result of the advances in healthcare technology.

Healthcare technology plays an extremely important role in everyday clinical and public health work. Used properly, it can:

- ◆ contribute to increased life expectancy
- ◆ enable greater precision for diagnosis
- ◆ reduce the time needed for investigations, treatment, and rehabilitation.

For these reasons, it is important to take great care when planning and acquiring new equipment. Any new equipment you acquire must be suitable for your purposes and improve access to quality healthcare. You also need to ensure that you have the ability and capacity to absorb, support, and use any technologies procured.

Did you know?

The equipment market is extremely diverse. A bewildering range of equipment technology is already available, and new makes and models of equipment are coming out continually.

Current estimates show that there are around 6,000 distinct device types and entities and 750,000 brands and models on the market, available from over 12,000 manufacturers worldwide. The spectrum of equipment ranges from simple items (for example, mechanical apparatus such as a hand-operated table-top centrifuge) to the more sophisticated ones (such as CT scanners).

Health facilities have to cope with this wide range of products. It has become difficult for developing countries to select and obtain the technologies appropriate to their needs.

Successful procurement and commissioning processes give you several benefits:

- ◆ The most economically advantageous terms for the equipment you acquire (not necessarily the cheapest price, but the best deal for your needs).
- ◆ Delivery and handover on time.
- ◆ Satisfactory and well-defined terms for delivery, installation, commissioning, training, payment, and warranty.
- ◆ Satisfactory aftersales service.
- ◆ Greater interest from the suppliers and manufacturers in submitting offers in the future.

Provided you fully describe and discuss the terms for the delivery, installation, commissioning, and training, and follow them up, there should be no arguments with the supplier. All being well, the equipment should work properly at handover, your staff will have obtained the necessary new skills to operate and handle it, and you will be able to authorize payment without hesitation.

Box 2 (Section 1.1) shows that HTM provides a wide range of benefits. It is difficult to express this in financial terms, but *Box 3* gives an idea of the sort of savings that can be made if procurement and commissioning of equipment is effectively carried out.

BOX 3: Savings Derived from Effective Procurement and Commissioning of Healthcare Technology

Problems that could be avoided	Resulting waste you could save
◆ lack of standardization	◆ 30–50% additional cost for extra spare parts and extra maintenance workload
◆ purchase of sophisticated equipment for which operating and maintenance staff have no skills	◆ 20–40% of equipment remains under-utilized or unused
◆ impact on equipment and buildings during installation, unforeseen at the initial tender stage	◆ extra modifications or additions required for 10–30% of equipment
◆ inability to correctly specify and foresee total needs when ordering equipment	◆ 10–30% additional unplanned costs
◆ improper use of equipment by operating and maintenance staff who lack the necessary training	◆ loss of 30–80% of the potential lifetime of equipment
◆ excessive equipment down-time due to absence of preventive maintenance, inability to repair, and lack of spare parts	◆ 25–35% of equipment out of service

Adapted from: Mallouppas A, 1986, 'WHO: Strategy and proposed action concerning maintenance of hospital and medical equipment', WHO, Geneva, unpublished document

Who is This Guide Aimed at?

This Guide is primarily aimed at managers involved in procurement and commissioning activities. It is designed to help staff:

- ◆ procure the right equipment, of the right quality, in the right quantities, at the right time, in the right place, and at the right cost
- ◆ ensure delivery, installation, and commissioning procedures are carried out so that equipment is ready for use.

This Guide is intended as a practical tool to assist in the procurement of both equipment and equipment-related supplies (in other words, consumables, accessories, spare parts and maintenance materials). The activities in this Guide are aimed at anyone involved in the procurement of healthcare technology. This includes:

- ◆ staff directly responsible for, or involved with, procuring and commissioning equipment (whichever agency they belong to – your health service provider, a government agency, an external support agency, a partner)
- ◆ health service decision makers
- ◆ external support agency decision makers
- ◆ decision makers of partners such as NGOs, faith organizations, and the private sector.

What Topics are Covered?

This Guide aims to outline the wide variety of procurement and commissioning activities in a practical way. This will help you to acquire, deploy, and use the right equipment and equipment-related supplies. The activities involved are equally relevant whether you buy, hire or loan your equipment, or receive it as a donation.



- Tip** • Procurement and commissioning activities cover a wide range of subjects – the objective of this Guide is only to highlight the key issues.

In this Guide, the phrase ‘procurement and commissioning activities’ is often used. It should be understood to imply the long chain of **logistics** activities, including selection, supply, delivery, storage, installation, commissioning, initial training, and so on.

Procurement and commissioning activities are part of the broader acquisition phase of healthcare technology management, which also includes technology assessment and research and development. These later topics are covered in less detail.

This Guide aims to explain:

- ◆ the options open to you for obtaining and sourcing equipment and supplies
- ◆ the activities you need to carry out before purchasing
- ◆ the steps you need to take when purchasing goods
- ◆ how to prepare for and receive, store, and distribute goods in-country
- ◆ the process of receiving goods on site, and installing, commissioning, and accepting them
- ◆ how to monitor your activities so you can improve future procurement and commissioning exercises.

It is important to understand where *Guides 2 and 3* overlap. Procurement should not take place until planning and budgeting have occurred. *Guide 2* covers planning and budgeting activities, and describes how you can establish the many management ‘tools’ that are needed for procurement (such as the Equipment Development Plan, Model Equipment Lists, and Purchasing Policy). In *Guide 3*, we go on to explain how you can use these tools to procure and commission effectively, in order to get the equipment you want. For example, in *Guide 2* we explained how to write equipment specifications. *Guide 3* goes on to tell you how you can use these specifications to purchase the equipment you require. Similarly, selection activities are split between the two Guides. *Guide 2* details the policies that ensure you select equipment suited to your plans and circumstances, whereas *Guide 3* uses those selection criteria to choose the final product to buy.

In this Guide the following terminology is used:

Purchasing	refers simply to the acquisition of goods or services in return for money or equivalent payment.
Procurement	is a wider term and refers to the process of obtaining goods and services in any way, such as through purchase, donation, loan or hire.

However, the use of the terms ‘procurement’ and ‘purchasing’ interchangeably to mean ‘procurement’ is a common and accepted practice.

Procurement of equipment is an area where it is common to receive assistance from external support agencies.

External support agency	a body responsible for providing money, equipment, or technical support to developing countries on various terms, such as international donors, technical agencies of foreign governments, non-governmental organizations, private institutions, financial institutions, faith organizations.
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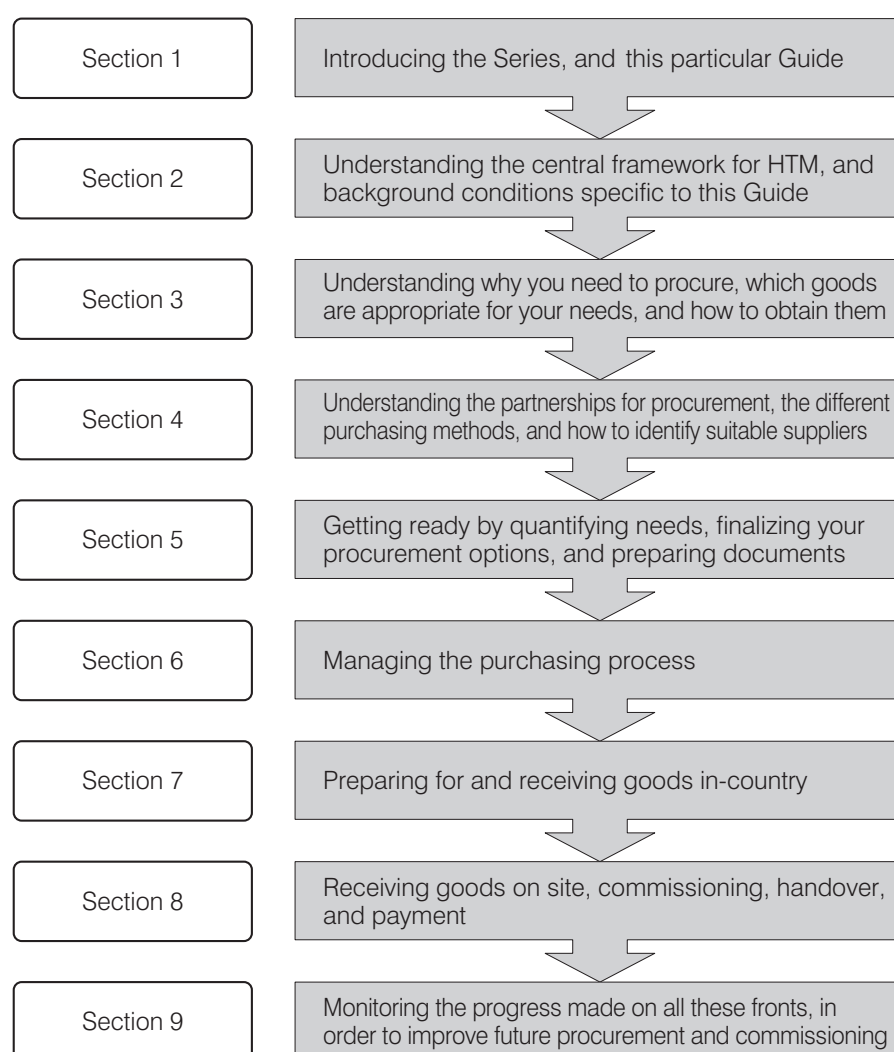
The system introduced in this Guide provides a solid approach to managing equipment procurement and commissioning activities. However, we recognize that there are other ways of organizing these issues which may be more appropriate for your administrative system. The most important thing is to implement a well-functioning system.

As you read through the recommendations in this Guide, you may find it useful to refer to advice in other Guides in the Series, as indicated in the text. Additional useful materials and contacts are given in *Annex 2*.

How is This Guide Structured?

Procurement and commissioning of equipment is a complex process, involving many different activities. The structure of *Guide 3* is shown in *Figure 3* and highlights the different steps you must take in order to obtain functioning equipment for your health facility.

Figure 3: The Structure of Guide 3



Who Does What in Procurement and Commissioning?

Depending on how many staff you have with the necessary skills, procurement and commissioning may take place at any level. However, it is often more economic to procure in bulk, and at a level where the necessary skills are concentrated. Thus, it is often more cost-effective to procure equipment centrally. *Guide 2* and *Section 2.2* provide further discussion on the appropriateness of decentralizing different healthcare technology management activities. Such decisions will depend on:

- ◆ your country
- ◆ your health service provider
- ◆ which level of the health service you work at
- ◆ the degree of autonomy of your health facility
- ◆ the scale and type of procurement to be carried out.

If you have limited management and technical skills at your level (for example, health facility or district level), and procurement and commissioning activities represent a heavy workload, much of the work described in this Guide should be undertaken at a higher level in your organization (for example, regional or central level).

We suggest that the Procurement Unit and the HTM Working Group (*Section 1.1*) have a large role to play in advising the Health Management Team on all equipment matters. Depending on the size of your facility or what level of the health service you are operating at, your HTM Working Group may prefer to set up a number of smaller sub-groups.



Remember that procurement and commissioning activities are extensive multi-disciplinary tasks, and therefore require staff with different backgrounds, skills and experience. The suggestions given in this Guide are only intended as examples of the type of background required for the members of the groups and sub-groups. It is likely that many staff will sit on more than one sub-group. If you are short of staff, you could use fewer members, as relevant to the operational level of the sub-group.

In this Guide, the following groups and sub-groups are suggested:

The **Procurement Unit** which is responsible for managing the procurement activities could have the following types of staff:

- ◆ Procurement Manager.
- ◆ Purchasing and Supplies Officers.
- ◆ Technical staff, for example a biomedical engineer.
- ◆ Health planner.
- ◆ Equipment users, for example a medical advisor.
- ◆ Finance officers and accountants.

A **Procurement/Tender Committee** which manages the tender and quotation process and awards contracts. This could include the following types of staff:

- ◆ Procurement Manager.
- ◆ HTM Manager.
- ◆ Finance Manager.
- ◆ Co-opted users – invited to relevant meetings which discuss the equipment purchases for their specialities.

A **Specification Writing Group** which is responsible for developing generic equipment specifications, and the technical and environmental data sheets. This could include the following types of staff:

- ◆ HTM Manager.
- ◆ Maintenance staff from various disciplines.
- ◆ Purchasing and Supplies Officer.
- ◆ Stores Controller.
- ◆ Managers and representatives from equipment user departments – clinical, paramedical, and support services (as appropriate to the equipment being considered).

A **Commissioning Team** which is responsible for commissioning and acceptance, and which could include the following types of staff:

- ◆ Purchasing and Supplies Officer.
- ◆ HTM Manager.
- ◆ Maintenance staff from various disciplines.
- ◆ Stores Controller.
- ◆ Support Services Manager.
- ◆ Representatives from equipment user departments (as appropriate to the equipment being considered).
- ◆ Where necessary, stores and grounds staff to help move and open crates.

A **training sub-group** which considers equipment-related training issues, and could include the following types of staff:

- ◆ Human Resource Manager.
- ◆ Head of Medical Services.
- ◆ Head of Support Services.
- ◆ HTM Manager
- ◆ In-service Training Coordinator.
- ◆ Infection Control Officer, senior users, and maintenance staff (as appropriate to the equipment being considered).

Your Procurement Unit will carry out the regular and annual planning and procurement work. However, they may face difficulties if they have to take on the workload of an extra process, such as equipping a whole new facility. In these instances hired consultants, external support agencies, or other NGOs may run such development projects, including the healthcare technology procurement component, taking it outside the control of your staff that usually plan and procure. Such situations should be avoided and could be overcome by setting up a formal project committee where key personnel from all contributors and stakeholders are involved.

We suggest a **project sub-group**, which sets goals and oversees the progress of any externally assisted projects (whether for routine equipment procurement or for major development projects), in consultation with the external funding agency. Such projects are usually cross-sectoral and can occur across several levels of the health service; therefore the sub-group should include a variety of types of staff from:

- ◆ management
- ◆ equipment user departments
- ◆ the HTM Service
- ◆ support services (including the Procurement Unit).



Tip

- There may seem to be a large number of sub-groups but the aim is to:
 - spread the work around different members of staff so that the HTM Working Group (*Section 1.1*) does not have to do everything
 - ensure that the Procurement Unit is not solely responsible for everything; and
 - make the process more 'open' and less likely to be biased and manipulated.
- If you have a small health facility with few staff, the groups created to undertake procurement and commissioning activities could be much smaller or you could allow these tasks to be undertaken at a higher level in your organization. Try to use relevant staff with experience and involve those who show an interest in the task.
- This Guide has allocated many tasks to the HTM Manager and HTM Working Group on the assumption that they possess technical (maintenance) skills. If they don't, you should seek assistance from maintenance staff higher up the HTM Service.



Country Experience

In one country the following personnel are involved in procurement:

- ◆ *Technical specifications are drawn up by the central Health Ministry for all common equipment (for example, suction pumps, basic X-ray machines). For complex equipment, specifications are formulated when and where necessary.*
- ◆ *To develop specifications, technical committees are formed by the central procurement agency – the Biomedical Engineering Division of the central Health Ministry. Each committee comprises two clinicians nominated by their academic body (for example, the College of Radiologists), one biomedical engineer, and one administrator. The specifications are revised annually.*
- ◆ *The Biomedical Engineering Division acts as a procurement agency, and has the total financial allocation available within it. But it deals directly only with procurement of complex equipment and foreign funded projects. The requirements of individual health facilities are handled by the respective facilities. The Biomedical Engineering Division releases the financial allocations required. It also assists health facilities with technical expertise during evaluation, commissioning, and handover of equipment.*
- ◆ *All health facilities have set up Equipment Sub-Committees to deal with equipment matters. The Equipment Sub-Committees are composed of:*
 - *the head of the institution*
 - *clinicians representing the various disciplines*
 - *the matron*
 - *theatre/ICU sisters*
 - *representatives of equipment users (for example radiographers)*
 - *the pharmacist in charge of purchasing equipment*
 - *the Biomedical Engineering Division representative (if required)*
- ◆ *Equipment Sub-Committees are entrusted with preparing the annual equipment requirements, prioritizing them and submitting them to the Biomedical Engineering Division for budgeting. Once the budget is approved, the Biomedical Engineering Division informs each facility of their share of the allocation and offers assistance with procurement of complex equipment if required. The Equipment Sub-Committees then report monthly to the Biomedical Engineering Division on their progress. They also coordinate the commissioning and handover process.*
- ◆ *Once the equipment lists are received from facilities, the Biomedical Engineering Division prepares two master lists consolidating all requirements – one for new purchases, one for replacements. It then submits the estimates to the treasury for funding. There is a ceiling on annual capital expenditure for the social services sector, involving health, education and labour ministries. The treasury makes the final decision on budget allocation depending on the requirements of the whole sector. The treasury also decides the foreign and local component of allocations and informs the health ministry. The Biomedical Engineering Division allocates local funds to the respective health facilities.*

A wide range of people in the health service will be involved in procurement and commissioning activities, as can be seen from the membership of these sub-groups. It is important for everybody involved to take collective responsibility for these activities, to ensure equipment is well chosen and installed, and therefore lasts a long time. The key tasks and functions of the different groups and individuals that are described in this Guide are summarized in *Box 4*.

BOX 4: The Collective Responsibility for Procurement and Commissioning Activities

Working Together	Procurement Managers and Procurement Units (at all levels of the health service)	<ul style="list-style-type: none"> ◆ are key to a successful procurement system ◆ are responsible for overall management of procurement activities ◆ undertake procurement according to health service provider, national, and external support agency regulations, policies, and plans (<i>Section 2</i>) ◆ liaise with any other organization procuring equipment on behalf of the health facility/decentralized health authority ◆ collate submissions on equipment needs and draw up the procurement list (<i>Section 3.1</i>) ◆ prequalify suppliers, as appropriate (<i>Section 4.4</i>) ◆ prepare procurement paperwork with assistance from the Specification Writing Group (<i>Section 5.5.2</i>) ◆ administer the quotation and tender processes for the Procurement/Tender Committee (<i>Section 6</i>) ◆ undertake direct ordering, local purchasing of low-value goods, and ordering of recurrent supplies (<i>Section 6.5</i>) ◆ evaluate low-value quotations and award low-value contracts according to set criteria (<i>Sections 6.3 and 6.4</i>) ◆ organize and monitor delivery, customs clearance, and transport to site (<i>Section 7</i>) ◆ process procurement paperwork for payment (<i>Section 8</i>) ◆ set annual action plans for procurement and review progress (<i>Section 9</i>)
	Procurement/Tender Committees	<ul style="list-style-type: none"> ◆ for each round of procurement, endorse the chosen purchasing method, timetable, and source of funds (<i>Sections 5.3 and 5.4</i>) ◆ manage the tender and high-value quotation processes ◆ evaluate all tender bids and high-value quotes and award contracts according to set criteria (<i>Sections 6.3 and 6.4</i>)
	Health Service Providers	<ul style="list-style-type: none"> ◆ ensure there are regulations, policies, and plans for procurement and commissioning (<i>Section 2</i>) ◆ ensure there is a Purchasing/Supplies Procedure Manual (<i>Section 2.2</i>) ◆ ensure there are suitable evaluation criteria for products and suppliers (<i>Sections 3.2 and 4.4</i>) ◆ decide on the models of procurement to use (<i>Section 4.1</i>)

Continued opposite

BOX 4: The Collective Responsibility for Procurement and Commissioning Activities (continued)

Working Together	HTM Working Groups (at all levels)	<ul style="list-style-type: none"> ◆ are responsible for all equipment matters ◆ develop long-term Equipment Development Plans and annual plans (see <i>Guide 2</i>) that procurement is based on ◆ develop long-term and annual income and expenditure plans (see <i>Guide 2</i>) to cover the procurement and commissioning costs ◆ ensure procurement and commissioning are managed as part of the HTM cycle (<i>Section 2.2</i>)
	Heads of Department and HTM Managers	<ul style="list-style-type: none"> ◆ quantify needs for equipment, equipment-related supplies, and associated services (according to procedures in <i>Guide 2</i>) and submit them to the Procurement Unit (<i>Section 3.1</i>)
	Specification Writing Groups	<ul style="list-style-type: none"> ◆ develop a library of clear generic equipment specifications ◆ assist in preparing purchase documents by writing the technical and environmental data sheets ◆ keep the information up to date (<i>Section 5.5.2</i>)
	Commissioning Teams and HTM Teams	<ul style="list-style-type: none"> ◆ are key to a successful commissioning system ◆ identify who will be responsible for installation and commissioning (<i>Section 5.1</i>) ◆ organize and ensure all pre-installation work and preparatory activities are carried out as planned, from the time of placing the order through to the arrival of the goods (<i>Section 7</i>) ◆ undertake the formal acceptance process for newly received equipment (<i>Section 8</i>) ◆ plan and monitor that all services (installation, commissioning, initial training) are delivered as requested, or undertake them (<i>Section 8</i>) ◆ hand over equipment to the user department and equipment-related supplies to the Stores department (<i>Section 8</i>) ◆ set annual action plans for commissioning and review progress (<i>Section 9</i>)
	Training sub-groups	<ul style="list-style-type: none"> ◆ identify training needs ◆ identify suitable personnel of the right discipline to be trained ◆ identify suitable trainers (<i>Sections 5.1 and 7.1</i>) ◆ develop training materials (<i>Section 8.3</i>)
	Stores Controllers (at all levels)	<ul style="list-style-type: none"> ◆ receive, hold and distribute all equipment and equipment-related supplies, as appropriate (<i>Section 7.3</i>) ◆ undertake the formal acceptance process for newly received equipment-related supplies (<i>Section 8</i>) ◆ organize the general stores inventory and the stores stock control system (<i>Section 8</i>) ◆ keep accurate records and order stock on time ◆ protect stock against loss through theft or misplacement
	Accountants and Finance Officers	<ul style="list-style-type: none"> ◆ are responsible for the financial integrity of the procurement and commissioning process ◆ ensure that payments are made according to agreed payment schedules, after the official acceptance of the goods (<i>Section 8</i>)
	Project sub-groups	<ul style="list-style-type: none"> ◆ liaise with external support agencies providing assistance for routine procurement or major development projects (<i>Section 2.2</i>) ◆ set goals and review progress of externally-assisted projects (<i>Section 9</i>)

2. FRAMEWORK REQUIREMENTS

Why is This Important?

In order to deliver quality health services, it is essential to undertake effective healthcare technology management.

There are various framework requirements to help you do this. These include legislation, regulations, standards, and policies.

These framework requirements create the boundary conditions within which you undertake healthcare technology management. They include central or national guiding principles, policy issues, and high-level assumptions that can impede or assist you in your work.

It is very difficult to function effectively if these framework requirements do not exist, and you should lobby your organization to develop them.

Depending on how autonomous your health facility is, you may be able to develop these framework requirements at facility, region/district, or central level.

In most industrialized countries, laws, regulations, policies and guidelines form an indispensable part of health service management. For many developing countries, however, these regulatory procedures have yet to be developed.

Guide 1 provides a fuller analysis of how to develop these instruments, and shows that effective healthcare technology management (HTM) is essential in order to deliver quality health services. *Section 2.1* summarizes these points and offers advice on:

- ◆ the regulatory role of government
- ◆ establishing standards for your health system
- ◆ policy issues for HTM
- ◆ the importance of introducing an HTM Service
- ◆ managing change.

Section 2.2 goes on to discuss the background conditions specific to this Guide, and provides advice on:

- ◆ management authorities responsible for procurement and commissioning activities
- ◆ central health service policies and plans for equipment and procurement
- ◆ availability and best use of skills, and economies of scale
- ◆ the role of external support agencies.

2.1 FRAMEWORK REQUIREMENTS FOR QUALITY HEALTH SERVICES

Regulatory Role of Government

The World Health Organization (WHO) identifies four distinct functions for health systems:

- ◆ The provision of health services.
- ◆ The financing of health services.
- ◆ The creation of health resources (investment in facilities, equipment, and training).
- ◆ The stewardship of health services (regulation and enforcement).

Health service provision and financing, as well as resource creation may be taken on by both the government and private sector. Thus, there are various options for organizing health systems:

- ◆ Mainly public.
- ◆ Mainly private for-profit (for example, run by a commercial organization), and private not-for-profit (for example, run by faith organizations, NGOs).
- ◆ A mixture of government and private organizations.

However in all these systems, the government is solely responsible for the regulation of health services. The reason for this is that the government has a duty to ensure the quality of healthcare delivered in order to protect the safety of the population. These regulations may then be enforced directly by government bodies or they may be enforced by publicly funded bodies, such as professional associations, which apply government-sanctioned regulations.

Most governments would agree that the protection of health and the guarantee of safety of health services is vital. However, in many countries this regulatory function is underdeveloped, with weak legal and regulatory frameworks.

To regulate health services, the government should:

- ◆ adopt suitable quality standards for all aspects of health services, including acceptable international or national standards for healthcare technology, drugs, and supplies in order to ensure their efficacy, quality and safety
- ◆ establish systems to ensure standards are met, so that the bodies enforcing regulations have legal sanctions they can use if standards are infringed
- ◆ establish wide-ranging policies covering all aspects of the utilization, effectiveness, and safety of healthcare technology, drugs, and supplies
- ◆ establish systems to ensure these policies can be implemented.

For health services, the Ministry of Health is the body most likely to develop these government regulations. Other health service providers need to be guided by government laws, and should look to the Ministry of Health for guidance or follow their direction if required to do so by law or regulation.

Establishing Standards for your Health System

The government should agree on which quality standards have to be met by the health services in general. These will cover areas such as:

Standard
a required or agreed level
of quality or attainment
set by a recognized authority,
used as a measure,
norm, or model

- ◆ procedures and training
- ◆ construction of facilities
- ◆ healthcare technology, drugs, and supplies
- ◆ safety
- ◆ the environment
- ◆ quality management.

Since drawing up these standards can be both time consuming and expensive, governments may often choose to adopt acceptable international standards (such as ISO), rather than develop their own. However, they must be suitable and applicable to your country's situation and fit in with your country's vision for health services.

The adoption of suitable international or national standards for healthcare technology is of particular relevance to this Guide. Such standards would cover areas such as:

- ◆ manufacturing practices
- ◆ performance and safety
- ◆ operation and maintenance procedures
- ◆ environmental issues (such as disposal).

These are important since countries can suffer if they acquire sub-standard and unsafe equipment. Again, in the majority of cases ministries of health would save money and time by adopting internationally recognized standards. For more information on introducing internationally recognized standards into your procurement procedures, refer to *Sections 3.2 and 5.5.2*.

It is not enough simply to establish these standards; they also need to be adhered to. You should establish a national supervisory body that has the power to ensure that health service providers comply with the standards in force. To be effective, such an enforcement agency must be allocated sufficient financial and personnel resources. It should also be linked or networked with corresponding international bodies.

Much healthcare technology in developing countries is received through foreign aid and donations, but such products don't always meet international standards. Therefore, your country will need to negotiate with external support agencies. The best way to do this is to draw up a list of donor regulations – see *Section 3.3 and Annex 6*.

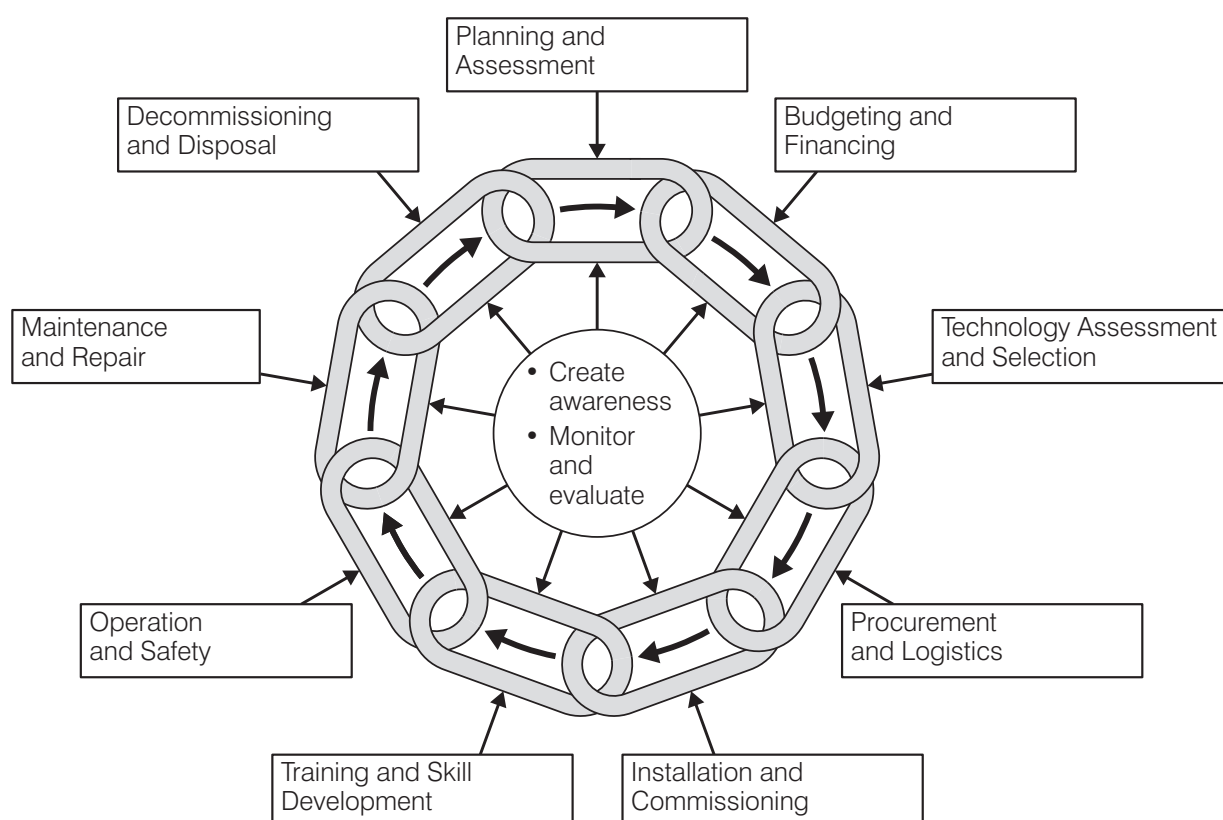
The legal system plays an important role in enforcing such standards, by ensuring that any infringements can be effectively prosecuted. It is therefore essential that the legal system is allocated sufficient financial and human resources to enforce claims against any institution operating equipment that does not meet the prescribed standards.

Developing Policies for Health Services

Every country needs to establish wide-ranging policies covering all aspects of health services. National health policies are usually developed by the Ministry of Health. If these policies are linked to regulations, then other health service providers must also follow them. Each health service provider can expand them internally, and must establish systems to ensure they are implemented.

One key framework requirement for this Series of Guides is that your health service provider should have started work on a Healthcare Technology Policy (for guidance on this process, see *Annex 2*). Such a policy usually addresses all the healthcare technology management (HTM) activities involved in the life-cycle of equipment, as shown in *Figure 4*.

Figure 4: The Healthcare Technology Management Cycle



Here we will consider just four issues that provide key background conditions:

- ◆ A vision for health services.
- ◆ Standardization.
- ◆ The provision of maintenance.
- ◆ Finances.

A Vision for Health Services

Every health service provider needs a realistic vision of the service it can offer. This should include a clear understanding of its role in relation to other health service providers in the national health service. Only when this vision is known can the health service provider decide what healthcare technology is needed, and prioritize the actions required to develop its stock of equipment.

It is unhelpful if lots of individual health facilities pull in different directions, with no coordinated plan for the health service as a whole. The central authority of each health service provider should be responsible for considering what sort of healthcare should be offered at each level of their health service. Preferably they will collaborate with the Ministry of Health, or follow their guidance if regulated to do so.

If there is no health service plan, there is no framework on which to base decisions. *Guide 2* provides further information on developing a vision and planning your healthcare technology stock.

Standardization of Healthcare Technology

Standardization

(also known as rationalization, normalization and harmonization)
– the process of reducing the range of makes and models of equipment available in your stock, by purchasing particular named makes and models.

Introducing an element of standardization for healthcare technology will help you to limit the wide variety of makes and models of equipment found in your stock. By concentrating on a smaller range for each equipment type, your technical, procedural, and training skills will increase and your costs and logistical requirements will decrease (see *Guide 1*).

It is easier to achieve standardization if equipment is planned and ordered on a country-wide, district-wide or health service provider basis. It is therefore important to combine forces with other facilities or health service providers, and it may be wise to follow standardization strategies of the Ministry of Health. It is important that these standardization efforts do not just apply to products purchased by health facilities, but also to donations.

Standardizing your healthcare technology may be difficult for a number of reasons. Your country and local businesses may have their own trade practices and interests. National donors may have tied-aid practices, while the procurement procedures of international funding agencies, health service institutions, and individuals may act against your standardization strategies (*Sections 3.3.2 and 3.3.3*).

You may need to hold discussions with organizations such as the Ministry of Industry and/or Trade, the chambers of commerce or specific business associations, as well as external support agencies. However, it is well worth persevering, as standardization offers many benefits, both in terms of cost and efficiency.

Provision of Maintenance

Proper maintenance is essential to ensure that the equipment you have purchased continues to meet the standards required throughout its entire working life.

Undertaking maintenance belongs to the service provision function of health systems, and could therefore, in principle, be carried out by the government, the private sector, or by a mixture of the two.

It is useful to organize the maintenance system along similar lines to the health service provision already existing in your country. For instance, if the health sector is predominantly run by the government, it is probably simplest to let the government run the maintenance organization as well. In contrast, if private organizations run the health services, it makes little sense for the maintenance activities to be carried out by a government body. In the majority of cases, a mixed system is most likely.

However, the government may wish to take a regulatory role and establish regulations that guarantee that healthcare technology performs effectively, accurately, and safely. The rules established are valid for all health service providers, irrespective of their type of organization.

Specific maintenance requirements would not need to be prescribed by the regulatory body. Instead, it is up to individual health service providers to decide how these will be provided. However, the nature and the complexity of some maintenance services often call for partnerships between the public and private health service providers. Partnerships may also exist between health service providers and private sector sources of maintenance support. For more details, refer to *Guide 1*.

To provide maintenance services, you will normally need to establish good links between maintenance workshops. This will create a network that supports the needs of all your health facilities. Maintenance is, of course, only one of many HTM activities that need to be carried out. However, the fact that maintenance workshops usually already exist in most countries serves as a useful starting point for establishing a physical HTM Service across your health service provider organization and across your country. For more details on how to organize an HTMS, refer to *Guide 1*.

Finances

To ensure that healthcare technology is utilized effectively and safely throughout its life, your health service provider will need to plan and allocate adequate capital and recurrent budgets. See *Guide 2* for more advice on this.

In a government-organized system these funds have to be provided by government budgets, while private systems or mixed systems must generate the required funds from their customers, or from benefactors and donors.

Depending on your health service provider and country, your HTM Service may be able to generate income by charging for services provided. Whether this income can be used to further improve the HTM Service depends on the policies of the responsible financing authority (such as the treasury or central finance office). *Guide 6* provides advice on this.

The Importance of Introducing a Healthcare Technology Management Service

We have established the importance of:

- ◆ adopting standards for healthcare technology
- ◆ developing healthcare technology policies
- ◆ establishing systems to ensure these policies are implemented.

All these aims could be achieved if each health service provider practised healthcare technology management (HTM) as part of the everyday life of their health service. The best way to do this is to have an HTM Service incorporated into each health service provider organization.

Box 2 (Section 1.1) shows that HTM provides a wide range of benefits. *Guide 1* attempts to express this in terms of the sorts of savings that can be made if HTM is effectively carried out. Taking maintenance as an example, we can see that it has not only a positive impact on the safety and effectiveness of healthcare technology, but that it also has two important economic benefits:

- ◆ It increases the lifespan of the equipment.
- ◆ It enhances the demand for health services, since demand for services is crucially dependent upon the availability of functioning healthcare technology.

Healthcare technology that is out of order quickly leads to a decline in demand, which will in turn reduce the income and quality of services of the health facilities. You will lose clients if, for example, it becomes known that malfunctioning of sterilization equipment may endanger the health of patients. Similarly, patients will avoid visiting health facilities that do not possess functioning diagnostic equipment.

Thus the justification for introducing an HTM Service is that it will benefit you economically and clinically, by ensuring that healthcare technology continues to meet the standards required throughout its working life.

The activities of an HTM Service belong to the service provision function of health systems. However, the government may wish to take a regulatory role and establish regulations that guarantee that HTM occurs. To achieve this, it will be necessary to have:

- ◆ a government body to provide regulations that will ensure the continued performance and safety of healthcare technology throughout its life
- ◆ a control mechanism to check that all health service providers pursue these healthcare technology management activities effectively
- ◆ legal or other sanctions that are enforceable if the rules are infringed.

The government body responsible for providing regulations could be the central level of the national HTM Service. Each health service provider could then develop its own HTM Service. It should involve a network of teams and committees that enable HTM to be practised in all facilities. In order to establish an effective HTM Service, you will need to provide sufficient inputs, such as finance, staff, workshops, equipment, and materials. Only in this way will you get the outputs and benefits that you require. For details of how to develop such an HTM Service, see *Guide 1*.

The organizational chart for the HTM Service will vary depending on the size of your country and your health service provider organization, and whether you are just starting out. However, *Figure 5* provides an example of the relationship between HTM Teams and HTM Working Groups (*Section 1.1*) that we envisage.

How to Manage Change

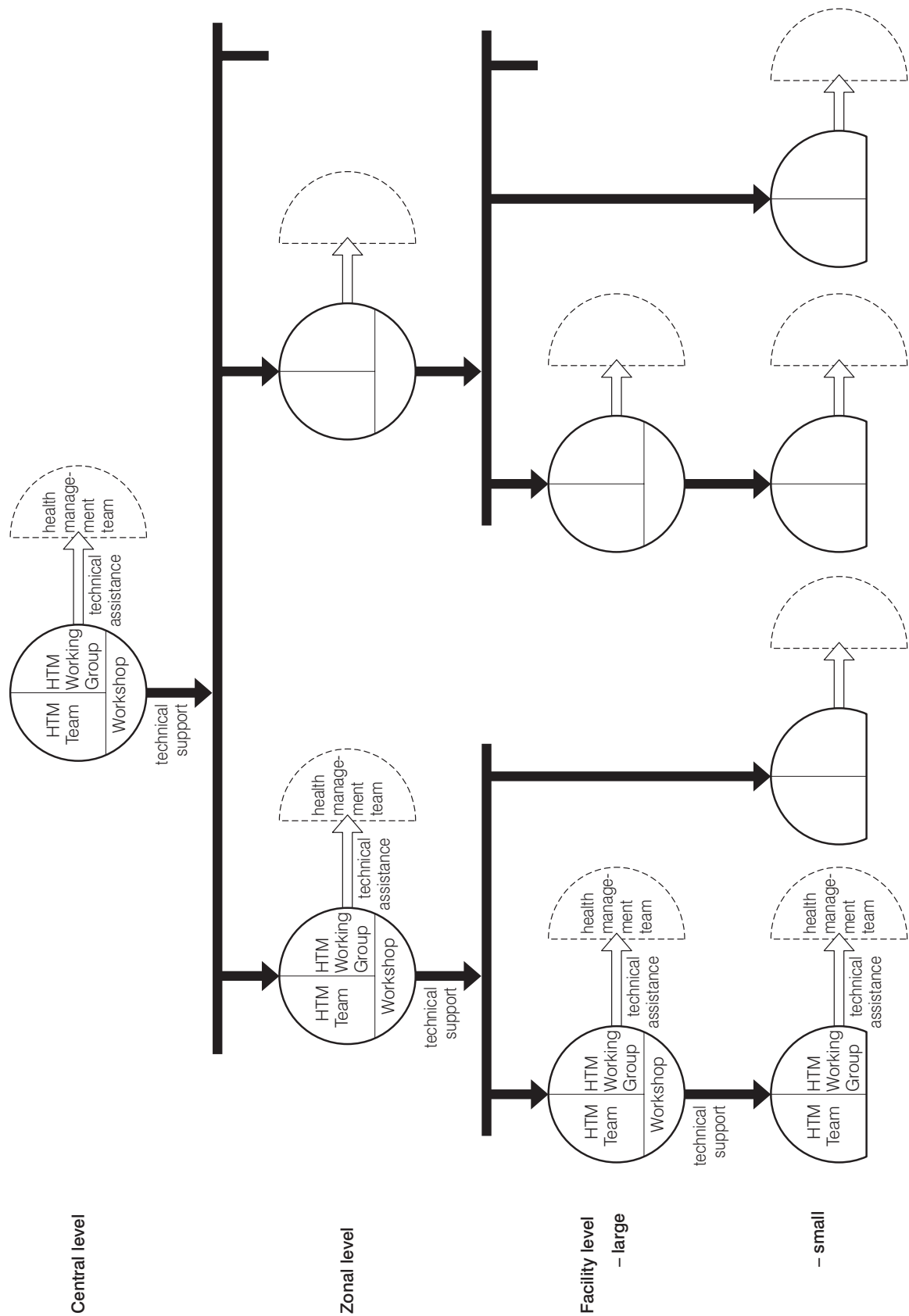
The regulatory requirements presented in this Section may appear somewhat idealistic, compared to the reality in many health systems. However, the aim is not to highlight the deficiencies of existing systems, but to provide a blueprint for a functioning healthcare technology management system. Hopefully, this will enable you to get the right framework conditions in place, and thus improve the effectiveness and the safety of your health services.

We are **not** recommending that your health service provider:

- ◆ throws out all its current HTM strategies and starts again
- ◆ makes sudden and sweeping changes that are likely to fail if they are over ambitious.

Rather it is better to take a step-by-step approach, introducing changes gradually, with a careful review process. To implement an HTM system with all the complexities described in this Series of Guides will take several years, and to try to achieve everything at once could be disastrous. However, for healthcare technology management to improve, it is important to act.

Figure 5: Sample Organizational Chart for the HTM Service



It is possible to write down all the correct procedures and yet still fail to improve the performance of staff. To ensure that your HTM procedures are effective, it is important for there to be good managers who can find ways to motivate staff (*Section 9.2*). Simply ordering staff to implement new procedures doesn't usually work. It is much better to discuss and develop the procedures with the staff who will implement them. This could take the form of discussion, working groups or training workshops. People who are involved in developing ideas about their own work methods are more likely to:

- ◆ understand the objectives
- ◆ understand the reasons why processes are necessary
- ◆ be encouraged to change their way of working
- ◆ be more interested in making changes which result in improvement
- ◆ see that the aim of the HTM procedures is to improve their delivery of healthcare.

We recognize that many readers will face difficulties such as staff shortages, poor finances, lack of materials, a lack of influence and time, and possibly even corruption. Introducing new rules and procedures into a system or institution that has no real work ethic, or which possibly employs dishonest workers, will not have any significant effect.

Therefore, strategies may be required to bring about cultural and behavioural change. For example:

- ◆ When materials are short, instead of focussing upon breakages and loss, place more emphasis upon the importance of staff working hard and putting in the hours.
- ◆ Favour good managers who are seen to be present and doing what they preach.
- ◆ Encourage an atmosphere where staff are praised for good work, rather than a culture of judgement and criticism.

Introducing rules and administrative procedures alone will not be sufficient to bring about cultural change. You will also need to find ways of increasing performance and productivity, and acknowledging/rewarding good behaviour is essential. For example:

- ◆ It is better to break a tool while actively undertaking maintenance, rather than breaking nothing but never doing any work.
- ◆ It is better to break a rule in an emergency (such as withdrawing stocks from stores), rather than stick to the rules and risk the possible death of a patient.

Annex 2 has some examples of useful reference materials. To bring about such changes, you will require skills in:

- ◆ managing change
- ◆ staff motivation
- ◆ effective communication
- ◆ encouragement
- ◆ supportive training with demonstrations.

All parties involved in the network of HTM Teams and HTM Working Groups need to participate in developing the HTM Service. This will encourage a sense of ownership of the service and its responsibilities, and will lead to greater acceptance and motivation among staff. If you are short of skilled staff (such as technicians, managers, planners or policy-makers), you may need to obtain specialist support to assist with some of these tasks.

2.2 BACKGROUND CONDITIONS SPECIFIC TO THIS GUIDE

Your country and health service provider may have existing regulating principles and conditions which will affect, or can inform, aspects of your procurement and commissioning work.

You will need to find out whether the regulations, policies, and procedures discussed in this Section exist in your country and organization. If they do, it makes sense to follow them. If such regulations do not exist, you will need to highlight these issues at the central level of your organization, and continue to follow the advice provided in this Guide at your level.

Management Authorities Responsible for Procurement and Commissioning

If you work for a health service provider organization, you must conform to:

- ◆ any existing regulations and guidelines concerning equipment procurement and commissioning activities, which are produced by the central management body.

In addition, there may be other higher authorities that provide regulation and guidance on equipment procurement and commissioning. Some examples of these are provided here:

- ◆ The Ministry of Finance usually provides regulations and guidelines for government procurement, stores management, imports, and customs duties.
- ◆ Other health service providers may look for guidance from the Ministry of Health.
- ◆ Any National Regulatory Authority might provide regulation and guidance on product standards, and monitor the imports of equipment and equipment-related supplies.
- ◆ The national Healthcare Technology Management Service, or your own, should provide guidance on equipment installation, commissioning, and acceptance.

- ◆ Other agencies may have been given authority to procure and commission certain types of equipment, and you must either follow their guidelines or not interfere with the equipment outside your responsibility. For example:
 - In the government sector, the Ministry of Works may be responsible for health buildings, plant, and service supply installations; the Ministry of Supplies for furniture and office equipment; and the Ministry of Transport for vehicles.
 - In the non-government or private sectors, there may be a Maintenance Service and/or a Logistics Division with authority over different types of equipment.
 - The national electricity supply, water supply, and telecommunication authorities will have varying responsibilities for different types of equipment.

These management authorities should have paid special attention to policies, procedures and guidelines in their relevant area. These will provide you with a clear sense of direction and enable you to make informed decisions about procurement and commissioning activities. Without the existence of such framework conditions, the task of selecting, procuring, and using suitable health sector goods becomes much more difficult.

One area of particular importance is the policies and procedures to cover unauthorized procurement outside the system (for example, doctors with contacts to donors). Your policies and procedures should make sure any items obtained through unauthorized procurement are supported with maintenance, and that any recurrent costs have been accounted for. Policy can either support unauthorized procurement or discourage it, but either way it should be made plain.

Guide 2 on planning and budgeting provides advice on developing policies for purchasing, donations, replacement, and disposal of equipment. Such policies should include information about when to purchase, what to purchase, when equipment should be replaced, reasons for replacement, and when you should write off equipment (see *Section 3.1* and *Annex 3*).

As procurement is a quasi-legal process and procurement and stock control involve large amounts of money and assets, it is usual for them to be strictly regulated. In the government sector it is often the Ministry of Finance that develops a Purchasing Regulations and Procedures Manual (also known as a Supplies Regulations and Procedures Manual). An outline of the form such a document could take is given in *Box 5* on page 34.



Country Experience

One country's purchasing policy is:

- a) priority is given to replacement of obsolete equipment*
- b) sophisticated and complex equipment for all facilities is procured by the Central Health Ministry*
- c) foreign funded procurement is handled by the Central Health Ministry*
- d) all the purchases are carried out through competitive bidding*
- e) where sophisticated or complex equipment is concerned, the 'turnkey' approach is always adopted (where the supply of equipment includes installation, commissioning, initial training for operators, warranty, building modification, safety, service and maintenance for five years after warranty)*
- f) other equipment is procured by the respective institutions under national procurement guidelines*
- g) an expert committee at national level formulates generic specifications for each item and circulates them among healthcare institutions in the country. These specifications are upgraded annually. The technical committee for drafting specifications consists of two consultant clinicians nominated by the respective academic bodies (such as the College of Paediatricians), one biomedical engineer who acts as secretary to the committee, and one administrator.*

Another country's purchasing policy for the government sector lays down general principles such as:

- i) Purchasers should base all procurement of goods and services on value for money, comparing issues such as quality (or fitness for purpose) and delivery against price. Value for money should be judged on whole life-cycle costs, not simply initial costs.*
- ii) Goods and services should be acquired by competition unless there are good reasons to the contrary.*

BOX 5: Typical Contents of a Purchasing/Supplies Manual

Authority/coverage of the manual	<p>Separate manuals may be required to cover different circumstances, as the source of funding for procurement will influence the way in which you arrange and carry out procurement:</p> <ul style="list-style-type: none"> ◆ If funding for procurement is provided by an external funding agency such as a development bank (for example, the World Bank), it usually has its own procurement procedures and requirements. These procedures may take precedence over national law, in which case you would have to follow them. ◆ Other ministries may have responsibility for purchasing some items of equipment. For example, vehicles may be purchased by the Ministry of Transport, and plant and service supply installations by the Ministry of Works. Procurement using national budgets will be governed by national rules and regulations.
Responsible purchasing bodies	<p>The manual should describe who it applies to:</p> <ul style="list-style-type: none"> ◆ In the government sector, different ministries will be involved in procurement, such as Health, Works and Supplies. The Ministry of Health, Central Medical Stores, or Supplies department may share joint responsibility for medical supplies and equipment. However, some independent programmes (for example, dental and laboratory services) or health facilities may handle their own procurement. ◆ For other health service providers, different divisions may be involved, such as those for purchasing, logistics, supplies, or transport.
Organizational issues	<p>The manual should provide:</p> <ul style="list-style-type: none"> ◆ charts showing the place of purchasing and supplies within the organization ◆ job descriptions including roles and responsibilities for all posts within purchasing and supplies ◆ administrative information for staff – for example, absences, hours of work.
Policy issues	<p>The manual should provide:</p> <ul style="list-style-type: none"> ◆ policy statements setting out objectives, responsibilities and authority for purchasing and supplies ◆ terms and conditions for purchasing ◆ relationship with suppliers, especially regarding gifts, entertainment, etc ◆ supplier and product selection ◆ acceptable freight methods and insurance ◆ customs regulations ◆ reports to management.
Procedures	<p>The manual should contain:</p> <ul style="list-style-type: none"> ◆ descriptions, accompanied by flowcharts, of procedures relating to requisitioning, ordering, transporting, customs clearing, receiving, inspecting, storing, and paying for goods ◆ procedures relating to the rejection and return of goods ◆ procedures in respect of the disposal of scrap and obsolete or surplus items ◆ descriptions of procurement and stores records, and how they should be kept.

Continued opposite

BOX 5: Typical Contents of a Purchasing/Supplies Manual (continued)

Financial resources and funding mechanisms	<p>Funding for procurement may come from a number of sources, including:</p> <ul style="list-style-type: none"> ◆ national funds ◆ central funds ◆ own funds, such as cost recovery schemes ◆ loans ◆ donations. <p>There should be descriptions of any variation in procedures depending on the type of funding source.</p>
Financial limits for procurement	<p>Different people (in different posts) responsible for purchasing are only allowed to purchase up to a particular monetary value. These authority levels and financial limits should be described.</p>
Implementation	<p>The manual should include a statement describing how the policies and procedures should be implemented, and how progress is monitored.</p>
Distribution of the manual	<p>Complete copies of the manual should be given to the following people:</p> <ul style="list-style-type: none"> ◆ Directors at health facility and decentralized health authority levels. ◆ Purchasing and supplies staff, both centrally and locally. ◆ Heads of teams involved in purchasing and supplies (such as finance teams, and HTM Teams).

The Purchasing/Supplies Manual:

- ◆ does not specifically address issues that are crucial to the successful purchase of equipment. So, alongside the Manual, the Procurement Service and HTM Service will also need to consult this Guide for further advice
- ◆ does not normally cover the technical details of the commissioning activities. Thus, you need guidelines from the HTM Service, Ministry of Works, or any other relevant body, on issues such as site preparation, installation, commissioning and acceptance of equipment.

Your health service provider needs to:

- ◆ develop written procedures and guidelines on all the aspects of procurement and commissioning that are covered in this Guide. This should take the form of a simple and easy-to-read guide that staff can refer to, and which can also be used as a training aid.

Central Plans for the Health Service

Equipment Development Plans and Budgets

Before any procurement and commissioning activities can take place, you must properly plan and budget for them.

Such planning is essential to limit wastage. Proper planning ensures that scarce funding is properly allocated, with high priority needs being dealt with first, and avoids unnecessary purchases. Maintaining an accurate inventory record and stock control system is invaluable when planning your purchasing requirements. *Guide 2* describes how to plan and budget for your equipment. (Topics covered in *Guide 2* include: establishing the Equipment Development Plan, purchasing policies, appropriateness criteria, Model Equipment Lists, equipment specifications and equipment inventory.)

Your budgets need to cover all your procurement and commissioning needs. When drawing up the budget, you need to differentiate clearly between different types of expenditure. For example, the capital budget is usually spent on equipment, and the recurrent budget is spent on running costs (such as consumables and spare parts). When procuring any item of equipment, you must commit funds to keep it in running order for a number of years or, if possible, over its lifetime.

The Procurement Process and Plan

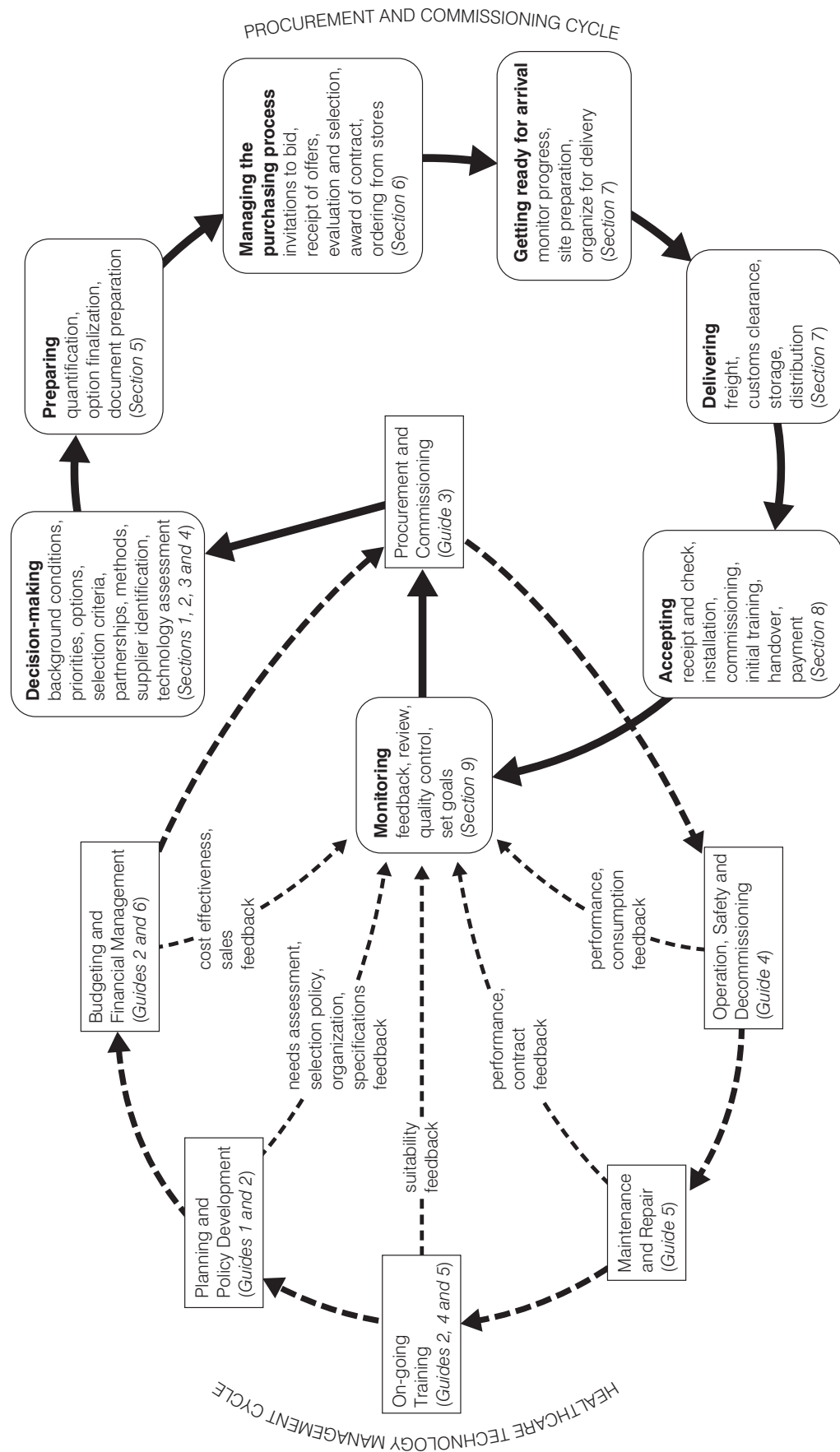
Procurement and commissioning can be thought of as a cycle that includes various steps, as shown in *Figure 6*. This process can be time consuming and expensive, but is necessary if you want to end up with the correct functioning equipment for your situation. *Figure 6* also shows that procurement is just one part of the healthcare technology management cycle. Other areas of healthcare technology management also feed into the process, so that the procurement process can be reviewed and improved. Not all cycles correspond exactly to the procurement cycle in *Figure 6*, but good ones incorporate all the stages.

Product selection is an important stage in the procurement process. Products must be selected based on a thorough needs analysis and adjudication system, taking into account the level of the health facility and the skills available. More sophisticated equipment is generally needed at higher levels, as the range of diagnostic and treatment services offered broadens (*Section 3.2*).

While there are several options for buying equipment, the majority of equipment purchases are carried out as either a tender or quotation process (*Sections 4.2 and 6*). Whatever method you use:

- ◆ you need to prepare a purchasing plan that indicates all the different procurement activities that must be carried out, with details and a timetable of when they should take place (*Section 5.4*)
- ◆ your purchasing method and plan should be designed to avoid the risk of collusion and corruption. It should also ensure transparency, accountability, and value for money, and foster fair competition.

Figure 6: Procurement Cycle Within the HTM Cycle



Availability and Best Use of Skills

This Guide presents a detailed and complete description of the procurement and commissioning process. To carry out the procedures outlined here, you will require a reasonable number of well-trained staff. In government sectors, this level of management and technical skills may be available at national or central level or even in large hospitals, but may be a problem at district level. In many non-government health facilities, purchasing is often the responsibility of individuals or groups who have little or no specialized training in equipment procurement, and who may lack technical expertise.

The current decentralization efforts in the health sector will bring about significant changes in the management and procurement of healthcare technology. District managers may be asked to quantify and specify all future procurement activities. This task is large and complex, and the present skills of district managers in some countries will be inadequate.

For these reasons, it may be necessary to:

- ◆ encourage planning, budgeting, and procurement tasks to be undertaken at central level for those facilities and service levels which cannot undertake the whole management process themselves
- ◆ encourage the planning and implementation of commissioning by a zonal level of the HTM Service that has sufficient skills
- ◆ encourage district managers to understand the process and be aware of what they are able to manage, and where they need help.

Training is therefore essential in order to ensure effective procurement and commissioning. All staff involved, from all agencies, must be properly skilled, managed and coordinated, with clear lines of responsibility and authority being given. This is important, as lack of coordination and decisions made on an ad-hoc basis can be costly. Poor practices not only lead to waste and delays but can also provoke allegations of corruption and inefficiency.



- Tip** • To make the process of coordination easier, you should clearly identify which different departments (in your organization and others) have a role to play in procurement and commissioning, detailing their job titles and responsibilities.

Obtaining equipment is a multi-disciplinary team task and you will need to involve individuals from across the health facility and organization (*Section 1.2*). As a minimum, it is likely that you will require specialized procurement expertise and experience, and will also need to involve personnel from the finance, medical, nursing, maintenance, and support services. In addition:

- ◆ HTM Working Groups should take the coordinating and monitoring role to ensure that procurement takes its rightful place in the healthcare technology management cycle (see *Figure 6*).



Experience in Southern Africa

In one southern African country, poor procurement procedures and lack of consultation between different disciplines led to problems. The Ministry of Works staff were not consulted by the Ministry of Health on the plumbing fittings to be put in a hospital, although they would be expected to maintain them.

The hospital experienced many problems with blockages of the toilets and flushing of the cisterns that were purchased from France. The Ministry of Works maintenance personnel tried to end these problems by replacing the toilet and cistern fittings with ones generally used in Africa. But this could not be done, because the European fittings used non-standard positions for water entry and waste exit, and the pipework installed could not be attached to the products available in Africa.

Complexity of equipment will determine the number of people involved in the process and their expertise. Placing several individuals on a number of different committees will enable better coordination as well as the most informed and best decisions.



- Tip** • Generally speaking, the greater the technical nature and complexity of an item, the greater the involvement should be of technical staff in the buying decision.

Economies of Scale

As your management system improves, decentralization often promotes accurate and timely decision making. However, certain activities may be better carried out at a central level, because it will not be economical to develop such knowledge at district or facility level. These could include defining equipment levels, developing technical specifications, and undertaking installation and commissioning. This is a good example of how the ‘economy of scale’ for technical knowledge will challenge the decentralization process.

Procurement may also be more efficiently carried out at a central level. Procurement of small quantities increases both the initial and the life-cycle costs of equipment (*Section 3.2*), because you cannot benefit from the savings that bulk-buying offers.

When making a needs assessment for one hospital, you are likely to arrive at low quantities of a broad variety of equipment. So undertaking calculations at facility level will not enable you to benefit from economies of scale. Instead, by combining procurement for several facilities at the same time, and gaining the resulting standardization, you can obtain significant advantages. These include better prices for bulk orders of equipment, consumables, and spare parts, shared training costs, and improved aftersales commitment from the supplier.

Thus it is preferable to:

- ◆ undertake equipment management and needs assessment at district or regional level, and merge procurement needs for a number of facilities or districts. This will result in the ideal combination of accurate management and procurement advantages, proportional to the economy of scale.

You may face problems with this rationalization and savings strategy when external support agencies target funds at individual facilities or districts. Thus it is preferable to:

- ◆ ensure external support agencies follow your Model Equipment Lists, Generic Equipment Specifications, and standardization policy (see *Guide 2*), in order to overcome the drawbacks.

The Role of External Support Agencies

The role of external support agencies in procurement is very important. Although their assistance is invaluable to many developing countries, often the recipients do not receive good quality products that are appropriate to their situation. These unfortunate circumstances arise when:

- ◆ there is a lack of knowledge of how to make appropriate choices of complex technologies
- ◆ there are formal procedures and rules (such as the use of open tenders) which do not lend themselves to selection based on the best overall deal for your situation.

Thus, throughout this Guide we highlight the areas where conflict may arise between your wishes and external support agency practices, and try to suggest resolutions.



- Tip** • Ultimately you will have to learn how to identify the right external support agency for different procurement needs.

Another problem is control of externally assisted projects (whether for routine equipment procurement or major development projects). Often external support agencies, hired consultants, or NGOs run such projects, including the healthcare technology procurement component, and take control away from the staff who are normally responsible for planning and procurement. Such situations should be avoided and could be overcome by setting up a formal project committee/organization where key personnel from all contributors and stakeholders are involved. This could be a sub-group of the HTM Working Group (*Section 1.2*).

By setting up a formal project committee, your organization would have access to all the information and a channel to influence the project, without having to bear the full workload of the additional process. Further information on establishing project organizations is not a part of this Guide, but it is recommended that you consider such solutions when similar situations occur.

One useful initiative includes the following strategies:

- ◆ A project committee made up of a range of local managers (such as technical, medical, financial) who have an input and veto into the design, specifications, procurement package, and purchase sources for the project.
- ◆ An implementing/procurement agent, contracted to act only as advisor to the health service provider. The agent would carry out specific actions such as administration or paperwork, on behalf of the health service provider. However, they would not act in the health service provider's place.
- ◆ A tender process that preferably involves selective bidding. This would ensure that an element of standardization can be maintained, and preferred sourcing is adhered to. The tender process can be undertaken by either the agent or the health service provider.
- ◆ The agent should display the bids in comparison tables so that the health service provider can choose the most economically advantageous option (taking into account a full range of issues and not just the cheapest price).

Such strategies are required to enable developing countries to regain some control. Where there is a strong local Procurement Unit it is possible to subject gifts to the same scrutiny as is the purchase of equipment. In some developing countries, for example, the maintenance service is asked to advise on its capacity to guarantee maintenance before a donation is accepted. In other countries, unsuitable shipments of donated equipment are turned away from the port of entry.

The suggestions in this Guide aim to improve the quality of support from external agencies, not to hinder it.



Experience in Sri Lanka

The Ministry of Health plans procurement and identifies funding sources. If the procurement is financed through external support, a steering committee and a technical/finance committee are appointed at central level.

The steering committee is comprised of the Secretary to the Health Ministry, a representative of the Department of External Resources, a representative of the National Planning Department, and the Chairman of the Tender Board. Its responsibility is to set up the time frame for procurement in consultation with the technical/finance committee, to monitor progress every two months, and to liaise with the external support agency.

The technical/finance committee consists of senior consultant clinicians covering the respective clinical disciplines, a biomedical engineer, a finance manager, an administrator, and a member of the Procurement Support Bureau. (The Procurement Support Bureau in the Treasury Department has a pool of experts on procurement issues, whose expertise on topics such as contract negotiations and legal matters is valuable.) The technical/finance committee is responsible for writing specifications, drafting tender documents, evaluating bids, and making recommendations to the tender board.

The tender process is administered by the Biomedical Engineering Division of the Health Ministry. Its responsibilities are invitations for bids, coordinating with the committees, issuing awards, signing and managing the contracts, and acceptance and handover of the equipment.

Box 6 contains a summary of the issues covered in this Section.

BOX 6: Summary of Issues in Section 2 on Framework Requirements

Quality Health Services	Government	<ul style="list-style-type: none"> ◆ actively regulates health services whether they are provided by public providers, private providers, or a mixture of the two ◆ develops checking systems and legal sanctions for infringement of health regulations ◆ adopts suitable standards for quality health services, in general ◆ specifically for healthcare technology, adopts standards for: <ul style="list-style-type: none"> - design, development, and manufacturing - performance and safety - use and training - waste disposal ◆ develops donor regulations to ensure all equipment received through foreign aid and donations also complies with the standards ◆ establishes public or quasi-public supervisory bodies to enforce regulations and standards
	Ministry of Health	<ul style="list-style-type: none"> ◆ develops national policies for health services ◆ specifically develops a Healthcare Technology Policy to cover all healthcare technology management activities including: <ul style="list-style-type: none"> - a vision - an element of standardization - the provision of maintenance - provision of finances for all HTM activities - the organizational structure for an HTM Service ◆ regulates on these issues (if required) ◆ develops an HTM Service made up of a network of teams and working groups ◆ uses the central level of the HTMS as the national regulatory body, if necessary, and to ensure that HTM policies are implemented ◆ provides sufficient inputs to ensure the HTMS is effective ◆ uses strategies to manage the changes involved carefully, so that they can be successful
	All Health Service Providers in general	<ul style="list-style-type: none"> ◆ conform to regulations and guidelines provided by government ◆ conform to the standards set by government ◆ follow the policies of the Ministry of Health if regulated to do so ◆ develop their own internal Healthcare Technology Policy and expand strategies ◆ develop their own HTM Service made up of a network of teams and working groups, with sufficient inputs to ensure it is effective, in order to ensure that HTM policies are implemented ◆ follow MOH regulations on the HTMS if regulated to do so ◆ implement strategies to develop skills in managing change, staff motivation, effective communication, encouragement, and supportive training with demonstrations ◆ introduce rules and procedures using discussion, working groups, training workshops, etc with the staff that will implement them ◆ include all parties involved in the network of HTM Teams and Working Groups in the development of the HTMS ◆ introduce changes to HTM step-by-step, with a careful review process

Continued overleaf

BOX 6: Summary of Issues in Section 2 on Framework Requirements (continued)

Procurement and Commissioning	High-level Regulatory Bodies	<ul style="list-style-type: none"> ◆ ensure that regulations, policies, guidelines and Procedure Manuals exist for procurement, standards, logistics, customs, stores management, installation and commissioning ◆ ensure it is understood which agencies are responsible for procuring and commissioning which equipment ◆ ensure the regulations, policies, guidelines, and procedures are updated regularly
	Health Service Providers	<ul style="list-style-type: none"> ◆ ensure additional policies and guidelines are developed for their organization on replacement strategies, appropriate selection criteria, standardization, recurrent cost provision, and initial training for equipment ◆ ensure adequate planning and budgeting takes place (see <i>Guide 2</i>), and procurement of equipment occurs according to those plans and budgets ◆ ensure a procurement cycle and plan are developed and understood by staff ◆ develop written procedures for all aspects of procurement and commissioning ◆ ensure that multi-disciplinary teams are established to manage the procurement and commissioning process for healthcare technology, with sufficient technical input from the HTM Service ◆ negotiate with external support agencies to ensure that the right procedures are used that will enable equipment appropriate to your needs to be procured ◆ establish a project sub-group that works jointly with external support agencies for routine equipment procurement or major development projects, in order to retain control within the health service ◆ only decentralize procurement and commissioning activities to levels where skills exist ◆ use economies of scale to your advantage by: <ul style="list-style-type: none"> - making use of technical skills and guidance from levels where the knowledge exists - combining forces with other levels to undertake needs assessment and bulk-buy equipment and supplies to gain procurement savings and standardization
	All groups involved in procurement and commissioning (at each level of your organization)	<ul style="list-style-type: none"> ◆ conform to regulations, policies, guidelines and Procedure Manuals provided by relevant bodies for procurement and commissioning activities, which dictate who can procure and commission what, when, and how ◆ only undertake procurement and commissioning activities at suitable decentralized levels in your organization where sufficient skills are present ◆ carry out their duties as team members according to their role and responsibility within the procurement and commissioning process

3. HOW TO DECIDE WHEN AND WHAT TO PROCURE

Why is This Important?

Your aim is to obtain equipment in the right quantities that is both suitable and appropriate for your needs, and fits your budget.

Obtaining equipment is intensive work, both in terms of time and resources. You therefore need to consider a number of factors before committing to buying, accepting donations, or hiring equipment.

You should consider whether acquiring the equipment represents rational and good practice. Any decision should take account of which supply sources are available, and also consider whether the funding organization has particular requirements that could influence your options.

You need to make some important decisions when considering the procurement of equipment. In this Section, we consider the following:

- ◆ Why you need to procure (*Section 3.1*).
- ◆ Issues to consider when choosing equipment (*Section 3.2*).
- ◆ A review of the different ways to get equipment (*Section 3.3*).
- ◆ Whether to obtain new or second-hand items (*Section 3.4*).

3.1 WHY YOU NEED TO PROCURE

Procurement Policies

Before carrying out any equipment procurement (through purchases, donations or rentals), you should already have carried out all the planning and budgeting activities which are described in *Guide 2*.

In other words, you should already have drawn up:

- ◆ an up-to-date Equipment Inventory
- ◆ a vision for health service delivery
- ◆ purchasing, donations, replacement, and disposal policies
- ◆ Model Equipment Lists.

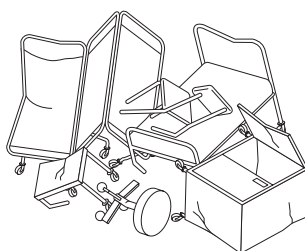
Planning and budgeting activities should result in an Equipment Development Plan, covering short- and long-term needs. Thus, ideally, all procurement should be for those items laid out in the Equipment Development Plan for the current year, plus occasional additional items required to cover contingencies (emergencies and unplanned-for events).

In line with the suggested Purchasing and Donations Policy in *Guide 2*, the five main reasons for procuring equipment (listed in order of priority), are normally:

1. Equipment requires replacement

Equipment should be replaced when:

- ◆ it has reached the end of its life
- ◆ it is no longer economical to repair
- ◆ it has become technically obsolete. (For example, the manufacturer no longer produces spare parts or accessories, the technology or technique is no longer considered appropriate, or a more cost-effective or more clinically effective model becomes available.)



In order to merit replacement, the equipment should be providing an existing service (such as a dental chair for a dental clinic). For valid reasons why equipment requires replacement, see the typical contents of a Replacement Policy in *Annex 3*.



Tip • Replacement is not an expansion of services, but merely a way of continuing to offer existing services.

This may be a good time to review your existing services and consider whether there is a continued need for the equipment concerned. It is also an opportunity to consider improving the service.

2. Regular supplies of equipment-related items are required

Examples of equipment-related items which are required on a regular basis include any of the following:

- ◆ Consumable items (such as X-ray film, ECG recorder paper).
- ◆ Replacement accessories (shelves, patient probes).
- ◆ Spare parts (light bulbs, bearings).
- ◆ Materials for their maintenance (oil, tubing).

It is quite common for health facilities to be unable to function effectively during much of the year if these items are not planned for and purchased. Many may need to be imported from abroad.

3. Additional equipment is necessary for providing a basic standard level of care

The basic standard level of care, in equipment terms, is provided by your Model Equipment List. The items that are currently missing from your stock are determined by comparing your up-to-date Equipment Inventory with the standard set in the Model Equipment List (see *Guide 2*).

You should consider more sophisticated technologies only when these core equipment needs have been fully met.

4. Additional equipment is required to improve services and go beyond a basic level of care

Improvements to health services may be brought about by rehabilitating existing health facilities, upgrading facilities, or building new ones. Any such improvements and expansion should be carried out in accordance with the strategic plans for the health facility, such as those laid out in your long-term Strategic Business Plan (see *Guide 2*).

5. Additional equipment is required that is outside the health facility's own plans

Procuring equipment outside your plans should only occur if the extra items:

- ◆ have been called for by directives from the central health service provider organization or a national body
- ◆ have been identified as a new need, or
- ◆ cannot be stopped/refused for political reasons, such as out of the ordinary, high profile, or political projects.

These five reasons for procuring equipment can only be acted upon if the following key factor is in place:

◆ **Funding becomes available.**

Once you know your needs and have made plans for equipment procurement (points 1 to 5 above), you can only ever procure if you have the budget to cover your plans. When funding does become available, it enables you to pursue the objectives set out above. Any such allocation of funds should be according to your Core Equipment Expenditure Plan (see *Guide 2*), to ensure that the money goes to the highest priority activity. Thus procurement will be planned and not random.

Procurement Planning Tools

Box 7 outlines a number of ‘planning tools’ you can use to help you to decide why you need to procure. Your Procurement Unit will need to work with many different types of health staff, in order to identify relevant information on procurement needs (*Section 5.1*). Further details on how to develop these tools, and how different health service staff can use them, are provided in other Guides in this Series.

BOX 7: Planning Tools Which Help You Decide to Procure

Planning Tools	How They Help
When replacing items:	
Replacement Policy (see <i>Annex 3</i> and <i>Guide 2</i>)	Establishing and implementing this tool is much more likely to ensure that the necessary regular planned replacement of equipment takes place.
Equipment Inventory (see <i>Guide 2</i>), and maintenance record system (see <i>Guide 5</i>)	These tools enable you to identify the need for replacement equipment at any time. For easy reference, estimated lifetimes for equipment could be entered into the inventory and could then prompt you when to purchase. Remember that the natural life of equipment is shortened by harsh environment, over-use, unskilled handling, neglect of maintenance and damage. Equipment malfunction and down-time also increase with the age of the equipment. Accordingly, cost-effectiveness decreases with age.
Replacement and condemnation criteria (see <i>Annex 3</i> and <i>Guide 4</i>).	These help you to judge when equipment has reached the end of its life, and therefore help you identify when equipment needs replacing.
Core Equipment Expenditure Plan (see <i>Guide 2</i>).	Some equipment will have to be replaced every year, so it makes sense to spread your budgeting for replacement over time. By allocating some money each year, you can avoid facing a large replacement bill later on. This tool should spread these costs over the long term. You can estimate your equipment replacement needs each year by reckoning that each piece of equipment has an average lifetime of 10 years. This means that roughly 10 per cent of your equipment stock needs to be replaced each year.
Disposal Policy (see <i>Annex 3</i> and <i>Guide 2</i>) and disposal procedures (see <i>Guide 4</i>).	When you replace equipment, these tools will help you dispose of the old machine. There may be government regulations regarding disposal that will help you develop these tools.
Stock control system (see <i>Section 7.2</i> and <i>Guides 4 and 5</i>).	Replacement equipment-related supplies should be purchased after an up-to-date stock take. Accurate stock control systems help with planning and ordering.

Continued opposite

BOX 7: Planning Tools Which Help You Decide to Procure (continued)

Planning Tools	How They Help
When buying additional new items:	
Equipment Development Plan, and Annual Purchase Plan (see <i>Guide 2</i>)	New equipment should be purchased according to your Annual Purchase Plan (drawn each year from your long-term Equipment Development Plan). This is based on an up-to-date inventory and Model Equipment List. Accurate inventory record-keeping helps with planning and ordering.
Package of inputs (see <i>Sections 5.1 and 5.5.2</i> and <i>Guide 2</i>)	Planning in advance for what will be needed after the purchase is every bit as important as the purchase itself. Thus, you must ensure that you procure the package of inputs required to keep equipment functioning through its life.
Core Equipment Financing Plan, and Annual Budget (see <i>Guide 2</i>)	Capital expenditure can only take place once you have identified sufficient funding sources. Your long-term Core Equipment Financing Plan and your Annual Budget should allocate known and possible sources of funds against elements of your planned expenditure.

3.2 ISSUES TO CONSIDER WHEN CHOOSING EQUIPMENT

Once you know why you are procuring equipment, you need to know what types of goods are suitable. In order to make the best use of scarce finances, you must try to obtain only the equipment that is most appropriate for your needs.

Choosing equipment is not easy, due to the wide range of products available. External influences also play a part. For instance, external support agencies may impose their own conditions regarding suppliers, which may result in inappropriate equipment being supplied or procured (*Section 3.3.2*). In such cases, it is wise to renegotiate or, if that fails, consider declining the funds or gifts and trying elsewhere.

It is the responsibility of the Procurement Unit, the HTM Working Group, and the Procurement/Tender Committee to choose equipment. To help them to obtain only equipment which is appropriate to your needs, your purchasing and donations policy (*Section 2.2*) should clearly specify the ‘good selection criteria’ to employ. All equipment should:

- ◆ be appropriate to your setting
- ◆ be of assured quality and safety
- ◆ be affordable and cost-effective
- ◆ be easily used and maintained
- ◆ conform to your existing policies, plans and guidelines.

Such selection criteria should then be used during the procurement process, when you evaluate and adjudicate between different offers from suppliers (*Section 6.3*).



- Tip** • You must ensure that product selection (screening) criteria are specified in your purchase documents (*Section 5.5.2*), so that suppliers are aware of how their products will be judged.



Country Experience

Often developing countries have been tempted to over-specify their requirements for sophisticated or complex equipment because funds for the procurement are part of a foreign aid package and have to be utilized for a specific purpose. Even if they need a basic technical platform, a sophisticated version and accessories are ordered at once because the funds will not be available after the budget line is over. Since only the basic functions of the equipment are commonly used, the funds utilized for advanced features are wasted.

For example, one country in 2001 purchased a Multi Slice CT scanner with 3-D reconstruction, virtual endoscopy and CT fluoroscopy facilities. However, it is used only for conventional CT scans. The funds used to procure the additional features were approximately 40 per cent of the procurement budget. The operators responsible for the machine were not computer literate, so had to undergo basic computer training before they could be trained how to use the scanner. The scanner was put into operation almost three months after installation and it took about eight months to get it going smoothly. Thus eight months of warranty were wasted.

When you are preparing your purchase documents (*Section 5.5.2*) it is important that you state clearly what you want, in order to avoid unsuitable equipment being procured. The main issues are presented here, and summarized in *Annex 3* (see *Box 53*).

3.2.1 Appropriateness to Setting

Be sure that you select equipment that conforms to the ideals shown in *Box 8*.

If you are considering procuring a particular item, it can be useful to talk to someone in a facility that has experience of using that model. Do not be afraid to ask the seller about the performance of the equipment in local conditions and ask if they (or a nominated agent) could provide staff training and maintenance, if required.

BOX 8: Key Factors Determining the Appropriateness of Equipment and Supplies

Factors	Issues
You have the skills	Equipment can be operated and (preferably) maintained by your staff, with or without additional training.
It suits your climate and conditions	<p>It has been designed or adapted to cope with the location where it will be used. For example:</p> <ul style="list-style-type: none"> ◆ In humid climates: <ul style="list-style-type: none"> - mould grows on microscope lenses, unless supplied with a drying agent (such as silica gel) to store with them. - if air-conditioning is switched off at night, water condensation builds up on printed circuit boards causing short-circuits, unless they are covered in a polymerized film. ◆ In high ambient temperatures: <ul style="list-style-type: none"> - condensers and heat exchangers of sterilizers, designed to suit European water temperatures, do not condense effectively leaving linen wet, unless a long drying cycle is provided. ◆ With unreliable power supplies: <ul style="list-style-type: none"> - some equipment is highly sensitive to power surges and requires suitable electronic suppressors and filters. ◆ With unreliable water supplies: <ul style="list-style-type: none"> - some equipment is sensitive to poor quality or hard water and requires suitable filters or treatment plant. ◆ In dusty environments: <ul style="list-style-type: none"> - some equipment is sensitive to dust levels and requires manual filters.
It is simple to use	The equipment should have a limited number of settings and modes of operation (unless you are buying extremely specialized equipment to suit extremely specialized personnel). Experience shows that equipment with more than three settings requires a specialist.
It fits into your health facility	<p>The equipment:</p> <ul style="list-style-type: none"> ◆ is compatible with existing equipment and knowledge in the organization (if possible) ◆ is suited to the power source and power quality available ◆ does not require unavailable or unreliable service supply installations (utilities) ◆ does not require more space than you have.

You may find that you have to procure additional pieces of equipment to go with your original item, if it is to work in your environment. For example:

- ◆ A voltage stabilizer (surge suppressor plus filter). This offers protection against power supply fluctuations, but does not protect against power cuts. It monitors the power supply, removes surges and spikes, and maintains a continuously regulated alternating current output to the item.
- ◆ An uninterruptible power supply. This offers protection against blackouts and power cuts of limited duration.
- ◆ An air-conditioning unit.
- ◆ A water filter or treatment plant.

3.2.2 Assured Quality and Safety

All equipment and supplies must be of sufficiently high quality. Some key areas that determine quality are shown in *Box 9*.

BOX 9: Key Factors Determining the Quality of Equipment and Supplies

Factors	Issues
Performance	Remember, a highly sophisticated piece of equipment will not necessarily perform better than a piece of equipment which is more basic, but easier to use. (See discussion above on 'appropriateness to setting'.)
Sources	Try to always buy from reputable companies, if possible. Unfortunately there are still many companies that supply poor quality and unsafe products (for example, infant incubators containing asbestos insulation, hydraulic operating tables that leak and will not rise, suction pumps that spark, operating theatre lights incorrectly wired thus producing shadows).
Materials and design	Check the durability and quality of the materials used. Remember, thin metal bends, cheap material tears, and small castors make it difficult to move items. Also check whether the equipment design is robust, and whether the equipment is easy to clean, operate, and maintain.
Safety	User and patient care and safety should never be compromised by poor quality items. Poor quality equipment (as well as bad installation, lack of maintenance, and improper use) can all lead to potentially dangerous situations, such as exposing patients and staff to radiation, electric shock and infection. Refer to <i>Guide 4</i> for detailed guidance on operation and safety issues.
Standards	Equipment should always meet recognized standards. There are a variety of formal safety standards and guidelines relating to equipment. These include standards covering: <ul style="list-style-type: none"> ◆ design, development, construction, and manufacturing practices ◆ performance and safety requirements ◆ operation and maintenance procedures ◆ environmental issues (such as disposal) For examples of different international and national standards relating to equipment, see <i>Annex 4</i> .
Labelling and packaging	Packaging should protect equipment and supplies from damage or deterioration during transit and storage. Goods should be specially packed and crated for shipment to avoid damage. Although most supplies are quite durable, some (such as rubber tubing and latex items) will spoil if left unused for too long. Plastic wrapping helps to protect such items against high humidity, and is more robust than paper wrapping. Labelling should include information about country of origin, date of manufacture and, if appropriate, expiry date and storage instructions. Labels and packaging should avoid long and unusual symbols. <p>Before purchasing specify the shipment packing requirements (<i>Section 5.5.2</i>) and, if possible, check the quality of the labelling and the packaging.</p>

People involved in choosing equipment should at least be aware of the major national and international standards and quality certificates that apply to equipment. Be aware that:

- ◆ apparently standard quality certificates may be based on varying factors
- ◆ export certificates and 'good manufacturing practice' certificates are both issued by authorities in the country of origin – thus their value depends on the capacity and diligence of the issuing regulatory authorities.

Not all countries have the necessary facilities and technical personnel to conduct complex quality and safety testing of goods. In these circumstances, there may be facilities that could be used in neighbouring countries, or the wider region.

Another way of ensuring quality and safety is by procuring from reputable and certified manufacturers and suppliers. The quality of manufacturing standards differs from country to country. Useful tips include:

- ◆ Only procure equipment and supplies from licensed, reputable and reliable sources.
- ◆ Before buying, ask the supplier which safety and performance standards an item complies with.
- ◆ Be wary of copies (items made to look like a well-known brand) as these are often of poor quality and do not conform to international standards.

3.2.3 Affordability and Cost-Effectiveness

There are a number of aspects to affordability and cost-effectiveness:

i. Cost and Quality

Cost and quality often go together. Better quality equipment is more expensive, but cheaper equipment is often of poor quality. Buying the cheapest item can be a false economy, because it may need repairing or replacing more frequently. It may be more cost-effective to spend more on a higher quality item that is more reliable and lasts longer.

Life-cycle costs

are those costs associated with obtaining, using, caring for and disposing of equipment, as well as the support, training and operating costs incurred over the period in which the item is used.

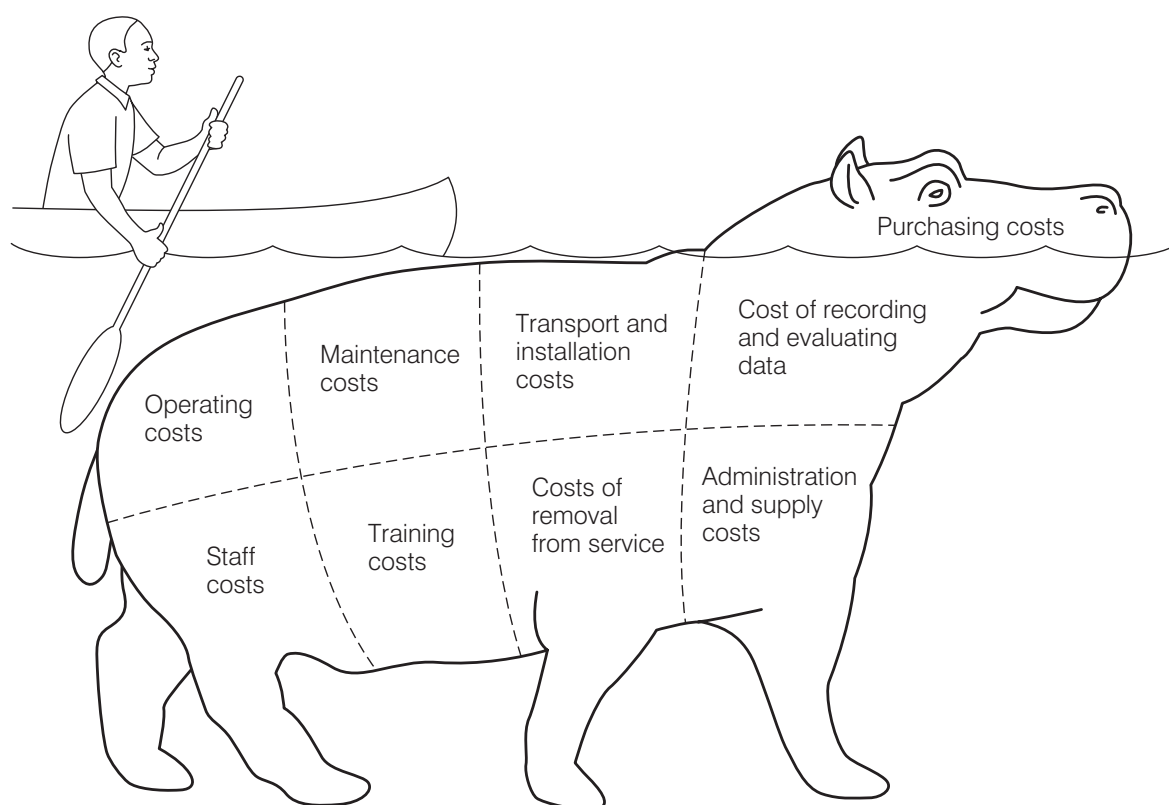
When procuring, you should consider not just the initial cost of purchasing, but also the life-cycle costs of the equipment. These are the costs covering the entire lifetime of the equipment, such as for use and maintenance. They can often amount to more than the initial purchase price. You may find that an item with a higher initial price has lower running costs over the long-term than a cheaper alternative.

Remember also that the cost of transportation and installation of poor quality equipment is at least as high as for more expensive equipment of possibly better quality. For most developing countries, with their long delivery routes, limited finances, and difficult operating conditions, equipment of good quality will in the end prove the better and more economical choice.

ii. Cost-effectiveness

In order for an item to be considered cost-effective, all the life-cycle costs have to be planned for and should be balanced against the benefits gained from the equipment. There are a variety of life-cycle costs related to healthcare technology, and most of these are hidden. This can be illustrated by using the image of a hippopotamus as shown in *Figure 7*. Hippos are known for only having a small proportion of their bulk showing above the water, while the vast majority is hidden dangerously below the surface.

Figure 7: The Hippopotamus Syndrome of Life-cycle Costs for Healthcare Technology



For accurate cost estimates you need to categorize your equipment, ranging from simple health facility furniture to highly sophisticated medical equipment. The cost of installation, training, maintenance, and spare parts normally increases as the level of sophistication of the equipment increases (see *Guide 2* on planning and budgeting).

Consider these costs carefully. Choices can then be made in an informed way. For example, a basic autoclave can sterilize up to the same standard as a sophisticated electronically controlled autoclave. However, both purchase and maintenance costs would be significantly lower for the basic unit.

Did you know?

The purchase price of a piece of equipment represents only a small part of the total lifetime costs of owning that item.

The average estimate is that the purchase price is only 20 per cent of the overall cost of ownership. Therefore, the cost of operation, maintenance and training through the life of the equipment may be as much as four times the purchase price.

To limit your costs, you should consider an element of standardization (*Section 2.1*). For example, obtaining equipment from a limited range of trusted suppliers is more economical in terms of service visits, spare parts, consumables, and training.

If you cannot meet these costs, you should reconsider whether it is worth getting the equipment, and the benefits of doing so. Some criteria for judging cost-effectiveness are:

- ◆ If the equipment is not available, will the management/treatment of a significant number of patients be impossible or unsatisfactory?
- ◆ Can the equipment significantly reduce other expenses (such as length of hospital stay, need for referrals to a more expensive higher-level facility, the need for expensive personnel or drugs)?
- ◆ Is the equipment too dependent on foreign sources and skills for spare parts and maintenance?

iii. Cost to Get Equipment Functioning

There are various costs involved with getting equipment onto site and functioning effectively when it first arrives. Further details on how to estimate such costs are given in *Guide 2* on planning and budgeting.

Before you procure any item of equipment, you need to make a careful comparison of the local and overseas costs for factors such as import duties, customs tax, freight, handling and insurance. *Box 10* itemizes the factors which influence the cost of procuring equipment.

BOX 10: Components of the Overall Cost to Purchase Equipment

If you know the net purchase price of a piece of equipment, then the following additional components are required, **depending on the equipment type**, to provide the overall cost of the equipment:

Cost components	Percentage of purchase price
Package of inputs (accessories, consumables etc) for one year	2–7%
Installation, commissioning, and initial training	0–15%
Spare parts for two years' operation	0.5–20%
Freight charges	8–15%
Insurance	1.5%
Contingency	3%
Further additional components may be required, such as:	
Charges of a procurement agent	5–10%
Site preparation work	0–10%
Warehousing, unloading/lifting equipment	0–1%
Service support for one year	0.5–7%

Refer to *Guide 2* to see how these figures relate to different equipment types.

The cost of the planning, delivery, installation, and training for equipment often exceeds the cost of the equipment itself.

iv. Cost to Keep Equipment Functioning

There are several costs required to keep equipment functioning throughout its life. Further details of how to estimate such costs are given in *Guide 2* on planning and budgeting. Cost components could include:

Consumable material costs. For some equipment, the cost of consumables, replacement accessories, and spare parts represents the main bulk of life-cycle costs. Ask yourself the following:

- ◆ What consumables, accessories, and spare parts do you need to operate and maintain the equipment? Does the equipment use its own specialized consumables?
- ◆ How much will these items cost?
- ◆ Are consumables and accessories available as disposable or reusable products?
- ◆ How many of these items have a short life (for example, those which are fragile and vulnerable to mechanical damage or repeated sterilization, those with fixed lifespans, those with shelf lives)?
- ◆ Can you obtain regular and reliable supplies of consumables, accessories, and spare parts?
- ◆ Where will the items come from and how easy is it to get hold of them, in particular those with a short shelf life?

- ◆ Are the items part of an ‘open’ procurement system, in other words anyone can supply them for your equipment, different manufacturers’ products can fit your machine, and this competition leads to lower-cost items? Or are the items part of a ‘closed’ procurement system, in other words they are only made by the equipment manufacturer, you are limited to one supplier only, and this monopoly leads to more expensive items?
- ◆ How long will they continue to be available? (Up to 10 years is a reasonable period for most equipment, and most manufacturers will agree with this.)
- ◆ Is the equipment likely to become obsolete due to technical and general advances in the sector? (Equipment manufacturers normally supply spare parts and consumables for out-dated equipment for up to only five years after a particular model has been taken out of production.)

Most suppliers know and can offer advice on which high-usage consumables, accessories and spare parts should be kept on hand.

Operational costs. To ensure the equipment can be used to provide the service required, further operational questions should be considered:

- ◆ What staff are required to manage, maintain, and use the equipment?
- ◆ Are staff available with the necessary skills and qualifications? What is their current workload?
- ◆ Do you need to train your staff? Do you need to hire additional/specialist staff?
- ◆ What service supply installations does the equipment require (such as electricity, water, gas, fuel)?
- ◆ How much will these items cost?
- ◆ Will you be able to afford any future upgrades and replacements for the equipment?

Maintenance costs. To ensure that equipment is continuously available for use, further questions must be answered:

- ◆ Is service support available locally, in the region, or from overseas?
- ◆ Will you be charged for service visits under warranty terms?
- ◆ Do you need a maintenance contract?
- ◆ What will a maintenance contract cover, and how much will it cost?

An easy way of estimating maintenance costs would be to ask suppliers to include and specify maintenance costs in their bid/quote. However, there is internationally recognized advice on typical maintenance costs. As shown in *Box 10*, the annual cost can range from 0.5 to 7 per cent of the equipment purchase price, depending on the type of equipment.



Experience in Sri Lanka

It can be difficult to attain maintenance skills in-house for sophisticated equipment, since manufacturers often will not provide advanced in-depth maintenance training for third parties (in other words, the client) preferring to provide it to their own staff or those of their representatives. Thus, the Ministry of Health in Sri Lanka has adopted the following policy when purchasing sophisticated equipment:

- ◆ *Require the manufacturer to have a local agent that can undertake the maintenance needed.*
- ◆ *Negotiate a five-year post-warranty service contract (including parts and labour) with the local agent at the time of purchase.*

In this way:

- ◆ *the local agent earns a respectable profit to run their business*
- ◆ *the Ministry of Health obtains a working machine, while keeping the service costs in the range of four to five per cent of the equipment value.*

All sophisticated equipment on the Ministry of Health's inventory is on a service contract, and they know the exact costs involved for maintaining such machines. Once the service contract prices are known, they find that the budget estimates for the balance of the equipment can be easily calculated.

Training costs. Training is essential if you want to make effective use of equipment. Do not compromise on training, but include actual needs in your calculations. Consider the following for each type of new equipment:

- ◆ How many equipment operators and maintainers need to be trained? How many training sessions will you have to run?
- ◆ How much will the instructor, the facilities, and any equipment-related materials cost for the training sessions?
- ◆ How much will it cost to develop training materials, buy manuals, and obtain training equipment?
- ◆ How often will you have to repeat these training sessions to allow for staff turnover, and gradual loss of skills?

Such training requirements are necessary initially, at the commissioning phase (when equipment first arrives). Training is also required on a regular basis, throughout the life of the equipment and the careers of your staff. For more details on analysing training requirements, drawing up an Equipment Training Plan, and estimating training costs, see *Guide 2* and *Section 5.1*.

3.2.4 Ease of Use and Maintenance

There is no point in procuring new equipment if your staff do not have the expertise or information to use and care for it effectively. The following four issues should be considered:

Skills and Training

Before procuring equipment, consider the following issues:

- ◆ How easy will it be for your staff to use, clean, and maintain the equipment?
- ◆ Are additional staff training or support services required? If so, can the supplier provide these or recommend someone who can? This is particularly important for complex vital equipment, such as critical care equipment (for life support, anaesthetics, ventilation, infusion, etc) as well as diagnostic imaging, radiotherapy, etc.
- ◆ Is the equipment supplied with detailed, easy to use instructions, together with operator and service manuals?

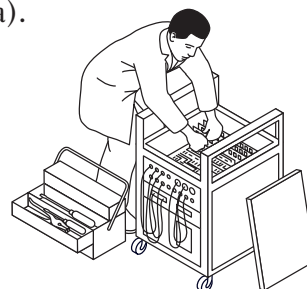


- Tip** • User and service manuals must contain detailed information on the technical characteristics and specifications of the equipment. They should include circuit (wiring) diagrams; planned preventive maintenance schedules; application, trouble-shooting and technical fault-finding routines; spare parts lists; safety procedures; adjustment procedures and calibration tests.

Maintenance and Support Services

It is important to specify requirements for maintenance and support very clearly in the purchase document (*Section 5.5.2*). Before procuring equipment, consider the following:

- ◆ If maintenance requires the services of a skilled engineer, is there a local supplier or agent available to help you in the event of a breakdown?
- ◆ If not, are maintainers available locally or nationally who can service, maintain and repair the equipment?
- ◆ If there is no authorized agent in your country, are there other organizations that offer this service? For example, the Ministry of Health's HTM Service or mission maintenance services (such as the Joint Medical Stores in Uganda, and the Christian Social Services Commission in Tanzania).
- ◆ How long is the maintenance contract for? Typically maintenance contracts are taken out or renewed every 12 months, but many other options are possible – negotiate the contract that best meets your needs.



Guarantees and Warranties

Before procuring equipment, consider the following:

- ◆ Does the supplier provide a guarantee or warranty for the equipment and for the parts? Think of every detail. For instance, in the case of imaging equipment, does the warranty cover glassware such as X-ray tubes? If so, is it covered on a full replacement basis or a pro rata basis? (If it is pro rata, you may only receive the full cost to replace an X-ray tube up to, for example, 30,000 exposures, after which the amount you receive will depend on how many exposures have been taken.)
- ◆ If a guarantee or warranty is provided, when does it begin and how long does it last? Guarantees can last for a year or more. Extended periods – such as three to five years – are possible, depending on the type of equipment or product.
- ◆ What conditions does the guarantee or warranty cover? In the case of equipment breakdown, will the manufacturer replace it, repair it, or provide a refund if the equipment is found to be defective due to faulty materials or workmanship? Does it cover both parts and labour costs? Are travel expenses covered, or will the user be responsible for sending the item back to the manufacturer?
- ◆ What consumer guarantees exist in your country? What are you covered for (refund, replacement, repair, compensation, or compensation for consequential loss)?



Tip • Guarantees will not cover defects arising from misuse, neglect, accidents or repairs carried out by service personnel and agencies not authorized by the manufacturer.

Consumables, Accessories and Spare Parts

Finally, consider the availability of consumables, accessories, spare parts and maintenance materials (refer to *point iv in Section 3.2.3* on the cost to keep equipment functioning).

Equipment that does not have adequate service support, or for which consumables and spares are not always readily available, is likely to be out of action for long periods and may have to be replaced prematurely.

3.2.5 Conformity to Existing Policies, Plans and Guidelines

Compliance With Your Purchasing and Donations Policy

As stated in *Section 3.1*, all procurement should be carried out in line with the Equipment Development Plan for your facility, should follow your procurement priorities, and should not introduce items that you cannot afford to sustain.

Equipment purchases and donations by external support agencies should not divert you from your plans, or be too complex, and should promote your basic standard of healthcare delivery before introducing more sophisticated services.

Compliance With Your Standardization Policy

Using a standardization policy can help you to limit the variety of equipment you buy, and help limit your purchases to a few trusted suppliers (*Section 2.1*). This is helpful, as it:

- ◆ enables you to make more economical use of consumables and spare parts
- ◆ simplifies inventory and stock control considerably
- ◆ enables operators and maintainers to more easily gain and retain knowledge concerning the equipment they deal with
- ◆ is better in terms of supplier relationships and services – suppliers will have greater incentive to provide aftersales support at reasonable cost if they believe you represent a larger market and there is potential for establishing a long-term relationship with you.



Experiences in Africa

The problem of not standardizing equipment was evident in one country where eight different types of obstetric equipment were found in a single hospital.

A good example of standardization occurred in Botswana where the same type of X-ray machine from a single company is used in all primary hospitals. Surgical instruments are also standardized so that all surgeons are familiar with the equipment wherever they go in the country.

In several places the highest benefits in standardization have arisen with laboratory equipment, because it is so heavily dependent on the use of reagents and other supplies.

Compliance With Model Equipment Lists and Generic Specifications

The equipment planning and procurement process should be based on national equipment lists. In many countries, the Ministry of Health has developed guidelines or standard lists of equipment for all levels of the health system. If there are no standard lists available, HTM Working Groups can work together to develop them based on a consultation process or adaptation of existing lists (from neighbouring countries, for example). *Guide 2* describes how this can be done, and *Annex 2* provides some examples.

A standard list is essentially a model list of equipment, based on the type of health interventions (diagnosis, treatment, and care) a facility is expected to carry out. It should reflect a suitable level of technology for those interventions, which can be supported at that level of facility. Referring to such a list can be particularly useful if, for example, you are faced with a wide variety of makes and models of the same type of equipment and do not know which to choose, such as choosing between an electric or foot-operated suction pump.



Experience in Uganda

In Uganda, a 'minimum healthcare package' has been developed for each healthcare level, which describes all the interventions required. From this, the National Advisory Committee on Medical Equipment has drawn up five model lists of medical equipment. The model lists provide a comprehensive overview of all the equipment and furniture required in a particular level of health facility.

The lists serve as a model for (re-)equipping all existing and new health facilities. They can be adjusted according to workloads, and size of the catchment population.

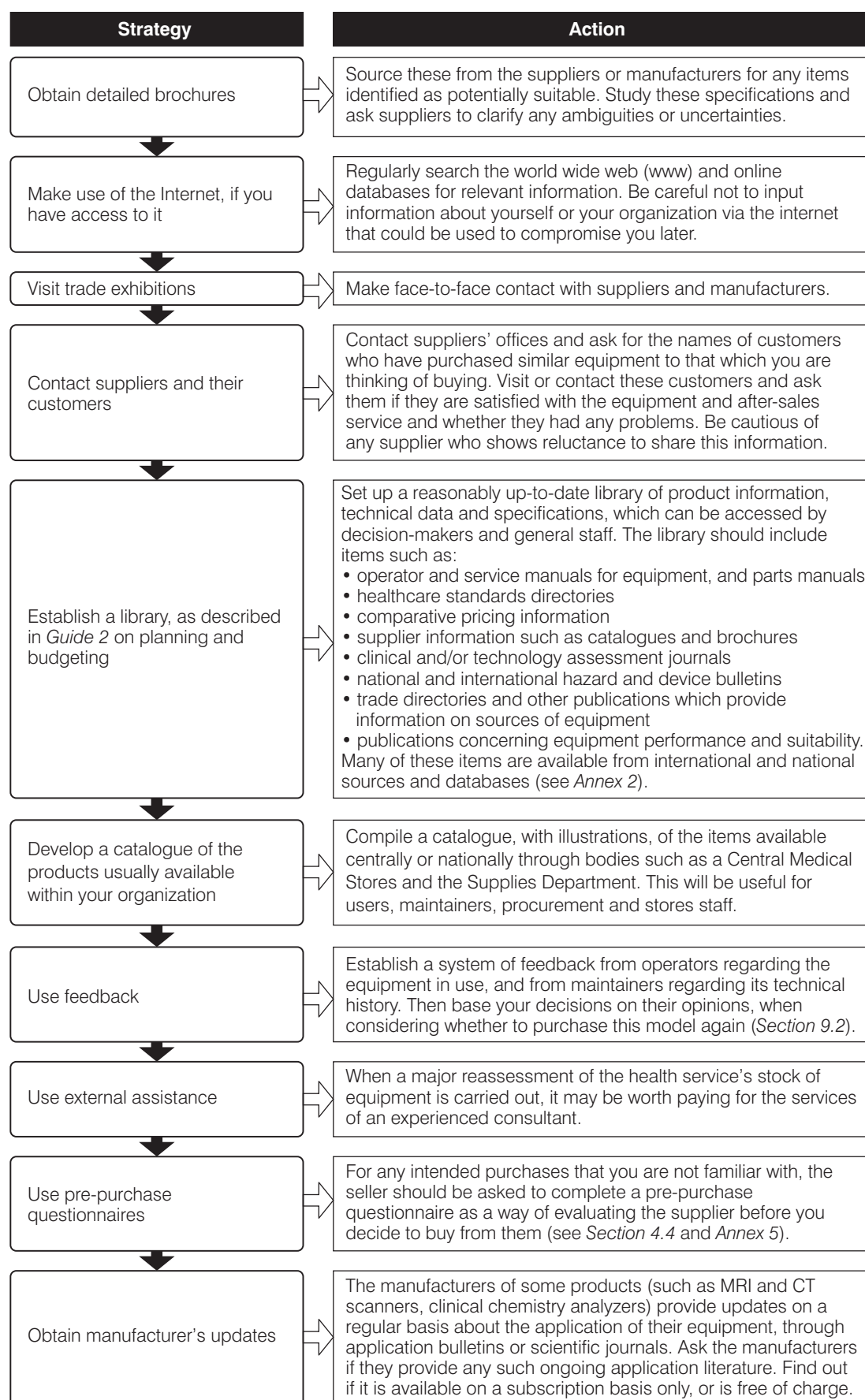
Literature and Knowledge Available to You

If you are considering purchasing any new equipment, it is essential to weigh up the costs against the potential benefits, before you buy.

It will not be feasible to be fully up to date in a market that is characterized by rapidly changing technologies. Technology assessment is part of the procurement process (*Section 1.2*) but is a large subject area in its own right. Usually there is limited technology assessment at national level for many developing and other countries. They rely on international research, however little of this has been directed at the needs of developing countries (see *Annex 2*).

You should carry out some market research, and try to find out as much as possible about the equipment before you buy it. Doing this not only helps you understand the specific requirements of the equipment, but also ensures that you are purchasing the most appropriate equipment for your particular needs.

Figure 8 presents a variety of options available for obtaining literature and knowledge about particular pieces of equipment, and you should use a combination of these.

Figure 8: Strategies for Sourcing Information and Knowledge About Equipment Models

3.3 A REVIEW OF THE WAYS TO GET EQUIPMENT

Once you know the equipment you need, there are several ways to obtain it:

- ◆ Purchasing
 - using funds from government (national budgets that are made available by the Ministry of Finance)
 - using independent funds from your own facility or health service provider
 - using funds from some types of external support agency (see *Box 11*). These funds can come in different forms:
 - as repayable loans with interest, from international financial institutions, and private organizations
 - as grants that do not have to be repaid, from foreign government aid agencies, and non-governmental organizations.
- ◆ Donations
 - from some types of external support agency (see *Box 11*). Pieces of equipment are chosen and supplied free of charge by non-governmental organizations, charities, individuals, and private businesses. This can range from gifts of small quantities of items to substantial equipment procurement projects.
- ◆ Leasing, renting, or hiring
 - may be an alternative to outright purchase of equipment for those with limited budgets or cashflow problems.

Box 11 shows the different types of external support agencies and their typical funding preferences.

Note: the use of the word ‘donor’ can be confusing as it can be used to refer to large governmental aid agencies providing interest-free grants for the purchase of equipment, as well as individuals providing free gifts of equipment. In this Guide we try not to use the word ‘donor’, and instead distinguish between being given money to purchase equipment and being given the equipment itself. Thus, we talk of ‘purchasing using external support agency funds’ which covers grants (*Section 3.3.2*), and ‘receiving donations of equipment’ which covers gifts of equipment (*Section 3.3.3*).

The ability of your Procurement Unit to choose between these options will vary depending on your country, your health service provider, your level within the health service (central, district, or facility level), and your level of autonomy.

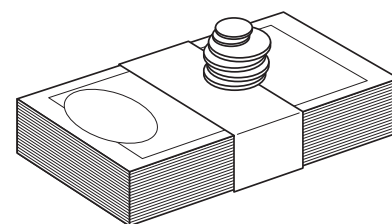
BOX 11: Different Categories of External Support

	Implementors	Source of funds	Type of support	Target groups
Multi-lateral finance	International financial institutions, such as the World Bank, Asian Development Bank	Contributions of member states	Repayable loans with interest	Predominantly governmental organizations
Multi-lateral aid	Groups of governments through aid agencies, such as the EU/EDF, and international agencies, such as UNICEF	Contributions of member states	Non-repayable grants, donations of equipment, technical assistance	Mixture of governmental organizations and population groups
Bi-lateral aid	Governments through aid agencies, such as USAID or GTZ	Tax money, to some extent donations	Non-repayable grants, donations of equipment, technical assistance	Mixture of governmental organizations and population groups
Non-governmental	Religious, humanitarian, and charity groups and individuals	Tax money, to some extent donations Donations	Non-repayable grants, donations of equipment, technical assistance	Predominantly population groups and local non-governmental organizations
Private	Private banks and businesses	Profits	Repayable loans with interest, non-repayable grants, donations of equipment	Mixture of all organizations and population groups

3.3.1 Equipment Purchases Using Nationally Available Funds

In many countries and facilities, the way in which items are purchased is determined by who is financing the purchase. The process varies depending upon:

- ◆ the objectives of the funding organization
- ◆ the amount of funds
- ◆ the timescale in which the item is to be procured.



Funding can cover the entire purchase cost or just the cost of specific components. Funds may be provided in the form of a one-off lump sum or as an annual sum, renewable over several years.

The procedures you have to follow depend upon the source of funds and your organization, as shown in *Box 12*.

BOX 12: How Purchasing Procedures Relate to the Type of Organization and Funding Source

Type of facility and funds	Purchasing procedures required
A public facility using its own funds or government funds	Equipment must be bought using government purchasing procedures (these are laid down in national laws and regulations).
A non-government facility (such as a mission hospital or private hospital) using its own funds	Equipment can be bought according to your own organization's procedures. If there are no purchasing guidelines, you will need to develop these, or use national or external support agency purchasing guidelines instead.
Any type of facility using external support agency funds or other special funds (<i>Section 3.3.2</i>)	Equipment must be bought using the funder's purchasing procedures. If these present a problem for your plans or technical requirements, you will need to negotiate any necessary changes.

Did you know?

International organizations, including UN agencies and the World Bank, have purchasing procedures for buying equipment. You can obtain guidelines from these agencies which you can adapt to your needs, if you have no procedures of your own.

Using Government Funds

At national level, responsibility for purchasing equipment is divided up between various government ministries. Within ministries, specific aspects of purchasing may also rest with particular departments or programmes. For example, in the public sector:

- ◆ In the Ministry of Health, both the Central Medical Stores (CMS) and the Supplies Department usually carry out purchasing.
- ◆ CMS usually purchases and distributes pharmaceuticals, medical supplies and basic (small) medical equipment, while Supplies is responsible for equipment and spare parts.
- ◆ Some independent programmes, such as the dental and laboratory services may handle their own purchasing, without referral to the MOH Supplies Department or CMS.
- ◆ Other ministries, such as Works, Supplies or Transport, may also be responsible for purchasing some types of equipment (for example, plant, furniture, and vehicles respectively).

There is often little coordination between these different units and most purchasing decisions are made on an ad-hoc basis. Often, there is great confusion about who is responsible for the different aspects of equipment purchasing. In many cases, heads of units, health facilities and staff do not know what type of equipment they can obtain from which source, and through which channel.

Most purchasing at the national level will be funded through national budgets and external sources. Also most tenders take place at this level.



- Tip** • Find out which bodies, such as ministries, and which sections are responsible for purchasing different types of equipment. Make a chart for future reference.

At decentralized levels (for example, district health authority and health facility levels) government funds allocated can be used to purchase equipment up to certain value limits. The financial limits will be specified in the Ministry of Finance's Purchasing Manual (*Section 2.2*). Often there are, as yet, limited purchasing skills at the decentralized levels.

If other health service providers receive government funds they must also follow the guidelines in the Ministry of Finance's Purchasing Manual.

Using Your Own Independent Funds

Government health facilities may be allowed to raise their own funds through some form of cost-recovery programme, or local business backing. The amounts raised are usually small. Therefore, the purchasing method used will be a simple one suited to low value, low volume purchases (*Section 4.2*).

Other (non-government) health service providers can purchase equipment according to their own rules when using their own funds. Responsibility for purchasing equipment is often divided up between various departments or programmes – for example, Procurement, Logistics, Supplies, or Transport divisions. As for the public sector, there is often little coordination between these different units. Most purchasing decisions are made on an ad-hoc basis, and often there is great confusion about who is responsible for the different aspects of equipment purchasing. Most tenders take place at the central level.

3.3.2 Equipment Purchases Using Funds From External Support Agencies

This applies to external support agencies that provide loans (repayable with interest) for you to do the purchasing, and grants (non-repayable) that they often use to purchase on your behalf in consultation with you.

The Regulations and Procedures of the External Support Agencies

If funding for the purchase of equipment comes from an external source, you need to purchase the equipment in accordance with the funder's procedures and conditions, or negotiate any necessary changes. Particular care should be taken when funding comes from external sources because some have their own agenda.

Others, although they mean well, may have regulations and procedures which conflict with your aims. You should be aware of the following conflict areas:

1. Your standardization policy

Procurement conditions may be tied to a particular country. External funders are often tied to national economic interests, which can result in tied aid (where the product must come from the donor country or another specified group of countries). This often results in inappropriate technologies being supplied that do not conform to your standardization efforts. Lack of coordination between the various external funders can also lead to duplication of effort, and multiple brands.



Country Experience

One country, in 1994, estimated that approximately 75 per cent of medical equipment in their hospitals and health centres had been funded from sources other than the regular government budget.

In many countries, hospitals within the same district or region are equipped with a variety of makes from different suppliers and countries, even for the same type of equipment. This places a great burden particularly on maintenance personnel, who often have not been properly trained on the equipment, and on hospital administrators in terms of providing funds for adequate stock levels of spare parts and consumables.

One hospital requested toilets from two donors. They received two sets, each of three toilets. One would have been enough, and neither had a path suitable to reach them in the rainy season.

2. Your available budgets

Funding may be limited to only certain types of projects or goods, and for a set time frame. External sources of funding may provide one-off equipment replacements, or equip new facilities. Alternatively, they may directly donate equipment (Section 3.3.3). However, they often provide no support to keep the equipment running. Ideally, external support agencies should be willing to finance both the equipment and a 'package of inputs' that will sustain the goods (Section 5.5.2), as well as provide support for an HTM Service so that equipment can receive long-term support.



Experience in Pakistan

The Finnish government aid agency supplied laboratory equipment to the Pakistan health service. The agreement included supply of consumables, spare parts and manuals, user and maintenance training, and the establishment of maintenance workshops.

Although offers of equipment may seem attractive, it is important to weigh up the benefits of having the equipment over the long term (*Section 3.2*). For example, will it prove difficult and expensive to run and maintain? Will the recurrent costs of consumables, spare parts, and maintenance mean the equipment is discarded once external funds and interest are withdrawn?

3. Your aims and wishes

Procurement conditions may be tied to a particular procurement method. Care must be taken not to be put in a position where your ability to make decisions about your choice of equipment is dictated by the use of competitive tenders (*Section 4.2.2*).

The aim of tendering is to have a process that means all suppliers submitting bids are treated the same and no one has the chance of receiving preferential treatment or offering incentives (in other words, a transparent process), and all bids remain confidential (in other words, a competitive process). This is achieved by using formalized rules and procedures. The very inflexibility of these rules and procedures, however, can affect your ability to make technical judgements about the bids.

Most international financial institutions (such as the World Bank, African Development Bank) and many bi-lateral government aid agencies dictate that some form of tender process should be used (normally international open tenders). Such open tenders must be competitive and open to anyone to bid. Therefore, your attempts to get the equipment that suits you may often be regarded as restrictive practices (and therefore illegal). For example, with an open tender, there can be:

- ◆ no standardization of equipment
- ◆ no consideration of additional factors concerning the equipment and supplier (for example, the aftersales support available locally), other than what is stated in the specification (*Section 5.5.2*)
- ◆ no screening of the manufacturing capability of the suppliers after the tender bids are in (unless you are allowed to use qualification criteria to judge suppliers **and** specify the criteria in the original purchase (tender) document – *Section 5.5.2*)
- ◆ no adjudication of bids on any basis other than the cheapest (unless you are allowed to use a scoring matrix of various factors that determine the best deal **and** the selection criteria is specified in the original purchase document – *Section 5.5.2*).

Procurement is a quasi-legal process and must be conducted in legalistic ways regardless of technical needs. Therefore such rules make the open competitive tender process unsuitable for buying complex technologies. As can be seen from the list above, your only chance of entering some of your technical needs into the process is to ensure that **all** of your requirements and methods of adjudication are explained in full in the original tender document. This can be very hard to achieve, but it is something you can aim for in the long-term.

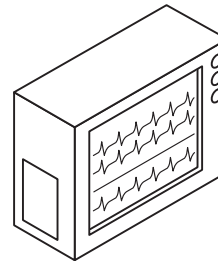
More realistically, successfully procuring the equipment you want depends upon gaining knowledge of the different external support agencies' procurement rules. For example:

- ◆ For procurement methods involving quotations (*Section 4.2.3*), you can usually meet your technical aims and wishes (standardization, provision of aftersales support locally, quality manufacturing, the best deal).
- ◆ For procurement using a restricted tendering process with national funds, non-governmental funds, and some bilateral aid agency funds, you may be able to meet your technical aims and wishes as long as you stick to the tendering rules and specify the screening and adjudication processes in detail in advance.
- ◆ For procurement using an open tendering process and funds from an international financial institution (a development bank), you probably will not be able to meet your technical aims and wishes unless purchasing simple equipment.

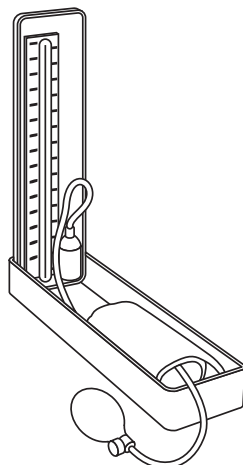
Thus, the art of getting the right equipment is choosing the right external support agency to fund it.

For example:

- ◆ If you want good quality complex technology – such as an ECG monitor – using an international financial institution to provide the funds would not be appropriate as their procedures may require you to source the cheapest unit from any supplier and country, regardless of the quality.



- ◆ If you want simpler technology in bulk, such as sphygmomanometers, funds and procedures of an international financial institution could usefully be employed to source the items globally and obtain the best price.





Country Experience

*In developing countries, the World Bank (WB) mainly supports the financing of capital goods as opposed to consumable supplies. The World Bank uses its **own** guidelines on the type of standard equipment that should be on site at primary, secondary, and tertiary health facilities.*

The World Bank does not carry out direct equipment supply, but provides the money as a loan for purchasing equipment. The borrower buys all goods, works and services, but the World Bank oversees the borrowers' use of funds and procurement method (international open tenders), and ensures that the purchasing is undertaken according to WB guidelines and is in line with its purchasing policies.

The World Bank has its own step-by-step guide on how the purchase of WB-financed goods, works and services should be planned and implemented. These guidelines apply equally when purchasing is carried out by the borrowers, their procurement agents, or other intermediaries such as UN agencies working on behalf of the borrower.

The strict rules and procedures for international open tenders mean that it has proven difficult to buy good quality complex healthcare technologies this way that are appropriate to developing countries' needs. WB support has been found to be most suited to bulk purchases of low technology healthcare equipment items.

Securing External Funding

If you are looking to secure funding from an external support agency, you will need to put forward a convincing business case to support your procurement plan. This case needs to be framed according to the agency's guidelines for applying for support.

A carefully constructed Equipment Development Plan or Strategic Business Plan (see *Guide 2*) helps to strengthen your proposal, by presenting clear equipment needs and goals, as well as expenditure and financing requirements. In this way, you could encourage external sources to donate equipment and offer funds that support your plans, and hopefully avoid purchasing inappropriate equipment.

Avoiding inappropriate equipment may be difficult but it is not impossible – some external support agencies have been known to make exemptions to their usual procurement rules (*Section 4.2*) in order for the client to obtain equipment more suited to their needs. Often, it may help if you can highlight specific examples of problems with equipment due to poor specifications or inappropriate procurement procedures.



Country Experience

Many external support agencies place restrictions on sourcing goods, preferring them to come from a certain group of supply countries. However, health service providers have obtained exemptions enabling them to include buying from outside the European Union and ACP countries (countries in Africa, the Caribbean, and the Pacific).

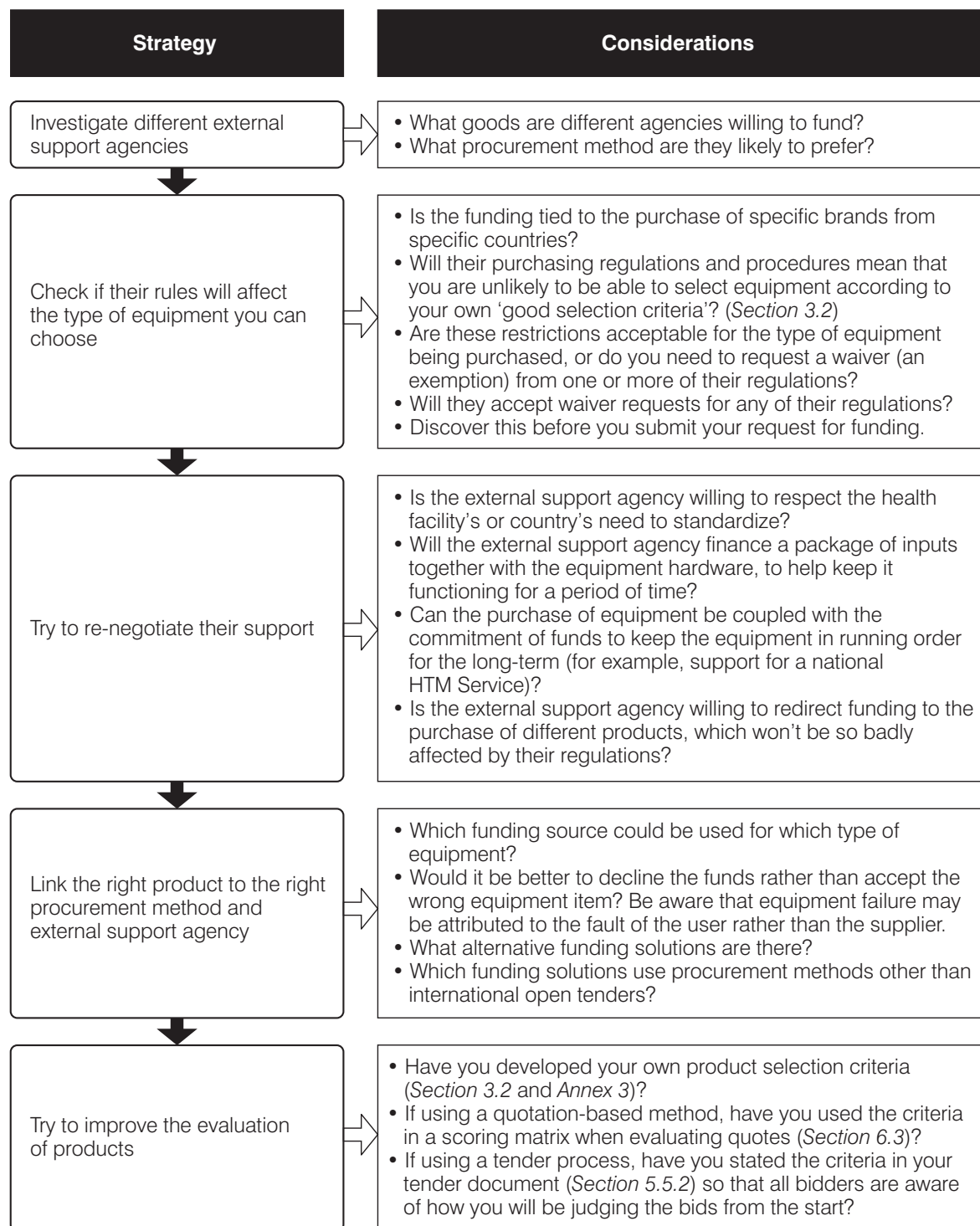
In Malawi, there was a European Union-financed project procuring spare parts. For this project Malawi managed to get exemptions (for more than 50 per cent of the parts) from both the EU usual practice to purchase from a single source, and their practice of procuring only from EU countries. The process delayed procurement, since parts were bought from many sources, but proved worthwhile because the parts could be sourced either from the actual manufacturers or from known alternative suppliers. These reputable alternative suppliers provided generic spare parts at a significantly reduced price. For example, operating theatre bulbs were obtained for as little as a quarter of the equipment manufacturer's cost. Contactors and battery packs from general suppliers showed similar price differences.

As the regulations and procedures of external support agencies may result in inappropriate equipment, you should take the steps shown in *Figure 9*.

Fortunately, the World Health Organization (WHO) and the World Council of Churches (WCC) have developed guidelines that aim to help both external support agencies and their potential recipients to understand one another's needs (see *Annex 2*). The aim of the guidelines is for donations to be appropriate, and they cover both equipment purchased using aid agency grants, and gifts of equipment. *Annex 6* provides a summary of the strategies to pursue for both recipients and providers of such support.

It will be useful to develop your own guidelines on relationships with external support agencies – some form of donor regulations (*Section 2.1*). To do this, you could adopt or modify the internationally available guidelines.

Figure 9: Strategies to Reconcile External Support Agency Rules and Your Aims for Equipment



3.3.3 Donations of Equipment

Occasionally, external support agencies may choose to provide you with equipment itself, rather than funds. This equipment may either be purchased by the agency (with or without any input from you), or existing equipment may be supplied.

Many items of equipment may be chosen and donated (supposedly free of charge) by external sources, charities, or individuals. Donations can range from a single piece of equipment to projects that provide substantial packages of equipment. In most cases, equipment will be supplied as new, though second-hand equipment is sometimes donated (*Section 3.4*).

Donations may be made as a result of a genuine desire to help, as a direct response to a request, or to secure financial gains for the donor (such as tax deductions). While donated goods are obviously an attractive proposition, you need to think carefully about all the advantages and disadvantages before accepting them.

The issues you need to consider include:

- ◆ **What will it cost?**
Are there any hidden charges, such as paying for customs clearance, storage, insurance and transport?
- ◆ **Is it appropriate?**
Is the equipment suitable for your health facility? Does the proposed equipment fit in with your health priorities and purchasing policies?
- ◆ **Do you have the skills?**
Are the necessary staff in place to install, operate, and maintain the equipment?
Are staff suitably qualified or is additional training required?
- ◆ **Is it sustainable?**
Does the proposed equipment require consumable items? Are such items available for a reasonable cost? Will it be supplied with a 'support package' of aftersales support and maintenance?
- ◆ **Why am I being offered it?**
Is the proposed donation regarded as a disposable piece of equipment due to difficulties in maintenance, obtaining spares, etc? If the donated equipment is second-hand, is it in danger of becoming obsolete in the foreseeable future, due to lack of parts, manuals or servicing support?



Country Experience

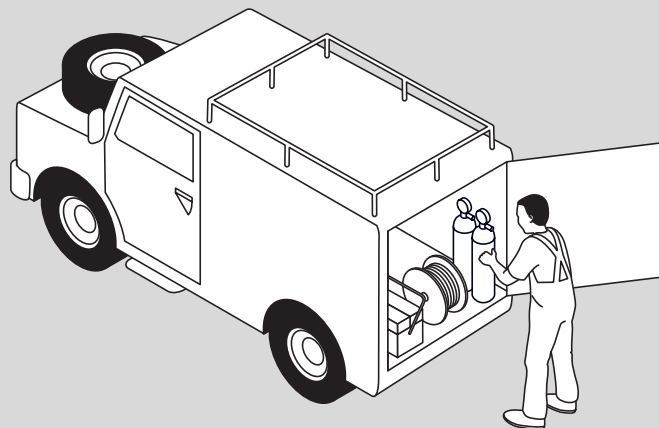
One country was donated a new hospital building with operating theatres, intensive care unit, wards and radiology department. Equipment from the donor country was provided, much of which was substandard, and did not conform to the receiving country's standard specifications.

In 2001, another country received a donation of 70 used dialysis machines. The machines were five different models from three different manufacturers and were supplied without water treatment plants, manuals and some accessories. Two years later, none had been commissioned.

A study in 1994 in Ghana discovered that half of the equipment found to be unusable in the Western Region was originally donated.

In Zambia, some equipment donated to the Ministry of Health, such as doppler units and suction pumps, proved to be unreliable and unpopular with users.

Some African countries have found that donated mobile clinics and maintenance units in practice take more than a year to get into running order.



In Vanuatu, sterilizers were donated but lack of adequate water pressure and hard water resulted in regular failures. An electric nebulizer was donated to a health centre that had no electricity. Also, a container-load of bed and wheelchair parts was sent in the hope that some would be usable – it created a large disposal problem instead.

In one country, a private individual donated an electro-surgical unit to a health facility in gratitude for good treatment. The unit was built for the US power supply (110V) rather than the local power supply (220V).

A decommissioned military base supplied six advanced ventilators to Nepal without their external gas flow sensors. As the hospitals could not afford these accessories, the ventilators could not be used.

In certain circumstances, you may feel it more appropriate to refuse donations. While it may feel awkward to do this, there is little point in accepting donations of equipment that are inappropriate to your needs. If in any doubt about whether to accept a donation or not, it will be useful to refer to:

- ◆ the ‘good selection criteria’ outlined in *Section 3.2*
- ◆ the summary guidelines for recipients and providers of donations (see *Annex 6*)
- ◆ the WHO and WCC donation guidelines (see *Annex 2*).

If you decide you would like to accept such support, you can submit a request for funding to the external support agency. *Annex 6* provides an example of an Equipment Donation Request Form.



- Tip** • Remember, donated equipment should be treated the same as if it were purchased. This means it should be registered and authorized for use in-country, and should be entered onto the equipment inventory and into the stock control system (*Section 8.4*).

3.3.4 Leasing and Leasing Type Arrangements

If you do not wish to buy equipment using your capital budget, you may choose some form of leasing arrangement, which uses funds from your recurrent budget instead. If you choose to do this, you need to weigh up carefully the costs and benefits. You must also check whether such arrangements are legal and approved by national authorities or your central management body.

There are two basic forms of leasing:

- ◆ **Leasing:** this is the straightforward hiring of equipment. In this case, the leasing organization retains ownership of the item and is also responsible for the maintenance, repair, and updating of the equipment. The lessee (in this case, the health facility) has possession and use of the equipment until such time as the lease contract runs out.
- ◆ **Leasing type arrangements:** this enables equipment to be acquired immediately but permits the cost to be spread over a period of time. Examples of leasing type arrangements include deferred payment (deferred purchase), hire purchase (paying by instalments), lease to buy, and sale and leaseback (when you sell something to release funds in order to rent something else).

Few of these schemes are likely to represent value for money, and such schemes should not be entered into simply as a means of avoiding current cash limit restraints or shortages of capital.

If you are planning to lease, carefully examine the terms and conditions of the contract, especially with regard to such aspects as limitations on the use of the equipment, and responsibilities for its insurance and maintenance. *Box 13* lists some of the key issues.

BOX 13: Advantages and Disadvantages of Leasing/Leasing Type Arrangements

Advantages	Disadvantages
<ul style="list-style-type: none"> ◆ Provides certainty as costs are known in advance. ◆ Reduces the need to tie up capital funds in fixed assets. ◆ Enables the suitability of equipment to be assessed over a pre-determined trial period. ◆ Sometimes enables you to obtain equipment or material that is hard to purchase. 	<ul style="list-style-type: none"> ◆ A fixed obligation is created to pay rental from your recurrent funds. ◆ The flexibility to dispose of obsolete equipment before the end of the lease may be reduced. ◆ Doesn't provide ownership. ◆ Agreements are one-sided. When leasing, if something goes wrong most risks are transferred to the lessee (for example, loaned items must be replaced if damaged). Under leasing type arrangements, although most of the risk remains with the owner of the equipment this has to be paid for in the rental price, and additional costs will be incurred, depending on the contract terms, if a leased item is misused or otherwise damaged.

In practice, the issue of whether to lease or buy is complex, and depends on operating, legal, and financial considerations.

3.3.5 Research and Demonstration Models

Research models
pieces of equipment still under development that are not yet available on the market.

Some manufacturers provide research models to chosen facilities for the purpose of testing their performance under real conditions before large-scale production is undertaken. The product must still comply with international safety standards. Occasionally manufacturers try to sell equipment that they say is pending approval from authorities such as the Food and Drugs

Administration (of the USA). For example, in one case a manufacturer attempted to sell ventilators pending FDA approval. The sale was refused, and the customer later learned that FDA approval had been withheld.

Demonstration models
pieces of equipment that are used by manufacturers for the purpose of demonstrating them to potential buyers.

Demonstration models can be regarded as second-hand equipment (*Section 3.4*), but they usually come with full documentation and warranty.

You should accept research and demonstration models only under strict conditions and using the following criteria:

- ◆ The equipment has been officially tested and approved by an independent authority.
- ◆ It conforms to international manufacturing safety standards such as IEC 60101 for medical and electrical equipment, ISO 5358 for anaesthetic equipment, etc, or national equivalents (see *Annex 4*).
- ◆ The equipment remains the property of the supplier.

- ◆ The supplier bears the running costs incurred (for example, accessories, consumables).
- ◆ The supplier will be responsible for any subsequent litigation arising from using the equipment on patients.
- ◆ You are not responsible for the loss or damage of the equipment.
- ◆ You obtain the consent of the patient or patient's relatives before using the equipment on the patient.

3.4 WHETHER TO OBTAIN NEW OR SECOND-HAND EQUIPMENT

Second-hand equipment
previously used equipment,
some of which may have been
refurbished (reconditioned,
rebuilt) to return it to good
working order

Obtaining **used equipment** from dealers, auctions, specialist suppliers or by direct purchase from a previous owner may be an alternative to buying new. However, if you choose to take this option, you need to check that your financing source allows it. Many international aid agencies and financial institutions do not allow the purchase of used equipment. Some countries also have a policy of not buying used equipment (though they are often not in a position to refuse donated used equipment). Important indicators for used equipment are the reliability of the supplier and the offer of a warranty.

Some companies (such as Philips and GE) offer factory **refurbished equipment** that can be an excellent option for buyers with limited funds. Refurbished equipment normally comes with a one-year standard warranty and a commitment to supply spare parts for several years.

Second-hand equipment is usually bought by small charities and non-government health facilities. Often, second-hand equipment is also donated to facilities. Whether bought or donated, you need to check that second-hand equipment is legal and approved by your national authorities. *Box 14* shows some of the key benefits and dangers.

BOX 14: Advantages and Disadvantages of Second-Hand Equipment

Advantages	Disadvantages
<ul style="list-style-type: none"> ◆ Often reduces the cost substantially (on average between 40 and 80 per cent of new equipment costs). ◆ May be more readily available. ◆ When reconditioned or rebuilt, may have a long life and be protected by guarantees or warranties. ◆ May be economical to buy when it would not pay to acquire new. ◆ May be compatible with others already in use, thus reducing the cost of holding stocks of spare parts and consumables. 	<ul style="list-style-type: none"> ◆ Can have problems linked to age and lack of spare parts, consumables, manuals, or servicing support. Although some organizations repair second-hand goods to improve their lifespans, many do not. ◆ Risks are bigger and you may have less protection if anything goes wrong. Used goods are sold as they are, meaning they are not always perfect. The supplier takes no responsibility if the faults are obvious when you make your purchase and you cannot expect a refund or compensation. You can only ask for your money back if the equipment does not do the job you bought it to do. ◆ May be less reliable, last for a shorter period of time, and require more maintenance than new equipment.

**Country Experience**

Many health service providers have successfully purchased second-hand goods from organizations that refurbish equipment (such as DentaId or ECHO). Such reputable agencies recondition and restore equipment to its original working condition for the purpose of resale. The equipment is supplied together with the necessary manuals, accessories, stocks of consumables, stocks of spare parts, and aftersales support.

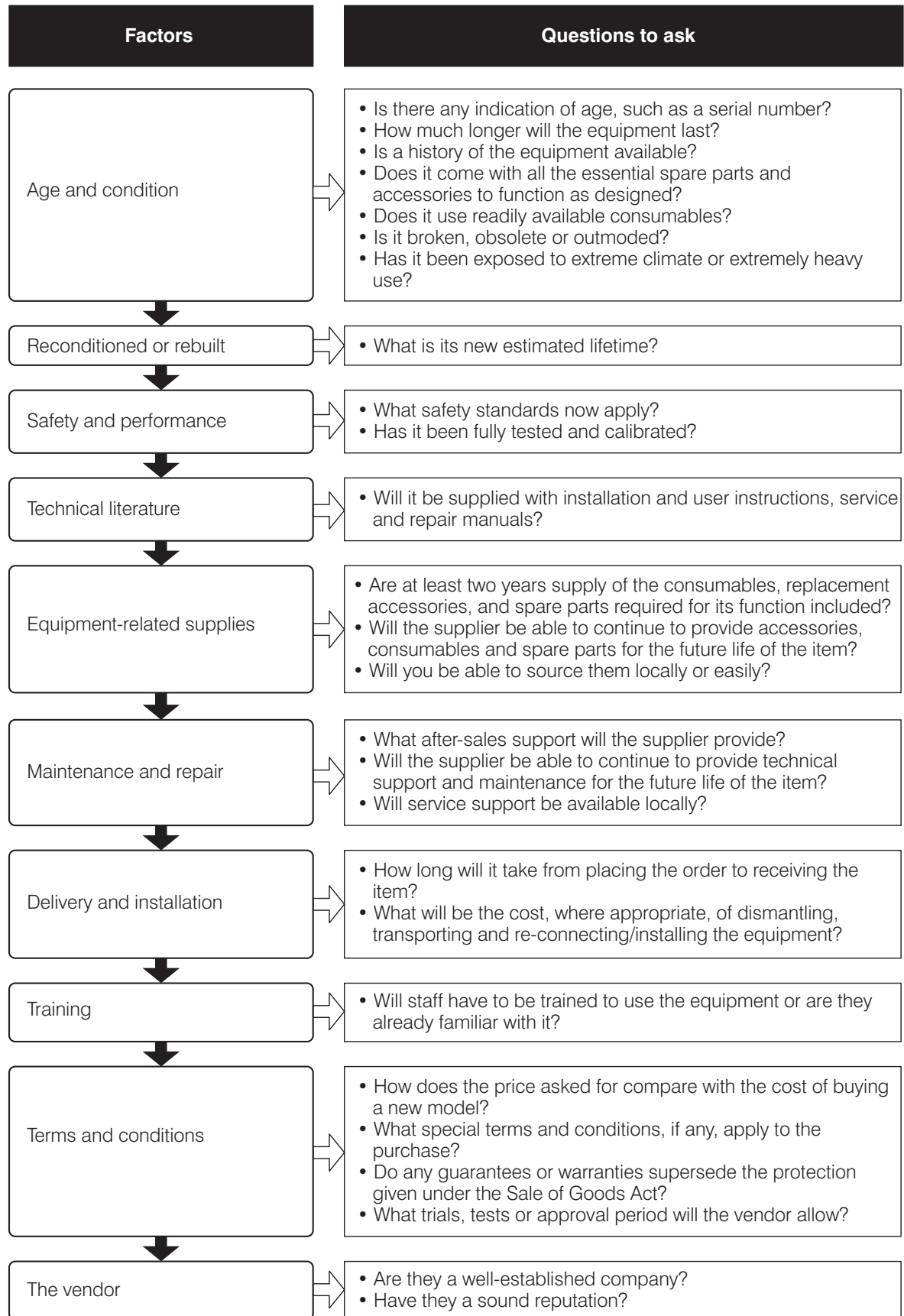
Second-hand equipment requires particular care. As a buyer you should try to satisfy yourself as to the condition, type, make, model and year of the item being supplied, rather than relying on the seller. However, we recognize that this is difficult if you are a long distance from the supplier. *Figure 10* provides you with some questions to ask which can help.

Remember, in some countries it is against the law for anyone to sell dangerous electrical goods. If you are buying or receiving second-hand equipment, carry out your own checks for any faults **before** you accept it (*Section 8*).



- Tip**
- It may be more cost-effective to buy new equipment rather than second-hand equipment which only has a limited life. If in any doubt, compare the costs of new and second-hand equipment before buying and, if there is not a significant difference, choose the new.
 - Remember that second-hand equipment should be treated as if it were new. This means it should be registered and authorized for use in-country, and should be entered onto the equipment inventory and into the stock control system (*Section 8.4*).

Figure 10: Questions To Ask if Buying or Receiving Second-hand Equipment



Box 15 contains a summary of the issues covered in this Section.

BOX 15: Summary of Issues in Section 3 on How to Decide When and What to Procure

Why Procure?	Health Service Provider, and Health Management Teams (at all levels)	<ul style="list-style-type: none"> ◆ ensure that equipment planning and budgeting takes place, and that the planning ‘tools’ required to help decide why and when it is necessary to procure equipment are available, such as: <ul style="list-style-type: none"> - an equipment inventory (see <i>Guide 2</i>) - a maintenance record system (see <i>Guide 5</i>) - a stock control system (see <i>Guides 4 and 5</i>) - purchasing, donations, replacement, and disposal policies (see <i>Guide 2</i>) - an Equipment Development Plan (see <i>Guide 2</i>) ◆ ensure these planning ‘tools’ are used to develop expenditure and financing plans for all equipment needs, as follows: <ul style="list-style-type: none"> - the long-term Core Equipment Expenditure Plan and Core Equipment Financing Plan (see <i>Guide 2</i>) - various annual action plans and the annual budget drawn from them (see <i>Guide 2</i>)
	HTM Working Groups and Procurement Units (at all levels)	<ul style="list-style-type: none"> ◆ use these annual plans to ensure that equipment is purchased for the right reasons, in the right order of priority, and for which funds are available
Choice Issues	HTM Working Groups	<ul style="list-style-type: none"> ◆ detail the ‘good selection criteria’ to employ when selecting equipment and supplies, according to the Purchasing and Donations Policy, and taking into account all factors relevant to the location, size, skill-level, and aims of the health facilities concerned (see <i>Annex 3</i>)
	Procurement Units and Procurement/ Tender Committees	<ul style="list-style-type: none"> ◆ use the ‘good selection criteria’ when evaluating offers and deciding what items to purchase (<i>Section 6.3</i>)
Ways to Obtain	Health Service Provider	<ul style="list-style-type: none"> ◆ develops guidelines for negotiating with external support agencies in order to try and obtain appropriate equipment (see <i>Annex 6</i>) ◆ decides whether the leasing, renting, or hiring of equipment will be allowed ◆ decides whether research and demonstration models will be allowed
	Health Management Teams (at all levels)	<ul style="list-style-type: none"> ◆ consider the different ways of getting equipment when developing the Core Equipment Financing Plan and income portion of the annual budget ◆ negotiate with external support agencies in order to identify the best type of funds for each type of equipment purchase (see <i>Figure 9</i>)
	Procurement Units (at all levels)	<ul style="list-style-type: none"> ◆ procure according to the rules for each of the different ways of obtaining equipment: <ul style="list-style-type: none"> - national rules for government funds - own health service provider’s rules for own funds - external support agency rules for external funds - negotiations for donations - terms for leasing ◆ decide which of the above ways you will use to obtain equipment on the basis of appropriateness of product, usage rate, costs for purchase, operational costs, lifespan, life-cycle cost, and availability of alternatives locally and regionally.

Continued overleaf

**BOX 15: Summary of Issues in Section 3 on How to Decide When and What to Procure
(continued)**

New or Used?	Health Service Provider	<ul style="list-style-type: none"> ◆ discover whether national regulations allow for the import of either used or refurbished goods ◆ decide whether the purchase of used items will be allowed for the health service, and under what circumstances ◆ decide whether the purchase of refurbished items will be allowed for the health service, and under what circumstances
	HTM Working Groups and Procurement Units (at all levels)	<ul style="list-style-type: none"> ◆ if allowed to purchase either used or refurbished equipment by central authorities, always investigate carefully the advantages and disadvantages before going ahead (see <i>Figure 10</i>) ◆ always carefully commission and safety test this equipment before accepting it (<i>Section 8</i>)

4. HOW TO DECIDE ON THE WAY TO PURCHASE

Why is This Important?

Whenever you purchase equipment, you need to decide the best model of procurement to use (for example, whether to purchase by yourself or collectively). You also need to decide upon the most appropriate purchasing method, and the types of suppliers to approach. Such planning will enable you to make efficient use of resources, and ensure that any equipment you buy is appropriate to your needs and is of the right quality. It will also enable you to work within the appropriate timescales.

Your purchasing decisions will be interlinked with the activities we have already described in *Section 3* on how to decide when and what to purchase. Your purchasing decisions will also affect the activities in *Section 5* on how to prepare for procurement.

There are various ways of purchasing equipment. You need to know the different options available to you, so that each time you buy you can select the most appropriate option. In this Section, we discuss the options open to you by looking at the following:

- ◆ Determining your model for procurement (*Section 4.1*).
- ◆ Choosing your purchasing method (*Section 4.2*).
- ◆ Different types of supplier available (*Section 4.3*).
- ◆ Identifying suitable suppliers (*Section 4.4*).

4.1 DETERMINING YOUR MODEL FOR PROCUREMENT

There are various models for procurement open to you, and the one you choose may affect the subsequent purchasing method you need to use (*Section 4.2*).

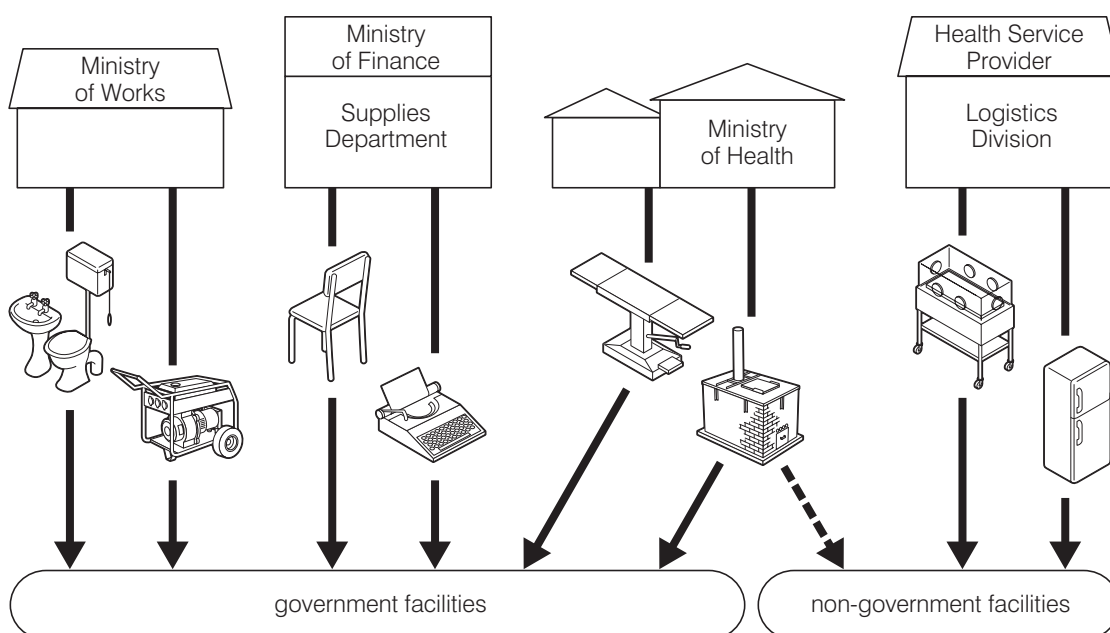
Each time you wish to obtain equipment, you need to determine the appropriate procurement body. This could be your Procurement Unit, the National Procurement Unit, or an external support agency. Often, you will use various combinations of these arrangements. For example, your health facility's Procurement Unit might place orders with local suppliers, while the national unit deals with international suppliers (possibly operating through procurement agents and external support agencies).

Most equipment procurement (purchasing, leasing, and requesting donations) is undertaken through one of five arrangements:

- i. **Centralized procurement** – procurement takes place centrally, for example at the national level.
- ii. **Group procurement** – joint procurement by different health facilities, health authorities (district, diocesan, regional), or health service provider organizations (public or private).
- iii. **Decentralized procurement** – health facilities or health authorities to which authority has been decentralized procure equipment themselves, or health facilities and health authorities with independent funds undertake their own procurement.
- iv. **Mixed procurement** – a combination of centralization and decentralization, whereby some parts of the procurement process are undertaken centrally and others at district or facility level.
- v. **Using procurement agents** – private companies are hired to handle procurement.

Centralized Procurement

Centralized procurement on behalf of many health facilities can be undertaken at the central level of your health service provider organization, or at national level. The unit responsible for procurement is often determined by the type of equipment to be bought. Equipment may be procured, for example, through the Ministry of Health, Ministry of Works, or Logistics Division (*Section 3.3*).



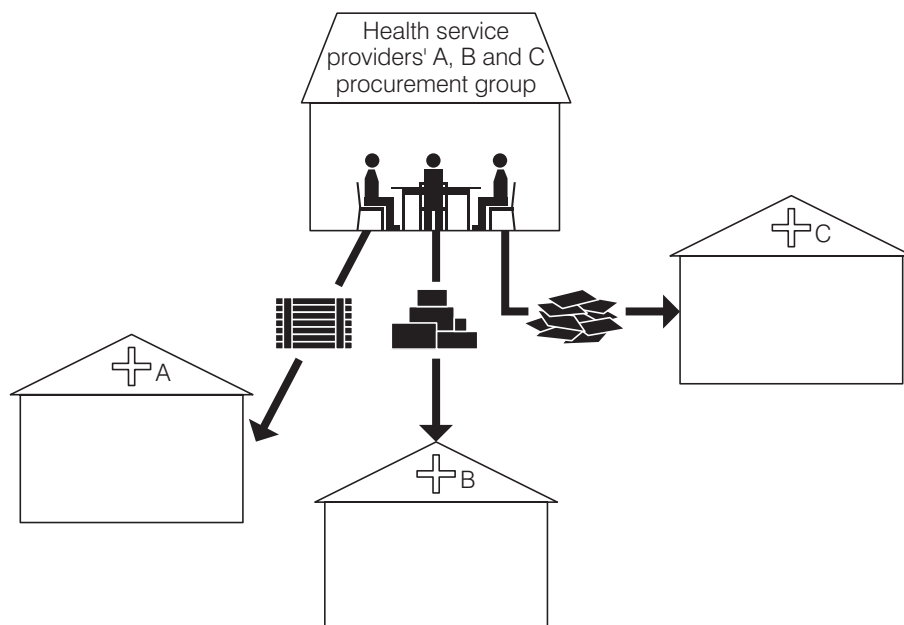
In general:

- ◆ To ensure the right equipment and equipment-related supplies are ordered, any Central Procurement Unit must work with the relevant end-users to draw up a list of requirements and specifications, and to prepare purchase documents which are appropriate to their needs. They must also liaise with the service providers about the evaluation process and final recommendations (*Section 6.3*).
- ◆ If using national funds, the procurement must be carried out using national procurement procedures (see *Box 12, Section 3.3*).
- ◆ If procuring on behalf of another organization, the National Procurement Unit should liaise with the director of the recipient health facility (such as a mission hospital) or health authority (such as a diocesan authority) to determine whether the equipment conforms to the organization's Equipment Development Plan, capabilities, and finances.
- ◆ For tenders and high-value quotations, a Central or National Procurement/Tender Committee (also known as a Tender Board) will evaluate the bids and choose the winning supplier.

For the advantages and disadvantages of centralized procurement, see *Box 16* under the discussion on group procurement below.

Group Procurement

Non-government facilities (such as faith or mining health facilities), and public facilities and authorities that have been given a degree of autonomy, can be more flexible in their procurement practices than the usual government facility. In order to make the best use of resources, there are instances when forming a procurement group is beneficial. You could join with other health facilities or authorities in the region, or with other facilities of the same speciality or type. This is also known as pooled procurement.



As a pooled team you have greater buying and negotiating power. You can procure items in higher quantities that make an order more worthwhile to the supplier. This leads to more favourable warranties and stronger service and training support. For example, a group of health facilities or small health service providers may decide to buy together, in order to secure the best deal. They may set up their own Procurement/Tender Committee for this purpose, or use the committee of one member of the group.

Normally, in group procurement one member negotiates some form of equipment ‘supply-period contract’ (see ‘Mixed Procurement’ below and *Section 6.4*) for all members of the group with similar needs and interests. Generally:

- ◆ While prices or terms are negotiated centrally (to the group), ordering and payment are the responsibility of the individual health facilities and/or decentralized health authorities.
- ◆ A contract awarded to a single supplier does not mean that the entire volume must be shipped at once. It can specify, as part of the contract terms, divided deliveries over the period of the contract to different members of the group, and multiple delivery points.



Country Experience

The Joint Medical Stores in Uganda procures for a large number of individually financed health facilities and tries to keep a stock of spare parts for all the equipment.

Aga Khan Health Services covers a number of health facilities in several countries. It has a well-established group procurement system for them.

Box 16 outlines the benefits and limitations of group procurement.

BOX 16: Advantages and Disadvantages of Central and Group Procurement

Advantages	Disadvantages
<p>Economies of scale</p> <ul style="list-style-type: none"> ◆ Lower costs or better terms can be obtained because of bulk (multiple) procurement of goods. ◆ A more competitive procurement process as the orders are bigger. ◆ Provides possibilities for discounts and rebates. ◆ Allows for consolidation of quantities and deliveries. ◆ Gives you improved and stronger procurement power as you are a larger customer. ◆ As a more significant and favoured customer, suppliers are encouraged to offer favourable contract terms. ◆ Acts as an incentive for suppliers – they find it more convenient to approach one Procurement Unit than a number of individual units. 	<ul style="list-style-type: none"> ◆ Distances between the centre doing the procurement and the districts/facilities receiving the goods. ◆ Problems in making the product available in a timely and efficient manner. ◆ Procurement is often slow.
<p>Procedures and skills</p> <ul style="list-style-type: none"> ◆ Uniform policies and procurement procedures can be followed. ◆ Promotes standardization by preparation of standard specifications for the whole package. ◆ Lends itself to the use of a formal tender process. ◆ Centralizes expertise to makes the best use of scarce technically skilled procurement personnel. ◆ Minimizes the financial and accounting management requirements of procurement. 	<ul style="list-style-type: none"> ◆ Lack of knowledge of local needs may lead to inappropriate choices. ◆ Variety of specifications for different geographical circumstances may not be taken into consideration. ◆ If corruption occurs, it can lead to a disastrous waste of funds on a large scale.
<p>Coordination and consultation</p> <ul style="list-style-type: none"> ◆ Encourages interaction and consultation between central and lower levels, and between group members. ◆ Encourages coordination. 	<ul style="list-style-type: none"> ◆ Coordination between many units can be difficult. ◆ Coordination of distribution, and good installation may suffer. ◆ User resistance can arise due to preference for different brands. ◆ Lack of involvement may make local staff feel less responsible.
<p>Administration</p> <ul style="list-style-type: none"> ◆ Keeps administration costs low – it is cheaper to place and process one order for US\$ 10,000 than 10 each of US\$ 1,000. ◆ Most cost-effective method when ordering a few high cost, slow-moving spare parts. 	<ul style="list-style-type: none"> ◆ Could result in many activities that involve expenditure and time without adding value. ◆ Can lead to proliferation of paperwork and delays. ◆ Is an intensive process and requires a great deal of work.

Decentralized Procurement

Non-government health facilities, and government facilities and health authorities to which responsibility has been decentralized, can often procure equipment themselves. If they wish, they can also request the National Procurement Unit to procure on their behalf, or enter into group procurement arrangements with others (see above).

Where full decentralization has not yet occurred, the Ministry of Health may have devolved some responsibilities for limited procurement to government health authorities and facilities, or to other facilities that they help to finance, such as faith facilities. In these cases, only items below a financial value limit set by the Ministry of Finance's Purchasing/Supplies Manual can be purchased by the facility or district without referral to the Ministry of Health (*Sections 2.2 and 4.2.1*).

Decentralized procurement by health facilities or districts is particularly suitable for:

- ◆ obtaining single, one-off items of equipment
- ◆ small orders
- ◆ low value and low volume
- ◆ emergency procurement
- ◆ prompt procurement
- ◆ supporting local suppliers
- ◆ obtaining items not supplied by central stores
- ◆ buyers with limited technical knowledge who can save time by bringing user departments directly in contact with the supplier, but at the risk of unfavourable financial terms.

If the orders are of low value, the Procurement Unit of the decentralized health facility/authority could evaluate quotations. But if responsibility for higher value purchases has also been decentralized, each health facility/authority may have its own Procurement/Tender Committee (also known as a Tender Board) for evaluating bids and selecting the winning supplier.

Box 17 summarizes the benefits and drawbacks.

BOX 17: Advantages and Disadvantages of Decentralized Procurement

Advantages	Disadvantages
<ul style="list-style-type: none"> ◆ Facilities and districts are given greater control over the procurement process. ◆ They also have the right to make their own decisions regarding the goods and suppliers, albeit on a restricted basis. ◆ Staff at decentralized levels are given an opportunity to develop their procurement capabilities. 	<ul style="list-style-type: none"> ◆ Administrative costs are often higher, making this a less cost-effective way of procuring. ◆ Discounts are unlikely. ◆ In some circumstances, the products obtained may conflict with standardization attempts. ◆ Staff at decentralized levels may have less experience and expertise at procurement than the centre.

Mixed Procurement

Mixed procurement uses a combination of centralized and decentralized skills in the procurement process.

In some countries, the Ministry of Health has started to hand over some components of each round of procurement to decentralized levels (such as quantifying needs, writing specifications, handling the acceptance process); other areas (such as tendering, supplier selection, and price negotiation) continue to be dealt with at the central level.

Another example of mixed procurement is where the Central Procurement Unit undertakes a centrally managed bid process to contract suppliers of goods, such as spare parts. In this case, health facilities are allowed to place orders direct from the supplier.

Such contracts are usually **supply-period contracts** (also known as framing contracts, draw-down contracts, or time-supply contracts). In these cases, the supplier winning the tender is given a contract to supply certain goods over a fixed period; for example, one or two years. During that period any member of the health service provider organization (facility, district, etc) wanting those goods simply orders them direct from the supplier. After the supply period, the tender is run again at central level (Section 6.4).

**Country Experience**

In the Philippines there is a combination of centralized and decentralized purchasing. Regional offices handle tenders or quotations for the needs of all different health facilities, and a price schedule is distributed to the facilities so that they can buy the goods from their regional office.

In one country, supply-period contracts were agreed for five years (for items such as surgical instruments, infusion pumps). There was an initial large central delivery covering the needs of all the different facilities. After this, supplements were bought on the same contract by the different facilities individually.

Using Procurement Agents

In special circumstances, procurement agents may be hired to carry out procurement. This normally happens when the order is large or complicated to import, or the skills required are beyond in-house capacity and resources. Typically this happens when there is procurement for a development project, such as equipping a new hospital. In addition, it can be a cost-effective option when a group of districts lack procurement expertise or sufficient knowledge of the equipment market.

Procurement agents are usually private companies who have experience in dealing with procurement of a wide range of goods, in bulk, from multiple sources. Many procurement agents, but not all, have experience of health sector goods. Some United Nations agencies, such as UNICEF, can also be hired to act as procurement agents. Procurement agents can be costly. They will work on a variety of bases, either a fixed fee or a small retainer plus a percentage of the order.

As stated in *Section 2.2*, ideally:

- ◆ **The procurement agent should strictly follow the procurement procedures of the organization hiring them.** However, if such procedures are not available, they will use their own procurement procedures or other agreed procedures.
- ◆ **The procurement should always be based on the client's equipment specifications and requirements.** However, if these are not available, they may have specifications of their own and advise you on requirements. In this case, it is essential you ensure they have knowledge of health sector goods.
- ◆ **The procurement agent should involve your organization in the evaluation process and final recommendations.** However, some may assume you do not have the skills and, believing they know best, may try to make the decisions for you. This does not always provide you with appropriate equipment for your needs.



Tip

- The procurement agent should be working on your behalf and presenting the outcome of each step of the procurement activities to you, so that you can make the decisions. They should **not** be following their own agenda and keeping you in the dark.
- Always ensure you use a procurement agent that has a good reputation of prior knowledge and experience for procuring healthcare technology.

4.2 CHOOSING YOUR PURCHASING METHOD

4.2.1 An Overview of Purchasing Methods

Various purchasing methods exist for different circumstances. You will need to select the right method for your situation, in order to ensure the appropriate items are purchased at the right time, in the correct quantities, and on the most favourable terms.

Purchasing equipment may involve either:

- ◆ placing a direct order with a company
- ◆ going to tender (national, regional, or international); or
- ◆ obtaining a number of quotations (through various methods).

Direct order contacting the supplier directly for a price, and placing an order.

Tendering a purchasing procedure whereby potential suppliers are invited to make a firm and unambiguous offer of the price and terms which, on acceptance, should be the basis of the subsequent contract. As the process is confidential, suppliers can provide an offer knowing that no other bidder can knowingly undercut them. As the bidding format is formal and ‘transparent’, no supplier can offer an extra incentive.

The process can be either ‘open’ to anyone to respond to, or can be ‘restricted’ to a smaller group (*Section 4.2.2*).

Quotation the stated price and terms provided by a supplier, when asked to do so, with a validity period for acceptance by the purchaser. Usually several quotations are obtained for comparison.

You can obtain the quotation via a number of methods – request for quotes, national competitive bids, or competitive negotiation. The method you select will depend upon whether you are buying locally, nationally or internationally, and what rules apply (*Section 4.2.3*).

The objective of the tendering/quotation process is to ensure the ‘best fit’ supplier is selected to supply goods and/or services that offer best value for money. Each purchasing method involves different steps and different time requirements, and is suitable for different models of procurement (*Section 4.1*). *Box 18* provides a summary of the main purchasing methods, each of which are discussed in more detail in the rest of this Section.

BOX 18: Comparison of Purchasing Methods

Method Features	Tenders		Direct Ordering	Quotation-based Methods		
	Open Tender	Restricted Tender		Competitive Negotiation	National Competitive Bid	Request for Quotes
Alternative names	International competitive tender	Limited or selective tender	Direct procurement Direct contracting Local shopping	Negotiated procurement, international or local shopping	National request for quotes	Request for quotations
Suggested financial range	Greater than Euro or US\$ 100,000	Compulsory above Euro/US\$ 100,000, also often recommended for lower values	Small financial ranges (below Euro/US\$ 5,000) unless standardized to a particular product of any value	Depends on national regulations, but usually less than Euro/US\$ 25,000	Depends on national regulations, but usually less than Euro/US\$ 100,000	Depends on national regulations, usually less than Euro/US\$ 25,000, most common for small financial ranges
Authorization level	Procurement/Tender Committee	Procurement/Tender Committee	Procurement Manager	Procurement/Tender Committee	Procurement/Tender Committee	Procurement Manager
Procedure, in brief	Internationally recognized, formal, regulated process, open to anyone to bid	Internationally recognized, formal regulated process, restricted to a smaller number of bidders	The buyer contacts a single supplier directly	The buyer contacts a number of potential suppliers and bargains for a specific price or service arrangement	Nationally recognized process, open to anyone based nationally to quote	A minimum of three quotes are requested for comparison, most commonly used for local suppliers
Supplier selection	Open to any interested supplier on a (local) world-wide basis. Suppliers are screened once the bids are received (post-qualification)	Pre-qualified suppliers, usually three to six in number. These are selected following an open tender or other formal process to pre-qualify them	One supplier that is either pre-qualified, has expressed an interest, or has been standardized to	Three or more pre-qualified suppliers (local and/or foreign)	Open to any interested local suppliers (manufacturers, authorized agents of international manufacturers, or licensed wholesale importers)	Three or more suppliers (local and/or foreign) that are either pre-qualified, or have expressed an interest (with post-qualification)

Continued opposite

BOX 18: Comparison of Purchasing Methods (continued)

Method Features	Tenders		Direct Ordering	Quotation-based Methods		
	Open Tender	Restricted Tender		Competitive Negotiation	National Competitive Bid	Request for Quotes
Procurement notification	Adverts placed widely in publications with international circulation (such as official gazettes, technical magazines, national and international newspapers, trade publications, embassies)	Direct invitation	Direct invitation	Direct invitation	Advertising limited to the official gazette or national press	Direct invitation
Probable timescale	8–12 months	5–6 months	2 weeks–1 month	1–2 months	5–6 months	2 weeks–1 month
Prices	Lowest prices can be obtained, although the administrative costs are highest	Favourable, although the administrative costs can be high	Usually highest	Favourable, and very low if hard competition	In local currency, favourable when prices are below the international market	Acceptable
Requirements	High procurement expertise required – knowledge of sources, preparation and evaluation of many bids, and supplier qualification	High procurement expertise required – knowledge of sources, preparation and evaluation of complex bids, and supplier qualification	Lower level procurement expertise for preparation of requirements, and evaluating offer	Experienced Procurement Unit with good access to market intelligence, knowledge of sources, current world prices, and negotiating skills	High level procurement expertise for preparation and evaluation of many bids	Lower level procurement expertise for preparation of requirements, and comparison of quotes

Continued overleaf

BOX 18: Comparison of Purchasing Methods (continued)

Method Features	Tenders		Direct Ordering	Quotation-based Methods		
	Open Tender	Restricted Tender		Competitive Negotiation	National Competitive Bid	Request for Quotes
Suitability	<ul style="list-style-type: none"> ◆ annual purchasing ◆ when many reputable suppliers are available and likely to be interested ◆ large contracts ◆ large value and bulk equipment purchases ◆ if pre-qualification is not feasible or not allowed by regulation or the external funding institution ◆ World Bank recommended method ◆ for establishing supply-period contracts 	<ul style="list-style-type: none"> ◆ annual and biannual purchasing ◆ large volume of goods ◆ specialized equipment ◆ complex equipment ◆ high value equipment ◆ when a limited range of reputable manufacturers and potential suppliers are available ◆ when a substantial list of registered suppliers has been developed ◆ large emergency procurement, such as in a natural disaster ◆ for establishing supply-period contracts ◆ for establishing a product to which others may be standardized 	<ul style="list-style-type: none"> ◆ brand products ◆ single-source items ◆ specialized products ordered on request ◆ for purchasing goods standardized to existing makes and models ◆ low value goods ◆ small volume orders ◆ extension of an existing contract ◆ reordering as part of a supply-period contract 	<ul style="list-style-type: none"> ◆ locally available equipment and services (both national and imported) ◆ small volume orders ◆ equipment not widely available ◆ special terms or specifications are required ◆ emergency purchases ◆ when you know the limited amount you can spend ◆ limited sources of supply 	<ul style="list-style-type: none"> ◆ when goods or services are available locally at prices below those in the international market ◆ when contract value does not justify procedural costs of tenders ◆ when national regulations require support for local businesses 	<ul style="list-style-type: none"> ◆ reorder level purchasing ◆ emergency supply ◆ small volume orders ◆ low value goods ◆ limited sources of supply

Continued opposite

BOX 18: Comparison of Purchasing Methods (continued)

Method Features	Tenders		Direct Ordering	Quotation-based Methods		
	Open Tender	Restricted Tender		Competitive Negotiation	National Competitive Bid	Request for Quotes
Comments	<ul style="list-style-type: none"> ◆ highest administrative workload and cost ◆ needs careful preparation ◆ technical judgement of bids may not be possible, so does not necessarily provide the best deal for your situation ◆ does not commit you to accept lowest price only if evaluation criteria are specified in the tender document 	<ul style="list-style-type: none"> ◆ commonly used method ◆ high administrative workload and cost ◆ technical judgement of bids may not be possible, so does not necessarily provide the best deal for your situation ◆ does not commit you to accept lowest price only if evaluation criteria are specified in the tender document 	<ul style="list-style-type: none"> ◆ not transparent and therefore liable to questions of ethical character ◆ useful if the price is reasonable and there is no benefit from competition ◆ in the absence of competition, it is more difficult to determine whether the quoted price is economical or reasonable ◆ the quickest method 	<ul style="list-style-type: none"> ◆ not transparent and therefore liable to questions of ethical character ◆ should be approached with caution. However it is often the most economical and efficient way of procuring products 	<ul style="list-style-type: none"> ◆ normally used for public procurement within the buyer's country ◆ unlikely to attract foreign suppliers, though locally represented international suppliers can participate ◆ local currency is generally used for bidding and payment purposes 	<ul style="list-style-type: none"> ◆ often used for purchases from suppliers in the immediate location of the buyer ◆ low administrative workload (requests for quotes can be faxed and emailed to suppliers) ◆ ensure sufficient specifications are provided with your request to encourage appropriate quotes



Experience in Sri Lanka

In Sri Lanka, the Ministry of Health uses a competitive tender process that follows national guidelines for all equipment procurement. These national guidelines include the requirement for each supplier to have an established local agent/distributor in the country with a minimum of two-year authorization, and evident financial and technical capability.

Quotations are used for common and standard accessories, and are obtained only from manufacturers who have already supplied equipment. The quotations must specify the quantity, unit price, total price, validity and delivery period.

However, for foreign-funded projects the Ministry of Health may be obliged to use other procurement methods laid down by the external support agency.

The purchasing method you choose will vary, and depends on the following:

a. What you are purchasing

The type and quantities of equipment, supplies, and services being purchased.

b. The model of procurement used

Whether centralized, decentralized, group, or mixed procurement, or using a procurement agent (*Section 4.1*)

c. Who is paying

Purchasing methods vary depending on whether the money comes from your own funds, national funds, or external support agency funds (*Section 3.3*). The funding organization (whether national or external) usually recommends the purchasing method and the forms of contract to be awarded (*Section 6.4*).

d. The transparency required of the process

For tenders, the process must be formal and conducted so that suppliers cannot offer health service staff any incentive. In certain instances, such as some quotation-based methods and direct ordering, an element of personal communication is allowed during negotiations, which opens the process to possibilities of influence.

e. Procurement guidelines

Procurement procedures vary between the different funding bodies and these requirements must be taken into account.

f. The market place

Purchasing methods vary depending on whether there is the likelihood of interest by foreign bidders, and whether there is a locally available range of quality products (locally produced, or imported for resale).

g. The size and value of the purchase

Your Purchasing/Supplies Manual (*Section 2.2*) should state the financial limits that determine the purchasing method to use. For example:

- ◆ Items below a certain value (individually) and a package of items costing less than a certain value are usually purchased using the quotation-based methods.
- ◆ Items above a certain value (individually) and a package of items costing more than a certain value are usually purchased using tenders.

If an external support agency is funding the purchases, they may set the financial limits that will determine the purchasing method used.



Country Experience

Financial brackets may be set by international bodies that determine which purchasing method to use. For example, the EU/EDF in 2003 had the following financial brackets:

- ◆ 0–5,000 Euro: direct procurement
- ◆ 5,000–25,000 Euro: three quotations
- ◆ 25,000–100,000 Euro: limited or restricted tender
- ◆ 100,000 Euro and above: international tender.

In Zambia in 2000, government regulations provided the following financial brackets:

- ◆ for items up to Kwacha (K) 150,000: buyers purchase directly from the supplier (direct procurement)
- ◆ for items from K150,000 up to K5,000,000: buyers purchase upon presentation of a minimum of three quotations obtained from reputable suppliers (request for quotes)
- ◆ for items from K5,000,000 up to K25,000,000: permission must be sought from the Executive Director of the facility or health authority to purchase via the Tender Committee using either an open tender or selective tender, as long as a minimum of three bids is obtained
- ◆ for items from K25,000,000 and above: the Tender Committee still goes out to tender, but must refer the papers to the National Tender Board for ratification
- ◆ non-government facilities and private hospitals do not have to use these financial brackets, as long as they are using their own funds.

For a UK-based international NGO, the financial brackets are:

- ◆ For items below £2,500, there is no need for three quotations. However, the reasons for choosing the particular supplier should be documented in writing on the copy of the Purchase Order.
- ◆ For items between £2,500 and £18,000, a minimum of three quotations are requested. Completed quotation forms are compared, and the reasons for selecting a particular supplier are documented in full, including any specific donor requirements.
- ◆ For items greater than £18,000, tenders are issued, taking into account the individual external support agency's requirements.

Note: some international bodies may express financial brackets in the international SDR (Special Drawing Rights) currency. This is a stable theoretical currency that is based on a number of real currencies such as the US dollar, the British pound sterling, the Euro, and the Japanese yen. Any country can find out the exchange rate for its currency against the SDR.

h. The level of authorization required

Your Purchasing/Supplies Manual (*Section 2.2*) should also state the authorization levels required for each purchasing method. For example:

- ◆ items that are individually below a certain value, or a package of items costing less than a certain value, are usually purchased by personnel at health facility and decentralized authority levels, using a quotation-based method
- ◆ items that are individually above a certain value, or a package of items costing more than a certain value, are usually purchased by personnel at regional or central authority levels, often using tender methods.



Country Experience

The approval levels for purchasing for a UK-based international NGO are as follows:

- ◆ *Less than £1,000 – an Operations Assistant in the field.*
- ◆ *More than £1,000 but less than £10,000 – the Operations Manager in the field.*
- ◆ *More than £10,000 but less than £150,000 – must be referred to the Operations Manager at head office.*
- ◆ *Greater than £150,000 – any two of the Chief Executive Officer, Director of Finance, or Director of Operations at head office, and a tender format is used.*

i. How soon the equipment is needed

There may be critical dates for delivery and different purchasing methods involve different timescales. Direct ordering is obviously the quickest method, followed by quotation-based methods, while tendering methods take a considerable time to organize and process.

Using tenders, the absolute minimum time from the start of the purchasing process until the contract is awarded is four months. This allows for one month for preparing the tender documents, two months tender response time, plus one month evaluating the tenders and negotiating the contract. **However, depending on the organization undertaking the tender, the time can be considerably longer than this.** Experts suggest it can take anything up to 12 months and sometimes longer, depending on the equipment. The key is to set deadlines and stick to them.



Experience in Sri Lanka

The Ministry of Health in Sri Lanka finds that tenders can take as long as 16 to 24 months to process, as follows:

- ◆ *Preparation and approval of the tender document – two months.*
- ◆ *From tender issuing to closing – six weeks to two months.*
- ◆ *Evaluating the bids and awarding the contract – three to six months.*
- ◆ *Obtaining guarantees and signing the contract – one to two months.*
- ◆ *Obtaining letters of credit – one month.*
- ◆ *Freighting, customs clearance, and in-country delivery – five to eight months.*
- ◆ *Installation, commissioning, and handover – two to three months.*

4.2.2 Tenders

At the national and central levels most purchasing above a certain value is undertaken using a tender process. This is also the chosen method for the majority of the purchasing activities of external support agencies.

The reason a tender process is preferred is due to its nature, which:

- ◆ is formal and regulated. Above certain order values, it must be undertaken according to international rules.
- ◆ allows any supplier to place an offer. In other words, it is open to ‘free market’ forces.
- ◆ uses a standard written bidding format which ensures all suppliers provide information and prices for the same specified elements of the bid, and there is no space for anyone to offer added incentives. In other words, it is transparent.
- ◆ ensures that each supplier’s bid is confidential and that no supplier can know what their competitors are offering. A tender process also encourages each supplier to provide a good offer if they hope to win. In other words, it makes the bidding competitive.
- ◆ does not allow negotiation between the supplier and health service staff, which de-personalizes the process. In other words, it avoids corruption.
- ◆ has formal written procedures and rules which are quasi-legal. In other words, breaking the rules amounts to fraud/criminal deception.

Types of Tender

A tender can be either open or restricted. Be careful to check if there are regulations concerning each specific type of tender, such as restrictions or requirements from the funding organization.

Open tenders are open for any interested supplier to bid. They can be national, regional, or international, and you can receive many responses. Normally, international open tenders attract the most competitive offer and potentially the lowest price. But they take a long time, and are fairly complex and expensive to administer. The most complex process is an international open tender under World Bank guidelines, which is open to all member countries from the World Bank. (Note: although the World Bank calls it international competitive bidding, it is in fact an open tendering process.)

The timescale from the start of the tender process (writing tender invitations including the specifications) until the goods are commissioned and ready for use is seldom less than six months. It may take at least one year, or even longer, for open international tenders.

Restricted tenders are restricted to a smaller number of pre-qualified suppliers (*Section 4.4*), which means you eliminate bids from suppliers who may be wasting your time or are unsuitable. Restricted tenders can also be national, regional, or international.

There are several formal ways to pre-qualify suppliers, depending on the regulations of your country and the organizations involved. Often, using an open tender process initially to assess and pre-qualify suppliers is the best method. You need to carefully specify your requirements for such pre-qualification – for example, financial viability, past supplies, local representation, documented company skills, quality control programmes, reputation, references, etc. You also gain leverage against poorly performing companies by threatening to take them off your list of pre-qualified suppliers (*Section 4.4*).

Restricted tenders are usually quicker, since the pre-qualification process is carried out in advance. Also, once you have a limited number of competitive suppliers, it is easier to produce your tender documents and it takes less time to evaluate the tenders. The timescale could therefore be as short as four to six months if everything works out smoothly.

Adjudication of Tenders

In the past, many tenders have been accepted on the basis of the lowest purchase price, rather than the best deal for your situation. This practice can be misleading and should be avoided. However, you can only enter into technical judgements about the bids if you have produced an extremely detailed tender document covering all aspects of the product, and specified how the bids will be judged.



- Tip**
- Aim to make your tender document as detailed as possible. What is the point of receiving as many offers as possible, if none of them provides you with the equipment you want?

Thus, your tender document should specify the whole ‘package of inputs’, your product evaluation criteria, supplier qualification criteria (if applicable), and any scoring system, so that you are free to select the ‘best fit’ product and not just select on the basis of price alone (*Section 3.3.2*).

As *Section 3.2* shows, the product evaluation factors that you should specify explicitly on your tender document include:

- ◆ equipment quality
- ◆ documentation
- ◆ aftersales support
- ◆ installation/commissioning requirements
- ◆ maintenance
- ◆ training provision
- ◆ delivery requirements
- ◆ need for consumable products
- ◆ quality control
- ◆ warranties.

These allow you to consider bids on the basis of the ‘most economically advantageous’ offer – in other words the best value for money – rather than just price alone.

Box 19 describes the benefits and drawbacks of using tenders.

BOX 19: Advantages and Disadvantages of Tendering

Advantages	<ul style="list-style-type: none"> ◆ suitable when many reputable suppliers are available and likely to be interested (open tender) ◆ suitable when you know that a limited number of reputable suppliers can be identified to compete (restricted tender) ◆ suitable for large contracts, large equipment value, and high volume/bulk equipment purchase ◆ suitable when transparency is required to avoid allegations of fraud, and formal procedures are required to avoid allegations of corruption ◆ suitable if funding organizations require a process open to the free market competition (open to anyone) ◆ normally ensures a very low price (although not necessarily the best deal – see below) with restricted tenders giving a favourable price, but not as low as open tenders.
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Continued overleaf

BOX 19: Advantages and Disadvantages of Tendering (continued)

Disadvantages	<ul style="list-style-type: none"> ◆ suppliers may quote a price that is too low in order to win, leading to subsequent disputes if goods or services supplied are unsatisfactory ◆ once the bid is closed, you cannot change any of the tender conditions ◆ unsuitable for some contracts (for example, if technical specifications cannot be detailed in the tender documents and consultation is essential to clear up technical points) ◆ bids mostly accepted on the principle of the lowest price – this can be misleading as the best buy is not necessarily the lowest price ◆ unsuitable for technically complex equipment (for example, a complex order may require extensive technical evaluation and subsequent amendments, which may not be allowed in a tender process as they could affect the validity of competition) ◆ a slow process and therefore not suited for emergencies ◆ an expensive process in terms of administration (clerical staff, stationery, postage costs, etc) ◆ requires a high level of purchasing expertise, including knowledge of sources and supplier qualifications, preparation and evaluation of bids, etc <p>Some of the points above can, however, be prevented by thorough tender preparation.</p>
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Skills and Time Available

Although a tendering process is meant to achieve the best price, equipment suppliers also face problems with the tender process, mainly due to the shortage of the buyer's skills and the time constraints imposed by the funding institution's procurement procedures. Equipment suppliers report that existing tender procedures present the following problems that ultimately affect the bid value:

- ◆ The buyer's lack of experience in writing specifications and purchase (tender) documents means the supplier receives inadequate information on which to bid.
- ◆ The tender document format, designed to provide no preferential bias, does not allow bidders to explain pertinent features of their product/offer (for example, any important detail that the buyer forgot to specify), biasing the process in favour of the lowest cost bid.
- ◆ The buyer's poor understanding of equipment means tender documents frequently omit the 'package of inputs' required to keep the equipment working. If a bidder includes them his price will not be competitive, but if he quotes for them separately such an addition to the bid is unacceptable.
- ◆ Inadequately skilled adjudicators cannot compare the relative merits of bids, so tenders are usually decided on the basis of cost.
- ◆ The bid preparation time allowed is short, leaving no time for clarification. However, the process of adjudication, clarifying contracts, making financial arrangements, etc, can take up to a year. This delay has to be reflected in the price or they will make a loss on the product.

- ◆ Significant effort is invested in preparing each bid. The chance of success is small, so this cost is reflected in the price. For tenders where delays are common and significant amounts of paperwork are required (for instance the multi-lateral funding institutions such as the World Bank and other development banks), the mark-up can be as much as 20 per cent. To save money, clerical staff may draw up the bid, and are less likely to detect problems in the tender request.

4.2.3 Quotation-based Methods

It is often preferable to use some form of quotation-based method, as these are less formal and rigid than tenders. Also, they do not have to conform to international regulations, and you can apply your own technical judgements when evaluating the offers. This leads to faster processing and cheaper administration, and you are more likely to get the equipment you need. However, the key disadvantage of using quotation-based methods is that they can introduce the possibility of corruption, due to:

- ◆ the lack of transparency in the process (the possibility of the buyer being influenced by the seller)
- ◆ the possibility for direct negotiation after the first round of bidding.

For these reasons, quotation-based methods are generally less well suited for large contracts, where the implications of corruption have greatest importance. However, the more strictly the quotation process is regulated (for example, by national law or by your organization's policy), the easier it is to use quotation-based methods instead of tenders.

For most of these methods you approach a minimum of three suppliers that are selected (either pre-qualified suppliers or those who have expressed an interest – *Section 4.4*). For some of these methods, negotiations can take place directly after receiving the first quote.

The main quotation-based methods are:

- ◆ **Request for quotes** where the buyer simply approaches a minimum of three suppliers and asks them to quote for specified goods and services. The buyer then evaluates and compares the quotations and selects the best one for their situation.
- ◆ **National competitive bids** where the need for quotes is advertized nationally so that as many quotations as possible are received from anywhere in the country, which are then evaluated and compared.

- ◆ **Competitive negotiation**, where the buyer approaches several suppliers telling them the sort of goods/services that are required (and even the money available) and asks what sort of deal they can put together. After the suppliers make their first offer, the buyer does a round or more of negotiating to get better deals. The buyer can tell each supplier about the offers from other suppliers, and ask if they can do better than that (and may even say who the competing suppliers are and give details of the offers made). This round of undercutting goes on until the buyer is happy they've got a deal they like.

Box 20 describes the benefits and drawbacks of using quotation-based methods.

BOX 20: Advantages and Disadvantages of Quotation-based Methods

Advantages	<ul style="list-style-type: none"> ◆ much quicker and less formal than tenders ◆ can (sometimes) negotiate the terms of the offer directly with suppliers ◆ more likely to get the type of equipment you want than with tenders, as you can use technical judgements in the evaluation process ◆ for small or uncomplicated orders, the same written format – a Purchase Order – can be used for both requesting a quotation and for placing an order. You will need to state clearly whether it is a quotation request or an order
Disadvantages	<ul style="list-style-type: none"> ◆ less transparent than tenders (more open to corruption) ◆ greater risk of dispute about contract terms (delivery times, etc) as the purchase document may be less detailed ◆ greater risk of accusations about unfair treatment from suppliers who are not successful

4.2.4 Direct Ordering

Direct ordering is used when buyers:

- ◆ know what they want, even down to the exact make and model
- ◆ know which supplier to approach
- ◆ can contact the supplier directly, communicate personally with them, and negotiate terms.

Direct ordering is the most informal and the fastest method. It is best suited to small contracts, emergencies, purchasing from local suppliers, and purchasing direct from a specific manufacturer (for example, for a standardized product).

The supplier you approach is either a specific manufacturer, a reliable company you may have dealt with before, or someone on your lists of pre-qualified suppliers or suppliers who have expressed an interest in the past.

Box 21 describes the benefits and drawbacks of direct ordering.

BOX 21: Advantages and Disadvantages of Direct Ordering

Advantages	<ul style="list-style-type: none"> ◆ you can purchase exactly what you want, from the supplier you want, and negotiate any terms you want ◆ you can talk all the issues over in person ◆ the fastest and most informal method ◆ the same written format (a Purchase Order) can be used for both requesting a price estimate and for placing an order. You will need to state clearly whether it is an estimate request or an order.
Disadvantages	<ul style="list-style-type: none"> ◆ there is no competition in prices ◆ you do not give yourself the chance to see what other beneficial products and deals were available ◆ most open to corruption

4.2.5 Making the Best Use of Your Purchasing Method

With effective tenders and quotation processes you can achieve substantial savings, if the market provides sufficient competition. However, the process is fairly complicated and experienced purchasing personnel with knowledge of sources and negotiating skills are required for tasks such as:

- ◆ supplier qualification (*Section 4.4*)
- ◆ preparing purchasing documents and contracts (*Sections 5.5.2 and 6.4*), and
- ◆ adjudication (evaluation) of bids/quotes (*Section 6.3*).

In order to attract the best suppliers and achieve the best prices, you need to use purchasing procedures that are as clear and transparent as possible, and base your decisions upon formal criteria that have been stated in detail. Anything less could be perceived as being secretive or, worse, could lead to accusations of favouritism among suppliers. Unsuccessful suppliers may feel that they have no chance of winning and consequently withdraw from future tenders or quotations.

Any of the purchasing methods described can be used whatever your procurement timetable is, no matter whether you procure on an annual, scheduled, perpetual or single project basis – see *Section 5.4*.

Choosing the right purchasing method is vital for fulfilling other aspects of HTM such as, standardization, maintenance and quality control. For example, standardization is not achieved by frequent use of international open tenders based on price, but may be accomplished by using an international open tender process to establish a supply-period contract lasting several years (*Sections 4.1 and 6.4*).

Many countries have been successful in using tenders to obtain supply-period contracts for either:

- ◆ products they buy in large volumes such as small handheld medical equipment (stethoscopes, laryngoscopes); or
- ◆ specialized equipment such as laboratory equipment or X-ray machines.



In this way, it has been possible to equip many facilities with the same type of equipment over several years.



- Tip** • International open tenders usually attract the most competitive offers and potentially the lowest price, but quality issues are often of secondary importance to the price. It is also difficult to ensure the project is delivered on time, as you may be dealing with unknown suppliers and longer lead-times.

The purchasing methods most commonly used are as follows:

Some form of restricted tender, which requests bids from pre-qualified suppliers

- ◆ countries with well-established purchasing systems
- ◆ international external support agencies
- ◆ central Procurement Units

Some form of quotation-based method

- ◆ international NGOs
- ◆ civil societies
- ◆ private sectors
- ◆ decentralized Procurement Units



- Tip** • If external support agencies or procurement agents are involved in the supply of goods, they may undertake the quotation/tendering process themselves, or you may need to use their quotation/tendering format. Encourage them to use your Equipment Specifications, Purchase Document and Contract details.
- To be ready to purchase, you should already have a list either of pre-qualified suppliers or those that have expressed an interest.

4.3 DIFFERENT TYPES OF SUPPLIER AVAILABLE

Before choosing any equipment, your Procurement Unit needs to draw up a prospective list of credible and reliable suppliers. Suppliers come in a number of forms:

International and national manufacturers. These are primary sources of equipment, as they carry out the manufacturing themselves. Most equipment is manufactured outside developing countries, but increasing amounts come from developing countries. For example, Pakistan is one of the largest producers of surgical instruments that are marketed by large European companies.

International and national suppliers. These are secondary sources of equipment, which means they sell items made by others. They include manufacturers' representatives and agents, distributors, wholesalers, foreign exporters, local importers, and retailers (small sales outlets).

International supply organizations. These are bodies that procure items on your behalf, and may also stock supplies in bulk (similar to a wholesaler). They include procurement agents and non-profit supply organizations. They are also known as packaging agents since they can procure and freight a 'package' of compatible equipment for their clients, supplying all the items needed to equip a new department or an entire hospital. (Note: this package is not the same as the package of inputs required to keep equipment functioning throughout its life.)

International turnkey organizations. These are companies that, in addition to providing the services of a packaging agent (as described above), oversee the arrival of the equipment on site and organize its installation, commissioning, and handover in a working condition to the client. They may also offer consultancy support on issues such as specifications, equipment selection, appropriate room use and service supply installations.

To establish the available suppliers of each type, the Procurement Unit will need to use:

- ◆ equipment brochures
- ◆ staff experience
- ◆ equipment records, such as the equipment inventory (see *Guide 2*) and the maintenance record system (see *Guide 5*)
- ◆ internationally available equipment source directories and databases, usually accessed by subscription (see *Annex 2*)
- ◆ information gathered from incoming tender documents, which should contain facts about suppliers, such as references, financial situation (last available accounts), authorizations (which manufacturers they represent), knowledge and skills, service locations, and more.

The different types of supplier are most commonly used as follows:

Buying direct from manufacturers (manufacturers rarely supply direct to smaller-scale or low value customers) or procurement agents	larger customers, such as <ul style="list-style-type: none">◆ government Central Stores◆ procurement agents◆ external support agencies
Buying through a wholesaler or retail outlet (for example, local distributors, specialist stores, showrooms, department stores) or a non-profit supply organization	smaller-scale or low value customers, such as <ul style="list-style-type: none">◆ facility level◆ district level

International Manufacturers and Their Representatives

Some multinational manufacturers have their own supply and distribution network, but many use local representatives or agents to distribute and market their products. The advantages of such an approach are:

- ◆ There is someone local to you – in your country or a neighbouring one – to whom you can address your concerns and needs, who can deal with issues such as currency, customs clearance, and tax duties, and hopefully can supply aftersales support.
- ◆ If the agent represents multiple suppliers, they may also be able to provide you with valuable product comparison information on various products, such as cost comparisons, alternatives, literature and brochures.

You should be aware that equipment purchased through representatives may appear more costly than buying from the manufacturer direct, since the cost will include a commission for the representative. However, such commissions are important since they are used by the representative to ensure that they can provide aftersales support.

Local Manufacturers and Suppliers

The equipment sector in developing countries can broadly be divided into two categories:

- ◆ Suppliers of (predominately imported) equipment.
- ◆ A handful of companies involved in equipment services, such as installation, maintenance, and repair.

Few companies combine supply and servicing. Even fewer actually manufacture the products they sell. Where it exists, local manufacturing of healthcare products is normally limited to a small number of common products such as basic consumables, simple furniture, prosthetics, occupational therapy and physiotherapy aids. For example, simple furniture such as beds and cabinets may be manufactured locally, but specialized furniture such as adjustable beds, is likely to be purchased from abroad.

When equipment is made locally, it is generally designed to suit local conditions, such as climate and available power supply. It will also take into account local needs, such as a requirement to be robust and made of hard-wearing material, so it may last and perform well in your environment. However, it will generally be designed to local standards for safety and performance, so make sure these products are of good quality and are safe. Try to apply the same quality judgements as if you were buying internationally (*Section 3.2*).

Wholesalers and Retailers (International and Local)

Wholesalers and retailers buy a range of products from a variety of manufacturers for re-sale. Only occasionally do they also act as representatives for the manufacturer, offering some level of aftersales support in addition to selling. Some are distributors for more than one manufacturer, and the same products may be sold by many companies. Others have exclusive rights to act as a manufacturer's sole distributor in a country or region, and they then answer invitations to tender or quote only for that manufacturer's products. The advantages of using a wholesaler or retailer are:

- ◆ Cost effectiveness – their close relationship with manufacturers, a good network of contacts, and purchasing in bulk, means that such suppliers can often offer a favourable price and obtain discounts.
- ◆ Flexibility – such suppliers can fulfil orders of variable sizes (single units or multiples) when the manufacturer cannot always do so. Retailers may also be involved in leasing equipment.



- Tip** • You should be aware that wholesalers and retailers can be a barrier between you and the manufacturer. Sometimes they place their own name plates on equipment so you don't even know who the manufacturer is, or how to contact them when facing a problem with the equipment.

International Supply Organizations

These can be commercial procurement agents, as well as non-profit supply organizations.

Procurement agents are commercial companies, such as the Crown Agents, that will purchase goods on your behalf, and add a percentage for doing so in order for the company to make a profit.

Non-profit supply organizations can be national organizations such as Joint Medical Stores in Uganda and Mission for Essential Drugs And Supplies in Kenya, or international bodies such as Technologie Transfer Marburg in Germany and International Dispensary Association in the Netherlands. They work on the not-for-profit principle, so any charges passed on to you are to cover their costs only.

The international supply organizations offer an alternative to purchasing directly from manufacturers. Buying in this way is particularly attractive for Purchasing and Supplies Officers, who may have limited experience, for the following reasons:

- ◆ Expertise – international supply organizations can provide procurement expertise together with illustrated catalogues and price lists.
- ◆ Cost-effectiveness – as they are not tied to particular manufacturers, and act as wholesalers buying products in bulk from many sources, these organizations are in a unique position to be able to provide internationally competitive prices. Non-profit supply organizations have the added advantage of being able to offer you even better prices as they are not trying to make a profit from the transaction.
- ◆ Wider range of contract size – international supply organizations can also supply a range of contracts since they both hold bulk stocks and can make small volume equipment sales that may not interest the manufacturers.

Non-profit supply organizations can play a valuable role in some tenders and quotes, depending on whether the external funder has any restrictions on their use.



- Tip**
- You should be aware that many international supply organizations deal in all types of products and do not necessarily have any experience of health sector goods. It is important to identify those that have knowledge and experience of healthcare technology products.
 - International supply organizations do **not** usually provide you with aftersales support. They may be able to negotiate for aftersales support from the manufacturer on your behalf, if you request it.



Country Experience

When the World Bank finances projects, they have rules about buying from international non-profit supply organizations, as follows:

- ◆ *In emergencies and disasters, or where the number of items is large but the overall value is small, procurement directly from established UN agencies such as UNICEF, and non-profit supply organizations such as the International Dispensary Association is acceptable.*
- ◆ *However, the total amount of procurement directly from these organizations on any given project should remain small, and should be used only when an international open tender is not possible. In other words, no more than US\$ 5 million should be procured from UN agencies, and US\$ 250,000 from NGOs experienced in procurement.*

International Turnkey Organizations

You can contract these commercial firms to undertake part, or all, of the procurement and commissioning activities described in this Guide on your behalf. To achieve this, they utilize a combination of their own engineers, those recruited for the duration of the contract, and manufacturers' representatives. They can provide advice on the design of rooms, and the schedule of equipment and service supplies required. In many cases, however, they operate to a brief provided by the client's architects.

As for all other types of secondary suppliers listed above, it is important to remember that turnkey organizations:

- ◆ do not all have knowledge and experience of the health sector
- ◆ can be a barrier between you and the equipment manufacturers
- ◆ do not usually provide you with aftersales support for the goods supplied.

In addition, the interests of the turnkey organization are not the same as those of the client. It is in the turnkey organization's interest to supply as much expensive equipment as possible, which may come from particular manufacturers that they have close ties to. Care must be taken with the selection of such firms, their contract, and the goods they offer to supply.

Whether to Buy Locally (Local or Imported Products) or Internationally

For equipment, an international bid almost always results in lower prices than a tender or quotation limited to the local market. Therefore, in both the public and private sectors, developing countries most frequently purchase their equipment from foreign sources.

If purchasing from abroad, it is worth noting that suppliers of equipment are unlikely to provide a full range of aftersales services to buyers in developing countries. This is because it is often difficult for suppliers to identify local companies with the facilities and staff required to provide aftersales support. In addition, setting up such a support network is expensive, and suppliers are unlikely to do this until they are confident that a stable market for their goods will be established.



- Tip** • At every opportunity when talking and negotiating with international suppliers, provide feedback on the performance of their local representative if they have one. If they don't have a local representative, provide local knowledge of firms with suitable facilities and skills to act as representatives.

4.3 Different types of supplier available

There may be some instances when it is cheaper to purchase locally – for example, where the shipping cost is high and the product cost is low. You may also prefer to purchase items which are manufactured locally to encourage the development of sustainable local markets, particularly for simple items.



Tip • If available, quality, low value and small volume items should be purchased locally.

A summary of the benefits and drawbacks of buying locally or internationally is given in *Box 22*.

BOX 22: Advantages and Disadvantages of Local or International Purchasing

Source	Advantages	Disadvantages
Local	<ul style="list-style-type: none">◆ speed and efficiency of communication◆ makes payment easier – local agents can sometimes accept local currency and allow deferred payments◆ helps the delivery process – local agents often handle port clearance◆ introduces new products which may be cost-effective alternatives to existing products◆ more appropriate products, if made locally◆ commissions paid on sales help local aftersales support capabilities◆ knowledge about actual product and support available locally◆ quick availability in emergencies◆ prompt delivery◆ lower transport costs◆ provides support to the local economy	<ul style="list-style-type: none">◆ may slow communication, if untrained, unmotivated, or a part-timer◆ may increase costs through addition of commission and other charges – could be as much as 15 to 30 per cent of export price◆ higher unit prices paid for low volumes◆ not always available in the quantity and quality needed◆ local capacity and services may be insufficient or unavailable◆ shortages may occur in the local supply market
International	<ul style="list-style-type: none">◆ more competitive products at lower prices (depending on delivery costs)◆ products of better quality (possibly)◆ can order a wider range of goods of different complexities◆ more likely to fulfil your specifications (if appropriate)◆ better capacity, financial position, reputation, and reliability (if good sources found)	<ul style="list-style-type: none">◆ communication may be more difficult◆ longer delivery time◆ higher transportation costs◆ foreign currency difficulties◆ complex payment structures (letters of credit, bank drafts, etc)◆ import duties and insurance◆ delays in delivery due to weather, transport, strikes, and customs action◆ complexity of buying abroad◆ legal and commercial considerations and procedures involved in buying abroad◆ unavailability of local support services◆ does not support the local economy◆ products may be inappropriate to local needs and conditions

Figure 11 provides you with some factors to consider when deciding where to source equipment.

Figure 11: Things to Consider when Sourcing Equipment

Issues	Considerations
Do you need both equipment and services?	Unless the equipment is simple, your contracts with suppliers should specify both the equipment (hardware) and services. This can be difficult when the contract is for only one health facility or a few items. This is one reason why it is important to standardize equipment, and to join with others to buy in bulk.
Are you buying complex or expensive equipment?	It is prudent to stick to well-known and reputable manufacturers or suppliers. Ideally, choose those that are able to offer a full range of support services, including: accessories, spare parts, advice, training, technical back-up and support, troubleshooting, maintenance, servicing and repair. Consider pre-qualifying these suppliers – see <i>Section 4.4</i>).
Are you buying only a few items of one type?	It may not be economical to request the suppliers to visit to commission and train staff. They should have a suitable agent in the region that could undertake these activities.
What can local distributors offer?	Find out who distributes equipment in your area. If the seller is an independent distributor, what is his/her relationship with the manufacturer? Remember, if they sell exclusively for a particular manufacturer, they can only offer you one make of products. Alternatively, they may represent several manufacturers, and offer you competing lines.
Is the supplier authorized to supply?	Request a 'letter of authorization to supply' from the supplier. This ensures that the supplier is legitimately offering products that he/she has the authority to sell. It is customary for suppliers to show that they have authority to sell in particular countries and regions. Letters of authorization can, but need not, apply to both equipment and equipment-related supplies.
What is the local impact of your decision?	Decision-makers should be aware of their influence on the shape and competitiveness of the local equipment industry, and bear in mind any policy to purchase locally.

4.4 IDENTIFYING SUITABLE SUPPLIERS

To get the best suppliers, your Procurement Unit needs a credible and reliable screening, assessment and selection process.

Screening of prospective suppliers can take place:

- ◆ before the bidding/quoting process (known as pre-qualification); or
- ◆ after the bidding/quoting process (known as post-qualification).

It is used to narrow the field to suitably capable companies from which to accept offers.

If your purchasing method is open (open tender, national competitive bid), you can receive responses from any potential supplier, whether you know of them or not. In this instance you should post-qualify them during the bid/quote evaluation process (*Section 6.3*).

If your purchasing method is restricted (restricted tender, competitive negotiation, request for quotes, direct ordering), you need a list of suppliers to approach. Ideally this should be a list of suppliers that you have pre-qualified (see below), but it can also be a list of suppliers who have expressed an interest in the past, which you then post-qualify during the bid/quote evaluation process.

Selection of the final supplier and product occurs once all bids/quotes have been evaluated and compared (*Section 6.3*). However, you can prepare for this by identifying suitable qualification criteria for the suppliers.

The screening process should be ongoing, and should consider:

- ◆ supplier and product quality
- ◆ service reliability
- ◆ delivery time
- ◆ capability and technical capacity – the ability to offer technical advice, back-up and support, troubleshooting, servicing, repair, and supply of consumables, accessories, and spare parts
- ◆ experience and reputation – have they given good service in the past? Is the experience of their products good? Are they well represented in your country or region? What are their references?
- ◆ formal certification – do they have ISO 9000 certification or other independent assessment results (see *Annex 4*)?
- ◆ formal authorization – have they the authority from the manufacturer to supply the goods?
- ◆ financial viability – can they produce copies of their audited accounts?

If properly managed, screening of prospective suppliers and ongoing monitoring, helps to eliminate substandard suppliers and ensure that only the most reliable supplier is contracted.



- Tip**
- You should use the same criteria for pre- and post-qualification
 - You may have a National Regulatory Authority (*Section 2.2*) that already screens suppliers. If not, you should buy only from those suppliers that are known to provide quality products, because their products have been approved by their own national regulatory authority (see *Annex 4*).
 - You should keep an up-to-date list of suppliers that express an interest in providing goods and services.

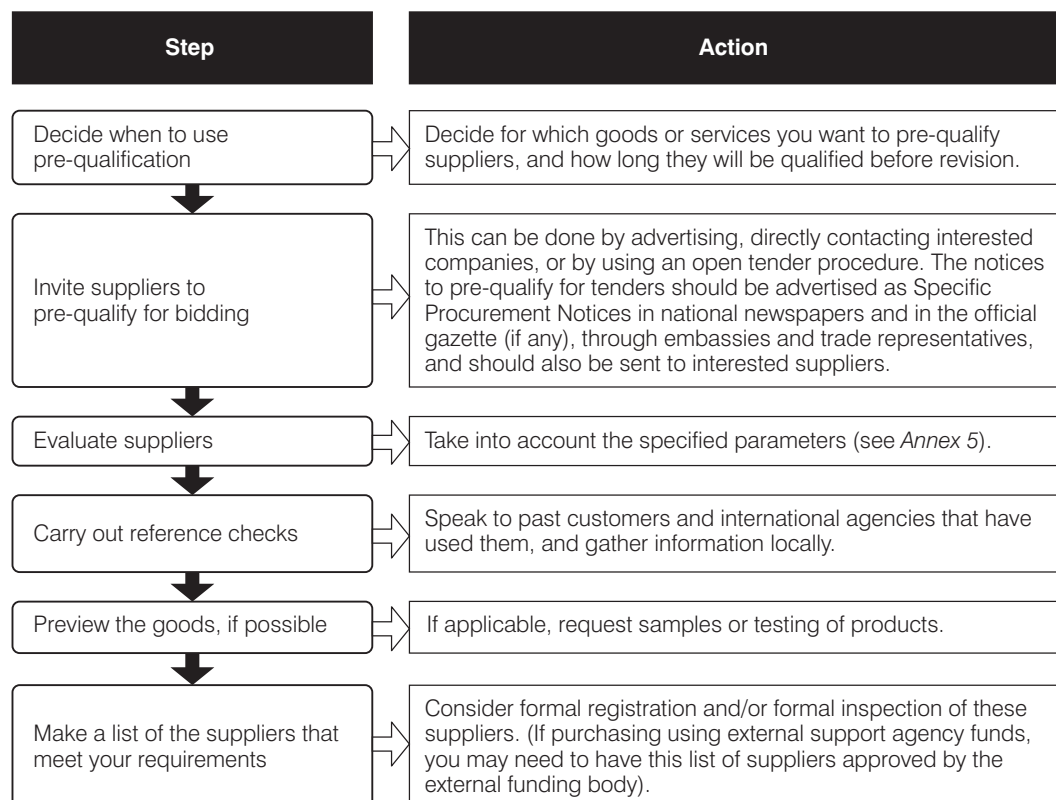
Pre-Qualification

Pre-qualification means that potential suppliers are formally screened before bids or quotes are requested from them. This is used for restricted purchasing processes where suppliers receive direct invitations, such as restricted tenders and competitive negotiation.

Pre-qualification is not a device intended to reduce competition, instead it is a process to ensure invitations to bid/quote are extended only to those who have adequate capabilities and resources.

A sample questionnaire for pre-qualifying suppliers, together with a list of the characteristics of a good supplier, is provided in *Annex 5*. *Figure 12* provides the steps to take when pre-qualifying suppliers.

Figure 12: Steps to Take to Pre-Qualify Suppliers



Once you have drawn up a list of pre-qualified suppliers, you can then issue purchase documents and ask them to bid/quote.

Establishing such a list can be time consuming. However, in the long run, it speeds up the time taken to adjudicate bids and award contracts. It also reduces the workload of the purchaser who would otherwise have to evaluate bids from unqualified suppliers.

When asking for new quotations and bids, you should always consider new bidders alongside your list of pre-qualified suppliers, in order to ensure continued competition. Ideally, you should review your list of pre-qualified suppliers at least every two years. This enables suppliers who did not pre-qualify the first time to apply again for pre-qualification at a later stage.

Also, you can threaten poor performing suppliers with being removed from the list of pre-qualified suppliers unless they improve.



Country Experience

Developing countries can contact agencies such as UNICEF and WHO/EPI who have a list of qualified suppliers that may be accessed (for example, suppliers of cold chain equipment such as refrigerators).

Post-Qualification

Post-qualification means that potential suppliers are screened after bids or quotes have been evaluated. This is used for all open purchasing processes where invitations have been advertized (such as open tenders and national competitive bids), and any process where you have not been able to pre-qualify the suppliers.

In this case, the screening of suppliers does not take place until after bids/quotes have been received and evaluated (*Section 6.3*). Then the Procurement/Tender Committee uses the ‘supplier qualification criteria’ to assess the supplier’s capabilities, based on forms you have asked the supplier to complete and samples they have provided. Sample criteria for evaluating past, current, and new suppliers, and the characteristics of a good supplier are provided in *Annex 5*.



Tip • You must ensure that the supplier qualification (screening) criteria are specified in your purchase document (*Section 5.5.2*), so that suppliers are aware of how they will be judged.

If there are numerous offers from suppliers there may be long delays in awarding contracts, as it is necessary to ensure your chosen suppliers can provide quality products and services. Should long delays occur, it may be necessary to reconfirm prices, or ask suppliers to re-bid, before finalizing the contract (*Section 6.3*).

Monitoring

Once selected, the Procurement Unit should also monitor suppliers throughout the procurement process and throughout their contract term. To do this, you need a monitoring system in place (*Section 9.2*). This will be based on the supplier qualification criteria which was originally used to select suppliers.

The Procurement Unit should maintain a cumulative file for each supplier with copies of registration documents, references, special correspondence, complaints and other anecdotal supplier information. This database may also be useful to select suppliers for coming tenders/quotations.

Disqualification

You should also have a system and criteria in place for disqualifying or barring suppliers who perform poorly, supply sub-standard products, or do not adhere to contract terms. Suppliers should not be disqualified permanently. Instead, a register of barred suppliers should be maintained for an agreed time limit. Re-admittance will depend on re-inspection.

Note: disqualification or being put on a barred list is not the same as refusal for pre-qualification. Only the most reputable and reliable suppliers will be pre-qualified. The other suppliers assessed are not pre-qualified. However, they are not automatically barred.

Box 23 contains a summary of the issues covered in this Section.

BOX 23: Summary of Issues in Section 4 on How to Decide on the Way to Purchase

Models	Health Service Providers	<ul style="list-style-type: none"> ◆ decide what should be procured centrally and what procurement can be decentralized ◆ decide if group procurement will be used, and who with ◆ decide whether and how to undertake mixed procurement ◆ decide whether to use supply-period contracts ◆ decide whether and when to use procurement agents
	Procurement Units	<ul style="list-style-type: none"> ◆ procure using the model appropriate to each situation as per the health service provider organization's central guidelines
Methods	Health Service Providers or a higher authority (such as the Ministry of Finance)	<ul style="list-style-type: none"> ◆ decide the value limits and authority levels for each purchasing method, so that it is clear when they should be used and by whom ◆ decide where tenders should be undertaken (at central, regional, district, or facility level), and establish the appropriate Procurement/Tender Committees
	Procurement Units (at all levels)	<ul style="list-style-type: none"> ◆ follow the health service provider's rules for each type of purchasing method (usually found in the Purchasing/Supplies Manual – <i>Section 2.2</i>)
Suppliers	Procurement Units (at all levels)	<ul style="list-style-type: none"> ◆ gather information from multiple sources on the different types of suppliers available, and their characteristics ◆ use the types of supplier required by the external support agency ◆ approach the types of suppliers appropriate to your level
Screening	Health Service Providers	<ul style="list-style-type: none"> ◆ develop 'supplier qualification criteria' (see <i>Annex 5</i>) ◆ use both pre- and post-qualification of suppliers (see <i>Annex 5</i>), as appropriate to the purchasing method (see <i>Box 18</i>) ◆ develop a process for monitoring supplier performance ◆ ensure there is a system for disqualifying poor suppliers
	Procurement Units (at all levels)	<ul style="list-style-type: none"> ◆ compile a list of suppliers that have expressed an interest ◆ screen the suppliers that you use at your level ◆ feed back information on the performance of suppliers and their products to groups and authorities that need to know (<i>Section 9.2</i>)

5. HOW TO PREPARE FOR PROCUREMENT

Why is This Important?

There are certain pre-purchase activities that must take place every time you purchase equipment. These ensure you buy only the equipment you need, enable you to make efficient use of your skills and time, and ensure you are prepared, so that all activities go smoothly.

The pre-purchase activities already discussed (*Sections 3 and 4*) will help you determine which options to choose for each round of procurement. These options will then have a knock-on effect on other preparatory activities. For example, your method of purchasing will determine what purchase documents you must prepare. Likewise, your chosen model for procurement will have implications in terms of the personnel involved. Also, the source of funding will determine the time required

In this Section we look at the pre-purchase activities that must take place each time you decide to obtain equipment:

- ◆ Determining the quantities required (*Section 5.1*).
- ◆ Deciding whether to use lots (*Section 5.2*).
- ◆ Finalizing how to procure (*Section 5.3*).
- ◆ Timetabling your procurement (*Section 5.4*).
- ◆ Preparing your procurement paperwork (*Section 5.5*).

5.1 DETERMINING THE QUANTITIES NEEDED

Available Plans

Estimate
an approximate judgement
of number, amount, quality,
and character

The planning and budgeting activities of your HTM Working Group (see *Guide 2*) should have produced the following short- and long-term plans (ideally covering five or more years):

- ◆ The Equipment Development Plan showing healthcare technology needs.
- ◆ The Equipment Training Plan showing ongoing skill development requirements.
- ◆ The Core Equipment Expenditure Plan showing expenditure requirements.
- ◆ The Core Equipment Financing Plan showing the planned funding allocated for these needs.

The annual planning and budgeting process should identify, cost, and prioritize which activities from these plans, can be afforded and achieved in the coming year (see *Guide 2*). Thus, by the date set by your health service provider for finalizing annual budget estimates, you should have developed the:

- ◆ Annual Purchase Activities for replacement and new equipment, including the package of material inputs (stocks of accessories, consumables, spare parts) and support activities (such as pre-installation, installation, commissioning, and initial training)
- ◆ Annual Rehabilitation Activities for major large-scale renovation projects
- ◆ Annual Corrective Activities for undertaking repairs and PPM, and covering consumable and administrative inputs
- ◆ Annual Training Activities for ongoing training and skill development in all aspects of healthcare technology management
- ◆ Annual Equipment Budget showing income and expenditure.

However, if you have not yet undertaken these steps, *Guide 2* provides a short-cut planning and budgeting process. As a bare minimum, the HTM Working Group needs to:

- ◆ review the equipment inventory and maintenance records to see what equipment needs replacing
- ◆ gather requests for urgent needs for replacement and new equipment from Heads of Department
- ◆ apply the priorities outlined in your purchasing and replacement policies to decide what to buy
- ◆ agree the likely package of inputs and support activities for the equipment to be purchased
- ◆ undertake an exercise (see *Guide 2*) to calculate the realistic usage rates of consumables, replacement accessories, spare parts, and maintenance materials.

The HTM Working Group submits the requirements to the Health Management Team, which:

- ◆ checks available budgets to make sure there are sufficient capital funds to buy the equipment with its package of inputs and support activities. There must also be sufficient recurrent funds to buy the existing needs for ongoing recurrent supplies
- ◆ increases future recurrent budgets, if equipment is bought, to cover the additional running costs.

Quantification

Quantify
express as exact measurable
numbers, amounts, sizes,
and types

During the annual planning and budgeting process (see *Guide 2*), different members of staff will finalize the lists of requirements for the different needs, with cost estimates. These requirements must be submitted to the Procurement Manager. The members of staff responsible for quantifying and submitting the actual requirements are detailed in the rest of this Section.

For procurement purposes, the Procurement Unit needs to list the items they have to purchase according to the following categories:

- a. orders from capital budgets
- b. orders from recurrent budgets.

a. Orders from Capital Budgets

Spending financed by capital budgets is different from spending financed by recurrent or operational budgets, because:

- ◆ the cost per item (equipment, contract, or project) is usually much greater – items tend to be high value, one-off purchases, which make up a sizeable portion of most budgets
- ◆ other associated needs (supplies, materials, labour) should be purchased at the same time as the item **while the capital funds are available**, to ensure the new item can function
- ◆ the purchasing procedure is usually more complex.

Thus capital budgets are used for:

- ◆ equipment
- ◆ the package of inputs (accessories, stocks of consumables and spare parts, freight and insurance, and possibly other inputs from the supplier – see below)
- ◆ pre-installation work
- ◆ support activities which ensure that you can use the equipment (installation, commissioning, and initial training – these may be part of the package above if the supplier is providing them)
- ◆ major equipment rehabilitation work that is too expensive to be covered by your usual annual recurrent maintenance allocation.

These requirements are quantified as follows:

Equipment

New and replacement equipment needs will form part of the Annual Purchase Activities drawn up by the HTM Working Group, who will also determine indicative prices for the annual cost estimates (see *Guide 2*).

The sorts of equipment you buy are likely to depend upon the level of health services you provide. Health facilities are most likely to purchase single items of equipment (for example, an ultrasound machine, an X-ray machine). Districts and national health authority levels, on the other hand, purchase multiple items of equipment to equip or re-equip a number of health facilities.

The package of inputs and support activities required from the supplier

The HTM Working Group decides which elements of the package are to be provided by the supplier for each type of equipment. This will be determined when annual cost estimates are prepared, which include indicative prices. However, different members of staff will need to determine what items you actually need to buy, and how many. They will then submit these requirements to the Procurement Unit. *Box 24* highlights some of the issues you need to consider.

BOX 24: Quantifying the Package of Inputs for Equipment Purchases

Package element	Considerations
<p>An initial stock of accessories to cover your initial stock period (possibly one or two years)</p> <p>Heads of User Departments should calculate the needs</p>	<p>Depending on your knowledge of the equipment, you have two choices:</p> <p>Either you ask in your specification (<i>Section 5.5.2</i>) for the supplier to submit an offer and price for the types and quantities of accessories that he thinks you need for your initial stock period.</p> <p>Or, you consider how you want to use the equipment, and use the procedures in <i>Guide 4</i> to decide:</p> <ul style="list-style-type: none"> ◆ the different types of accessories to get (for different modes of operation of the equipment, different applications, different size patients or samples, whether re-usable or disposable, and all associated connecting parts) ◆ the quantities required to make up a 'basic set' for each piece of equipment (for example, although you only use one monopolar diathermy electrode at a time, you may need to own a basic set of three monopolar electrodes – one in use, one being cleaned, one as a spare) ◆ the multiples of the basic set required for the initial stock period (depending on the lifetime of the accessory, and the numbers of the same piece of equipment being purchased).
<p>An initial stock of consumables to cover your initial stock period (possibly one or two years)</p> <p>Heads of User Departments should calculate the needs</p>	<p>Depending on your knowledge of the equipment, you have two choices:</p> <p>Either you ask in your specification (<i>Section 5.5.2</i>) for the supplier to submit an offer and price for the types and quantities of consumables that he thinks you need for your initial stock period.</p> <p>Or, you consider how you want to use the equipment, and use the procedures in <i>Guide 4</i> to decide:</p> <ul style="list-style-type: none"> ◆ the likely consumption rate of each consumable at your health facility ◆ available pack sizes ◆ typical shelf lives ◆ the quantities required to cover your initial stock period ◆ multiples to cover the numbers of the same piece of equipment being purchased

Continued opposite

BOX 24: Quantifying the Package of Inputs for Equipment Purchases (continued)

Package element	Considerations
<p>An initial stock of spare parts to cover your initial stock period (possibly one or two years)</p> <p>The HTM Manager should calculate the needs</p>	<p>Depending on your experience with maintaining the equipment, you have two choices:</p> <p>Either you ask in your specification (<i>Section 5.5.2</i>) for the supplier to submit an offer and price for the types and quantities of spare parts that he thinks you need for your initial stock period, for both planned preventive maintenance and likely breakdowns.</p> <p>Or, you use your experience and the procedures in <i>Guide 5</i> to decide:</p> <ul style="list-style-type: none"> ◆ the different parts to get for unpredictable work, such as repairs, by considering the life of the part, how many machines you need that part for, and at what service level the parts will be stored ◆ the different parts to get for planned preventive maintenance, by considering the rate of use of the part, how many machines the part is required for, and at which service level the parts will be stored
<p>Freighting and insurance</p> <p>The HTM Working Group should identify the needs</p>	<p>You list your particular requirements in your purchase document (<i>Section 5.5.2</i>) so that the supplier can offer a price.</p>
<p>Installation, commissioning, and initial training</p> <p>The HTM Working Group should determine who does this</p>	<p>If you are asking the supplier to provide these support activities, you list them in the specification (<i>Section 5.5.2</i>) so that the supplier can offer a price.</p>

Pre-installation work

The requirements will be determined when specific annual cost estimates are prepared, and amended if necessary once the final equipment choice is known (*Section 6.4*), as shown in *Box 25*.

BOX 25: Quantifying the Purchase Requirements for Pre-Installation Work

Requirements	Activity
<p>Site preparation tasks</p> <p>The HTM Manager should calculate the needs</p>	<p>Use the procedures in <i>Guide 2</i> to:</p> <ul style="list-style-type: none"> ◆ plan the work ◆ draw up bills of quantities for the materials required ◆ identify needs for contracts ◆ determine indicative prices
<p>Lifting equipment</p> <p>The HTM Working Group (or Commissioning Team) should calculate the needs</p>	<p>Use the procedures in from <i>Guide 2</i> to:</p> <ul style="list-style-type: none"> ◆ identify the need for hiring of lifting equipment ◆ identify available sources and costs ◆ determine indicative prices

Continued overleaf

BOX 25: Quantifying the Purchase Requirements for Pre-Installation Work (continued)

Requirements	Activity
Warehousing The HTM Working Group (or Commissioning Team) should calculate the needs	Use the procedures in <i>Guide 2</i> to: <ul style="list-style-type: none"> ◆ identify the need for warehousing of equipment ◆ identify available sources and costs ◆ determine indicative prices

Support activities, if undertaken in-house

The HTM Working Group will identify whether there are elements of the package you can provide yourselves. The requirements will be determined when specific annual cost estimates are prepared, and amended if necessary once the final equipment choice is known (*Section 6.4*), as shown in *Box 26*.

BOX 26: Quantifying the Purchase Requirements for In-House Support Activities

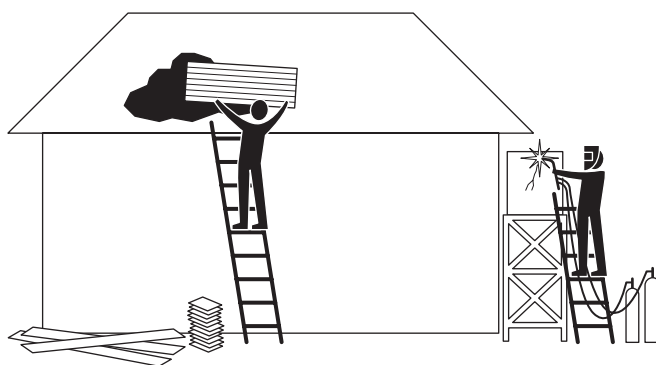
Requirements	Activity
Installation and commissioning undertaken in-house The HTM Manager should calculate the needs	Use the procedures in <i>Guide 2</i> to: <ul style="list-style-type: none"> ◆ plan the work ◆ draw up bills of quantities for the materials required (cables, piping, connectors) and the supplies required (consumables needed during commissioning) ◆ identify needs for contracts (extra labour, or the whole job) ◆ determine indicative prices
Initial training undertaken in-house The HTM Working Group (or its training sub-group) should calculate the needs	Use the procedures in <i>Guide 2</i> to: <ul style="list-style-type: none"> ◆ plan the work ◆ identify training materials required (photocopying of handouts, paper) and the supplies required (consumables needed during training) ◆ identify needs for contracts (trainers, room hire, accommodation) ◆ identify needs for equipment hire (overhead projectors, for example) ◆ determine indicative prices

Major equipment rehabilitation work

The annual planning and budgeting process will identify the major equipment rehabilitation tasks which cannot be funded using recurrent budgets. The requirements will be determined when specific annual cost estimates are prepared, as shown in *Box 27*.

BOX 27: Quantifying the Purchase Requirements for Major Equipment Rehabilitation Work

Requirements	Activity
Major equipment rehabilitation work The HTM Manager should calculate the needs	Use the procedures in <i>Guide 2</i> to: <ul style="list-style-type: none"> ◆ plan the work ◆ draw up bills of quantities for the materials required ◆ identify needs for contracts ◆ determine indicative prices



- Tip**
- The Procurement Unit is responsible for compiling the list for procurement. This is carried out by combining the lists and requests submitted by different departments and/or facilities, and linking them to the annual action plans.
 - Manufacturers' manuals, their local agents, and suppliers can often provide useful information about the items required and the likely consumption rates. This can help you to calculate the quantities required and associated costs.

b. Orders from Recurrent Budgets

Spending financed by recurrent or operational budgets is different from spending financed by capital budgets, because:

- ◆ the cost per item (supplies, utilities, contracts) is usually less – items tend to be low value individually, and are bought in small volumes
- ◆ but the items are constantly being replaced at regular intervals, so cumulatively make up an important portion of most budgets
- ◆ the purchasing procedure is usually better understood, as it is undertaken routinely.

Thus recurrent budgets are used for:

- ◆ replacement accessories
- ◆ regular supplies of consumables
- ◆ regular supplies of spare parts
- ◆ regular supplies of maintenance materials
- ◆ contracts
- ◆ administrative inputs for equipment and maintenance management
- ◆ inputs for ongoing training.

Unfortunately these needs usually get lost among all the general and medical supply requirements (food, stationery, bandages, drugs, etc). To keep your existing equipment in working order, you need to quantify accurately throughout each year the various equipment-related supplies you need to purchase. This can be difficult, and facilities often run out of stocks, unless:

- ◆ you have undertaken a special exercise to determine realistic needs, rather than simply ordering what you bought last time which may not have been enough. *Guide 2* provides advice on how to do this.
- ◆ you have made equipment-related supplies ‘stockable’ items in your stores system (*Section 8.4* and *Guides 4 and 5*)
- ◆ you have a good stock control system (*Section 8.4* and *Guides 4 and 5*).

Recurrent supplies estimates will form part of the Annual Corrective Activities and the Annual Training Activities drawn up by the HTM Working Group, who will also determine indicative prices for the annual cost estimates (see *Guide 2*).

However, to quantify the actual needs, different members of staff should consider the issues presented in *Box 28*.

BOX 28: Quantifying Ongoing Requirements for Recurrent Supplies

Package element	Considerations
<p>Stocks of consumables and replacement accessories</p> <p>The Stores Controller and Heads of User Departments should calculate the needs</p>	<p>Depending on your stores system, you have two choices:</p> <p>If these items are 'stockable' in the stores system and you have a good stock control system, the Stores Controller:</p> <ul style="list-style-type: none"> ◆ uses stock control cards to calculate the order quantity (by multiplying the average monthly consumption by the time between orders), using the procedures in <i>Guide 4</i> ◆ consults Heads of Department for new additional needs (see <i>Box 24</i>). <p>If these items are 'non-stockable' in the stores system, Heads of Department use their knowledge of the equipment and the procedures in <i>Guide 2</i> to calculate the needs, using as guides:</p> <ul style="list-style-type: none"> ◆ experience of typical requirements for expected workloads ◆ new requirements for items being brought back into working condition (see major rehabilitation work and maintenance plans) ◆ additional requirements for planned new purchases ◆ user PPM schedules and timetables ◆ an allowance for emergencies.
<p>Stocks of spare parts and maintenance materials</p> <p>The Stores Controller and the HTM Manager should calculate the needs</p>	<p>Depending on your stores system, you have two choices:</p> <p>If these items are 'stockable' in the stores system and you have a good stock control system, the Stores Controller:</p> <ul style="list-style-type: none"> ◆ uses stock control cards to calculate the order quantity (by multiplying the average monthly consumption by the time between orders), using the procedures in <i>Guide 5</i> ◆ consults the HTM Manager for new additional needs (see <i>Box 24</i>). <p>If these items are 'non-stockable' in the stores system, the HTM Manager uses their knowledge of the equipment and the procedures in <i>Guide 2</i> to calculate the needs, using as guides:</p> <ul style="list-style-type: none"> ◆ experience of typical requirements for likely breakdowns, planned remedial work, and PPM schedules and timetables ◆ additional requirements for planned new purchases ◆ replacement of tools ◆ an allowance for emergencies.
<p>Maintenance contracts</p> <p>The HTM Manager should calculate the needs</p>	<p>Use the procedures in <i>Guide 2</i> to calculate the needs, using as guides:</p> <ul style="list-style-type: none"> ◆ a review of the previous year's contracts ◆ experience of typical requirements for likely breakdowns, planned remedial work, and PPM schedules and timetables ◆ additional requirements for planned new purchases ◆ calibration of tools.

Continued overleaf

BOX 28: Quantifying Ongoing Requirements for Recurrent Supplies (continued)

Package element	Considerations
Administrative inputs Heads of Department and the HTM Manager should calculate the needs	Use the procedures in <i>Guide 2</i> to calculate the needs for: <ul style="list-style-type: none"> ◆ stationery, forms, records ◆ literature, written resources, subscriptions ◆ utilities ◆ fuel allocations ◆ protective clothing ◆ any leasing (rental) charges (<i>Section 5.3</i>).
Training inputs The HTM Working Group (or training sub-group) should calculate the needs	Use the procedures in <i>Guide 2</i> to: <ul style="list-style-type: none"> ◆ review the Equipment Training Plan ◆ identify training materials required (photocopying of handouts, paper) and the supplies required (consumables needed during training) ◆ identify needs for contracts (trainers, room hire, accommodation) ◆ identify needs for equipment hire (overhead projectors, for example) ◆ determine indicative prices



- Tip**
- Maintaining accurate and up-to-date stock records will help you to determine how many recurrent items to stock.
 - The Procurement Unit is responsible for comparing the list of requests with past consumption, and clarifying any ‘out of the ordinary’ trends directly with the various departments and Stores Controller.
 - The procedures for drawing up maintenance contracts are provided in *Guide 5* on maintenance management.

Prioritization

With so many purchase requirements it is often necessary to prioritize needs to suit the funds available. *Guide 2* provides advice on prioritizing needs during the annual planning and budgeting process, and *Guide 5* provides advice on prioritizing maintenance work. The method suggested is the **VEN (VED) system** in which items are categorized as:

- ◆ **Vital** – items that are crucial for providing basic health services and should be kept functioning at all times.
- ◆ **Essential** – items that are important but are not absolutely crucial for providing basic health services. In other words, a period when they are out of operation can be tolerated.
- ◆ **Not so essential/desirable** – items that are not absolutely crucial for providing basic health services. In other words, it is possible to adapt and plan around their absence if they are out of operation.

If funds are limited, actions involving vital items should be given first priority, followed by those involving essential items. Items that are not so essential/desirable are given the lowest priority.

The task of prioritizing the requirement belongs to the relevant departments and the Health Management Team. It is not the job of the Procurement Unit.

Contingencies

Procurement should be carried out at all times according to your established plans. However, occasionally departments may require additional equipment and equipment-related supplies which were not in the original plans. This could be due to any of the following:

- ◆ Emergency unforeseen needs (requiring additional equipment, or training).
- ◆ Crisis breakdowns of serviceable equipment (requiring additional spare parts, maintenance materials, and contracts).
- ◆ Unexpected surges in workload, outbreaks and epidemics (requiring additional consumables and replacement accessories, and administrative inputs).

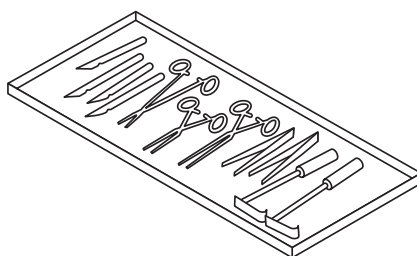
In these cases the relevant Head of Department/HTM Manager submits their needs to the HTM Working Group for consideration (see *Guide 2*). If approved, and the Health Management Team can allocate a budget, then the Procurement Unit can purchase the necessary items.

5.2 USING LOTS

Having identified what you need to procure, you can consider whether it is worth combining any of the requirements into lots (sets) to ease the procurement administration process.

Combining similar or related equipment items into lots for the purpose of purchasing them can provide you with substantial savings, by:

- ◆ reducing the timescale of the procurement and delivery processes
- ◆ achieving economies of scale
- ◆ attracting a larger number of bidders – ranging from suppliers bidding for a single lot or a small number of lots, to those able to supply all the lots.

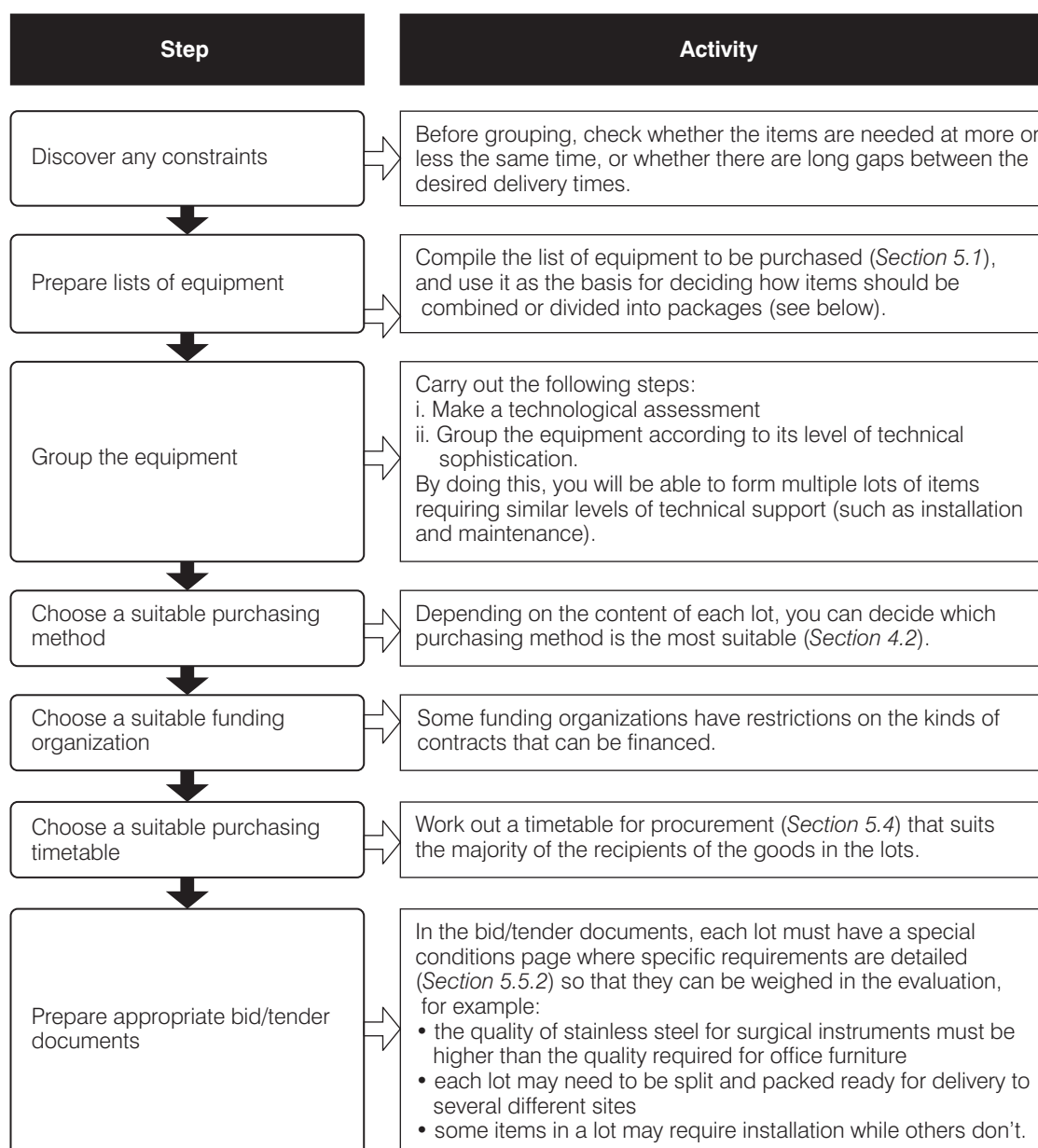


Some items are easy to group since they are well defined. Examples include office furnishings (furniture and fixtures), medical furnishings, surgical instruments, electrical supply equipment, plumbing fixtures, kitchen equipment and laundry equipment. Medical equipment is harder to group, as the term covers a much wider variety of items. Some examples of possible groupings that can be used are:

critical care equipment	ward equipment
imaging equipment	dental equipment
laboratory equipment	eye equipment

The steps you should take to group equipment into lots are provided in *Figure 13*.

Figure 13: Steps to Take When Preparing Lots





Experience in Uganda

In Uganda, the Ministry of Health observed that the grouping of similar equipment into specific lots has generated a wider response of eligible tender bids, thus increasing competition and the chance of better prices.

5.3 FINALIZING HOW TO PROCURE

At this stage in the pre-purchase activities, you are able to make decisions that will finalize how you are going to procure. Such decisions must be taken **each** time you procure equipment. We have already discussed all the different options, in *Sections 3 and 4*, so here we will simply describe the steps that are usually taken. (Please note that many of these steps are inter-linked, so they may occur in a different order.)

First of all, you will have determined:

- ◆ the type and quantities of equipment and equipment-related supplies required (*Section 5.1*)
- ◆ the lots to use (*Section 5.2*).

This will provide you with information that can help you make your next choices:

- ◆ The type of items to be procured and the size of the order will determine the most appropriate procurement model to employ (central, group, decentralized, mixed, using a procurement agent – *Section 4.1*).
- ◆ The financial limits and authority levels for such orders will determine the purchasing method (open tender, restricted tender, a quotation-based method, direct ordering – *Section 4.2*).
- ◆ The purchasing method will determine whether you must identify potential suppliers, and possibly pre-qualify them if you have not already done so (*Section 4.4*).

You can refer to the Core Equipment Financing Plan to identify the funds available and likely funding sources (government, self, external support agency – *Section 3.3*), and make decisions on:

- ◆ how to use government funds and your own funds
- ◆ the external support agencies to approach for funds that would be most appropriate for the type of goods/lots, value of order, and likely purchasing method
- ◆ which items cannot be financed and which external support agencies to ask for donations of equipment
- ◆ whether recurrent funds can be used to lease the equipment rather than purchasing it from the capital budget (*Section 3.3*).

You will then need to procure the goods according to the rules for each of the different ways of obtaining equipment:

- ◆ National rules for government funds.
- ◆ Own health service provider's rules for own funds.
- ◆ External support agency rules for external funds.
- ◆ Negotiations for donations.
- ◆ Commercial terms for leasing.

The next step is to decide when the procurement of these goods can occur (*Section 5.4*).

5.4 TIMETABLING YOUR PROCUREMENT

In previous sections, we have considered how to determine what items you require, and looked at various methods for procuring them. You will now need to go on to consider your procurement timetable. There are various options open to you.

Equipment and supplies may be procured on an irregular basis, or according to a planned and fixed timetable (schedule). For instance, you may decide to make a one-off purchase of an ultrasound machine because funds have become available. Alternatively, you could add it to your planned and scheduled orders and buy it at the same time as your other purchases.

Box 29 provides a brief description of common procurement timetables, and procurement is often achieved through a combination of these.



- Tip** • Most procurement takes place through a combination of procurement timetables for different categories of products.

The frequency with which items are ordered often depends upon:

- ◆ what you are purchasing
- ◆ whether this is a one-off or routine and recurrent purchase
- ◆ whether you are purchasing a low or high volume of items
- ◆ the supply system
- ◆ procurement procedures (this is dictated by who is financing the purchase)
- ◆ value of goods (this often dictates how often you buy and from whom)
- ◆ whether the supply source is local or international
- ◆ geography
- ◆ storage capacity
- ◆ administrative costs
- ◆ health situation (such as seasonal variations, epidemics).

BOX 29: Common Procurement Timetables

Timing	Description
Annual procurement	This consists of one time per year when orders should be placed for all items. Once the annual quantification exercise has been carried out, the entire annual amount (or as much as can be afforded) is procured using the appropriate purchasing method (<i>Section 4.4</i>), leasing, or requesting donations. There should also be mechanisms for making small supplementary procurements if needed, during the year. Ideally tenders/quotations should be advertised at the beginning of each financial year to minimize the chance of running out of stocks of equipment and supplies.
Scheduled procurement	This consists of periodic orders at set times during the year, such as monthly, quarterly, biannually. Orders are placed at the scheduled order dates for quantities large enough to cover average needs until the next order is scheduled (this includes stock needed during the lead time for that order, plus replenishment of stock).
Perpetual procurement	This consists of orders being placed as and when you need them, for example, whenever stock falls below a certain set level.
Single project procurement	This is often used when the procurement of healthcare technology is part of a larger project which is separately funded – for example, the construction of a new health facility.

For example:

- ◆ A central store might purchase most items on a yearly basis.
- ◆ Zonal stores (regional, diocesan, district) might order from the central store on a fixed re-supply interval, such as quarterly.
- ◆ Health facilities might order most items monthly from the regional or district stores, or less frequently, depending on their situation. For instance, an isolated rural hospital which is hard to reach may decide to order less frequently than an urban hospital which is closer to the store.



- Tip**
- Ordering the correct quantities on time avoids difficulties such as shortages, the need for emergency supplies, and being forced to accept inappropriate equipment at short notice. Overstocking is costly, and you should regularly review the quantities you require. (See *Guides 4 and 5* for advice on stock control).
 - In order to retain stock levels and receive items on time, you will need to plan for the long-term, particularly when procuring items from abroad.

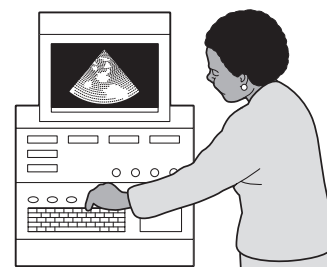
For time-critical procurement, you should timetable your procurement process carefully. It is often a good idea to start with the date that you want the equipment to be ready for use. From there you can work backwards, and deduct the time for ordering and all other parts of the procurement process (*Sections 6, 7 and 8*). An example is shown in *Box 30*.

BOX 30: An Example of Planning Time-Critical Procurement

A new specialist gynaecologist is expected to arrive for a new health facility, and it has been agreed that she should be equipped with an ultrasound machine. The machine needs to be commissioned and ready for use when she arrives. However, working backwards through the tasks we can see that:

◆ acceptance testing and commissioning	1 week
◆ local transport	1 week
◆ overseas shipping and customs clearance	3 weeks
◆ finalizing the contract and supplier filling the order	6 weeks
◆ evaluation of bids	2 weeks
◆ bidding process	5 weeks
◆ preparation of the bidding documents	3 weeks
◆ approval of funds for the ultrasound machine	3 weeks

Total 24



As a result, you have to be prepared to start the procurement work six months before the gynaecologist takes up her new post.

Whenever you procure, you should prepare a procurement plan that indicates the different procurement activities that you must carry out, with a timetable of when they should take place. This should include activities such as:

- ◆ when procurement paperwork should be prepared (*Section 5.5*)
- ◆ when pre-qualification documents should be issued (*Section 4.4*)
- ◆ when procurement notices will be advertized (*Section 6.1*)
- ◆ when purchase documents will be issued to suppliers (*Section 6.1*)
- ◆ when and where the public opening and evaluation of bids will take place (*Section 6.2*).

5.5 PREPARING YOUR PROCUREMENT PAPERWORK

The paperwork you need to prepare will vary, depending on your choice of procurement method. For example:

- ◆ If you have decided to **lease equipment** – you will need to complete the commercial leasing forms, contract, and other paperwork of the company concerned.
- ◆ If you have decided to **request donations** of equipment – you will need to complete your donation request form (see *Annex 6*) and any subsequent paperwork from the external support agency, such as a donation agreement. To assist the donation of appropriate goods, it will be advantageous to also prepare an equipment specification, technical and environmental data sheet, and any delivery requirements you have (*Section 5.5.2*).
- ◆ If you have decided to **purchase equipment** – you will need to follow the instructions in the remainder of this Section.

Whatever purchase method you choose, it is important that you prepare and use appropriate paperwork for the purchase process. This is usually in two parts:

- ◆ the **invitation to bid/quote** (also known as the invitation to tender/quote, or tender/quote notice), and
- ◆ the **purchase document** (also known as the purchase request document, tender document, bidding document, request for tenders/quotations, Purchase Order).

Depending on the purchase method you choose (*Section 4.2*), this paperwork can be comprehensive in design and detail (for tenders) or simpler (for quotations).

Preparing the purchase paperwork requires a significant investment of time and resources. You will need to consult with a wide range of staff from different disciplines, including: health workers, technical personnel, administrators and financial officers. Depending on the equipment being purchased, you may also need to consult builders and architects.

Standardizing the layout and common information to be contained in your purchase paperwork helps ensure a uniform approach and, in the long run, makes the purchase process much easier.



- Tip**
- If you need assistance with preparing purchase paperwork, you should seek advice from the appropriate national authorities and other institutions that frequently purchase equipment.
 - Make sure all purchase paperwork uses clear and unambiguous descriptions and instructions. The quality and evaluation of bids/quotes depends to a large extent on the quality of your paperwork. Be aware that ambiguous terms or poor specifications can lead to problems later on.

5.5.1 The Invitation to Bid

Invitation to bid
a notice to prospective suppliers that the buyer wants to purchase goods, used to advertize the tender/request for quotations.

The invitation to bid should outline the tender/quotation requirements. This should be **kept brief** – remember it may have to appear as an advertisement in a newspaper. The Procurement Unit should include information that describes:

- ◆ the nature of the purchase (what goods or services are required, for what purpose, etc)
- ◆ the purchasing group that is asking for offers
- ◆ the procedures to be used for the purchase (whether a tender or one of the quotation-based methods, possibly the timetable for the purchase process and the evaluation method, etc)

- ◆ conditions under which bids/quotes will be accepted (received on time, including all necessary information, all formalities are met, etc)
- ◆ how the purchase document (bidding document) can be obtained
- ◆ the charge for the purchase document, if applicable. Note: a charge is sometimes applied, in order to discourage time-wasters and to cover costs
- ◆ address for submission
- ◆ closing date for bids/quotes
- ◆ details of other dates covered by the purchase process (date of opening of bids/quotes, validity period of prices/offer, etc).

Depending on the purchase method used (see *Box 18* in *Section 4.2*), such purchase notices are:

- ◆ either advertized in:
 - official gazettes
 - technical magazines
 - national and international newspapers
 - trade publications
 - embassies
- ◆ or they are sent directly to the prospective suppliers.



Tip • If a fee is to be charged for the purchase document (bidding document), it must be reasonable and reflect only the cost of printing and delivery to prospective bidders. It should not be so high as to discourage qualified bidders.

The invitation for a quotation should always be in writing. It should be submitted to at least three suppliers. These should be either pre-qualified or be suppliers who have already expressed an interest.

5.5.2 The Purchase Document – Summary

Purchase document
where the buyer clearly states everything that they wish to purchase, and the terms of the purchase.

For the simplest purchasing methods (direct orders, obtaining quotes from three suppliers in your local town), you could use a standard pre-printed Purchase Order form (see *Annex 11* for an example). However, you would have to:

- ◆ state clearly that it was a request for a quote rather than an actual order
- ◆ attach sufficient additional information to encourage appropriate offers, such as the specification, details of the supply requirements, relevant drawings, etc. Details of what information to include are outlined in the remainder of this Section.



- Tip** • The information you provide must be sufficient to ensure you receive quotes from a number of suppliers, which are comparable in quality and cost.

However, for more complex purchasing methods, including tenders and most quotation-based methods:

- ◆ the Purchase Order is only used once the bidding and negotiating is over and you are placing your order (*Section 6.4*), and
- ◆ the actual purchase document usually consists of a whole series of forms and guidelines collected together.

The detail and content of purchase documents may vary, depending on the size and nature of the order. However, they generally include similar contents. The documents for quotations are likely to be less detailed and rigid than those for tenders.

Purchase documents need to provide:

- ◆ **item information** that describes all the things you want to purchase, set out in some form of schedule of requirements, and
- ◆ **order information** that provides instructions to bidders on the terms and conditions for supplying the goods.

As long as all pertinent details appear somewhere, there is no set rule for what you provide under the item information and what you provide under the order information. In this Guide, the phrase ‘item information’ is used to refer to all paperwork that requires a technical input from the end-users and maintenance staff. The phrase ‘order information’ is used to cover data that staff regularly involved in procurement will know.



- Tip** • Ensure all likely requirements for the goods or services are identified and included in this preparatory process.

Some information may apply to all items in the order (for example, language requirement or technology requirement may be generic for the whole country). Some information may apply to different parts of an order (for example, delivery to different health facility sites). More specific details may be relevant to one item only (for example, packaging and transport for refrigerated supplies).

The Procurement Unit must gather together the information from various sources and responsible bodies, and these are noted through the rest of this Section.

5.5.3 The Purchase Document – Part One: Item Information

The item information includes:

- a. the equipment specification and quantities required
- b. technical and environmental data
- c. special conditions page
- d. summary price schedule for the offer.

The Procurement Unit should obtain this information from the HTM Working Group (or its smaller Specification Writing Group).

a. Equipment Specification and Quantities

In your purchase document, you need to provide a clear generic specification, including:

- ◆ a detailed description of the equipment
- ◆ the ‘package of inputs’ needed to keep the equipment going through its lifetime (including delivery, installation, initial training, consumables, and aftersales support)
- ◆ the quantities required.

The specification is the **most important document**, both for the purchaser and for the potential supplier, since it sets out precisely what characteristics are required of the products or services sought.

Did you know?

Many countries suffer from using poor equipment specifications. Common mistakes include:

- ◆ **the product description is too short**, providing insufficient details of what is required. For example, a specification which says: ‘Please supply one autoclave’ is useless. It gives no details at all about the type of unit, what needs to be autoclaved, its size, or how it will be powered (by electricity or kerosene). Many different sorts of autoclaves could be supplied, most of which would be unsuitable.
- ◆ **the product description is too rigid**. If the description provided is not general enough, this can be very limiting. For example, a specification which states: ‘Please supply one X-ray machine such as a Siemens model Unistat 11’ is so specific that most suppliers (other than Siemens) cannot help. The only exception to this rule would be if you actually wanted to buy a particular make and model of machine (for example, if you have standardized to it – see Box 32).
- ◆ **the product description reduces your options**, by providing a description of a type of equipment rather than the function you require. For example, a specification which states: ‘Please supply one peristaltic pump for diffusion’ means that all you will be offered is peristaltic pumps. If instead you say you want to undertake infusion with the best available pump, you widen the choice of different available pumps that suppliers can offer.

The HTM Working Group (or a smaller Specification Writing Group) is responsible for developing a library of generic specifications. Such specifications are based on the functions you want the equipment to perform, not brand names. *Guide 2* on planning and budgeting describes how to develop such a library, using a consultation process with relevant equipment users and maintainers.

Box 31 describes the sorts of information that you should include in your specification.

BOX 31: Contents of a Typical Equipment Specification

Element	Examples
Description of the equipment, and quantities	<ul style="list-style-type: none"> ◆ Describe what the equipment should be used for. ◆ Describe what the equipment should do – its purpose, scope, function and capabilities (that is, the output required). ◆ Describe the design and features you want, taking into account factors such as performance to be achieved, and technical characteristics as follows: <ul style="list-style-type: none"> - operational requirements - versatility of the equipment - safety requirements (in other words, the manufacturing standards equipment should comply with). Where you cannot provide a standard, specify that the equipment should match the authoritative standards appropriate to the country of origin (for example, DIN – German Industrial Norms, BS – British Standard, or others – see <i>Annex 4</i>) - quality expected - durability - energy saving features - physical characteristics (for example, construction/material requirements, colour and finish, unit or pack size, power-type, whether or not it is portable). ◆ Describe what preferences you have when there are alternatives (for example, whether you want wheels, handles, a drying cycle, extra facilities, whether it must be made of plastic). ◆ Include any restrictions on country of origin. ◆ Include the expected performance or output, but do not necessarily define how this should be achieved. ◆ Try to use common titles for equipment types that are widely understood by various countries. For example, the United States uses a United Medical Devices Nomenclature System (UMDNS). Other manufacturing countries have developed their own systems, and the European Commission is trying to combine these as a Global Medical Devices Nomenclature (see <i>Annex 2</i>). ◆ If the goods you are purchasing are not whole pieces of equipment, but are simply accessories, consumables, and spare parts for existing equipment, you must provide technical details of each item. You must also specify the make, model and year of manufacturer of the equipment that they are used with (see <i>Guides 4 and 5</i>).

Continued overleaf

BOX 31: Contents of a Typical Equipment Specification (continued)

Element	Examples
<p>Package of inputs required. This must cover everything else you need to use the equipment over its entire lifetime.</p>	<p>The package of inputs may include any or all of the following:</p> <ul style="list-style-type: none"> ◆ Accessories (for example, shelves, mains lead, patient cables, hand-pieces). Outline all the accessories you need to last a specified length of time (at least two years), together with sizes, types and quantities. Usually, it will be necessary to purchase at least three sets of accessories – one in use, one being cleaned, one as spare. ◆ Consumables (for example, electrodes, breathing circuits, gel). You will require a stock to last a specified period of time (at least two years), although you should also take into account expiry dates and short-life items. You must detail the exact type and number of consumables. (It may be advisable to make them conform to the types and sources of existing supplies, so that existing stocks can be rationalized.) Remember that, while some equipment uses standard supplies, other equipment requires specific supplies and you will need to order accordingly. ◆ Spare parts (for example, bottles, switches, o-rings, gaskets). You will require a stock to last a specified period of time (at least two years). You must detail your requirements for both planned preventive maintenance and typical repairs. This should be based on your experience, knowledge of the technology, and the manufacturer's recommended list. ◆ Manuals – you will require both Operator and Service Manuals including circuit diagrams. It is advisable to obtain two copies of each. ◆ Warranty – you must specify that the guarantee should last for at least 12 months from delivery or the end of commissioning, not 12 months from the shipping date (since if the goods spend six months getting to you, you will have lost half the guarantee period). If the equipment is not going to be used for some time after delivery, special arrangements must be made with the supplier to re-define the warranty period (<i>Section 5.5.4</i>). ◆ Delivery – you must specify the freighting arrangements, by air, sea, or road. Also include details for the packing and crating for freight, the destination, and the delivery date or delivery period (number of weeks). Try to use common Incoterms (for trade transportations). These can be found on the internet (world wide web) with good explanations, and should be checked before use as they are occasionally updated (<i>Section 5.5.4</i>). ◆ Insurance – you must specify whether you want the goods to be insured during the delivery period. Some countries require all imports to be insured locally. Make sure you specify any rules that apply (<i>Section 5.5.4</i>). ◆ After-sales support (the supplier's general capacity to deliver technical and commercial know-how after delivery) – specify whether you require this to be available locally, and outline the sort of support required. In addition, ask for a price for a maintenance contract (for reference, in case it is needed).

Continued opposite

BOX 31: Contents of a Typical Equipment Specification (continued)

Element	Examples
For some equipment, such as sophisticated or imported items, or equipment which is new to you, you may also need to specify the following item lines:	<ul style="list-style-type: none"> ◆ Site preparation details – you must ask for the technical instructions and details from the suppliers so that you can plan for this work, either in-house or by contracting out. ◆ Installation – you must ask for help with this if it is required. ◆ Commissioning – you must ask for help with this if it is required. ◆ Acceptance – you must clearly detail the responsibility of both the purchaser and supplier with respect to testing and/or acceptance of the goods. ◆ Training of both users and technicians – you must ask for help with this if it is required, and for written training resources. ◆ Maintenance contract (an important part of aftersales support) – you must ask for one of these if it is required (see <i>Guide 5</i>). It will be necessary to agree and stipulate the duration and whether it should extend beyond the warranty period, the cost and whether it includes the price of labour and spare parts, and the responsibilities of the owner and supplier.

The layout of the equipment specification is important, since details must be clear for the bidding suppliers. The easiest method is to lay it out like a form, with details of your requirements on one side of the page and the response from the supplier on the other. On one side, you write down your **schedule of requirements**. This includes a concise description of each element of the order, with the quantities required and the technical specification unique to that element. On the other side, sufficient space should be provided so that the supplier can enter all relevant information (such as model type, unit size, and price) against each element. This layout makes it easy to compare the supplier's reply (their offer) with your requirements (your specification), and is useful when you are evaluating bids (*Section 6.3*).



- Tip** • When listing the package of inputs, it is important that you do not simply ask the supplier to state whether or not they can supply the various services listed. If so, you may just receive a 'yes' or 'no' answer. Instead, you must specify that they should provide a quote for each of the services listed. This way, when it comes to awarding the contract, you can decide whether to omit certain services if they are too costly.

The length of the specification will vary, depending on the item being purchased. For a simple item the specification may be a brief description. For a more complex item it may run to several pages. An example of a layout for a long specification is shown in *Annex 7*. Another is provided in *Guide 2* on planning and budgeting.

Your technical specifications need to be revised and updated periodically (*Section 9.2*), in response to:

- ◆ feedback from users and maintainers
- ◆ changes in technology
- ◆ arrival of new products and applications on the market.

Properly written generic equipment specifications enable you to conform to the standards set by government, and to continue to meet the standardization policy of your health service provider (*Section 2.1*). *Box 32* describes how you can use generic specifications and still introduce an element of standardization into your stock of healthcare technology.

BOX 32: Standardization and Specifications

If standardization is in place, you need to procure particular or named makes and models of equipment. However, this can present difficulties with international funding institutions (such as the World Bank) and other government aid agencies, since their guidelines dictate that purchase by tenders must use generic descriptions of equipment.

The following methods will help you to achieve a better balance between international and national procurement rules and your standardization policy:

- ◆ **Standardization to a level of technology.** This type of standardization can be achieved by writing clear generic specifications which safeguard the standardization of equipment at a certain level of technology. These specifications should describe the suitability of equipment, and reflect the skill levels of user and maintenance personnel.
- ◆ **Standardization on makes, and economical viable quantities.** Procuring and stocking recurrent supplies for single items of equipment is often prohibitively expensive. Therefore, it makes sense, where possible, to try to obtain significant quantities of the same make and model for certain equipment. This is more economical when it comes to buying and stocking spare parts and consumables. It also enables you to share things such as maintenance and training. This, in turn, leads to a greater retention of relevant technical knowledge among your staff, which can result in considerable savings. This type of standardization can be achieved in the following ways:
 - by quantifying and ordering equipment using a model for procurement on either a country- or district-wide basis (*Section 4.1*)
 - by using supply-period contracts that allow the winning bidder to supply goods over a set number of years (*Sections 4.1 and 6.4*)
 - alternatively, using a tender process to select the competitive make and model to purchase. For subsequent purchases, sticking to that brand by using direct ordering or quotations (if there is more than one supplier of the goods), until such time as you wish to review the marketplace.

b. Technical and Environmental Information

As well as providing details of the types of equipment and support services required, your purchase document also needs to include technical and environmental data that describe your domestic preferences. Such data describes the types of environment and surroundings in which the equipment will be used. This enables the supplier to offer the most suitable product for your needs, and suggest technical solutions if required.

For example, a supplier might offer:

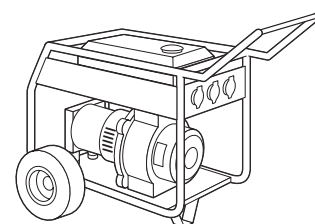
- ◆ a voltage stabilizer or uninterruptible power supply, if you have an unstable power supply
- ◆ to adjust motors and pressure vessels to operate correctly, if you are at a great height above sea-level
- ◆ an air-conditioning unit, if your health facility reaches very high temperatures
- ◆ silica gel to store with supplies and polymerized coatings for printed circuit boards, if you suffer from high humidity
- ◆ extra filters, if your environment is dusty .

You may include this information within the generic equipment specification.

However, since much of the information is common to many pieces of equipment, some health service providers have found it simpler to develop a separate summary ‘Technical and Environmental Data Sheet’, which can be referred to in the purchase documents. This data sheet can be distributed to all suppliers, interested parties, trade delegations and other relevant bodies. Such a data sheet can be provided regardless of the length of specification or the procurement method used, ensuring that all parties are kept informed of prevailing national conditions that could affect the operation of equipment.

The HTM Working Group (or a smaller Specification Writing Group) is responsible for developing a Technical and Environmental Data Sheet. *Guide 2* on planning and budgeting describes how this is done. It should include details of:

- ◆ electricity supply – mains or other supply, voltage and frequency values and fluctuations
- ◆ water supply – mains or other supply, quality and pressure
- ◆ environment – height above sea-level, mean temperature and fluctuations, humidity, dust level, vermin problems
- ◆ manufacturing quality – international or local standards required
- ◆ language required – main and secondary
- ◆ technology level required – manual, electro-mechanical or micro-processor controlled.



You can develop a general data sheet for your country, or create more specific data sheets for your region, or your health facility. A sample of a Technical and Environmental Data Sheet is given in *Annex 7*.

c. Special Conditions Page

A separate page should describe any special conditions attached to different parts of the order (for example, conditions which apply when using lots – *Section 5.2*). For example, there may be:

- ◆ different delivery destinations and crate labelling required for different parts of the order
- ◆ different quality of stainless steel required for surgical instruments than for office furniture
- ◆ elements of the order that require installation and elements that do not.

d. Summary Price Schedule for the Offer

The supplier needs to provide a concise summary of the offer in terms of prices. The aim is to get a quick overview of the offer, which can be used in the evaluation process when offers are compared (*Section 6.3*).

You should lay out this summary in the same format as the schedule of requirements (so that the supplier does not have to duplicate their efforts), and list each element from your specification that needs a price. In this schedule the supplier should provide:

- ◆ the unit and total prices for the quantities in each element (product, accessories, training, etc)
- ◆ prices for alternative ways of providing your requirements
- ◆ any pricing options that you must choose from (for example, delivery with insurance, delivery without insurance).

At the end of the sample full (long) equipment specification in *Annex 7*, there is a summary table of all prices arising within the offer. This can be used as the summary price schedule for the offer, otherwise an alternative price schedule must be drawn up for the supplier to complete.

5.5.4 Purchase Document – Part Two: Order Information

In addition to outlining your purchase requirements, your purchase document needs to include a section on supply conditions including:

- a. instructions to bidders
- b. evaluation and award criteria
- c. warranty requirements
- d. delivery requirements and conditions
- e. payment arrangements and conditions
- f. standards and quality requirements.

The Procurement Unit should obtain this information from the relevant people and authorities listed through the rest of this Section.

Once the Procurement Unit has compiled such data, they can develop a general version of the requirements. This will then only need modifying for each round of purchasing.

a. Instructions to Bidders

These instructions should cover everything a potential supplier needs to know when preparing and submitting a bid, and includes:

- ◆ project description
- ◆ language documents must be submitted in (for example, English)
- ◆ how the cost of the offer should be presented, and in what currency
- ◆ how the relevant forms (described in *Section 5.5.3* on item information above) must be completed
- ◆ details of the closing date and procedures for submitting offers
- ◆ bid/quote opening details
- ◆ regulations covering the tender/quotation, such as eligibility requirements (evidence of arrival on time, all parts completed and signed, samples enclosed, etc)
- ◆ other documents required, such as bid forms, bid and performance securities (see *point e* on payment arrangements below), brochures, manufacturer's specifications and certificates
- ◆ any special clauses, such as procedures for:
 - requests for modifications and clarifications to the offer
 - bid withdrawals
 - bid amendments and variations in quantity.
- ◆ monitoring criteria for goods and services (usually delivery and quality of performance).



Tip • Specify all bids/quotes to be submitted in triplicate, clearly marked as 'original' and 'copies' and 'not to be opened before'.

b. Evaluation and Award Criteria

These details should cover the criteria and procedures for bid evaluation/ adjudication, award, and notification. Here you should specify:

- ◆ general compliance criteria (for example, the offer conforms to all terms and conditions, the bidder is qualified to supply, the bidder has a local representative in your country able to provide aftersales service support – *Section 6.3*)
- ◆ the product selection criteria (*Section 3.2*)

- ◆ the importance of the technical specifications, and the fact that financial criteria will only be considered after the technical criteria have been met (*Section 6.3*)
- ◆ any scoring system and weighting system, if used for adjudication (*Section 6.3*)
- ◆ the supplier qualification criteria (*Section 4.4*)
- ◆ criteria for disqualification (*Section 6.3*)
- ◆ any legal reasons why offers may be rejected.

c. Warranty Requirements

This section should describe your preferred warranty period and start date. However, the final arrangements will need to be agreed at the contract stage (*Section 6.4*) along with the details of what is covered by the warranty (*Section 3.2*).

A common warranty period is 12 months. Ideally, the warranty period on new equipment should not begin until installation and acceptance testing are complete. Often, however, there is little choice. For instance:

- ◆ For European Union/European Development Fund purchased equipment, the warranty begins from the time of receipt.
- ◆ For World Bank purchased equipment, the warranty begins from the time of shipment.

It is common for a health facility to lose several months of free parts and service from the manufacturer because new equipment is not immediately installed (*Section 8.3*). Some suppliers will agree to different conditions, such as the warranty lasting:

- ◆ 15 months from shipment
- ◆ 12 months from installation
- ◆ 12 months from the date of handover, if the time elapsed is not 12 months from shipment.

d. Delivery Requirements and Conditions

These details describe the delivery terms that suppliers must conform to, so that they can prepare suitable quotes or bids. In this part of your purchase document, you need to state your requirements for:

- i. destination of the goods
- ii. delivery schedule and date
- iii. packing requirements
- iv. freighting method, terms and charges
- v. carrier and clearing method
- vi. import regulations and requirements



- Tip**
- If external support agencies and/or procurement agents are involved in the supply of goods, they may dictate some of the delivery requirements and conditions. Check whether this is the case or not.
 - The Ministry of Finance's Purchasing/Supplies Manual should give guidance on freightage, customs and transport (*Section 2.2*). It will specify the use of specific trade terms depending on the type and size of supplies and degree of urgency. Alternatively, seek advice of other groups (such as other facilities, ministries, NGOs, external supply agencies).

i. Destination of the Goods

You must specify whether goods have to be delivered directly to the health facility site, a central store/distribution centre, or to the nearest custom clearance point (for example, an airport, or a sea port).

Transporting goods directly to the health facility site is more desirable (especially for large or complex goods) but can be costly. If you want this to happen you must specify a suitable freightage method and terms (see *point iv* below and *Annex 8*), and whether you want the goods to be pre-cleared through customs in order to avoid routing them through your capital city (see *point v* below). It is not usually economical for the supplier to organize the onward delivery from your port to the health facility, as there is unlikely to be a scheduled service or normal transportation route (in some cases it can add up to 15 per cent or more on the cost of goods). Thus, you will need to inform the supplier of the carrier/freight forwarder you want them to use (see *point v* below).

To save on delivery charges, you could ask for various products from different suppliers to be delivered to a central collection point abroad, where they can be combined together for freightage in bulk. In these cases, the destination will be specified as the 'consolidation location'.

ii. Delivery Schedule and Date

The delivery lead time (the number of weeks from placing the order to receiving the goods) is not given to you by the supplier automatically – you will only receive such information if you ask for it. Delivery times vary, depending on factors such as:

- ◆ your budget
- ◆ availability of goods ordered
- ◆ means of transport (road, sea, air)
- ◆ whether goods are to be consolidated
- ◆ import/export formalities, and
- ◆ pre-installation preparations.

You may want to state your own delivery date by which the goods must be delivered.

iii. Packing Requirements

You may need to give instructions on packing arrangements to make sure that goods are not damaged or do not deteriorate during transport. If you are insuring the delivery (see *point iv* on freighting below), the insurer may have stricter instructions. You should:

- ◆ specify how the goods should be packaged and protected (for example, crated or boxed, export packed, marked for special storage or handling)
- ◆ ask for an indication of carton sizes and weight (required when transporting the goods yourself, and when unloading and moving the packages).

For most developing countries, the packing should be sufficient to withstand rough handling, exposure to extreme temperatures, salt and precipitation, and open storage.

Normally it is sufficient to state that the supplier must ensure air or seaworthy packaging. If any special markings are required on the boxes, the supplier must be informed.

iv. Freighting Method, Terms, and Charges

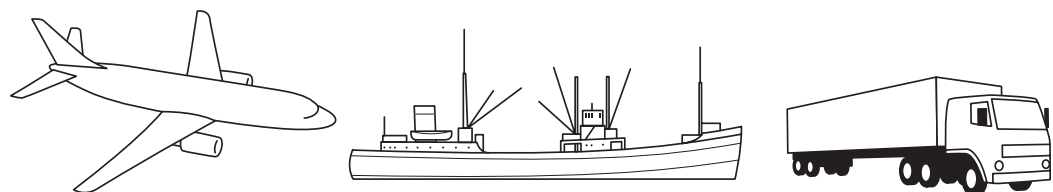
There are various **freighting methods and terms**, which describe the arrangements for transportation and insurance.

The following criteria should be considered when selecting the mode of transport and freighting terms for international shipments:

- ◆ urgency of shipment
- ◆ size of the shipment – weight and volume
- ◆ origin of the goods – supplier's location
- ◆ normal transportation routes and scheduled services between the source and destination
- ◆ ports of entry, receiving facilities, and transportation infrastructure at the destination
- ◆ relative costs and budgetary limitations.

If you want the supplier to quote for freighting the goods to you, you should specify:

- ◆ the delivery route (whether by road, sea or air)
- ◆ the method of delivery (carrier, courier, post, etc)
- ◆ the type of insurance.



To keep things simple, it is sensible to request that freight and insurance charges are quoted separately from the cost of the goods. Make sure this is reflected in the layout of your equipment specification and summary price schedule (*Section 5.5.3*). If you are unsure of the best way to freight and insure goods, ask the supplier for advice.

To help you select the freighting services best suited to your needs, suppliers use a range of different international commercial terms (Incoterms) for the transportation of trade goods, which cover freight and insurance. The most commonly used terms are summarized in *Annex 8*. Use these terms in your communications with suppliers.

For example:

- | | |
|---------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| For goods from abroad | <ul style="list-style-type: none"> ◆ ideally offers should be invited on the basis of Cost, Insurance and Freight (CIF) or Carriage and Insurance Paid (CIP) ◆ under CIF and CIP, the supplier arranges insurance ◆ in all other cases, insurance cover is not automatic but can be arranged if you require it (either by the buyer or supplier) ◆ note that only under CIP are deliveries made direct to a destination of your choice (such as the health facility site) rather than to a port. |
| For locally available, locally manufactured, or locally assembled goods (including those previously imported) | <ul style="list-style-type: none"> ◆ offers should be invited on the basis of ExW (ex works, ex factory, or off-the-shelf) ◆ the ExW price, in these cases, should include all duties, sales and other taxes already paid. |

Freighting charges vary enormously. The cost depends on:

- ◆ the volume and weight of the goods ordered, rather than on the value of the goods
- ◆ the type of goods. For example, hazardous or heat-sensitive goods can cost considerably more to transport and may be restricted to particular modes of transport (for instance, laboratory reagents, which are flammable, require special packing and documentation). Note that packing dangerous goods with other items affects the whole shipment
- ◆ mode of transport (road, sea or air) and distance.

Insurance charges vary depending on what parts of the journey and what activities are covered. Insurance from dispatch until the end of commissioning is best, but your choice will depend on cost.

Did you know?

Equipment manufacturers and suppliers report that as much as eight per cent of goods exported are damaged during delivery.

When buying insurance, you need to check the validity, terms and restrictions. The standard CIF and CIP terms offer basic cover only and, as a buyer, you may need to consider additional insurance cover. CIF terms, for instance, only offer cover from port to port, and are valid for a limited period of time.

Freight contracts that include insurance are usually more expensive. However, it is worth paying a little more to insure your goods against loss or damage during freighting. If the supplier is responsible for freighting, it may also be convenient to let the supplier organize the insurance for the goods.

The amount you have to pay for insurance depends on the value of the goods. So:

- ◆ list a variety of alternatives in the purchase document and pick the best fit
- ◆ ask your supplier or carrier (see *point v* below) for details of insurance costs and terms, before placing the order/signing the contract (*Section 6.4*)
- ◆ ask for details on the type of cover the insurer provides – will it be a refund, a credit, or replacements of goods.

While insurance is extremely valuable, some external funders, such as government aid agencies, do not always pay for insurance. In such cases, you will have to balance the risks and weigh up the cost of insurance against the consequences if you do not insure.



Country Experience

Some countries, such as Pakistan, require that all incoming consignments are insured locally. International NGO, MSF (Doctors Without Borders) insures all goods bought internationally up to 90 days after arrival in the port of destination.

v. Carrier and Clearing Method

As well as specifying how you want items to be delivered (*point iv* above), you also need to specify in the purchase document who you want to transport them.

The company that transports your goods is known as the **Carrier** or **Freight Forwarder**. This may be:

- ◆ a carrier that your health service provider or government already has an arrangement with, who they regularly use to transport goods
- ◆ a carrier recommended by the external support agency funding the procurement
- ◆ a carrier recommended by the supplier, or
- ◆ if no such arrangements exist, a carrier you contract yourself.

When choosing a carrier, you should consider their reputation and range of services. The questions to ask include:

- ◆ Will they comply with the instructions – from yourself and the supplier?
- ◆ Can they produce documentation accurately and on time?
- ◆ Are there satisfied customers you can speak to?
- ◆ Will they transport goods from the port to your stores within city boundaries, and if necessary outside city boundaries? (Often this is done by the clearing agent – see below, who may seek the services of another transport company, depending on the size of the shipment.)
- ◆ Can they conform to your specified carrier conditions (for example, no changes of carrier en route, no deck cargo)?

The range of tasks carried out by the carrier depends upon whom you choose:

- ◆ Some can make all the delivery arrangements, including freighting, paperwork, crating, consolidation services and transportation of the goods. If contracted, they may even handle customs clearance and cargo handling services.
- ◆ Others may only offer limited services, such as just sea or air freight, or delivery to selected sites but not door-to-door, and may not include ‘extras’ such as packing.



- Tip**
- Freight forwarders (forwarding agents) usually provide the most comprehensive service, including shipment, customs clearance and onward transportation of the goods from the port to the final destination.
 - Ask your supplier, external funder, or procurement agent for advice and recommendations for the best carrier for your purposes. If you work for government, also liaise with other government bodies for advice.

Clearing customs is a complex and specialist task, whether clearing through a major port of entry (such as the capital) or pre-clearing the goods so they can be delivered to a small customs post (*Section 7.2*). Unless you have an experienced team with clearing and forwarding skills, it is better that you hire some form of specialist agent to clear goods and provide onward transportation for you.

Your carrier, if contracted to do so, can normally deal with importation, customs clearance, and onward transportation. However, in some cases this may not be possible or desirable. For example:

- ◆ The carrier has no local branch in your country.
- ◆ You prefer a firm other than the carrier to be your customs agent.
- ◆ You require help to clear customs and receive the goods on arrival.

In this case, you need to contract a separate **Clearing Agent** (handling agent) instead of the carrier to deal with importation, customs clearance, and onward transportation. State in the purchase document who this agent will be. You can use either the government-appointed agent or, if the price seems reasonable, another experienced agent.



- Tip**
- Remember that a clearing agent may need inputs from you to help them describe the healthcare technology correctly in the paperwork for customs.
 - Liaise with central or local supplies departments or other procurers to find a reliable and knowledgeable clearing agent.

vi. Import Regulations and Requirements

Each country has specific import regulations and requirements. As part of your order information, you need to detail whether **Pre-Shipment Inspection (PSI)** is required or not. *Box 33* describes this activity. You need to check current procedures regarding inspections with your national customs department, as well as with your supplier. Be aware that you, as the buyer, must request PSI – it will not happen automatically.

BOX 33: Pre-Shipment Inspection

Pre-Shipment Inspection (PSI) involves inspection of goods before they are shipped. Goods are inspected at the supplier's own premises. Inspectors:

- ◆ check the quantity and quality of goods to be exported
- ◆ ensure that they are fit for their intended purpose and are adequately packed for shipment
- ◆ offer an independent assessment of the net worth of items, and
- ◆ certify that the value of the goods matches the commercial invoice.



PSI is a legal requirement for some countries for customs clearance or import. It may be required for shipments of all goods, or only for shipments over a certain value. Thus, the buyer must check current procedures with their national customs department, as well as with the supplier.

Failure to comply with PSI requirements can cause delays in customs clearance and extra expense, or can result in goods being confiscated or returned. Thus, the buyer must be responsible for requesting PSI, if it is a legal requirement.



Country Experience

Some developing countries, such as Tanzania, require Pre-Shipment Inspection on all imports over US\$ 5,000.

PSI is a common condition for procurement for many international external support agencies, for example EDF/EU-funded goods.

As part of your order information, you also need to make sure that **responsibilities for customs formalities are clear**. Customs formalities include:

- ◆ the import/export license
- ◆ duty payments, and
- ◆ other administrative matters.

Whether responsibility for these matters will be yours or the suppliers depends on the freighting terms agreed between the two of you. For example:

- ◆ If the freighting arrangements entered into are Delivered Duty Paid (DDP) – the supplier clears the goods for import and carries out, where applicable, all customs formalities including paying duty.
- ◆ If the freighting arrangements entered into are Delivered Duty Unpaid (DDU) – the supplier carries out the customs formalities for exporting the goods from their country, and the buyer carries out all customs formalities necessary for importing the goods.

For further details of how customs responsibilities differ according to freighting arrangements, see the box of Incoterms in *Annex 8*.



- Tip** • Often medical equipment and supplies are exempt from customs duties and tax. If this is the case, you need to:
- obtain the certificate that proves the goods are exempt (usually provided by the Ministry of Finance)
 - either give it to the supplier if he is responsible for having the goods cleared without paying duty and tax, or
 - give it to your own clearing agent for customs clearance.

Some types of goods require **special documentation** for their transportation (for example, to allow them to be exported, to warn of the presence and special handling for hazardous materials). Ask the supplier to state what special documentation applies to the products they are providing.

e. Payment Arrangements and Conditions

Having determined your delivery requirements, you will now need to draw up payment arrangements and conditions. These details describe for the suppliers the payment terms they must conform to, so that they can prepare suitable quotes or bids. In this part of your purchase document, you need to state the following:

- i. Specific requirements for payment
- ii. Validity period of quotes/bids
- iii. Validity period of contract prices
- iv. Details of payment schedules
- v. Payment methods and terms
- vi. Details of bid security and performance security arrangements
- vii. Penalties for default.



- Tip**
- If external funding agencies or procurement agents are involved in the supply of goods, they may dictate some of the payment arrangements and conditions. Check whether this is the case or not.
 - Best practice is to finalize all payment negotiations when drawing up the contract (*Section 6.4*), and to avoid extra expense and paperwork on both sides.

i. Specific Requirements for Payment

In your purchase document, you need to specify the currencies in which bidders are to state their prices, as well as the currency for payment.

This is an important distinction, as often the currency quoted in the offer may be different to the currency used to pay the supplier. For example, for some EU-funded projects the quote/bid must be in local currency, but payment can be made in Euros.

If you expect to receive offers from several countries, you need to outline the procedure that you will use to convert prices from different currencies into a single currency for the purpose of comparing and evaluating bids/quotes.

You must provide information concerning what you will do in the case of currency fluctuations. Changes in exchange rates should be based on bulletins issued by an international bank or independent money bureau. The date used to apply the exchange rate could be the date of payment or the date of import declaration.

ii. Details of the Validity Period for Quotes/Bids

You should provide suppliers with details of the validity period you require for their initial offer. This is the date up to which the supplier confirms that their terms and conditions, and price are valid. The period covered should be sufficient to enable you to compare and evaluate the offers and award the contract.

The period required will vary depending on the external support agency and the length of time taken in their procurement process. For example:

- ◆ For procurement by the EU/EDF, the validity period is 150 days.
- ◆ For procurement under many World Bank contracts, the validity is 180 days.

Find out if there are national regulations or external support agency restrictions, and choose an appropriate time window depending on the volume and complexity of the tender/quotation.

iii. Details of the Validity Period for Contract Prices

You also need to include details of the validity period for the prices in the final contract. This is the date up to which the supplier confirms that their terms, conditions, and prices are valid once the contract has been signed. The length of this period will vary, depending on the type of tender/quote and contract. For example:

- ◆ For more complicated purchasing methods (such as tenders) and complex orders (such as multiple deliveries over time), contract prices need to remain fixed for longer.
- ◆ For contracts that include services (such as installation, and training) that may take place some time after the goods are shipped, the contract prices also need to remain fixed for longer.

In some exceptional circumstances, such as highly inflationary environments and very complicated procurement processes, you may need to include a ‘price escalation clause’ that adjusts prices for inflation at specific intervals. It is highly recommended that such a clause is based on or linked to an objective measure, for example a rate quoted by an international bank or independent money bureau. If you do use a price escalation clause you need to:

- ◆ specify in what circumstances an adjustment to prices will be made (one example could be exchange rate fluctuations)
- ◆ specify clearly what adjustments will be made in these circumstances
- ◆ specify that all subsequent price rises will **only** be accepted if the suppliers can provide details of proven escalation in costs. (This is to deter a monopoly supplier from using the clause as an excuse to increase prices beyond inflation.)

For supply-period contracts over several years (*Sections 4.1 and 6.4*), you may combine fixed and escalating prices. For example, you could set fixed prices for the first year, while prices for subsequent years would be linked to inflation rates. Also remember to include a clause about exchange rate fluctuations.

iv. Payment Schedules

Your purchase document should outline the payment schedules. You should include arrangements for dealing with suppliers who fail to deliver any or all of the goods, or who fail to perform the services within the specified period.

You should state whether the contract provides full payment either in advance (this should occur rarely), at the time of delivery (when you receive the goods), or at a deferred date. A deferred payment is when payment is deferred for a set period that can be 30, 60, 90, 120, or 180 days.

Alternatively you may wish to use a phased payment schedule (also called staggered, staged, retention, or split payment). Under this arrangement, payment is made in defined amounts at defined stages. For example:

- ◆ 40 per cent of the total may be paid on shipment, and the balance paid following satisfactory receipt of the goods.
- ◆ For added protection for some orders of equipment, you may separate out the payment for goods (the equipment) from the payment for services (commissioning, installation, and initial training). In this way, it is easier to ensure that goods and services are only paid for once they have been satisfactorily received.

Both deferred and phased payments allow you to withhold payments if the supplier provides sub-standard or incomplete deliveries.



Tip • For deferred and phased payments, remember to include clauses about exchange rate regulations.



Country Experience

Many international external support agencies use phased payments, for example:

- ◆ *For EU/EDF, 60 per cent of payment is made on shipment, 30 per cent on provisional acceptance, and 10 per cent after the warranty period.*
- ◆ *World Bank projects vary, with no standard payment schedule.*
- ◆ *For the African Development Bank, 40 per cent of payment is made on shipment, 40 per cent on receipt, 10 per cent after installation, and 10 per cent after the warranty period.*

One developing country uses the following payment schedule:

- ◆ *50 per cent of payment is made on despatch of goods, triggered by the supplier's proof of despatch (Bills of Lading showing shipment by a stipulated date)*
- ◆ *20 per cent is made on arrival, triggered by proof of arrival at the delivery site (the clearing agent's papers)*
- ◆ *25 per cent is made on acceptance at the health facility site, triggered by proof of acceptance by the Commissioning Team*
- ◆ *5 per cent is only paid if the goods arrived and the services were completed on time (as stated in the contract).*

An example of a payment schedule for an NGO is:

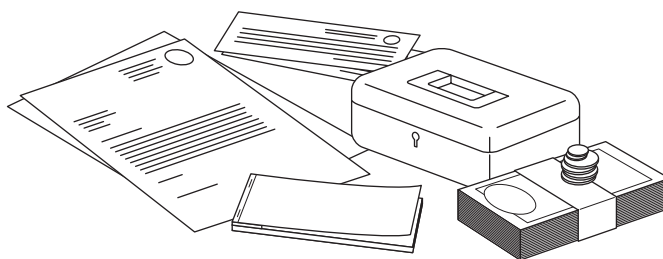
- ◆ *80 per cent of payment is made on shipment, and 20 per cent on final acceptance supported by the acceptance certificate.*

v. Payment Methods and Terms

In order to obtain the best prices from your suppliers, you need to guarantee that payment is secure and will take place on time. Your purchase document must therefore clearly state your payment method and outline the terms and procedures for payment. Two important factors determine payment methods:

- ◆ the value of the order (for high value orders, all parties feel more secure with confirmed letters of credit), and
- ◆ the relationship between the supplier and purchaser (if there is a satisfactory track record on both sides the supplier may agree to different methods, such as payment on receipt rather than in advance).

Various **payment methods** exist. These can include cash, cheque, bank draft, 'authority to pay' letter, and letter of credit. The method of payment you select will depend on a variety of issues, including the amount to be paid, availability of foreign currency and geographical location. The characteristics and security levels of the different methods of payment are listed below:



- ◆ Cash is only used for small amounts of low value items that you purchase locally to your health facility out of 'petty cash' (usually used for payments in advance and on receipt).
- ◆ Cheques are normally used to pay local suppliers (usually used for payments in advance, on receipt, and phased payments).
- ◆ A bank draft is a bank guaranteed cheque and therefore works almost like cash (usually used for payments on receipt, and phased payments).
- ◆ An 'authority to pay' letter is issued by the buyer to his or her bank. Funds are then transferred to the supplier's bank once goods have been received, resulting in payment (usually used for payments on receipt, and phased payments).
- ◆ The most secure way to pay is to use a Letter of Credit (LOC). This is an inter-bank document stating that money is available in the buyer's bank for the contracted supplier to claim once the job has been completed. To do this, the supplier must present evidence (within a given time period) that the goods have been supplied (shipping documents, etc) and that all the terms and conditions stipulated in the contract have been met (the buyer's handover certificate, etc). Then the bank can credit the supplier's account.

It is best to state the method of payment you are offering in the purchase document. However, some suppliers may query the chosen way to pay: this may be an indication that they have limited financial credibility. For example:

- ◆ A LOC is generally required by the supplier if they are unsure of the buyer's financial status. For instance, they may know that the buyer is periodically short of funds or has a slow payment process, and the LOC will assure prompt payments.
- ◆ A LOC is generally used by the buyer when asked to provide part or all payment in advance of receiving the goods (in other words, when placing the order). Sometimes there might be reasons to believe that the supplier will not be able to supply the goods as agreed. Experience shows that some supposed 'suppliers' do not even exist or cannot be traced after they have received some money. Ideally you should avoid doing business with suppliers if you are uncertain of their credentials; however, it is often difficult to check all companies, particularly from developing countries. Thus, using a LOC is a way to secure your funds from being spent on companies that fail to deliver.

There are different varieties of LOC, and the cost to set them up increases with the number of guarantees which are built in:

- ◆ A 'revocable LOC' can be cancelled or altered by the buyer after it has been issued.
- ◆ An 'irrevocable LOC' is a legally binding obligation for the issuing bank to pay (as long as the buyer meets all the terms and conditions), and cannot be amended or cancelled without the consent of all parties to the transaction.
- ◆ A 'confirmed LOC' is one that is issued by a national (relatively unknown) bank in a developing country and validated by a recognized international bank which guarantees payment to the supplier in the case of the national bank or buyer defaulting.

When developing countries buy from foreign suppliers, a confirmed LOC is most commonly used. The cost is high, but the payment is assured.

Using a LOC entails the following terms and conditions:

- ◆ a LOC must be above US\$ 100,000 in order to be economical
- ◆ a LOC generally involves a surcharge of between 1 and 2.5 per cent for the buyer
- ◆ phased drawings can be arranged on LOCs against stipulated conditions.

These terms must be negotiated with the supplier at the contract stage (*Section 6.4*). You should seek professional advice from either procurement agents or the banking sector to establish suitable conditions and procedures.

vi. Bid Securities and Performance Securities

In your purchase document, you need to specify any ‘securities’ required from the supplier. There are two common types – bid securities, and performance securities.

A **bid security** (also known as a bid bond) is a financial guarantee given by the potential supplier at the time a bid is submitted. It is normally only used for larger tenders. Its purpose is to provide the buyer with some protection against irresponsible bids and encourage suppliers to live up to their obligations. It may take the form of:

- ◆ cash
- ◆ a certified cheque
- ◆ a bank draft
- ◆ a state bond or other negotiable bank document
- ◆ a bank guarantee from a reputable bank.

This security (normally one per cent of the value of the offer) is forfeited if the successful bidder withdraws the offer or refuses to agree to contract requirements. The bid security usually remains valid for four weeks beyond the validity period for the bid.

The bid security **must** be returned when the Notice of Award is announced and contract accepted (*Section 6.4*). Even if the validity of the security has expired, you are still legally required to return it. If you fail to do so, your Procurement Unit may be charged costs.

A **performance security** (also known as a performance bond) is a deposit given by the supplier at the time the contract is awarded. It gives the buyer some protection against failure to deliver/perform and encourages the supplier to fulfil their contract obligations. However you may decide that phased payments provide enough security instead (see *point iv* on payment schedules above).

Performance securities are mainly used for contracts for services that are not linked to the purchase of goods, where the buyer feels that security is necessary (for example, with foreign, unknown companies) but cannot obtain any security from payment for goods that will ensure the supplier’s compliance. For example, they might be used for a service contract after the warranty has expired, since all the goods will have been paid for by the time the service contract starts.

A performance security may take the form of:

- ◆ a bank guarantee from a reputable bank
- ◆ an irrevocable letter of credit.

The form and amount of the performance security should be specified in your purchase document. This will vary, depending on the type of security and the nature and size of the work contracted. An amount of between 2.5 and 10 per cent of the contract price is often used. The performance security is returned only after goods **and** services have been received, and are found to meet all contractual standards and be of acceptable quality.

The decision when to use bid and performance securities generally depends on the relationship between the buyer and supplier, and the type of payment used.

For example:

- ◆ If payment is made after full delivery, then a performance security is only needed for the warranty.
- ◆ If payment is in advance then a bank guarantee or LOC should be requested for a large proportion of the contract value.

vii. Penalties for Default

Your purchase document should contain remedies if the supplier fails to comply with the signed contract, or if you as a customer do not comply. Your order information needs to specify:

- ◆ the remedies available to each party in case of default by the other party
- ◆ the body of law under which defaults will be resolved
- ◆ the penalties to the supplier for defaulting on contract details (for example, withholding payments in progress and/or cancelling any outstanding transactions).



Tip • It is very important that the penalties specified must be practical – in other words they must be possible to impose.

f. Standards and Quality Requirements

The item information in your purchase document should have detailed the technical standards and quality requirements (see *Box 31*). But in the order information, you need to provide details of how the supplier shows that they conform to these standards. You need to detail your requirements for:

- ◆ quality and safety standards or certificates for each product, to be provided with the bid/quote
- ◆ registration with any national or health service provider authority that controls and oversees quality and compliance of imported healthcare technology (if applicable in your country), and
- ◆ any other relevant evidence of quality assurance, to be submitted with the bid/quote and each shipment.

Box 34 contains a summary of the issues covered in this Section.

BOX 34: Summary of Issues in Section 5 on How to Prepare for Procurement

Quantify	HTM Working Groups (and sub-groups), Heads of Department, HTM Managers, at all levels	<ul style="list-style-type: none"> estimate and quantify all procurement requirements once annual funding has been finalized (see <i>Guide 2</i>) submit the quantified needs to the Procurement Unit prioritize the needs, if funds are short
	Procurement Managers	<ul style="list-style-type: none"> compile those procurement needs that will come out of capital funds, and those needs that will come out of recurrent funds
Lots	Procurement Managers	<ul style="list-style-type: none"> decide if use of lots is applicable group the goods into lots
Choices	Procurement Manager/Health Management Team	<ul style="list-style-type: none"> for each type of item, quantity, and lot to be procured, choose: <ul style="list-style-type: none"> the correct procurement model (<i>Section 4.1</i>) the right purchasing method (<i>Section 4.2</i>) whether you must pre-qualify suppliers (<i>Section 4.4</i>) the funding source (<i>Section 3.3</i> and <i>Guide 2</i>) whether to purchase, lease or obtain a donation of equipment (<i>Section 3.3</i>) ensure each round of procurement is carried out according to the rules that apply to the choices made
	Procurement/Tender Committee	<ul style="list-style-type: none"> review and approve the quantification preceding each procurement exercise review and approve recommendations for tenders, quotations, or direct orders
Timetable	Procurement Managers	<ul style="list-style-type: none"> decide when each item/lot should be procured (by annual, scheduled, perpetual, or single project procurement) plan time-critical procurement carefully make a procurement plan of the activities to be carried out
	Procurement/Tender Committee	<ul style="list-style-type: none"> approve the procurement timetable and the procurement plan
Documents	Specification Writing Group	<ul style="list-style-type: none"> prepare the generic equipment specifications for items to be purchased (see <i>Guide 2</i>) prepare the Technical and Environmental Data Sheet(s) (see <i>Guide 2</i>) prepare the special conditions page prepare the summary price schedule for the offer
	Procurement Unit	<ul style="list-style-type: none"> prepare the invitations to bid prepare all the order information for the purchase documents, consulting with relevant bodies as necessary check the item information against quantification (<i>Section 5.1</i>) compile the complete purchase documents



6. HOW TO MANAGE THE PURCHASING PROCESS

Why is This Important?

To be efficient and effective, purchasing needs to be carried out according to clearly documented policies and procedures. This applies equally to complex tender/quotation processes or simple orders from stores.

Purchasing must also conform to the requirements of the funder – whether national or external. It is important that staff who buy equipment understand all aspects of the purchasing procedures and comply with them.

In this Section we discuss the four main stages of the buying process, when using tenders/quotations:

- ◆ Asking for bids/quotes and issuing documents (*Section 6.1*).
- ◆ Receiving and opening the bids/quotes (*Section 6.2*).
- ◆ Evaluation and comparison process (*Section 6.3*).
- ◆ Award of contract and placing the order (*Section 6.4*).

In addition, this Section covers:

- ◆ Local direct purchasing and ordering (*Section 6.5*).

6.1 ASKING FOR BIDS/QUOTES AND ISSUING DOCUMENTS

For each round of purchasing, the Procurement/Tender Committee approves the appropriate purchasing method (*Section 5.3*), according to national procurement procedures or those of the health service provider organization. The Procurement Unit and the HTM Working Group prepare a detailed purchase document (*Section 5.5.2*).

The next step is to request tender bids or at least three quotations. This should always be done in writing. Usually the Procurement/Tender Committee manages the tender and high-value quotation processes, while the Procurement Unit manages the low-value quotation processes. However, this will depend on your country and health service provider.



The process of requesting bids/quotes varies with the different purchasing methods, as follows:

Open tenders/ national competitive bids	◆ the invitation to bid (<i>Section 5.5.1</i>) is advertized in a number of locations (see <i>Box 18</i>) and the purchase document is issued to interested suppliers.
Restricted tenders/ competitive negotiation/ request for quotes	◆ the purchase document is issued directly to a number of pre-qualified or selected suppliers (<i>Section 4.4</i>), together with the invitation to bid.
Direct ordering	◆ the purchase document is issued directly to a single pre-qualified or selected supplier so they can provide a quote (<i>Section 6.5</i>).

Before any purchase document is sent out, the Procurement Unit must check it for accuracy, check the details are correct and complete, and ensure all essential papers are attached (*Section 5.5.2*).

There are some circumstances when you will not use the standard requesting process:

- ◆ If you simply want to reorder an item that has previously been purchased from a satisfactory supplier at an acceptable price, it may be possible to issue a repeat order.
- ◆ In exceptional situations, when a certain item is likely to be out of stock imminently, you might consider negotiating with the supplier from the previous tender or contract to provide you with replacement items.



- Tip** • In your invitation to bid/quote, it is usual to state the day, time, and place for both the receipt and the opening of the bids/quotes.

6.2 RECEIVING AND OPENING TENDER BIDS/ QUOTATIONS

For the simpler or less formal purchasing methods, the procedures tend not to be so rigid. However, a more regulated process leads to clearer transparency (lack of corruption) and greater confidence among suppliers. The process you choose depends on your method of procurement, as outlined below:

- ◆ For **direct ordering** – the Procurement Unit will simply receive the quote from your chosen supplier, by a date agreed, and open and study its contents.

- ◆ For **competitive negotiation** – since the offers are not confidential with this method, the process can be formal or informal. Depending on your regulations and the value of the order, the Procurement Unit could simply provide a date for receipt of quotes (without a special opening date), and open and study the contents on receipt.
- ◆ For a **request for quotes for low-value goods from suppliers in your local town** – the process is usually much less formal. Relevant user and maintenance staff may collect the quotes from the suppliers. Alternatively, the Procurement Unit may provide a date for receipt of quotes (without a special opening date), and open and study the contents on receipt.
- ◆ For **all other methods** – you will need to follow the instructions in the remainder of this Section.

The Procurement Unit must receive the bids/quotes by the specified closing date and time. These may be submitted by hand or by mail. The Procurement Unit should keep a written record of all bids/quotes received, noting down when they were received and who received them. Received bids/quotes should then be stored unopened in a secure location (such as a safe) until the opening date. *Box 35* outlines the common procedures for opening tender bids and quotations. In general, the quotation processes are less formal than tender bids.

BOX 35: Most Commonly Used Procedures for Tender Bid and Quotation Opening

Opening Tender Bids	Opening Quotes
Opening <ul style="list-style-type: none"> ◆ On the opening date, the Procurement Manager (or an appointed officer from the Procurement Unit) should formally open the sealed bids at the stipulated time and place and in public. ◆ The box/envelope should be opened in the presence of at least three official representatives. One should be a representative from an outside department (such as the Treasury) and at least one should be a member of the Procurement/Tender Committee. 	<ul style="list-style-type: none"> ◆ For high-value orders: <ul style="list-style-type: none"> - on the opening date, the Procurement Manager (or an appointed officer from the Procurement Unit) should formally open the quotes at the stated time and place and in public. - the box containing the quotes should be opened in the presence of at least three official representatives. At least one should be a member of the Procurement/Tender committee. ◆ For low-value orders, the quotations may be received and opened by the Procurement Manager, in the presence of one or two members of staff from the Procurement Unit.
Registering <ul style="list-style-type: none"> ◆ Bidders and/or their representatives who are present should sign a register showing that they were present. 	<ul style="list-style-type: none"> ◆ The opening of the quotes is recorded.

Continued overleaf

**BOX 35: Most Commonly Used Procedures for Tender Bid and Quotation Opening
(continued)**

Opening Tender Bids	Opening Quotes
Processing <ul style="list-style-type: none"> On opening, the following should take place: <ul style="list-style-type: none"> Bids opened in order of receipt. Bidder's name, total amount of each bid, any discount, list of samples, bid modifications, and other such details should be announced and recorded. Confirmation that the bid is properly signed and accompanied by the required securities, if applicable. Confirmation that the documents meet the eligibility and tender requirements (evidence of arrival on time, necessary documents and samples enclosed, etc). If satisfactory, the bid is admitted for further comparison (evaluation). If not satisfactory, the bid is excluded. The excluded bidder should be informed in writing. Bid opening is recorded, and a copy of the record is sent to the funder/external support agency if requested. 	<ul style="list-style-type: none"> On opening, the following should take place, as relevant to the quotation-based method: <ul style="list-style-type: none"> Bidder's name, total amount of each bid, any discount, list of samples, bid modifications, and other such details should be recorded. Confirmation that the bid is properly signed and accompanied by the required securities, if applicable. Confirmation that the documents meet the eligibility and purchase requirements (evidence of arrival on time, necessary documents and samples enclosed, etc). If satisfactory, the bid is admitted for further comparison (evaluation). If not satisfactory, the bid is excluded. The excluded bidder should be informed in writing. Bid opening is recorded, and a copy is sent to the funder/external support agency if requested.
Late arrivals <ul style="list-style-type: none"> Late bids should not be opened but should instead be stamped with the date and time and returned to the bidder with a letter of explanation. 	<ul style="list-style-type: none"> Late quotations should not be considered and should instead be returned unopened to the supplier.
<p>Note: there may be variations to this approach for some purchasing methods. For example:</p> <ul style="list-style-type: none"> Restricted tender bids are not opened in public. In some cases, bid/quote opening may only involve the opening and recording of the offers. The checks for documentation (such as the bid bond, bid forms, audited financial reports, etc) are carried out during the evaluation/adjudication process (<i>Section 6.3</i>). You must check national regulations and the funder's requirements to see if this is the method to follow. In some cases, all tender bids are opened, including those that were late. However, the late bids are recorded as such, and are kept separate from valid bids submitted within the timescale stipulated. Again, check the national regulations and funder's requirements. 	

6.3 EVALUATION AND COMPARISON PROCESS

For the simpler or less formal purchasing methods the procedures tend not to be so rigid or complex. However, using the evaluation and comparison strategies provided in this Section can do no harm. Depending on your purchasing method, the Procurement Unit and relevant user and maintenance staff should carry out the following activities:

- ◆ For **direct ordering** – simply study the quote and ensure the supplier has met all requirements, at a price that you can afford.
- ◆ For **competitive negotiation** – ensure each supplier has provided all your requirements, compare the offers, note the differences and parts that could be improved, and use these as a starting point for your rounds of negotiation.
- ◆ For a **request for quotes for low-value goods from suppliers in your local town** – ensure each supplier has met all your requirements, compare the offers, noting the differences, and choose the best deal.
- ◆ For **all other methods** – you will need to follow the instructions in the remainder of this Section.

Once orders rise above a certain value, it is usual for the Procurement Unit and the Procurement/Tender Committee to both play a role in the evaluation and comparison process. The Procurement Unit usually administers the process, and collates information for the Procurement/Tender Committee to pass judgement on. The Procurement Unit can make recommendations but the task of deciding the winning bid should be left to the Procurement/Tender Committee. This separation of responsibilities helps to avoid conflicts of interest. It also reduces the pressure on general members of staff in the Procurement Unit who may interact with suppliers on a daily basis.

It is usual for bids/quotes to be assessed:

- ◆ first, to ensure that the offer complies with the requirements in your purchase document, and that all parts have been completed and are enclosed
- ◆ second, to compare and assess all parts of the offer, in order to identify the one which is the best fit and best value for money.

For assessment to be carried out properly, it is important to ensure that the Procurement/Tender Committee has the necessary skills to act as an effective evaluation team. This should include technical, financial, purchasing expertise and, if necessary, legal expertise (*Sections 1.2 and 2.2*). Sometimes the Procurement/Tender Committee may require additional assistance. This may be provided by relevant end-users and members of the HTM Service, the project sub-group (*Section 1.2*), or a hired procurement agent.





Experience in Botswana

The Government Computer Bureau of Botswana purchases all computers centrally for all government ministries, using a Ministry of Finance central budget. For obvious reasons, the Bureau recognized the need to standardize computer purchases. The Bureau needed to provide the National Tender Board with the background information necessary concerning their purchasing plans in order to convince the Board to allow standardization. They were successful by developing the following close working relationship with the National Tender Board:

The Government Computer Bureau:

- ◆ *telephones the secretary of the National Tender Board about their purchasing projects, explains the details, offers assistance if required, prepares the way for an understanding of pending tender adjudications, and describes what they are trying to achieve*
- ◆ *follows tender procedures and obtains as least three quotations/bids from different companies*
- ◆ *sends a member of staff to accompany their tenders to the National Tender Board meetings to argue their case*
- ◆ *presents the Board with the reasons why the 'package of inputs' and quality are necessary*
- ◆ *provides the Board with tangible reasons why stocks of spare parts and consumables should be purchased at the same time as the equipment, such as the unproductive downtime which would result from the lack of consumables or spares, the essential nature of the service provided by the equipment, and the consequences to services due to equipment downtime.*

The National Tender Board:

- ◆ *accepts technical reasons as valid in the adjudication process, and accepts technical advice concerning computers from the Government Computer Bureau since the Board does not have that knowledge itself*
- ◆ *does not choose the cheapest option, but looks for quality and a 'package of inputs'*
- ◆ *buys stocks of spare parts and consumables at the same time as buying the equipment.*

Unresolved issues are:

- ◆ *The purchase of a blanket maintenance contract for all the computers acquired. Since the Ministry of Finance has not set up a central budget for computer maintenance, all ministries owning computers obtain maintenance independently.*
- ◆ *The purchase of training with the equipment as part of the 'package of inputs'. Since all government training is purchased from a central budget it is not linked to the equipment procurement process.*

The process of evaluation and comparison can often be time consuming. However, it is important to ensure that decisions for awarding contracts are not made simply on the basis of which items are the cheapest. During evaluation the items should be assessed against the requirements specified in the purchase document (*Section 5.5.2*). The most common way to evaluate offers is to use an elimination process, where some offers are rejected at each stage. Offers should be judged against the following criteria:

- ◆ Compliance with requirements in the purchase document.
- ◆ Technical nature of the offer (part of the product selection criteria – *Section 3.2*).
- ◆ Financial nature of the offer (part of the product selection criteria – *Section 3.2*).
- ◆ Supplier qualification criteria – *Section 4.4*.

By doing this, you ensure that decisions are based on best value for money for the whole life-cycle cost, rather than simply being based on the item's purchase price.

The process of evaluation and comparison must be fair and thorough. To achieve this, the process must follow a defined pattern to ensure all bids/quotes are dealt with in exactly the same way.

The evaluation process for tenders is similar to that for quotes, although the tender process is normally a far more comprehensive task and is also regulated by law. The tools for evaluation can be the same, but the amount of information required is usually much less with quotation methods. Obviously, if you only request three quotes for a simple small order, the evaluation process should not take much time. The following evaluation steps are used, and some bids/quotes are rejected at the end of each step.

Step 1: Checking for Compliance

The first step when evaluating offers is to determine which, if any, are not compliant with the technical, commercial, and other specifications in the purchase document (*Section 5.5.2*). The Procurement Unit should be able to do this. It involves a more detailed examination of the offer to determine the compliance by the bidder with the requirements specified in the purchase document. This is known in tender processes as the **substantial responsiveness** of the bid. This process is more formal and comprehensive for tenders than for quotations.

A substantially responsive bid is one which:

- ◆ conforms to all the terms and conditions. This means that the supplier has responded to all parts of your schedule of requirements, has filled in all the boxes, and is able to supply all the parts required; and,

- ◆ also establishes the bidder's qualifications to supply and deliver the products within the delivery schedule. For example, the supplier:
 - has enclosed signed audited accounts, signed company declarations on health, safety, and environmental activities, certificates of quality manufacturing, and a letter of authorization from the manufacturer
 - has nominated a representative in your country (if this was one of your compliance criteria).

All non-substantial bids will be rejected as non-responsive and should be excluded from further in-depth evaluation.

In practice you will find that most bids contain reservations from one or more of the detailed requirements given in your document. If these are just minor adjustments and do not represent a substantial deviation from your expressed interests, you can still conclude that the bid is substantially responsive and therefore should be included. However, list the reservations for closer clarification.

To assist in this examination you may ask for other clarifications from the bidder. You may also wish to inspect the quality methods and production methods stated in their documents. This request and response should be in writing. The bidders, however, are not allowed to make any changes to the substance or price of their offers.

After evaluating the offers for compliance, some offers are discarded as the suppliers fail. The remaining offers can go forward to be compared in terms of technical performance (in *Step 3*).

Step 2: Preparing the Evaluation Information

The Procurement Unit should collate and compile the information from all the responsive bids into Evaluation Information Sheets. *Box 36* gives an example of the sort of data that needs to be included. Ideally the Evaluation Information Sheets should allow side-by-side comparison of the offers. *Figure 14* in *Step 4* shows an example for a simple purchasing method (a quotation-based method). For tenders there are more responses and the orders tend to be more complex, so more paperwork is required to obtain a true comparison. Usually there is too much information to be compiled in a single sheet, so you may like to use:

- ◆ one sheet for collating purely technical information about the product
- ◆ one for information on accessories, consumables, and spare parts
- ◆ one for aftersales service, and
- ◆ one for price information.

You can use large hand-drawn charts to enable comparison between suppliers. Alternatively, this is an area where the use of computers is useful, especially if procurement (or tendering) is managed centrally. General spreadsheet programs or specialized computerized procurement programmes are useful tools to simplify the collation of data and preparation of the Evaluation Information Sheets (see *Annex 2*).

BOX 36: Evaluation Information Sheets

Evaluation Information Sheets present an easy way to compare different bids/quotes. For ease of comparison, it is best to allocate one page per subject matter (technical product details, price, etc) and compare the offers side-by-side. You should also highlight where each offer deviates from the equipment specification. Typical Evaluation Information Sheets would include the following evaluation criteria:

Technical product data:

- ◆ the international/regional standards that the equipment adheres to
- ◆ whether the operational method used is new, well tried, or old
- ◆ the level of sophistication of the technology and the operating technique
- ◆ which functions and measurements do not meet the specifications in the purchase document
- ◆ whether any quality assurance certificates apply to the equipment

Accessories, consumables, spare parts:

- ◆ a list and the cost of accessories included in the offer
- ◆ a list and the cost of consumables included in the offer
- ◆ a list and the cost of spare parts included in the offer
- ◆ the length of time spare parts will be available and their location

After-sales service:

- ◆ cost of aftersales support
- ◆ guarantee/warranty periods
- ◆ the details of the aftersales support that can be provided

Price information:

- ◆ the price
- ◆ delivery arrangements
- ◆ costs to install, commission, and train
- ◆ the life-cycle costs

Note: this is an example and not a comprehensive list. The information you choose to include will depend upon the complexity of the equipment purchased – you may not need to go into such technical detail for simple equipment or recurrent supplies.

The Procurement Unit should present the Evaluation Information Sheets to the Procurement/Tender Committee (for tenders and high-value quotes) or the Procurement Manager (for low-value quotes). They should be accompanied by an explanation of the requirements, main objectives, and any binding constraints. Then the evaluation process can commence (*Step 3*).

Step 3: Carrying out the Technical Evaluation

The Procurement/Tender Committee should base their decision on advice from members of the group with professional knowledge relevant to the offer. If appropriate, they should also seek advice from representatives from the relevant user department and HTM Team. (For low-value quotes, the Procurement Manager should also seek advice from these end-users.)

The Committee should consider the product selection criteria, as set out in the purchase document (*Section 5.5.2*). It is essential that the information provided by the supplier is only related to the equipment specification and the selection criteria listed in the purchase document – any additional information intended to sway the evaluation can be seen as corruption. Hence the importance of detailing your requirements adequately in the purchase document. **The better the purchase document is, the easier the evaluation process will be.**

Details of the selection criteria for evaluating the equipment are provided in *Sections 3.2 and 5.5.2*. *Box 37* lists a few points to remember, relating to the technical aspects of the offer.

BOX 37: Summary Technical Assessment

- ◆ If a detailed specification was issued, then every detail of the offer must be closely checked to make sure it conforms with the original specification.
- ◆ If only a brief specification was issued, then the checks should be limited to ensuring the equipment or service offered meets the requirements.
- ◆ Any modifications or alternatives offered must be assessed individually, and decisions made whether any one is more cost effective than another.
- ◆ Remember that the technical assessment includes suitability, safety, ability to commission and train, after-sales support, warranty arrangements and more – do not simply assess technical data concerning the equipment.

For both quotations and tenders it may be necessary to ask the supplier to clarify any ambiguities or uncertainties. Alternatively, you can draw up a shortlist of suppliers and ask those included to demonstrate their equipment, as part of your technical evaluation. (This is unlikely to be necessary for very simple equipment, and may be impossible for many overseas suppliers.)

After the technical evaluation, some offers are discarded if they fail to meet the requirements. The remaining offers can go forward to be compared in terms of financial performance (*Step 4*).

Step 4: Carrying out the Financial Evaluation

The offers that have survived the technical evaluation (*Step 3*) can now be compared in terms of financial performance. Remember that financial evaluation must include all costs. You need to consider:

- ◆ **The lowest purchase price** (the cheapest to buy).

Recurrent supplies and basic or simple equipment items could be bought on the basis of purchase price alone, as long as the quality is sufficient.

- ◆ **The most economically advantageous offer.**

For more complex equipment, you need to consider:

- all the other life-cycle factors, alongside purchase price, which could have a bearing on the cost of ownership – for example, delivery, installation, training, consumables, spare parts, fuel efficiency, maintenance contract.
- other features that determine the likely life of the equipment and hence its cost-effectiveness – for example, quality, local availability of aftersales support, technical complexity.

To make sure you are getting the most for your money consider:

- ◆ What are the freight costs? Note: it is easier to compare and evaluate freight costs from competing suppliers when transportation costs are expressed as Cost Insurance and Freight (CIF) or Carriage and Insurance Paid (CIP) (*Section 5.5.2*).
- ◆ Can the equipment be installed and commissioned, and staff trained in-house? Or will special agreements with the supplier or an outside technical unit be needed? What will be the costs of these?
- ◆ What will be the cost of equipment and its operation for the next year/two years/five years? (Is the equipment expensive to run? Does it require expensive consumables to run? Does it require costly spare parts?)
- ◆ What is the expected useful life of the equipment?
- ◆ What will be the maintenance and repair costs? Are they included or excluded?
- ◆ Will it be more economical to maintain the equipment in-house or with a service contract over its useful life?

Paying a higher initial purchase price may be justified if:

- ◆ the equipment will be more economical over its lifetime
- ◆ the equipment does not require new investment in training and spare parts' stock holdings, because it is similar to equipment already in use
- ◆ the equipment quality means it will perform better and last longer.

Box 38 provides a summary of financial assessment criteria.

BOX 38: Summary Financial Assessment

In summary, the financial assessment should ensure that:

- ◆ all costs are properly covered in the prices offered (for example, product price, manuals, delivery and shipping costs, insurance, customs duties)
- ◆ bids are comparable (in other words, currency conversions are correct at the time)
- ◆ alternative costings for alternative methods of meeting the specifications are identified and logged separately
- ◆ the costs compare with, or are lower than, the estimated costs when the purchase document was prepared
- ◆ details of any extra costs we did not expect which appear in the offer are noted (for example, testing and inspection charges, special installation tools, specialized consumables)
- ◆ discounts are noted
- ◆ terms of payments are included.

Note: this list is not necessarily complete, but gives an indication of the type of cost make-up that should be considered.

As for the technical assessment, you should aim to compare offers side by side. With open tenders and national competitive bids you may receive many responses – perhaps as many as 30 or more – requiring careful comparison over several pages. But for other restricted purchasing methods, you should be able to use a fairly simple form for financial assessment, as shown in *Figure 14*.

After the financial evaluation, some offers may be discarded if they fail to meet your requirements. The remaining offers can go forward to be placed in order of priority (in *Step 5*).

Figure 14: Sample Quotation Comparison Form

This sample form works well for the financial assessment of offers, but similar forms can be used for various aspects of the technical assessment. Very often three or four forms are used for the evaluation of a single offer.

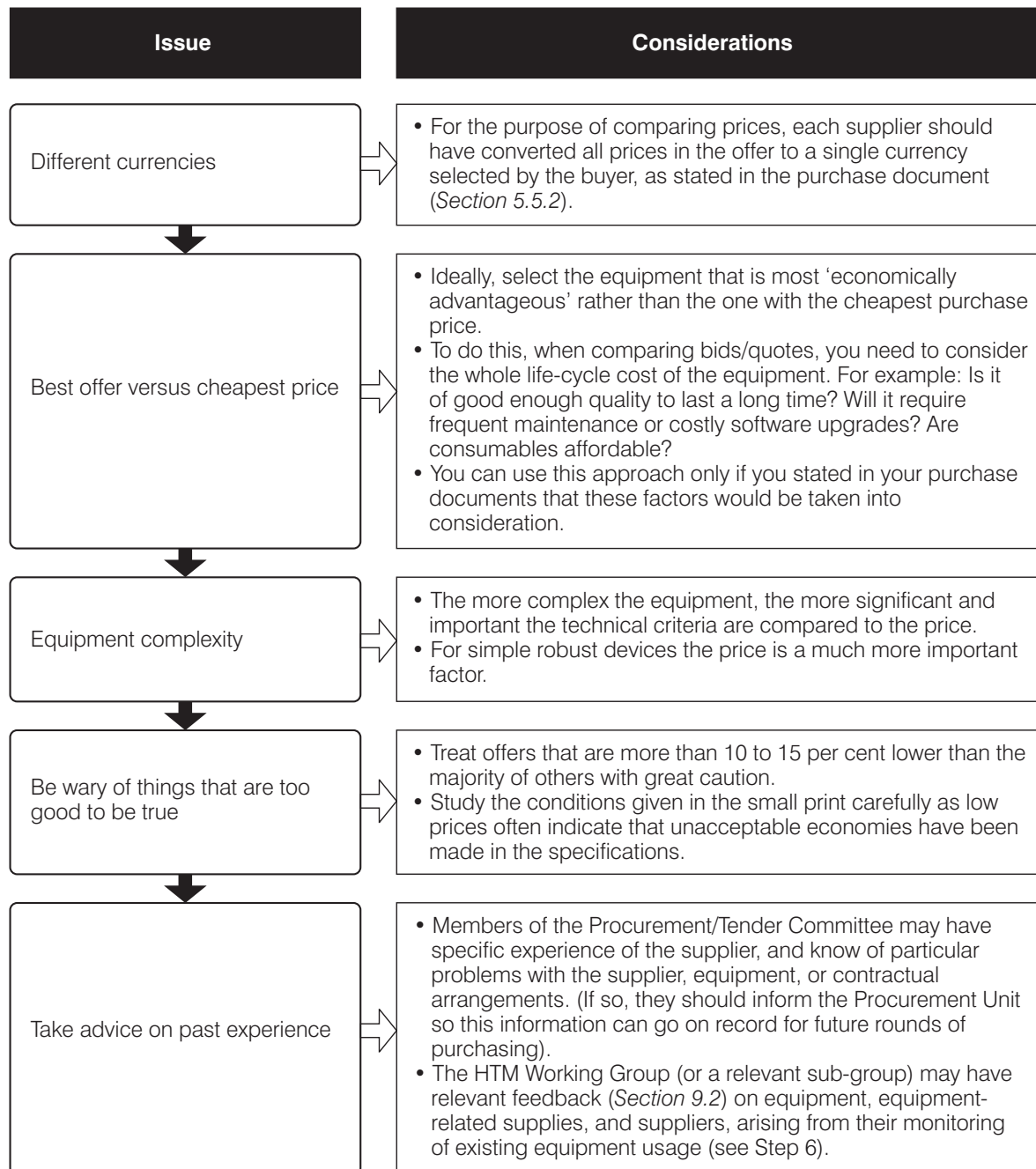
QUOTATION COMPARISON FORM						
Contract number:		Client:				
Specification number:		Requisition number:				
Enquiry (offer) number:		Evaluation team:				
Item(s) being assessed:		Date of evaluation:				
	Estimate	Supplier 1	Supplier 2	Supplier 3	Supplier 4	Supplier 5
Date of quotation:						
Quotation reference:						
Quotation valid to:						
Price ExW of equipment and supplies						
Price for packing						
Price for delivery						
Price for install/commission/training:						
Price for extras identified:						
Total price						
Terms of payment						
Delivery method						
Comments						
Reasons for rejection at this stage						

Step 5: Making Recommendations

Having completed these steps in the evaluation process, the Procurement/ Tender Committee (or Procurement Unit for low-value orders) needs to make recommendations about the possible winning order of the shortlist of suppliers.

Figure 15 shows the sort of criteria that can help you to make such decisions.

Figure 15: Issues to Consider Which Help You to Make a Decision



At the end of this process, the Procurement/Tender Committee (or Procurement Unit for low-value orders) should be able to produce a summary of the bid/quote information per shortlisted supplier, with their priority ranking (first, second, and so on). Consultations can then be sought regarding the recommendations (in *Step 6*).

Possible Scoring and Weighting Systems

To help with making recommendations, some people use a scoring system for each element of the bid/quote (for example, all the technical and financial selection criteria used in *Steps 3 and 4*). The Procurement/Tender Committee (or Procurement Manager for low-value orders) chooses the scoring system. For example, an element in the offer scores 0 if it is absent, 1 if it is poor, 2 if fair, and 3 if good. Each element of a supplier's offer is given a mark according to this scoring system. By adding up all the marks, it is possible to see which bid/quote has the highest score. (If such a system is used, a score line can be inserted into the comparison forms – such as *Figure 14*).

However, many people find scoring systems difficult to implement. For example, everyone has to understand why an element of an offer would be marked 'poor' instead of 'fair'. A points system can become too much of a compromise unless it is done carefully. Also, some elements of an offer may be seen to have more importance than others (for example, the presence of a particular safety feature may be more important than a two-week delay to the delivery date).

Thus, some people also assign a weighting system to different aspects of the bid/quote. The scores obtained under the points system (described above) are multiplied by a percentage (a weight) according to their perceived importance. The actual percentages should be assigned by the Procurement/Tender Committee, be flexible, and vary depending on the equipment type and in-house skills available.

For example, for medium- and high-complexity equipment, technical criteria are usually assigned greater importance than the costs of the product. Thus, the weighting system could be:

- ◆ 10 per cent for contents of offer fulfilling your requirements
- ◆ 20 per cent for technical features of the product
- ◆ 30 per cent for technical support provided
- ◆ 10 per cent for warranty terms
- ◆ 5 per cent for delivery time
- ◆ 25 per cent for life-cycle costs.

This gives a 75 per cent weighting for supplier support and technical features, and a 25 per cent weighting for financial criteria, providing a ratio between the two of 3:1 that is typical for medium- to high-complexity equipment.

However, many people find that to assess each element of an offer with a points system, and also place a value on the amount one element represents in the whole offer is complex (for example, would a good battery life be more important than poor aftersales support?). Also, if scoring and weighting systems are complex, they become too difficult to describe in the tender document as required (*Section 5.5.2*). Thus, many people find it more straightforward to simply use the phased evaluation and elimination process described in *Steps 1 to 4* above.

Step 6: Consultations

Before the Procurement/Tender Committee (or Procurement Unit) finalizes its recommendations, it is useful to consult or liaise with the staff that will use and maintain the equipment. There are two options for doing this:

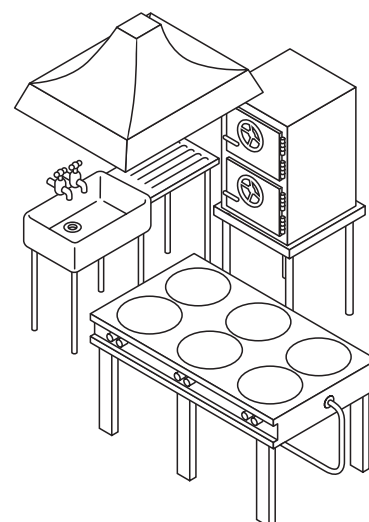
- ◆ If such staff are co-opted members of the evaluation committee then their views will already have been heard, and you can go on to *Step 7*.
- ◆ Often relevant staff are not present at the Procurement/Tender Committee meetings, so they need the opportunity to review the summarized tender information before the final decision on the winning bidder is made.

It is beneficial to take the time to consult on the recommendations, since:

- ◆ the evaluation team can gain from the experience of staff that regularly work with the equipment
- ◆ the end-users have an opportunity to appeal a decision that they can see will create problems for them.

To avoid information leaks you should only involve personnel who you think can contribute actively. All other staff should be informed, but they need not be given detailed information.

The heads of the relevant user and maintenance departments should study the summarized information and recommendations, comment on the suppliers that appear to be winning the tender/quotation, and lodge an appeal (with reasons) where necessary. For example, when there is a tender for the supply and installation of kitchen equipment, the relevant kitchen and HTM managers have a chance to see the priority rankings of the bidders before a decision is finalized. They can put forward objections to the winning bidders if they know the product to be poor or that the supplier's performance has been poor in the past.



The Procurement/Tender Committee (or Procurement Unit) can then take note of this information in order to shortlist the offers in winning order. This prioritized shortlist can then go forward so that the suppliers can be evaluated (*Step 7*).

Step 7: Evaluating the Suppliers

For some purchasing methods, suppliers are pre-qualified (*Section 4.4*). This may include restricted tenders or certain quotation-based methods. In such instances, you do not need to worry about this part of the evaluation process, since suppliers have already been screened as part of the pre-purchase activities (*Section 5.3*). Therefore, the Procurement/Tender Committee (or Procurement Unit) can simply make their final decision (*Step 8*).

Other purchasing methods, such as open tenders or national competitive bids, do not use pre-qualified suppliers. In such cases, you will need to post-qualify them (*Section 4.4*).

You could evaluate all the suppliers at the beginning of the evaluation process. However, since investigating each supplier according to the criteria shown in *Annex 5* takes considerable time, we suggest you only investigate the winning bidder. If they fail, you can move on to assess bidder number two, and so on. Your decision on when to evaluate the suppliers will depend on whether you have a great deal of offers to compare.

The nominated supplier from whom you intend to buy should be evaluated according to factors such as:

- ◆ capabilities and capacity to supply the required equipment
- ◆ financial position
- ◆ reputation and reliability
- ◆ ability to effectively carry out the contract
- ◆ previous history of supplying similar products and services.

This supplier qualification criteria should have been set out in the purchase document (*Section 5.5.2*). If the bidder does not meet your criteria, their bid is rejected. You should then go on to consider and evaluate your second choice bidder.



- Tip** • You should spend less time on small, low-value, and one-off contracts, but much more effort if the contract is large, complex, high-value, or if you may want to buy more from the same supplier later.

The qualification criteria used to screen the suppliers is thoroughly dealt with in *Section 4.4 and Annex 5*. *Box 39* lists a few points to remember when evaluating the supplier.

BOX 39: Summary Supplier Assessment

In summary, the supplier assessment should use the criteria in *Section 4.4 and Annex 5* to check:

- ◆ all aspects of the bidder's capability to perform according to the contract
- ◆ all aspects of the bidder's ability to meet all the qualification criteria.

At the end of this process, the Procurement/Tender Committee (or Procurement Unit) will be able to make their final decision (*Step 8*).

Step 8: The Final Decision

At the end of the evaluation and elimination process, the Procurement/Tender Committee (or Procurement Unit) should be in a position to select their first choice bidder, based on a summary comparison of the benefits and costs of all the bids received.

However, it is possible to go through this whole evaluation and comparison process and find that you are not ready to award the contract within the validity period of the bid/quote (*Section 5.5.2*). If this is the case, you need to ask the suppliers to extend this period to enable you to finish the process according to best practice (and maybe alter the delivery date).

Before awarding the contract, you should check that the overall cost of the winning bid/quote is within your budget (see *Guide 2*). If the bid/quote exceeds your estimated costs, you need to decide on the following:

- ◆ **Whether to reduce the size of the order, or the quality of the goods.** There is a general rule (but not any legal regulation) that an alteration of quantities up or down by 15 per cent should not normally influence the quoted unit price. So, often, the supplier is willing to accept a smaller quantity than he calculated for. It might be more difficult for him to accept a request for a lower quality product, although he may sell you a simpler model.
- ◆ **Whether to continue, and reappraise your estimate or terms.** If you decide to go ahead with the winning bidder and cannot increase your budget, you may need to consider other ways of making savings. For instance, you might look at whether you could carry out the installation, commissioning and initial training yourself. Alternatively, you may choose a cheaper transportation method, and alter the delivery date accordingly.
- ◆ **Whether to negotiate with the bidders to reduce their costs to meet your estimate.** This is not normally allowed for tenders, but for other purchasing methods it can be very effective. For example, you might decide to inform suppliers that there can only be a sale if the prices are reduced by, say, 10 per cent.

- ◆ **Whether to abandon and restart the whole exercise.** Re-tendering or re-quoting is an option. However, it may be quicker and more effective to ask the bidders to recalculate their prices (through one of the three methods listed above) while keeping all other parts of the tender identical.

You must be careful that the new requirements (your modifications) are not radically different to the original requirements. Otherwise, you could be accused by unsuccessful suppliers of changing the terms so much that they could have put in an offer on an entirely different basis. You should check national regulations carefully for assistance on this matter.

The Procurement/Tender Committee needs to agree on these revised terms before the final contract is agreed (*Section 6.4*).



- Tip**
- Some buyers award contracts to a single supplier. Others routinely split contract awards between two or three suppliers, in order to avoid dependence on one supplier (depending on your standardization strategy).
 - The background information used for the selection process should be documented and held on file for future reference.

At the end of this process you should have obtained equipment with the qualities detailed in *Box 40*.

BOX 40: Final Outcome of the Purchasing Process

At the end of the purchasing process, the equipment chosen should:

- ◆ be of high quality, and manufactured to the relevant international standards
- ◆ be robust, able to withstand the local climate and conditions, and made with these conditions in mind
- ◆ be suitable for use by your existing staff. (The equipment chosen should have a level of technology that your staff are already accustomed to and are confident to use. Also, staff should easily be able to attain the relevant skills in operation and maintenance.)
- ◆ conform to your standardization initiatives
- ◆ be manufactured by companies with good representation in the region, who can offer competitive prices for freight, installation and training visits by local agents, and who can provide accessible aftersales support and locally available spare parts
- ◆ avoid the introduction of a wide range of different consumables, accessories and spare parts requirements, thereby assisting initiatives for rationalization of supplies and bulk ordering
- ◆ be energy conserving and have been purchased with energy efficiency in mind.



Once the Procurement/Tender Committee (or Procurement Unit) has chosen the supplier(s), the Procurement Unit needs to negotiate with them and agree the final terms of the contract, before placing an order (*Section 6.4*).

6.4 AWARD OF CONTRACT AND PLACING THE ORDER

Overview of the Formal Process for Awarding Contracts

Purchase Order a sequentially numbered printed form (from a quadruplicate book) used by the buyer to place an order with a supplier, listing the details of all that is required. It is an official and binding document issued to the supplier, which authorizes the expenditure of funds for goods and services, and acknowledges that payment will follow. Once created, the necessary funds are dedicated from the relevant budget account (expenditure line) against the Purchase Order number.

For the simplest purchasing methods and small orders, your purchase document (*Section 5.5.2*) may simply be a completed Purchase Order form (see *Annex 11*).

Proforma Invoice a legal document between the supplier and the buyer providing a complete breakdown of the supplier's quote and terms for the order, against which payment is made by the buyer. Most commonly used by buyers to allocate and arrange the transfer of funds via bank money transfer to international suppliers. Used by customs in the country of destination to determine the customs value of imported goods.

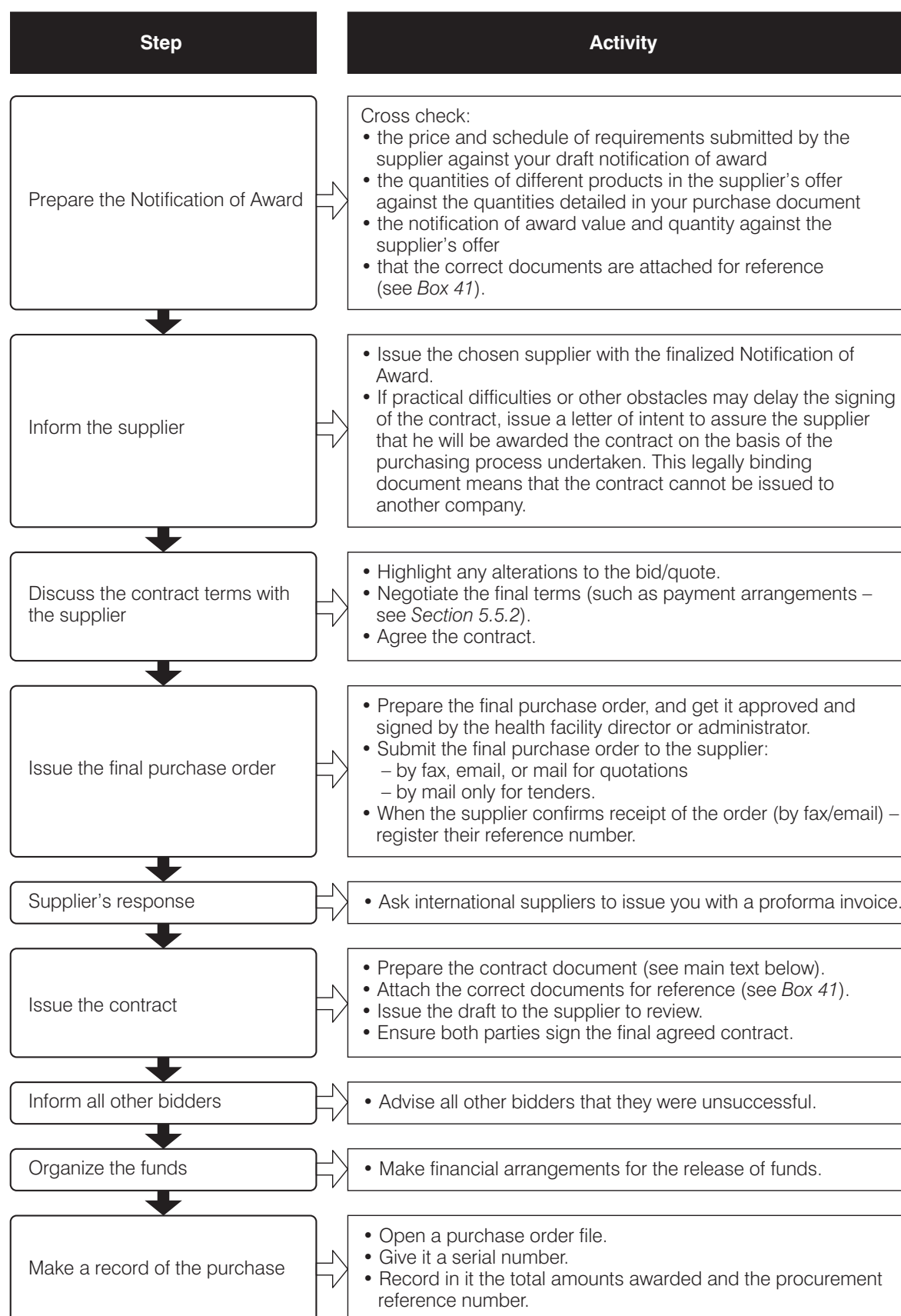
Contract a legally binding document between the buyer and a supplier for a specified period of time, which describes the goods and services being supplied.

Once you have chosen a supplier (*Section 6.3*), there are several documents that the Procurement Unit issues to them:

- ◆ a Notification of Award
- ◆ a finalized Purchase Order
- ◆ a finalized Contract.

For **tenders and high-value quotations**, the Procurement/Tender Committee needs to agree the content of these documents before the Procurement Unit drafts them.

Figure 16 shows the key procedures and activities involved in awarding contracts.

Figure 16: Suggestions for Procedures to Follow When Awarding Contracts

For the **simpler or less formal purchasing methods** the procedures tend not to be so rigid or complex. Thus, for direct ordering, competitive negotiation, and a request for quotes you would normally carry out the following procedures:

- ◆ for local suppliers, discuss and finalize any changes to the initial quote with the winning supplier. You can then ask them to submit a final quotation, issue a final Purchase Order based on this final quotation, and prepare the contract (see below).
- ◆ for international suppliers, discuss and finalize any changes to the initial quote with the winning supplier. You can then issue a final Purchase Order based on this final quotation, request a proforma invoice from the supplier, and prepare the contract (see below).



- Tip**
- There are four copies of the Purchase Order. One is sent to the supplier, one is filed in stores waiting for receipt of the goods and services, one goes to the finance office for payment to be arranged, and one remains in the order book in the Procurement Unit.
 - The Procurement Unit should file their copy to create a database of all orders. In this way you will have a record of information (such as the supplier's contact details, unit quantities, and code and catalogue numbers) to help you make subsequent orders.

Preparing the Contract

Preparing contracts is a highly specialized task and requires a great deal of care. Problems can arise from misunderstandings between the buyer and supplier over factors such as price, delivery, installation, and warranty terms.

To avoid confusion, make sure that your contract is in writing and that it gives clear, full details of all of the following:

- ◆ A detailed description of the goods and services to be provided.
- ◆ Agreed prices.
- ◆ Any discounts offered.
- ◆ Payment terms.
- ◆ Documentation required.
- ◆ Cancellation rights, if you have any.
- ◆ Warranty or guarantees, with details of how long they will last.
- ◆ A date for delivery of the goods.
- ◆ Delivery terms.
- ◆ Penalties if either party fails to comply.
- ◆ The priority of the documents supplied, in case of disagreement over specific paragraphs in specific documents.

The contract needs to be comprehensive, but need not be repetitive. It can contain (or refer to) previous documents for the details, provided those documents are clearly identifiable. In that way only agreed changes need to be described separately in the contract. However, the terms and conditions of a contract should not greatly differ from those on which the bid/quote was requested (as outlined in the purchase document).

Box 41 summarizes the details and documents required for notifications of award and contracts.

BOX 41: Documents and Details to Include with the Notification of Award and the Contract

Notification of award	Contract
<ul style="list-style-type: none"> ◆ Notification of award form signed by authorized signatories, including: <ul style="list-style-type: none"> - unit and total price awarded - total quantity awarded ◆ Reference to the purchase document and offer 	<ul style="list-style-type: none"> ◆ Contract document, including: <ul style="list-style-type: none"> - general conditions of contract - specific conditions of contract - agreed schedule of requirements ◆ Summary price schedule for the offer submitted by the supplier ◆ Notification of award ◆ Reference to the purchase document and offer (although for tenders and high-value quotations it is useful to attach these documents so that you know where they are)

For a comprehensive discussion about what to include in the contract, refer to *Section 5.5.2* on preparing your purchase document. *Figure 17* highlights the key points that need to be clarified with the supplier and included.

When preparing the contract, the Procurement Unit is responsible for:

- ◆ checking contracts for accuracy and ensuring that specifications, and contractual terms and conditions are clear and unambiguous
- ◆ checking what restrictions, if any, may apply to the import of items on the procurement list
- ◆ checking whether any items of equipment require special documentation for their transportation. (For instance, does the supplier require documents from you to enable the goods to be exported? Do the goods require documents stating the presence and special handling requirements for hazardous materials?)
- ◆ specifying the number of copies of invoices and shipping documents that you require (often too few copies are sent, resulting in customs clearance delay and expense)
- ◆ including any other special instructions (for example, no delivery at weekends or during holidays)
- ◆ verifying the supplier's bank account number and details for payment.

Figure 17: Summary of Key Points for a Contract Document

Issue	Key Points
Specifications	<ul style="list-style-type: none"> • Equipment, services, and suppliers should conform to the specifications indicated. No alterations or alternatives will be acceptable unless confirmed in writing. • Describe installation, commissioning and training requirements, and ask for any site preparation needs. • Detail the after-sales maintenance or other similar support services expected. • Provide details of the local nominated representative (if this was an eligibility requirement).
Warranty terms	<p>Detail:</p> <ul style="list-style-type: none"> • when the warranty starts and how long it lasts • what is covered by the warranty.
Freighting terms	<p>Detail:</p> <ul style="list-style-type: none"> • the transport method required (e.g. air, sea, road) • international freighting terms • insurance cover.
Delivery	<p>Detail:</p> <ul style="list-style-type: none"> • appointed carrier/freight forwarder, if applicable • consolidation point, if required • freight port of exit and arrival point of entry • destination point • date of delivery • shipping and customs documents required.
Payment currency	<ul style="list-style-type: none"> • Agree on the currency in which payment will be made (this is not always the same as the currency used for providing the bid/quote). Payment is usually in a currency widely used in international trade, or the currency of the supplier or buyer. (Many international suppliers do not accept payment in local currency, or include a contingency factor for conversions that increases the price). • Determine the exchange rates that will be used.
Payment terms	<p>Detail:</p> <ul style="list-style-type: none"> • method of payment (e.g. letter of credit, bank draft, cheque) • terms of payment (e.g. pre-payment, payment on-delivery, deferred payments, phased payments) • validity period for contract prices • any settlement terms and discount arrangements.
Penalties for default	<p>Detail:</p> <ul style="list-style-type: none"> • the remedies available to each party in case of default by the other party • the body of law under which defaults will be resolved • penalties to the supplier for defaulting on the contract details.

If there is anything that you do not understand, ask for it to be explained. If you have any doubts, get advice before you commit yourself.


Tip

- Your contract document is a complete statement of your requirements for goods and services.
- Problems encountered with suppliers often occur due to ambiguous standards and poor specifications.
- Check with other health facilities, ministries, NGOs, UN agencies and clearing agents about national import bans or special requirements. The exact stipulations may be found in the official government gazette.
- If commercial and legal aspects of setting up the contract are ignored, then the risk of failure or unplanned expenses is increased.

The supplier should be sent a draft copy of the purchase contract to review. Once everything has been agreed, the contract is signed by both parties.

Copies of the final purchase contract should be kept in several places:

- ◆ If buying using external support agency funds or loans, copies of the confirmed contract and all evaluation reports should be given to the external support agency.
- ◆ Keep a record of all purchase contracts in a database. Update these records to show action taken, progress, outstanding issues, and the completion of the contract (*Section 8.5*).

Other Contract Formats

Contracts can be drawn up to cover long-term arrangements, such as a supply-period contract which awards a supplier with the contract to supply certain goods over a set number of years (*Section 4.1*).

Establishing a longer-term contract with a supplier (for example, for two to three years or longer) can:

- ◆ cut contract transaction costs
- ◆ reduce the cost of holding stock, and
- ◆ help towards your standardization policy (*Section 5.5.2*).

Under long-term arrangements, buyers and suppliers agree commercial terms (for example, prices, delivery schedules, and packing requirements) for the term of the contract. Then, when an order is placed against the contract, it can be delivered rapidly.

Note: you may enter into other types of contract if you procured your equipment by some means other than purchasing, or you procured services without purchasing equipment. If you:

- ◆ **lease equipment** (*Section 5.3*) – you need to complete the leasing contract of the commercial firm you have chosen
- ◆ **request donations** of equipment (*Section 5.3*) – you need to complete the donation agreement
- ◆ **require maintenance and repair support** – you need to enter some form of contractual arrangement (see *Guide 5* on maintenance management for the options available).

Debriefing Unsuccessful Bidders

Until the successful bidder has been notified, no other bidder should be informed about decisions relating to the award of the contract.

Once successful bidders have been informed, you should make the summarized results public and carry out debriefing, if requested by the unsuccessful bidders. This can be carried out verbally or in writing. Debriefing should cover:

- ◆ a list of all contracts awarded and names of successful bidders (if necessary the names can be omitted)
- ◆ details of the total value of each contract. Details of the actual item price or rates in individual offers are confidential and should not be disclosed. However, you may disclose a prospective supplier's ranking. If the bidder was the lowest in cost terms but not selected on value for money, it is better to tell the bidder that, although their price was competitive, other factors were more significant in the award decision.

You should also give the unsuccessful bidders feedback on issues such as:

- ◆ offer terms and technical details – where these differed fundamentally from those of the buyer
- ◆ aftersales service – inadequate arrangements for servicing or supply of spare parts.

While there may be no obligation to debrief suppliers, it is good practice to do so. There are many benefits, including:

- ◆ establishing a reputation as a fair, honest, 'open' buyer
- ◆ offering unsuccessful bidders valuable information that will help them to be more competitive in the future. This is likely to be of most value to smaller and newer suppliers.

6.5 LOCAL DIRECT PURCHASING AND ORDERING

Besides tenders and quotations, there are two ways to obtain goods locally – local direct purchasing, and ordering from stores.

Making a Local Direct Purchase

Usually, health service providers have established a financial limit, below which items can be bought by health facilities from suppliers in their local vicinity without central permission (*Section 2.2*).

Low value items occasionally need to be bought direct from the local market, without the need for three quotes (although experience and regular purchasing may have provided you with knowledge of the best sources). For example:

- ◆ basic office items, such as stationery, which are in constant demand
- ◆ items required to directly meet a specific demand that could not be met from stock (non-stockable items)
- ◆ items required in an emergency, or for prompt purchase of goods
- ◆ where the quantity needed is small
- ◆ where the item is not supplied by the official stores.

When making such local purchases, you should use a Purchase Order (*Section 6.4*). This one document performs various functions:

- ◆ It authorizes you to buy and serves as a guarantee for the supplier that goods will be paid for (*Section 6.4*).
- ◆ It is a record that the goods have been delivered/collected. For the procedures required for this, see *Section 8.2*.
- ◆ It is a trigger to ensure payment is made. For the procedures required for this, see *Section 8.5*.

For local direct purchases, the supplier is usually paid at the time of collection or delivery, and often in cash (or occasionally by a cheque prepared by the finance office). Accurate records should be kept of these payments, as described in *Section 8.5*.

Health service stores should review their stock levels regularly to ensure that they are sufficient to meet demands. New orders should be based on the turnover of the store (plus, for central/zonal stores acting as distribution centres, the expected consumption of the health facilities they supply).

When a Purchase Order is drawn up, the unique reference number of the originating order from the requesting department (user, maintainers, or stores) is recorded on it. This makes it possible to trace any purchase back to the person who ordered it, check progress with the order, and match the Purchase Order with its originating order (see *Annex 11*).

Ordering From Health Service Stores

In many countries, health service stores hold stocks of small items of equipment (such as instruments, bed pans), as well as equipment-related supplies (consumables, accessories and spare parts). Sometimes these items are kept in the Medical Stores system and sometimes in the Supplies Stores system (*Section 7.3*). They may be held in the health facility store, and restocked from central or zonal (district, diocesan, regional) stores that act as distribution centres. Therefore you should:

- ◆ find out the correct point of supply for the equipment you require (from the health facility's pharmacy or stores departments, from Central Medical Stores, from the district Supplies Store, and so on)
- ◆ note down the name of the Procurement Officer through whom your requests should be channelled.

Internal orders from departments to the health facility store usually occur on a weekly basis. However, external orders are normally placed with the central/zonal stores at greater intervals – usually monthly or quarterly – and delivered according to a fixed schedule. These external orders are either paid for in the usual way, such as by cheque, or a budget allocation is set up at the central/zonal store that the health facility can spend. Each Procurement Unit should ensure they:

- ◆ are familiar with the different sources of supply, and the different sources' procedures for acquiring goods (such as defined supply periods)
- ◆ use the stock cards to determine the order quantities required before the next supply period, and to ensure rational stock levels (see *Guides 4 and 5*)
- ◆ only order items your health facility needs and is authorized to keep
- ◆ only order items if sufficient funds/budget allocations are available.

Equipment and equipment-related supplies can be ordered from stores using various standard requisition and issue forms (see *Annex 11*). These forms are printed in books (in triplicate at least) with sequential order numbers for each form. They can also be pre-printed with a list of available items, together with their specifications and stores code numbers. The requisition forms need to be authorized by various people at health facility level, as follows:

- ◆ for internal requisitions for goods from health facility stores – the requisition forms should be authorized by the head of the requesting department (equipment user, maintenance, or administration). They should also be cleared by a Finance Officer, who checks that funds are available in the relevant budget.
- ◆ for external requisitions for goods from central/zonal stores – the requisition forms should be authorized by the Stores Controller and the Procurement Manager. A Finance Officer should check that funds are available in the budget expenditure line set up with the central/zonal store. If not, alternative methods of payment will be need to be arranged.

Guides 4 and 5 provide details of how to use these forms to order stocks. You should:

- ◆ fill in requisition forms clearly, giving as much detail as possible about your requirements and specifications. This helps to avoid incorrect items being supplied and prevents delays in filling your order.
- ◆ process and file the copies of the requisition form in the following areas, as appropriate:
 - the requesting department
 - the stores that you are placing an order with
 - the Finance Office
 - the Procurement Unit.

Getting the Order Right

Figure 18 provides tips on ordering supplies. The recommendations apply to all recurring supplies ordered at health facility level (both locally and internationally).

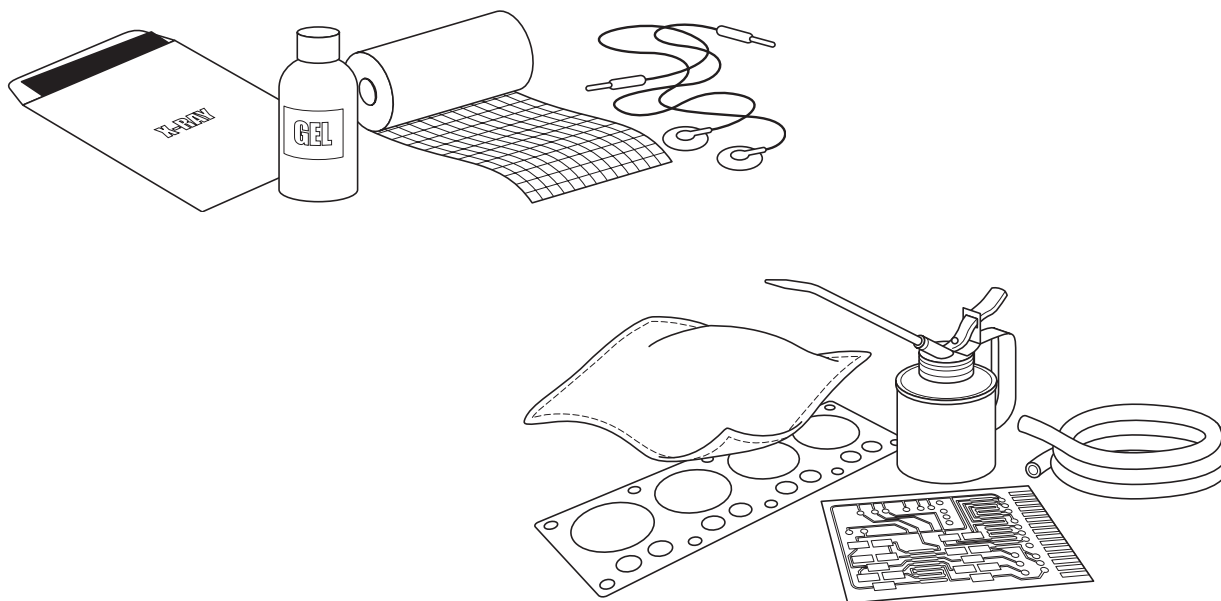
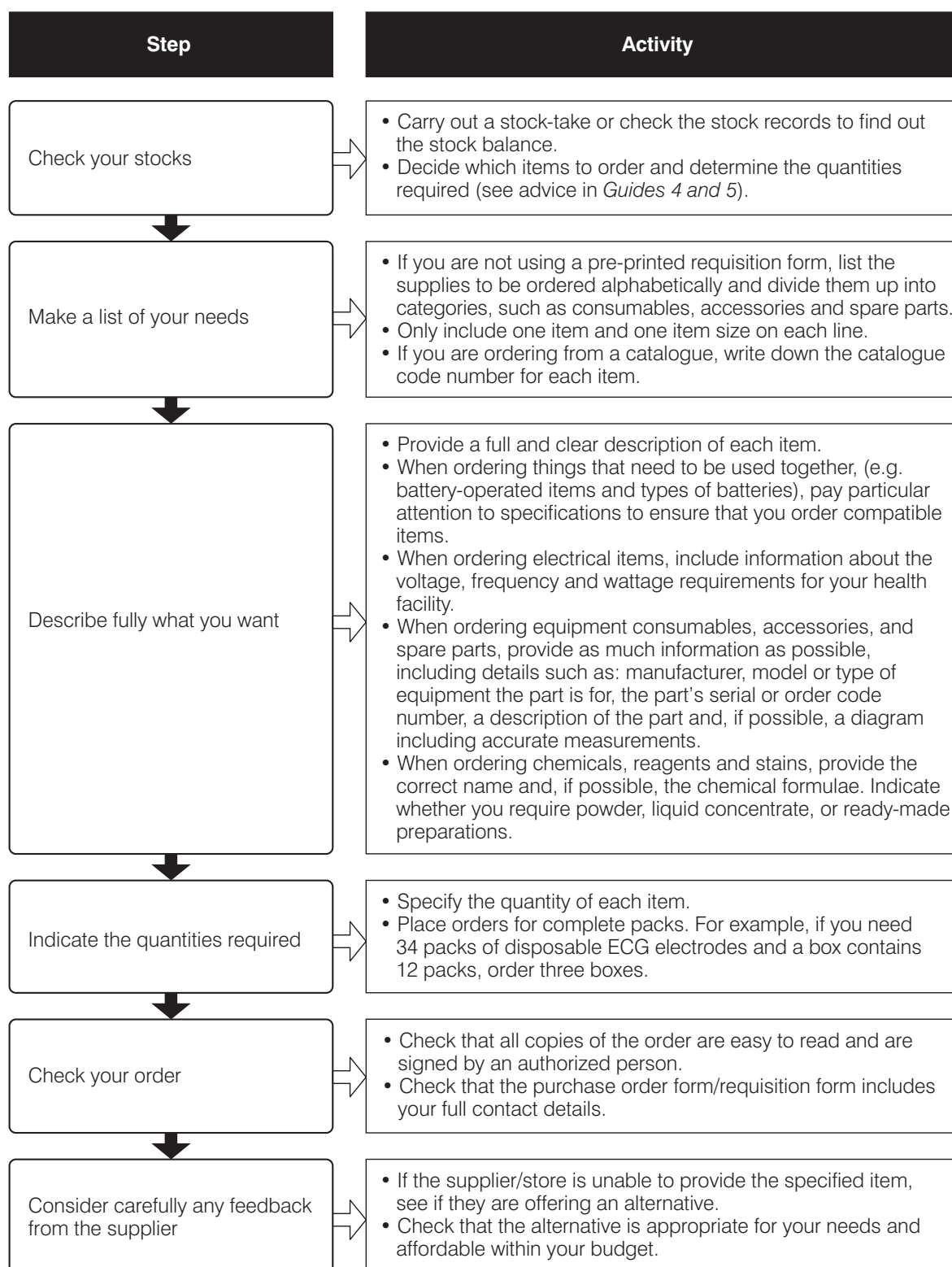


Figure 18: Tips on Ordering Supplies



Box 42 contains a summary of the issues covered in this Section.

BOX 42: Summary of Issues in Section 6 on Managing the Purchasing Process

Requesting	<p>Procurement/Tender Committee and/or Procurement Unit</p> <ul style="list-style-type: none"> ◆ once the decision is made on how to procure (<i>Section 5.3</i>), prepares requests either for tender bids or for quotations ◆ checks the invitations to bid for completeness and accuracy ◆ depending on the purchasing method (<i>Section 4.2</i>), advertizes for suppliers or directly contacts pre-qualified suppliers
Opening	<p>Procurement Manager</p> <ul style="list-style-type: none"> ◆ receives offers and stores them safely until the opening date ◆ accepts only those offers received by the specified date ◆ opens the offers on the specified date in the presence of the correct team (see <i>Box 35</i>) ◆ registers the offers and processes them to see if they meet certain criteria (see <i>Box 35</i>)
Evaluating	<p>Procurement Unit</p> <ul style="list-style-type: none"> ◆ checks the bids/quotes for compliance and discards those that are not 'substantially responsive' ◆ prepares Evaluation Information Sheets (see <i>Box 36</i>) for the Procurement/Tender Committee to compare the offers
	<p>Procurement/Tender Committee (or Procurement Manager for low-value orders)</p> <ul style="list-style-type: none"> ◆ compares each offer against the technical aspects of the product selection criteria, and discards those that fail ◆ compares each offer against the financial aspects of the product selection criteria, and discards those that fail ◆ makes a provisional recommendation and consults the potential users and maintainers ◆ evaluates the winning supplier according to the supplier qualification criteria, and if the first choice fails, evaluates the second choice, and so on ◆ makes the final decision
Contracting	<p>Procurement Unit</p> <ul style="list-style-type: none"> ◆ prepares the Notification of Award and final Purchase Order ◆ notifies the winning supplier and discusses terms ◆ prepares the contract document, with specialist assistance as necessary ◆ provides feedback to unsuccessful suppliers ◆ draws up any other types of contract necessary, such as long-term, leasing, donation, or service contracts
	<p>Procurement/Tender Committee</p> <ul style="list-style-type: none"> ◆ for tenders and high-value quotations, approves the formal documents prepared by the Procurement Unit
Local Orders	<p>Procurement Unit</p> <ul style="list-style-type: none"> ◆ uses Purchase Orders when buying direct from suppliers in the local vicinity (see <i>Annex 11</i>) ◆ uses stores requisition and issue vouchers (see <i>Annex 11</i>) when ordering from health service stores (whether the health facility store or central/zonal distribution centre) ◆ ensures supplies are ordered correctly (see <i>Figure 18</i>)



7. HOW TO RECEIVE GOODS AND DISTRIBUTE THEM TO SITE

Why is This important?

It is necessary to prepare to receive shipments, in order to avoid delays. It is also important to ensure safe delivery, safe storage at your distribution centres, and safe onward despatch.

These activities are key to improving both your performance and the delivery, and also enable you to control costs.

In this Section, we consider how to receive goods and distribute them to site by studying the following activities:

- ◆ Preparing to receive equipment and supplies (*Section 7.1*).
- ◆ Safe shipment, customs clearance, and transport to distribution centres (*Section 7.2*).
- ◆ Storage at distribution centres and despatch (*Section 7.3*).
- ◆ Delivery to final destination site (*Section 7.4*).

7.1 PREPARING TO RECEIVE EQUIPMENT AND SUPPLIES

Once a contract has been awarded (*Section 6.4*), several tasks must be carried out while you are waiting for the equipment to arrive.

7.1.1 Monitoring Progress Using a Gantt Chart

You can monitor the progress of your order using a Gantt Chart, as shown in *Figure 19*. In a Gantt Chart you display all the activities, from placing the order to using the equipment. To do this you use lines or bars that extend over calendar months to show when each activity starts and how long it should take. As each activity occurs, you mark how long it is actually taking. This shows at a glance what activities are behind schedule, on time, and ahead of schedule.

Using the Gantt Chart, you can coordinate all your activities across the agreed time period. For instance:

- ◆ activities represented by overlapping bars can be performed at the same time
- ◆ activities shown by non-overlapping bars must be carried out in the sequence indicated.

7.1.1 Monitoring progress using a Gantt chart

If external support agencies or procurement agents are purchasing the goods on your behalf they should monitor the progress of orders and keep you updated and informed of progress. However if you are purchasing your own goods, then your Procurement Unit and HTM Working Group (or its smaller Commissioning Team) is responsible for monitoring the procurement programme and detecting when delays may occur.

The Procurement Unit/Commissioning Team should prepare the Gantt Chart, either drawing it by hand or using a computer spreadsheet program. They need to take the steps shown in *Figure 20*.

Figure 19: Example of a Gantt Chart Monitoring Progress With Orders

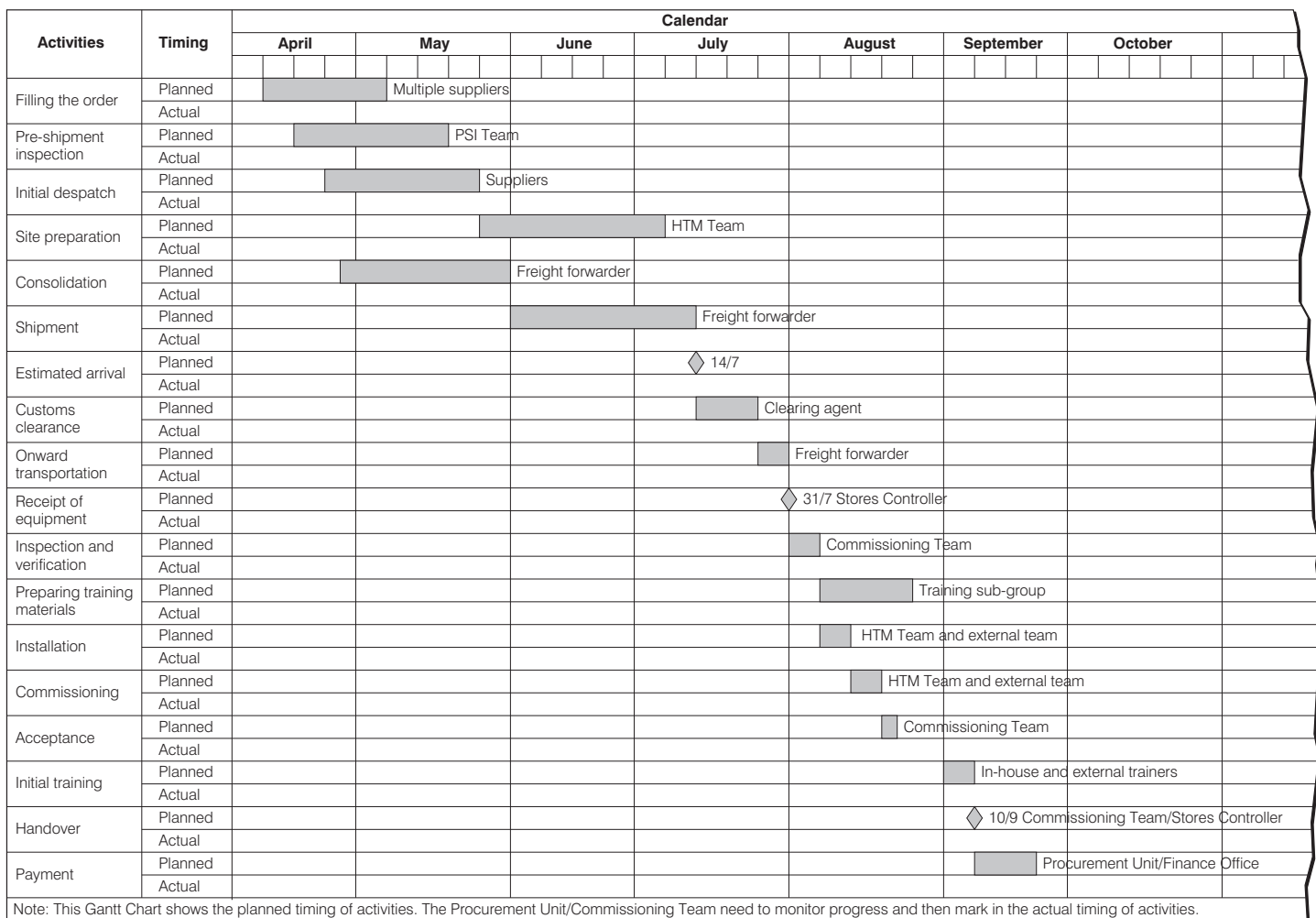
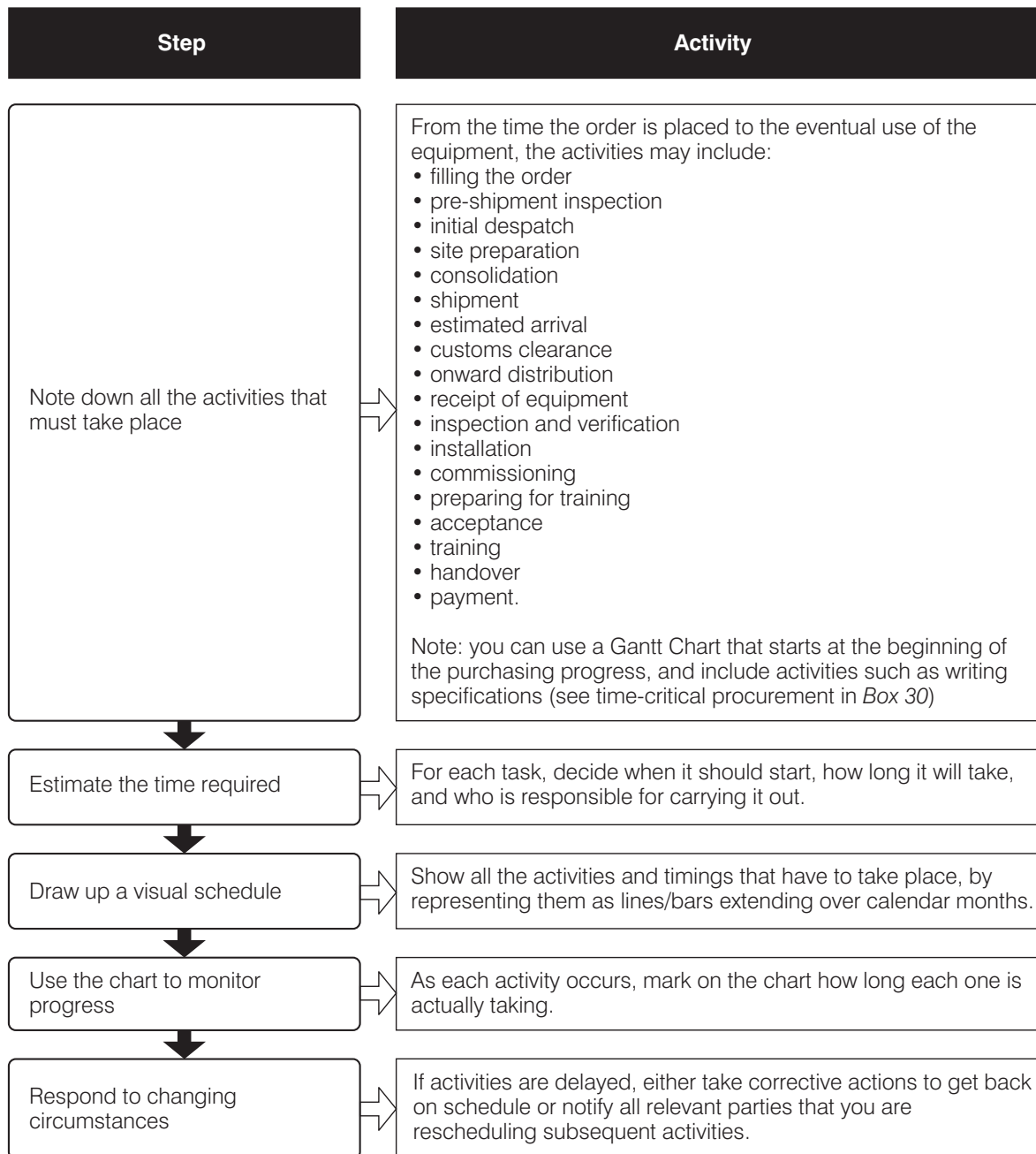


Figure 20: How to Set Up a Gantt Chart



There will always be critical and non-critical tasks in a Gantt Chart:

- ◆ For **critical** tasks, the estimated time required is equal to the time available in the programme, and any delay will result in a lengthening of the whole programme. For example, if it takes the supplier longer to fill the order than expected, the initial despatch of the goods must be delayed.

- ◆ For **non-critical** tasks, the time required is less than that available in the programme. However if a non-critical task is delayed, there will come a time when other activities dependent on that task also become delayed and the task then becomes critical to the programme. For example, shipping, clearing, and delivery of goods might take several months. During this time, you must prepare the site, which may only take a fortnight. However, if you delay the site preparation, you may not be ready when the goods arrive.

The Procurement Unit and Commissioning Team are responsible for monitoring the chart, making any revisions necessary, and detecting delays. In case of delay, they need to take appropriate corrective action. For example:

- ◆ It may be possible to put an activity back on schedule by using additional resources to complete it. (For example, if the rate of construction of a pump housing is behind schedule, you could ask the builder to employ more tradesmen and labourers.)
- ◆ It may be possible to remove the activity from the critical category by finding an alternative way of meeting the conditions required for subsequent activities. (For example, if the electricity supply cannot be connected in time for installation of the equipment, you could consider using a temporary supply from a generator so that installation can go ahead).

If the delay cannot be made up, it is necessary to revise the programme to accept the delays. This means the Procurement Unit/Commissioning Team must:

- ◆ reschedule the subsequent activities which are affected
- ◆ inform the HTM Team responsible for preparing the site of the new schedule
- ◆ inform the manufacturer/supplier or their representative (or any other contractor) responsible for installation and commissioning
- ◆ liaise with visiting engineers and other experts before they have left their countries/towns or booked into local hotels, to avoid unnecessary expense
- ◆ notify the Health Management Team at the facility
- ◆ keep any external support agency involved updated of progress.

For quick reference, it is useful to display the Gantt Chart on the wall of the coordinating office. This is usually the office of the Procurement Unit and/or the Commissioning Team.

7.1.2 Pre-Installation Work

Pre-installation work involves:

- ◆ preparing the site ready for equipment when it arrives
- ◆ organizing any lifting equipment
- ◆ organizing any warehouse (storage) space
- ◆ confirming installation and commissioning details
- ◆ confirming training details.

In some cases, the pre-installation work required is minimal; in others it requires considerable labour and finance.

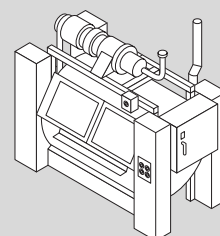


Experience in Africa

*Lack of pre-installation work can lead to equipment which is unusable.
For example:*

On an East African island, a huge steam-driven washing machine was left to rust for several years on the site of a 50-bed clinic. This was due to the fact that the clinic had no electricity apart from a small generator. Finally the washing machine had to be dumped.

The cost to transport the machine to the clinic swallowed up about the same amount of money as the clinic needed to run for a year.



Site Preparation

As a general guide, site preparation is the work required to ensure that the room or space where the equipment will be installed is suitable. It often requires the provision of new service supply connections (for electricity, water, drainage, gas, waste) and may require some construction work. Site preparation tasks can include:

- ◆ disposing of the existing obsolete item (disconnection, removal, cannibalizing for parts, transport, decontamination and disposal)
- ◆ extending pipelines and supply connections to the site, from the existing service installations
- ◆ upgrading the type of supply, such as increasing the voltage, or the pipeline diameter
- ◆ providing new surfaces, such as laying concrete, or providing new worktops
- ◆ creating the correct installation site, for example, digging trenches, building a transformer house or a compressor housing.



When considering where to position equipment, you should ask yourself the following types of questions:

- ◆ Is there sufficient access to the room/space? (Door sizes and elevator capacity are very important for X-ray and other large machines.)
- ◆ Is the room/space large enough?
- ◆ Is the position and layout of the room/space suitable?
- ◆ Are the required work surfaces and service supply points available?
- ◆ Is the environment adequate for the purpose? (For example, is it air-conditioned? Dust-free? Away from running water?)

If you are constructing new buildings or extensions, different relevant departments and groups need to work closely together to design the rooms and plan the service supplies. Planners, users, architects, service engineers, and equipment engineers need to be consulted (see *Guide 2* on planning and budgeting).

Site preparation can be carried out by:

- ◆ in-house staff (for example, the facility HTM Team or a central/regional HTM Team)
- ◆ maintenance staff from other national agencies (for example, electricians from the Ministry of Works)
- ◆ a contractor you have hired (for example, a private company or an NGO partner)
- ◆ the supplier or their representative.

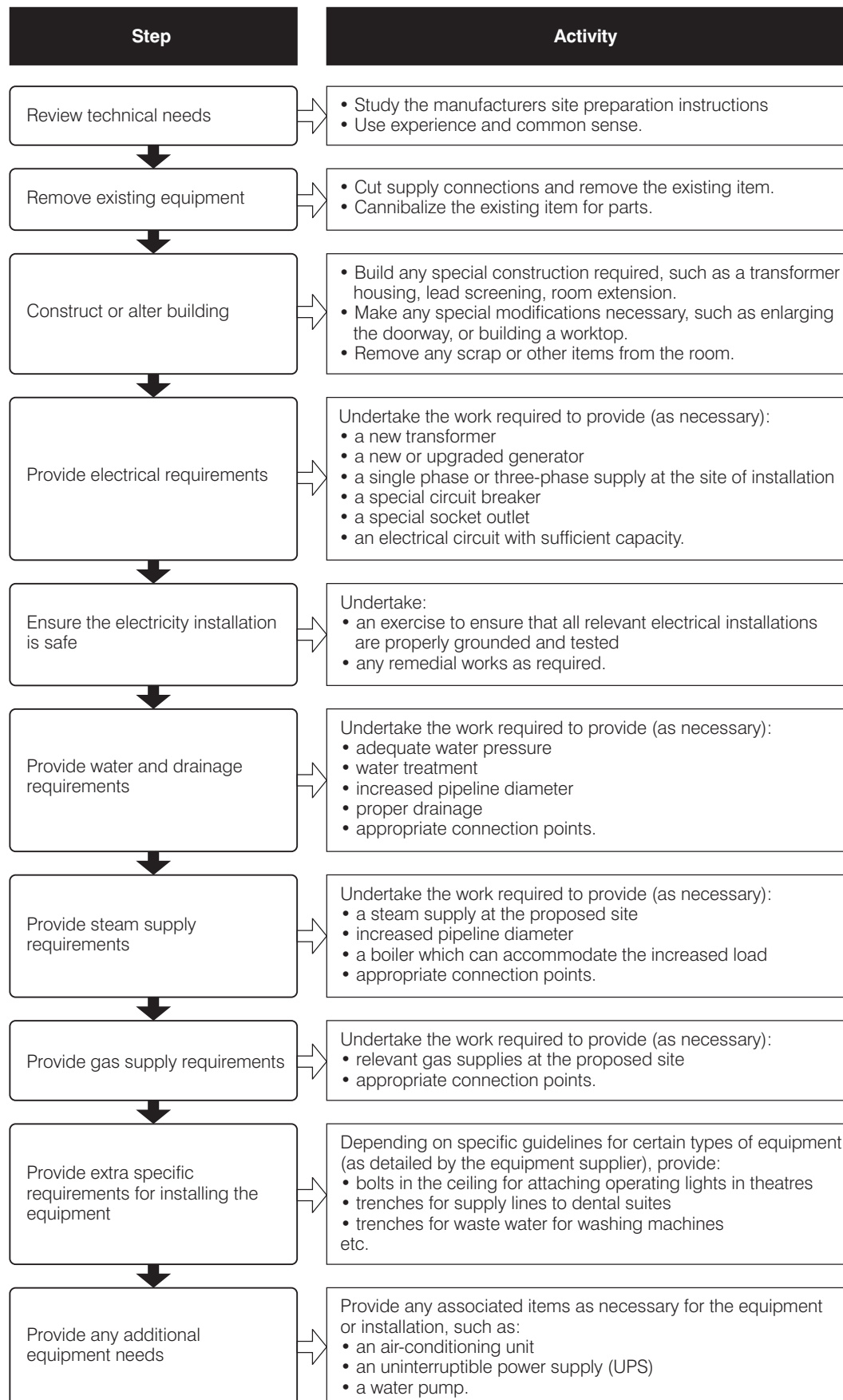
While planning and budgeting for your equipment (see *Guide 2*), you should have estimated site preparation costs for inclusion in your budget. However, as soon as the order is placed, the HTM Working Group/Procurement Unit should provide the supplier with details of the proposed equipment site and services, and officially request the necessary site preparation instructions.

Once these are received the HTM Manager can plan the work, quantify the needs and costs for materials and contractors (*Section 5.1*), and apply for a budget allocation. He or she should then oversee the work, and ensure it is undertaken before the equipment arrives.

Figure 21 shows the common site preparation steps that may be required, depending on the type of equipment purchased.



Tip • By the time the goods start to arrive, the site should be ready to receive them.

Figure 21: Common Site Preparation Steps



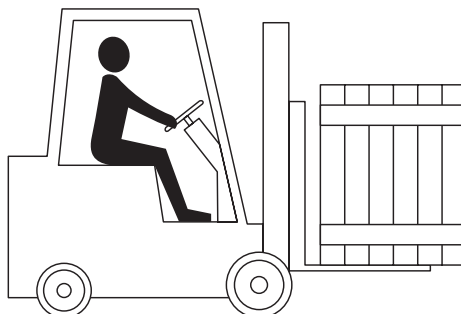
Country Experience

Many countries have examples of poor site preparation:

- ◆ *A special care baby unit so small that the phototherapy lamp treated all the babies whether they needed it or not.*
- ◆ *Piped gas not extended to all labour rooms in the maternity department.*
- ◆ *No lead lining in rooms intended for clinical radiography.*
- ◆ *Centrifuges without proper interference filters, affecting the performance of other electronic machines.*
- ◆ *A haematology analyser, very sensitive to environmental conditions, unable to be commissioned because of interference from the room's overhead light.*
- ◆ *A gas-driven ventilator installed in an operating theatre with no gas line.*

Organizing Lifting Equipment

When equipment arrives it needs to be unloaded, carried to the correct location, and positioned ready for installation. Depending on the size of the equipment, these tasks could be undertaken by stores, grounds, or maintenance staff, with the help of stores trolleys and hand carts. However, if the goods are large and/or heavy, you may need to hire lifting equipment such as cranes or fork lift trucks.



You should have made estimates of these hire costs for inclusion in your budget (see *Guide 2*), and quantified the needs in *Section 5.1*. However, as soon as the order is placed the HTM Working Group/Procurement Unit should:

- ◆ consult the supplier about the size and weight of crated goods
- ◆ identify specific lifting requirements
- ◆ locate local hire sources and identify their costs
- ◆ enter into hire agreements in advance of the equipment's arrival.

Organizing Warehouse Space

You need to consider any storage requirements, and make arrangements for goods which have to be stored before they can be unpacked and installed. It is common to make use of your health service provider's stores as distribution centres, and to find suitable rooms in the health facility for unpacking (*Section 8.2*). However there are some instances when you will have to pay for warehouse space:

- ◆ If goods are stored by customs because you have delayed clearance or have not paid duty, then customs will impose charges on you (known as demurrage charges).
- ◆ If equipment has to be stored when it arrives (perhaps by your freight forwarder, clearing agent, or a local warehouse) until you are ready to receive it on site, or install it.

Obviously, it is preferable to avoid these expenses. Thus it is important that the Procurement Unit and Commissioning Team try to monitor and avoid delays in the procurement process (*Section 7.1.1*). However, if these costs cannot be avoided the Procurement Unit must:

- ◆ consult with customs and identify costs
- ◆ consult with the freight forwarder, clearing agent, or local storage warehouses and identify costs
- ◆ make choices between the options, and make the arrangements and payments promptly.

Installation and Commissioning Details

You should already have decided who will undertake installation and commissioning when drawing up the purchase contract (*Sections 5.5.2 and 6.4*). The Procurement Unit/Commissioning Team should liaise with the installation team about the details that need to be confirmed. You will need to ask the installation team for their requirements for working/storage space, test instruments, and materials (such as consumables that will be used during the commissioning process) – *Sections 8.3.1 and 8.3.2*.

If the supplier (or other relevant agent) is doing the installation and commissioning, a good time to ask these questions is when you contact them about site preparation and lifting needs (see above). If you are using some other external agent, now is the time to contract them and agree all necessary arrangements for their visit (see *Figure 25 in Section 8.3.1*).

Training Details

You should already have decided who would undertake initial training when drawing up the purchase contract (*Sections 5.5.2 and 6.4*). The Procurement Unit/Commissioning Team should liaise with the training sub-group (*Section 1.2*) about the training details that need to be confirmed with the chosen trainers. You will need to:

- ◆ remind the trainers of the full range of training and training materials required from them
- ◆ ask the trainers for their requirements for training space, training equipment (for example, an overhead projector), and training materials (for example, consumables that will be used during the training sessions) – *Section 8.3.3*.

If the supplier (or other relevant agent) is doing the initial training, a good time to ask these questions is when you contact them about site preparation and lifting needs (see above). If you are using some other external agent, now is the time to contract them and agree all necessary arrangements for their visit (see *Figure 27* in *Section 8.3.3*). If you are undertaking the training in-house, appoint suitable trainers so that they can prepare for the task (*Section 8.3.3*).

7.1.3 Preparing for Customs Clearance

International shipments enter a country through a seaport, an international airport, or land customs depot. Countries control the flow of their imports and generate revenue through customs inspections, duties, and taxes. Customs agents will not release imported goods until all duties are paid or a customs exemption certificate is provided, and goods are inspected. Customs have to investigate all invoices because in some cases the true value of shipments is understated to reduce the amount of import duty to be paid. If Pre-Shipment Inspection has been requested (*Section 5.5.2*) this will speed up the customs process.

Before the goods arrive in the country, it is sensible to deal with clearance issues in advance. This will help to speed up the clearance process and the transport of goods from the port to the delivery site. *Box 43* outlines the main points to consider.

BOX 43: A Checklist of Customs Clearance Arrangements

Acting on the following considerations will help speed up customs clearance:

- ◆ Are any special documents required?
- ◆ Do you know the procedures and time required for obtaining import licences?
- ◆ Are you aware of import duties? Have you allowed for this in your budget and timetable?
- ◆ Are you aware of any exemptions to import duties?
- ◆ Is documentation necessary for importation clearance?
- ◆ Are you aware of the rate and cause of demurrage charges (storage charges imposed by customs because you have delayed clearance or not paid duty)?
- ◆ Are there any special handling requirements for products (for example, refrigerated storage for heat-sensitive products)?
- ◆ Are you arranging clearing in-house or employing a clearing agent?
- ◆ How will the goods be collected and delivered to their destination?
- ◆ Do you or your clearing agent have a good working relationship with customs officials?

You may require special documentation for importing some types of goods – see *Box 44* in *Section 7.2.1*. You should have checked for this when placing the order (*Section 6.4*). Prior to customs clearance, the Procurement Unit will need to organize the paperwork required. Often problems arise because customs officials have difficulties in assessing the essential nature or intended use of some health service goods being imported. Therefore it is important to fill in the forms and communicate with customs effectively.

You should have already chosen your specialized clearing agent or forwarding agent to clear and deliver the goods, if you do not have an experienced team with clearing and forwarding skills (*Section 5.5.2*). Now is the time to contract them and communicate with them on their requirements.

A duty is charged on all types of goods exported and imported. An external support agency or organization exporting goods to its projects overseas has to pay duty at the time of export, and duty in the country of import. In some cases, health service provider organizations offering charitable or free-of-charge health services may be exempt from paying these duties. However, this is the exception rather than the rule.

As a buyer you need to:

- ◆ know what the customs requirements are for sea, air, or land shipments
- ◆ be familiar with the duties to be paid
- ◆ know whether you are exempt from paying customs duties in the recipient country (this is the case for many goods purchased by NGOs, missions and government)
- ◆ know who has the authority to grant duty-free entry
- ◆ establish standard document lists, and procedures for submitting them to the correct people, to help get customs exemption quickly.



- Tip** • To help you plan the customs clearance procedure, it is useful to draw up the information in a table, listing:
- all the different steps required (with a description and the officials involved), and
 - the resources (time and costs) needed for each step.

7.2 SAFE SHIPMENT, CUSTOMS CLEARANCE AND TRANSPORT TO DISTRIBUTION CENTRES

7.2.1 Safe Shipment and Customs Clearance

Once an order has been placed, the Procurement Unit should monitor its arrival using the Gantt Chart (*Section 7.1.1*). The Procurement Manager has overall responsibility for safe delivery and handling of customs clearance. However, contract terms and agreements will determine who has responsibility for the insurance and transport management of goods. Depending on the delivery conditions you specified (*Section 5.5.2*), the responsibilities and duties of the buyer, seller, and freight forwarder may vary (see the Incoterms in *Annex 8*).



- Tip** • In most cases, the supplier clears the goods for export, while the buyer (or their representative such as a freight forwarder, clearing agent, or procurement agent) clears the goods for import.

Safe Shipment

Shipment of goods can be by a variety of methods – sea, air, road, rail, river. Shipment can take place in stages with different bodies responsible for different stages, as follows:

- ◆ A foreign supplier's contract may require them to deliver to a port in your country, then you organize onward transportation after customs clearance at the port.
- ◆ The supplier's contract may require them to deliver to one of your central/zonal distribution stores (including customs clearance if from abroad), then you organize onward transportation to the health facility.
- ◆ The supplier's contract may require them to deliver direct to the final destination health facility (including customs clearance if from abroad).

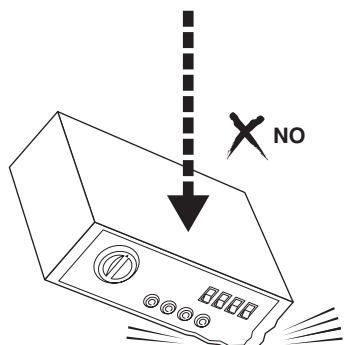
Deliveries direct to the health facility site should be considered for large and complex goods. In this case, your purchase contract would have to specify direct delivery (DDU, DDP, CPT or CIP – see *Annex 8*). For goods from abroad, there would need to be a halt mid-journey for the goods to clear customs. It is not usually economical for the supplier's freighting company to then carry out the last part of the journey in your country. In some cases it can add up to 15 per cent or more on to the cost of the goods).

Thus, you should have either:

- ◆ appointed a freight forwarding agent for the supplier to use, as specified in the contract document (*Section 6.4*)
- ◆ contracted the clearing agent, if you are using one, to arrange for transportation and delivery to your facility
- ◆ contracted a freight forwarding agent or local delivery company yourself – however this is only possible if you are clearing the goods through customs yourself, which is difficult in many countries.

Alternatively, if your health facility is a great distance from the major port of entry (such as the capital), but is near to a smaller port of entry (another airfield with customs officials, for example), you can specify that the supplier's freighting company goes through a process known as 'pre-clearance' of customs (*Section 5.5.2*). This means that the goods can go straight to the local customs site without being processed in the capital.

The Procurement Unit can monitor the progress of shipments by liaising with the shipping agent, or by using the internet to track goods that have been registered for shipment.



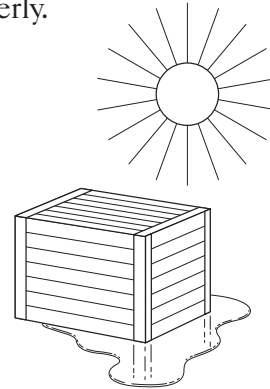
To ensure your goods arrive safely, you should have arranged for freighting methods and terms that include insurance (*Section 5.5.2*). Goods bought internationally should be insured against damage and loss. As a bare minimum, the insurance should cover shipment. Ideally, it should extend to cover areas such as all transportation and installation.

The Procurement Unit must ensure that all shipments are routinely inspected when they are accepted at the port, central distribution store, and/or final destination, in order to identify damaged goods or short shipments (shipments with parts missing) – see *Section 8.2* for procedures on checking deliveries, and *Section 8.6* for procedures if goods are damaged or lost.

Procedures for Clearing Customs

Customs clearance can be both inefficient and time consuming, leading to losses and extra costs. This is partly due to slow customs procedures but, most often, it is because import regulations have not been followed, documentation is missing, or buyers and sellers have failed to communicate properly.

Consignments have been known to remain at ports of entry for months, facing possible damage and theft and accumulating storage charges (demurrage charges), due to late submission of shipping documents or delays in clearing. Demurrage charges are often difficult to meet, due to their unexpected nature, and can build up quickly when deliveries are stalled in customs.



The Procurement Unit can avoid customs delays by:

- ◆ making sure they have prepared for customs clearance (*Section 7.1.3*)
- ◆ ensuring they liaise with the carrier, clearing agent, and customs to negotiate and handle all delivery and customs matters. These include the issues detailed in *Figure 22*.

Documentation Used in Clearance

You can plan your needs for customs clearance documentation by using *Box 44*, which lists the range of possible documents required – you will need to discover which are relevant for each shipment. The documents required will vary depending on your country, whether the goods are transported by land, air or sea, and the type of goods being shipped.

- Tip** • If in doubt about the documents required for clearance ask for advice from the carrier and clearing agent.



Figure 22: Delivery and Customs Issues to be Handled

Step	Activity
Identify the arrival of shipments, and the details required for customs clearance	<ul style="list-style-type: none"> As soon as the goods are freighted, ensure the supplier informs you (by fax or email) of details of the shipment including: <ul style="list-style-type: none"> contract number description of goods quantity the name of the carrying vessel, aircraft or vehicle the bill of lading number and date (see <i>Box 44</i> in section below) port of loading date of shipment port of discharge estimated time of arrival etc.
Obtain documentation for customs clearance	<ul style="list-style-type: none"> Ensure the supplier provides you with the original copies of the documents used in port clearance (see <i>Box 44</i>) such as: <ul style="list-style-type: none"> supplier's invoice showing goods description, quantity, unit price and total amount original and additional copies of bills of lading packing list for each package/box insurance certificates (if insured) manufacturer's or supplier's warranty certificate certificate of origin. Ensure the supplier mails these to you (with a copy to the insurance company, if required). Port authorities usually require the original copies of the documents for clearance. This can be difficult to organize, but an experienced handling/clearing agent should be able to handle these requirements for you.
Monitor the shipment's progress	<ul style="list-style-type: none"> Check progress on a regular basis, either with the carrier's local agent or by looking at the computerized tracking service on the internet (provided by large freight companies and some customs departments). Contact the carrier's local agent to obtain the exact arrival date, and details of the place/port at which the shipment will arrive.
Supply the correct documents to customs	<ul style="list-style-type: none"> Ensure that the necessary documentation is correct and provided to customs on time (see <i>Box 44</i>) Ensure that the description of the goods in any duty/tax exemption certificates (if required) accurately defines the goods in the consignments. Try to obtain documents in advance of the shipment's arrival – this helps to avoid storage charges.
Make any necessary payments	<ul style="list-style-type: none"> Arrange payment on time for duty plus any administrative charges, such as charges for permits – this helps to avoid storage charges.

BOX 44: Range of Documents Possibly Required for Clearing Customs

Typical Requirements	Description
To be arranged by the supplier/carrier:	
Bill of lading or waybill	This is the freighting contract and proof that the goods are on board the transport vessel. It describes the load in terms of the number of packages, volume, weight and any other useful information. The bill of lading applies to sea (maritime) transport. Waybills refer to land and air transport (such as an airway bill).
Certified invoice(s)	A proforma invoice from the supplier showing the order details and order value is used by customs to determine the customs value of the goods. Often it has to be certified by the bank through which the payment has been arranged.
Manifest or packing list	<p>The manifest is the document that indicates the type of products sent, their point of origin (where their journey started) and their destination. It is used by customs officials in the country receiving the goods.</p> <p>The packing list is the document that identifies the load package by package (in other words, lists the exact content of the consignment). You might find one overall packing list or one packing list per package/crate. Packing lists often include a reference to order numbers. It also resembles an invoice or delivery note.</p> <p>Note: you may find a combination of a waybill and a packing list. Usually the paper looks like a packing list, and includes the total number of boxes plus volume/weight details.</p>
Various export/verification certificates (as applicable)	<p>A certificate of origin specifies the country where the goods were manufactured, certified by that country's Ministry of Trade and Industry or Chamber of Commerce.</p> <p>A certificate of manufacture from the exporting country confirms that the product is manufactured by a licensed manufacturer, or is authorized for sale in the country of export. It may include additional details, such as confirmation that the manufacturer is licensed to produce specific types of items (sterile/non-sterile, liquid/semi-solid, products for internal/external use, etc). It will also provide assurance that manufacture is carried out in accordance with Good Manufacturing Practice, and is regularly inspected by a Medicines Inspectorate.</p> <p>A certificate of analysis is provided for solutions (reagents, supplies, etc) and describes the contents of the particular lot/batch of product being shipped.</p> <p>Verification certificates can be issued by third parties to verify specific factors relevant to the shipment. Such factors could include verification of the product's value, confirmation that there is a contract for the import of the goods, assurance that the contents are safe, or confirmation that the Pre-Shipment Inspection has taken place.</p>

Continued opposite

BOX 44: Range of Documents Possibly Required for Clearing Customs (continued)

Typical Requirements	Description
To be arranged by the supplier/carrier (continued):	
Various export/verification certificates (as applicable)	<p>A donation certificate states that the shipment is a donation. This is important to ensure equipment supplies are not subject to import tariffs in the destination country</p> <p>A declaration of hazardous materials is a document that should be included when the shipment carries one or more chemical products that require special care, handling or testing. Such products could include laboratory reagents, water purification products or radio-active components.</p>
Trader identification number (TIN) of the importer	This is the trader identification number linked to the 'New Computerized Transit System' that requires shippers to register their shipments on the internet or by email. The buyer can then track the progress of their goods on the internet.
Insurance certificate (if applicable)	This shows details of the insurance policy and premium taken out on the shipment/transportation
To be arranged by the buyer/clearing agent:	
Import declaration form	All importers need to complete this form and attach all other documents to it for submission to customs.
Duty exemption certificate (if applicable)	The Ministry of Finance or the Revenue Department issues exemption certificates for certain goods that do not require tax or import duty to be paid (this sometimes applies to donations).
Import license/permit (where applicable)	Most goods require an import license, and some restricted items require special import permits. These are usually issued by the Ministry of Finance or Ministry of Trade and Industry.
Customs Bill of Entry	This is a written account of the goods entering the country, which is used by customs for verifying and approving the release of the goods to you.

Normally, the shipper sends the documents they are responsible for once the goods have been handed to the carrier. If this has not happened, you should request that these documents be sent as soon as possible so you can proceed with the necessary customs clearance arrangements.

7.2.2 Delivering Goods from Customs to Initial Destination

Some goods may be delivered directly to the purchasing health facility. (Normally, this can only happen if the entire order is for one health facility – *Section 7.4.*)

Otherwise, you may deliver goods to a distribution centre where they are unpacked, marked for distribution to various health facilities, stored temporarily, and later despatched (*Section 7.2.1*). The distribution centre can be a central or zonal store (either a supplies or medical store).

Transport arrangements will have been specified in the purchase contract (*Sections 5.5.2 and 6.4*). If your central/zonal store is in the port city, most clearing agents deliver goods from customs to their warehouse, or to your premises as long as they are within the boundaries of the city. Delivering goods outside the city's boundaries costs extra. Thus, you have a number of options. You can:

- ◆ contract the clearing agent to do this – this is often the simplest and cheapest approach
- ◆ arrange to use your own transport, or
- ◆ hire a local transport company.

If you ever use your own transport to deliver equipment, it must be a vehicle belonging to your health service provider and be specified as safe for both the driver and equipment. Otherwise you can consider hiring a suitable vehicle and driver from a professional company. The first option is cheaper, but your vehicle may not always be appropriate.



- Tip** • Often only certain vehicles with license plates registered with the port/customs authorities can enter the port. There is no guarantee that your transport or even a Ministry of Health truck will be allowed into the port.

7.3 STORAGE AT DISTRIBUTION CENTRES AND DESPATCH

For most consignments, you will not need to consider interim storage at one of your stores. The only time storage should be required is if it is unavoidable – for instance, when goods have been bought in bulk and require splitting, if items are intended for later use, or if the site is not ready for the goods to be installed. Normally your aim should be to get equipment into place and working as soon as possible. If storage is appropriate the Procurement Manager should inform the relevant Stores Controller about the expected delivery and date as soon as the order is placed.

Your health service provider organization needs to decide how to store equipment and equipment-related supplies. *Section 8.4.3* discusses the issues about whether to keep these items together, and who should be responsible for them (see also *Guides 4 and 5*). The Supplies Stores and Central Medical Stores systems are normally responsible for storing, ordering and issuing equipment and supplies. Often larger equipment items and spare parts are kept in the Supplies Store, while smaller items of equipment, plus consumables, accessories and a small number of spare parts for user planned preventive maintenance (such as bulbs) are kept in the Central Medical Stores.

Generally there are two types of storage processes within a store:

- ◆ transit storage for onward distribution (undertaken at central/zonal level – see below)
- ◆ local storage for issue (undertaken at all levels – see *Section 8.2*).

Central or Zonal Stores

A store acting as a distribution centre (such as a central or zonal store) has two main functions:

- ◆ It operates as a supplier of goods held ‘in stock’. Smaller stores such as district and health facility stores order items from the central/zonal store, which are released by means of a requisition form (*Section 6.5*).
- ◆ It acts as a temporary storage facility for goods ‘in transit’. Goods from customs are often stored at the central store while delivery arrangements to their final destination are made, or until the facility is ready to receive them.

Goods arriving at the such central/zonal stores should be accepted into the receiving area, and dealt with in the following manner:

- ◆ Items ‘in stock’ are quarantined until physically checked. Receiving clerks must check the crates/cases and contents against the supplier’s invoice/delivery note. They should check for damaged and missing goods, and for compliance with the contract conditions (such as labelling). Any discrepancies, variations, and damage should be noted and reported to the Stores Controller.
- ◆ Items ‘in transit’ are not opened, nor are their contents checked. This is to maintain security and to ensure that no damage or loss takes place between storage and onward transportation to the final destination and installation. The clerks, therefore, are only responsible for checking the total number of boxes and their condition, but not the contents against the invoice/delivery note. If ‘transit’ crates have been opened or are visibly damaged, a member of the Central HTM Team should be asked to carry out an inspection and a contents check.

- Tip** • In addition to the delivery note, the carrier/clearing agent must hand over the shipping documents to the stores clerks.



Following these physical checks, the Stores Controller should:

- ◆ for stock items, sign the invoice/delivery note to indicate that all the goods have been delivered in the quantities stated on the invoice/delivery note, **or** for transit goods sign stating that the total number of unopened cases have been received and confirming the condition of the cases is correct
- ◆ note any problems with the goods on the invoice/delivery note (called ‘signing with reservation’)
- ◆ not accept any goods or quantities not stated on the invoice/delivery note
- ◆ report problems to the supplier and the carrier immediately, with an explanation of the nature of the problem (for example, under-supply or damaged goods)
- ◆ provide a separate report of any discrepancies to the Procurement Manager for action
- ◆ acknowledge receipt of the goods by notifying the supplier as soon as possible, regardless of whether the shipment was international or national.



- Tip** • Prompt inspection is essential to ensure that suppliers have fulfilled their contracts, and to make insurance claims if required.

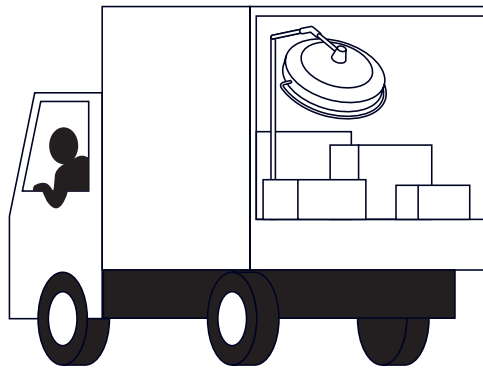
Once checked and approved, the goods should be formally released from the receiving area and moved to the warehouse to be stored as transit items, or held in stock. Separate locations in the warehouse should be assigned to deal with transit goods, stock goods, incoming storage and outgoing storage. Any goods with special storage instructions should be stored accordingly (such as those requiring refrigeration).

All stores should have a stock control system, either manual or computerized, which checks items in and out against orders made. (See *Guides 4 and 5* for details on a safe storage system). The distribution centres (central/zonal stores) should keep an inventory detailing all transit items received and issued, together with details of the accompanying documents. Methods of transport, delivery times, and confirmation of receipt from user units should also be recorded. Items to be held in stock should be entered on to stock control records (*Section 8.2*).

7.4 DELIVERY TO FINAL DESTINATION SITE

For the goods to reach their final destination:

- ◆ they may be delivered directly to the purchasing health facility by the freight forwarder (*Section 7.2.1*)
- ◆ you may have arranged collection from the port of entry and onward delivery using your own vehicle, a hired one, or a clearing agent (*Sections 7.2.1 and 7.2.2*)
- ◆ you may organize onward delivery from the central/zonal distribution centres yourself (*Section 7.3*).



If you are arranging the transport, the Stores Controller and Transport Manager are responsible for making sure that goods are not damaged during the journey. This includes:

- ◆ ensuring that goods are properly packed – placed in pallets, cartons, or crates and carefully and systematically loaded into vehicles on a first-in/last-out basis
- ◆ ensuring that the load is held secure by straps, nets or other means (to protect against the vibrations caused by travel over rough roads)
- ◆ protecting against water damage during rain, by avoiding transport on open vehicles, and ensuring goods are loaded and unloaded directly into a building and not left standing outside.

If the purchase contract states that goods should be delivered direct to the health facility by the supplier, clearing agent, or freight forwarder, they are responsible for arranging similar procedures so that goods are not damaged (*Section 6.4*).

On arrival at the destination health facility, the delivery note needs to be signed-off by the Stores Controller. The Stores Controller and driver should sign for the total number of cases and their condition. However, the cases should **not** be opened and their contents should **not** be checked before the Commissioning Team arrives (*Section 8.1*). In addition to the delivery note, the shipping documents **must** be handed over to the health facility staff.



Tip

- When you receive freight at facility level, you may find two signatures already on the delivery note – one from the Stores Controller of the central/zonal store and one from the driver that delivered the goods there.
- The signature of the health facility's Stores Controller on the delivery note transfers responsibility for the goods from the carrier to the health facility.

Box 45 contains a summary of the issues covered in this Section.

BOX 45: Summary of Issues in Section 7 on Preparing to Receive and Distributing Goods

Prepare to Receive	Procurement Unit/Commissioning Team	<ul style="list-style-type: none"> draws up their own Gantt Chart (see <i>Figures 19 and 20</i>), or liaises with any external support agency or procurement agent, in order to monitor progress of the procurement process takes appropriate action when delays occur, and informs all people involved with subsequent activities to try to avoid incurring unnecessary expenses organizes the hiring of any lifting equipment, as required tries to reduce the likelihood of needing to hire warehouse space, but organizes it as required after talking to the training sub-group, liaises with the supplier or any other trainer regarding their requirements for running training sessions, and organizes the arrangements contracts a suitable clearing agent investigates customs clearance requirements and duties to be paid, and obtains any special import licences and duty/tax exemption certificates (see <i>Box 43</i>)
	HTM Manager	<ul style="list-style-type: none"> oversees and ensures the site is prepared before the equipment arrives (see <i>Figure 21</i>)
	HTM Working Group or its training sub-group	<ul style="list-style-type: none"> liaises with the Procurement Unit/Commissioning Team to identify the questions and requirements to put to the trainers (whether the supplier, other agent or in-house) regarding training needs (<i>Section 8.3.3</i>)
Ship/Clear/Transit	Procurement Unit	<ul style="list-style-type: none"> monitors the progress of shipments using the Gantt Chart and any tracking system employed by the shipper depending on the freight terms (which dictate how far the goods are shipped by the supplier), arranges transportation for the remainder of the journey depending on the freight terms (which dictate how much of the journey is covered by insurance taken out by the supplier), arranges additional insurance for the remainder of the journey organizes suitable transport and delivery to a distribution centre for transit, if required
	Procurement Unit or Clearing Agent	<ul style="list-style-type: none"> liaises with the supplier and shipper and prepares the documentation for customs clearance (see <i>Box 44</i>) clears customs and pays any duty or demurrage charges required (see <i>Figure 22</i>)
Storage/Despatch	Procurement Unit	<ul style="list-style-type: none"> tries to get equipment on site and working as soon as possible considers storage only if absolutely necessary, and arranges this with the Stores Controller of the relevant distribution centre
	Store Controller at distribution centre level	<ul style="list-style-type: none"> ensures goods arriving 'in transit' are not opened and the delivery note is signed to say this ensures all shipping documents are received for goods 'in transit' stores 'in transit' goods separately from stock items enters into the stores record system: the receipt of 'in transit' goods, their onward despatch, and confirmation of receipt from the final destination

Continued opposite

**BOX 45: Summary of Issues in Section 7 on Preparing to Receive and Distributing Goods
(continued)**

Delivery	Stores Controller and Transport Manager at distribution centre level	<ul style="list-style-type: none"> ◆ ensures goods are transported to their final destination in suitable vehicles and in such a way that they will not be damaged ◆ ensures the shipping documents accompany the goods
	Stores Controller at the health facility level	<ul style="list-style-type: none"> ◆ receives the goods and stores them unopened until the Commissioning Team arrives (<i>Section 8.2</i>) ◆ signs the delivery note to say that the goods remained unopened ◆ takes receipt of the shipping documents



8. HOW TO RECEIVE, COMMISSION, AND STORE GOODS ON SITE

Why is This Important?

When a new item of equipment is introduced into the health service, it is necessary to make sure that it is:

- ◆ complete
- ◆ safe
- ◆ reliable, and
- ◆ functioning properly, before it is used.

Equipment that is not reliable or is not functioning properly can be dangerous.

All equipment, on arrival at a health facility, must be commissioned – officially accepted as safe and correct – and placed onto the facility's records, thereby registering ownership.

Similarly all orders for equipment-related supplies must be checked on arrival to ensure they are complete and correct, and be officially registered by being entered into the stores stock control system.

This Section covers the various activities that you need to manage once your equipment has arrived and before you can make use of it, by looking at:

- ◆ An overview of the Acceptance Process (*Section 8.1*).
- ◆ Receipt and checking of goods (*Section 8.2*).
- ◆ Assembly, installation, commissioning, and initial training (*Section 8.3*).
- ◆ Registration and handover (*Section 8.4*).
- ◆ When and how to make payments (*Section 8.5*).
- ◆ Damage or unsatisfactory supply (*Section 8.6*).



Tip • You should develop clear and written procedures for all the activities described in this Section.

8.1 AN OVERVIEW OF THE ACCEPTANCE PROCESS

Procedures

Each health facility should have an official **Acceptance Process** for equipment that arrives on site (a simpler process is used when equipment-related supplies arrive on their own – see *Section 8.2*). During the acceptance process, the HTM Working Group or its smaller Commissioning Team (*Section 1.2*):

- ◆ checks that the complete order has arrived
- ◆ ensures installation, commissioning, and initial training takes place
- ◆ ensures that the equipment is mechanically and electrically safe for users and patients and is functioning properly
- ◆ enters the equipment and equipment-related supplies into various health facility records.

A simple way to carry out these activities is to fill in a standard Acceptance Test Logsheet. This form is specially designed to make checking easier and to help to avoid mistakes. It is an important document since it is the first record to be placed in the Equipment File (see *Guide 5* on maintenance management), provides all relevant details of the start of the equipment's life at the health facility, and commences the service history of the equipment (*Section 8.4.1*). A sample Acceptance Test Logsheet is provided in *Annex 9*.

The Acceptance Test Logsheet has sections that cover all the components of the acceptance process, including:

- ◆ delivery/receipt of the equipment on site
- ◆ unpacking and checking for damage and for the complete order
- ◆ assembly
- ◆ installation
- ◆ commissioning and safety testing
- ◆ official acceptance
- ◆ initial training
- ◆ registration – entering stocks into stores and onto records
- ◆ handover.

Each of these sections in the logsheet needs to be completed and signed off to indicate that the activity has been successfully completed. Once the logsheet has been fully completed, it is signed off by the Commissioning Team to certify that the equipment and services are satisfactory. Only then can payment be made.

If there are problems with goods or services, the Commissioning Team should **not** sign off the logsheet, but should instead write a Fault Report on the equipment's shortcomings (see the last page of the sample logsheet). This would outline the problems encountered and advise that payment be withheld until the problems have been addressed.

The equipment is not normally put into routine use until the complaints have been resolved, the logsheet finally signed off, and the payments made.

To explain the difference between all the activities in the acceptance process, each one is discussed separately in the rest of this Section.

We recognize, however, that the acceptance process is straightforward for common low-technology items of equipment that are simple to use. Installation, commissioning, and initial training are not major activities and can happen all at once. For example, for a mobile examination lamp:

- ◆ Installation involves using a test meter to check the electricity supply of the socket outlet, and then simply plugging in the lamp.
- ◆ Commissioning involves using a test meter to check the electrical safety of the lamp so that it will not give the operator an electric shock.
- ◆ Initial training involves ensuring the operator knows where the on/off switch is, how to handle the light bulb, and how to alter the angle of the head without pulling the lamp over.

Personnel Responsible

The HTM Working Group (through its Commissioning Team) has overall responsibility for ensuring that the acceptance process is carried out, while the HTM Manager is in charge of all 'technical' components.

From the list of activities involved in the acceptance process, health service staff must be responsible for:

- ◆ receiving goods on site
- ◆ official acceptance
- ◆ entering stocks and information into existing record systems
- ◆ payment and complaints.

The people involved should be:

- ◆ the Commissioning Team at facility level, whose members include stores, maintenance and user department staff (*Section 1.2*)
- ◆ labourers/grounds staff to help lift and move equipment
- ◆ the Finance Office.

However, unpacking, assembly, installation, commissioning and initial training can be undertaken by either health service staff or external personnel. The Commissioning Team at the health facility must be involved and, if they are not undertaking the work themselves, should be assisted by either an in-house or visiting installation team and training team. The people involved could be any of the following:

- ◆ Senior maintenance staff within your HTM Team, workshop, or health facility who have experience of installing and commissioning the equipment or have the necessary skills.
- ◆ Specialist maintenance staff from higher level HTM Teams and workshops, or from other health facilities or health service providers who are knowledgeable about the equipment.
- ◆ Technical personnel, such as electricians or mechanics, from other maintenance organizations responsible for the equipment being installed (such as the Ministry of Works).
- ◆ Senior equipment users within your health facility, or specialists from other facilities or health service providers who have experience of the equipment and of training staff.
- ◆ The manufacturer or their representative's installation/commissioning team and training team.
- ◆ Contractors.
- ◆ Partners in technical cooperation projects, or staff from non-governmental organizations and charities.



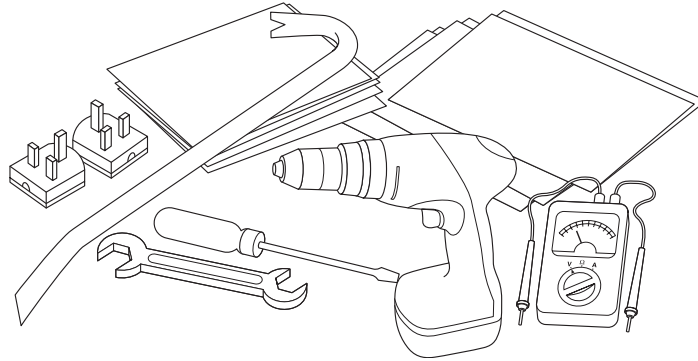
- Tip** • It is common for a manufacturer to send technical personnel (such as engineers) to do the installation/commissioning, and a different member of staff (such as a sales person) to carry out the user training.

To determine what personnel should be involved, ask yourself the following questions:

- ◆ **How complex is the equipment?**
The more complex an item is, the more likely it is that you will need the help of the manufacturer or their representative.
- ◆ **Do you have the necessary skills?**
If your HTM Teams cannot undertake the job it is useful to ask for assistance from a contractor.
- ◆ **Are you buying one item or buying in bulk?**
If you are only buying one item it may not be worth the expense of getting the manufacturer's help, and your HTM Team might be able to manage with sufficient written guidance from the manufacturer. However, if you are buying large quantities of the same product it is often worthwhile contracting the manufacturer or their representative to undertake the installation, commissioning, and initial training at as many locations as necessary.

Decisions about who will undertake the work must be taken at the purchase contract stage (*Section 6.4*).

Resources Required



Box 46 provides an idea of the types of resources required for the acceptance process.

BOX 46: Example of Resources Needed for the Acceptance Process

Documents	<ul style="list-style-type: none"> ◆ copies of the purchase order/contract documents ◆ shipping documents and delivery notes ◆ packing list (contents list) for each crate ◆ a stock of blank copies of the Acceptance Test Logsheet (see <i>Annex 9</i>) ◆ a stock of new Equipment Files (see <i>Section 8.4</i> and <i>Guide 5</i>) ◆ a stock of Register of New Stocks Forms (see <i>Annex 11</i>) ◆ a stock of blank Goods Received Notes (see <i>Annex 11</i>) ◆ a stock of blank or relevant stores stock cards (see <i>Annex 11</i>)
Materials	<ul style="list-style-type: none"> ◆ a hand trolley, fork-lift truck, or other means to lift and move crates and equipment ◆ crowbars and other tools to open crates and boxes ◆ tools for assembly and installation ◆ stock of mains plugs to attach to new electrical equipment ◆ insulation testing instruments for use on all electrical equipment to test adequate insulation and earth connections (see <i>Guide 5</i>) ◆ a safety analyzer for use on all electro-medical equipment to test that the equipment conforms to IEC 60101 electrical and medical safety standards (see <i>Guide 5</i>). If one is not available at the health facility, arrange to hire one ◆ any other relevant test equipment (see <i>Section 8.3.2</i> and <i>Guide 5</i>)
Space	<ul style="list-style-type: none"> ◆ a suitable room for unpacking (<i>Section 8.2</i>) ◆ a suitable room for assembly and testing if the goods are not installed in situ (<i>Section 8.3.1</i>) ◆ a suitable room for running training sessions (<i>Section 8.3.3</i>)

8.2 RECEIPT AND CHECKING OF GOODS

Receiving and Unpacking Equipment

The Procurement Manager must ensure that the equipment is delivered to a specially designated area, in which the crates can be kept safely and securely until the equipment is officially accepted and signed for. The equipment should not be delivered directly to a clinical department, where users may assume that it is ready and safe for use. The only exception to this rule would be very large equipment items, which must be delivered to the place where they will be installed.

The designated delivery area must:

- ◆ be clean and properly secured
- ◆ have easy access for the crates from the loading bay
- ◆ have easy access to departments once the equipment items are unpacked.

Possible delivery areas could include the health facility's main store, the maintenance workshop, or any appropriately sized room with adequate security.

Lifting equipment (such as cranes, forklift trucks, stores trolley, etc) may be needed to help unload heavy or large equipment or to move and position equipment ready for installation. This should be planned for and hired in advance (*Section 7.1.2*). If the equipment is small and light, it can be unloaded by hand and moved using extra helpers.

Once the goods are unloaded, the driver will need a copy of the signed delivery note before they can leave. The Stores Controller should sign off the delivery note, stating that they are simply signing for the total number of cases and their condition, and not verifying the correctness or condition of the contents (*Section 7.4*), as you are unlikely to be able to do this while the driver waits.



- Tip** • If the packing case (crate) shows signs of damage, and you suspect the equipment may be damaged, notify the supplier before unpacking. Documenting any damage with a photo is often useful.

As soon as possible after the goods have arrived, they should be inspected, whether insured or not, to make sure that the suppliers/issuing stores have fulfilled their contracts. There are two options:

- ◆ If the supplier is responsible for the unpacking and installation of the equipment, health facility staff should leave the packages unopened until the supplier's representative arrives. Then the Commissioning Team should join them for the unpacking.
- ◆ If your own staff are going to install the equipment, the Commissioning Team should do the unpacking.

Rather than involve all team members, this inspection should be carried out by at least the HTM Manager, an installation team member (whether in-house or external), a storekeeper, and possibly an equipment user.

Box 47 shows the different types of forms that are required to receive goods.

BOX 47: Common Types of Documents Needed When Receiving Goods

For goods delivered directly by the carrier/supplier to the health facility	<ul style="list-style-type: none"> ◆ Shipping documents (including packing lists) and invoice ◆ Delivery note
For goods held 'in transit' by central/zonal distribution centres then delivered to the health facility	<ul style="list-style-type: none"> ◆ Goods Receipt and Issue Note from the distribution centre ◆ Delivery note ◆ Shipping documents and invoice
For stock items issued by central/zonal stores to the health facility against a requisition	<ul style="list-style-type: none"> ◆ Stores Requisition/Issue Voucher (see <i>Annex 11</i>) ◆ Delivery note
For confirming the orders	<ul style="list-style-type: none"> ◆ Your purchase documents or Purchase Order
For recording the receiving procedure	<ul style="list-style-type: none"> ◆ An Acceptance Test Logsheet for equipment orders (see <i>Annex 9</i>) ◆ Stock (bin) cards and stock control ledger for recurrent orders of supplies (see <i>Annex 11</i>) ◆ Goods Received Note (see <i>Annex 11</i>) for all types of orders ◆ Goods Inward Book for all types of orders
For recording discrepancies	<ul style="list-style-type: none"> ◆ The Fault Report Form at the back of the Acceptance Test Logsheet for equipment orders ◆ A Discrepancy Report Form for recurrent orders of supplies

The unpacking and inspection process for equipment orders should follow the steps shown in *Figure 23*.

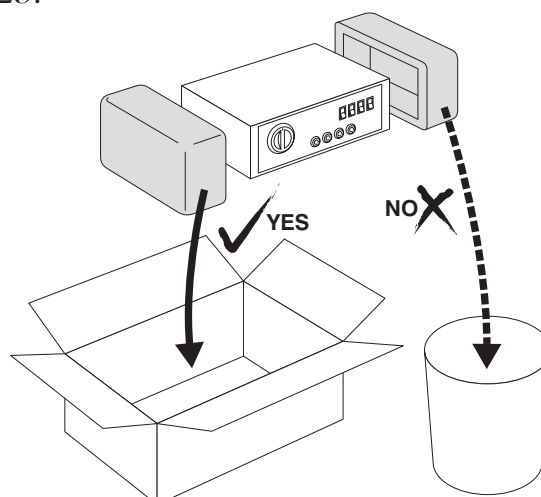
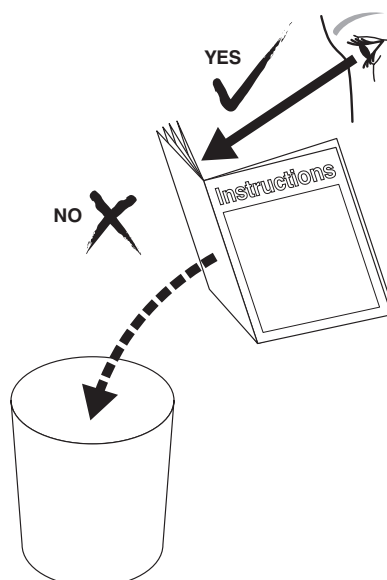


Figure 23: Unpacking and Inspecting Equipment Orders

Checks	Activity
For damage	<ul style="list-style-type: none"> • systematically open one crate at a time • check the boxes/packages inside each crate for possible damage • systematically open one package at a time and note what you find on the relevant documents (see below) • keep all packaging, supports, labels and booklets, as you may have to re-pack the equipment to return it for repairs. • unpack the equipment carefully • ensure that the equipment and its associated supplies do not appear to be damaged • if anything appears damaged, take a photograph if possible, and notify the supplier
Against documentation	<ul style="list-style-type: none"> • check that the delivery matches the packing list(s) • check that the contents comply with the specifications in the purchase order – in other words, check the type and model of all equipment and supplies • check that the quantities are according to the purchase order
Technical requirements	<ul style="list-style-type: none"> • ensure that the voltage shown on the packing list (or on the packing case) for electrical equipment is compatible with your power supply • check that the equipment data plate matches your order and the packing case/list and, for electrical equipment, that the voltage stated is correct • for electrical equipment, ensure the mains lead and battery charger, where applicable, is included
The 'package'	<ul style="list-style-type: none"> • check that all the necessary consumables, accessories and spare parts have arrived as per the purchase contract • keep these equipment-related supplies together in a dry, cool and safe place until you can issue some and register the rest into the Stores system (<i>Section 8.4.3</i>) • check that the operating manual, service manual (including a wiring/circuit diagram), and any assembly and installation instructions have arrived as per the purchase contract • keep the manuals together in a dry, cool and safe place until you can make copies and issue/store them (<i>Section 8.4.2</i>) • notify the supplier if any documentation is missing or seems unacceptable (e.g. in another language than requested)
Administrative requirements	<ul style="list-style-type: none"> • sign and date all relevant documents (such as the packing list and your order – see <i>Box 47</i>) to show that the contents of the delivery was correct • retain these documents for use in the rest of the Acceptance Process, and for later submission to the supplier/issuing store at the end of handover (<i>Section 8.4.4</i>) and submission to the Finance Officer for payment (<i>Section 8.5</i>) • record any discrepancies between the documents and the delivery contents on the documents themselves and on the Fault Report form • use the complaints procedures (<i>Section 8.6</i>) to investigate any discrepancies • complete the relevant sections of the Acceptance Test Logsheet.



As the Commissioning Team and any visiting installation team is present, installation and commissioning of the equipment and supplies can take place as soon as possible (*Section 8.3*).

Receiving, Unpacking, and Checking Recurrent Orders of Equipment-Related Supplies

You will regularly receive accessories, consumables, spare parts, and maintenance materials that you have purchased from stores or suppliers. At least two people should receive and check these recurrent orders when they arrive – the Stores Controller and one other person. The staff involved depends on the type of item being unpacked. For example, if you are checking spare parts, it would make sense to have maintenance staff present.

It is important to check supplies that have been received, before you put them away in the store. Otherwise you may only discover that an item is incorrect, damaged, or of poor quality when it needs to be used, at which time it will be too late to ask the supplier for a replacement.

When receiving recurrent orders of equipment-related supplies, you should follow the unpacking and inspection process shown in *Figure 24*.

Figure 24: Unpacking and Inspecting Recurrent Orders of Equipment-Related Supplies

Checks	Activity
For damage	<ul style="list-style-type: none"> • systematically open one box at a time and note what you find on the relevant documents (see below) • check the outer and inner packaging to make sure it is intact and inspect for signs of damage (e.g. spots, breakages, leaks, missing labels, tape or lids) • unpack the goods carefully • ensure that the goods do not appear to be damaged • if anything appears damaged, notify the issuing store • do not use damaged goods.
Against documentation	<ul style="list-style-type: none"> • check that the number of boxes and their contents match the packing lists (contents list) • check the delivery note, packing list and contents against the copy of the requisition or order form • check the items against the specifications of the requisition/order document. • check that the quantities are according to the requisition/order document.
Technical requirements	<ul style="list-style-type: none"> • check labels are legible and include complete information (e.g. approved name, strengths, storage instructions, manufacturer's details, expiry date) • check the shelf life and expiry date (if applicable). Do not accept items if the expiry date has passed. Only accept items nearing the end of their shelf life if you are sure you can use them before the expiry date. The expiry date is the time up to which the manufacturer guarantees the quality of the product, and many products, such as laboratory reagents, are only fit for use for a limited time. • check that consumable items, such as batteries, are enclosed and have sufficient shelf life • check that all necessary and requested documentation (such as care, cleaning, and decontamination instructions) is enclosed or available.
Administrative requirements	<ul style="list-style-type: none"> • sign and date all relevant documents (such as the packing list and your order – see <i>Box 47</i>) to show that the contents of the delivery was correct • return one copy to the issuing store, and retain the others for reference and submission to the Finance Officer for payment (<i>Section 8.5</i>) • record any discrepancies between the documents and the delivery contents on the documents themselves and on the Discrepancy/Fault Report form • use the complaints procedures (<i>Section 8.6</i>) to investigate any discrepancies • complete the Goods Received Note (<i>Annex 11</i>) and any Goods Inward Book • submit the Goods Received Note to the Finance Office to trigger payment if there are no problems (<i>Section 8.5</i>).

Recurrent supplies do not require assembly, installation, commissioning, or initial training (*Section 8.3*). Thus, once you have unpacked the supplies, you can directly enter them into the stores stock control system as described in *Section 8.4.3*.

8.3 ASSEMBLY, INSTALLATION, COMMISSIONING AND INITIAL TRAINING

The Procurement Manager and the Commissioning Team should be using the Gantt Chart to monitor the progress of the equipment's delivery (*Section 7.1.1*). Thus, they should have been able to coordinate the arrival of any installation and training teams (for example, a Regional HTM Team, supplier's representatives, or contractor) and ensure that everything runs to schedule.

Did you know?

Many poor installation and commissioning practices are due to poor communication and coordination between the various responsible departments and the different types of staff.

Common problems include:

- ◆ equipment arriving on site unannounced
- ◆ contractors arriving to work in the health facility without giving prior warning
- ◆ contractors carrying out work in the health facility without consulting the users and in-house technical staff
- ◆ health service staff left wondering what is happening and unable to plan their work.

Details of which personnel can carry out assembly, installation, commissioning, and initial training are outlined in *Section 8.1*. The final allocation of roles and responsibilities will depend on:

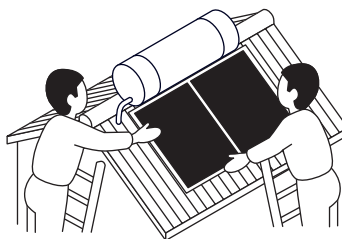
- ◆ the type and complexity of the equipment
- ◆ which organization is responsible for the equipment (for example, your health service provider or the Ministry of Works)
- ◆ the skills available locally
- ◆ the purchase contract terms.



- Tip** • Initial training may take place at the same time as commissioning or some time later, and be carried out by different people.

When external staff do the work, members of your Commissioning Team (such as the HTM Manager or senior maintainers) need to be present during these activities to supervise, observe and confirm test results. They need to monitor the contract, see the machines working, and ensure adequate training is given. It is also helpful for maintenance staff, and possibly user staff, to be present to learn 'on the job'.

8.3.1 Assembly and Installation



Preparation

While planning and budgeting for your equipment (see *Guide 2*) you should have estimated installation costs for inclusion in your budget. Also, when preparing the purchase contract or the donation agreement, you will already have decided who should undertake the work (*Section 6.4*).

However, as soon as the order is placed, the technical members of the Commissioning Team (such as the HTM Manager) should liaise with the chosen installation team so that they can:

- ◆ finalize the requirements, materials, need for contractors, and costs (*Section 5.1*)
- ◆ ensure all arrangements are in place for the in-house or visiting installation team (see *Figure 25*)
- ◆ oversee the work
- ◆ complete the relevant section of the Acceptance Test Logsheet, when the work has been completed satisfactorily.



Country Experience

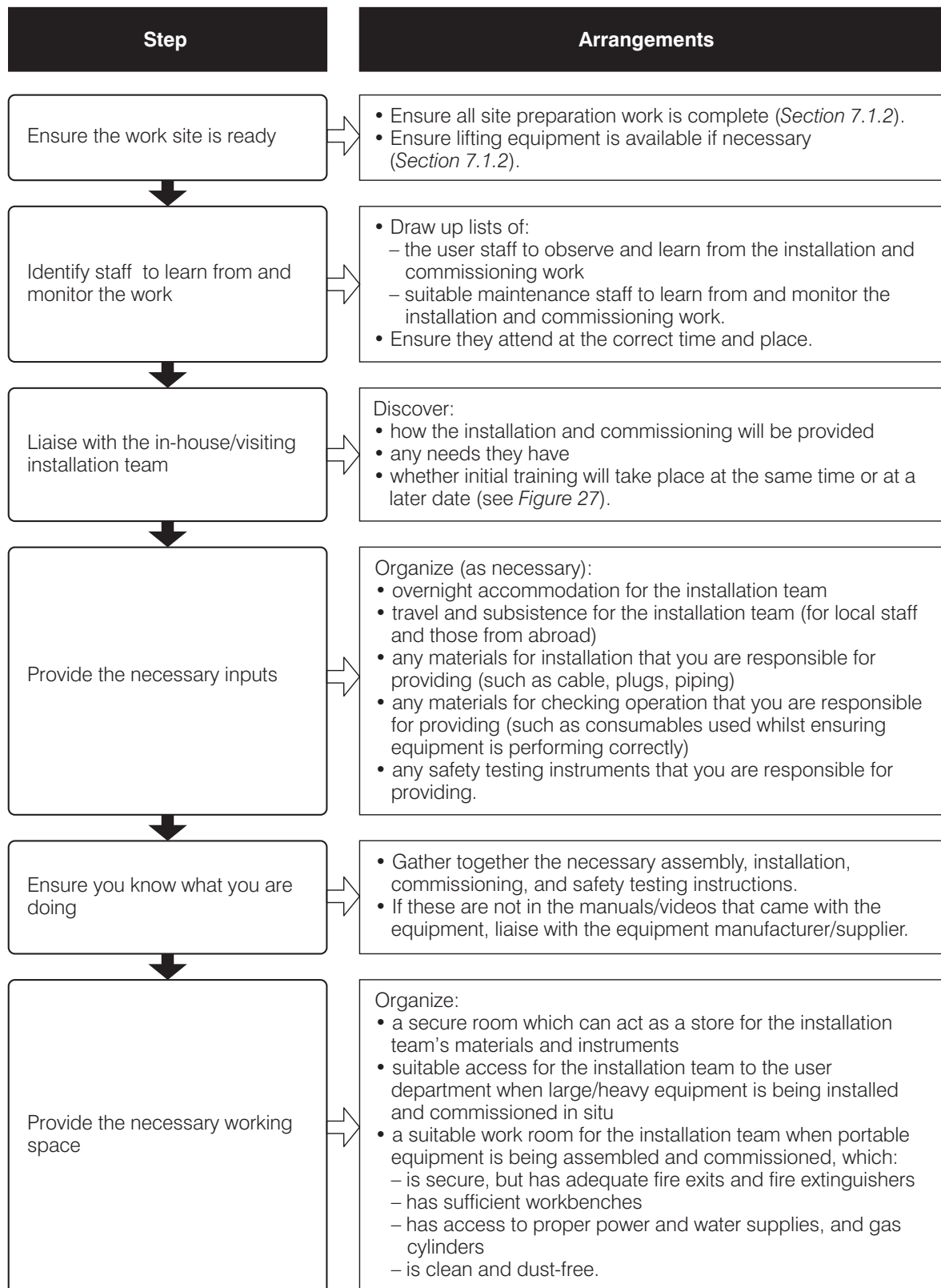
Many countries have examples of poor installation practices, such as:

- ◆ *X-ray machines with the tube directed at the operator's position.*
- ◆ *Large floor-standing horizontal autoclaves without any partitioning to block off the dirty and dusty machine access area to the rear of the machine from the sterile Central Sterile Supplies Department (CSSD) at the front.*
- ◆ *Centrifuges wired to insufficient mains capacity.*
- ◆ *Operating theatre lights mounted too low.*



Tip • Manufacturers/suppliers or their representatives will expect you to have prepared the site up to the connection points for their equipment (*Section 7.1.2*), then they will come and install it.

Usually (but not always) installation and commissioning occur at the same time, and are carried out by the same people. *Figure 25* shows the common arrangements to make in order for installation and commissioning to take place effectively.

Figure 25: Common Arrangements Required for Installation and Commissioning

There are some questions and issues that you need to clarify with the installers:

- ◆ **How long will the installation and commissioning take?**

What will be the impact on the department, floor or entire facility during the installation? Will it be necessary to move patients and for how long? What other activities may be interrupted?

- ◆ **When are the installation team likely to work?**

What hours of the day will the installation team work? Will they be able to work continuously over the weekend, if necessary, to complete the job as soon as possible?

Interruption of basic health services can be minimized if planned well in advance. It is important to liaise carefully with the user department. The shut-down of water, electricity and other utilities should be carried out during periods of least use, and back-up facilities should be considered.



Tip • You should define the types of in-house staff who should attend assembly and installation in order to learn ‘on the job’, and ensure they attend.

Procedures

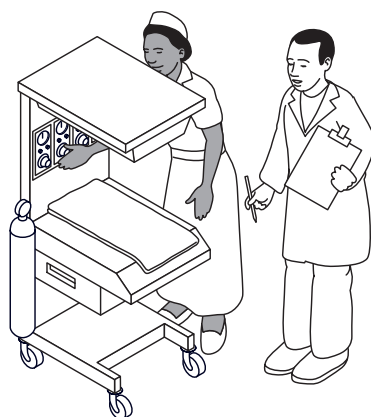
Assembly	the steps required to put equipment back together again if it was dismantled for shipment.
Installation	the process of fixing equipment into place. Depending on the complexity of the equipment, this can range from simply plugging the equipment into an electrical socket, to building it into the fabric of the room.

Before the installation team (in-house or visiting) can install equipment, they may have to assemble it. The installation team will install the equipment by connecting it to the connection points (such as taps, circuit breakers, pipe junctions, connectors, socket outlets) left by the site preparation team (*Section 7.1.2*). Assembly and installation should be carried out by following the manufacturer’s instructions in the operator or service manual, or by watching any video provided by the manufacturer.

8.3.2 Commissioning

Commissioning	a series of tests and adjustments performed to check whether new equipment is functioning correctly and safely, and ensure that any necessary adjustments are made, before the equipment is used.
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Commissioning usually, but not always, takes place straight after installation.



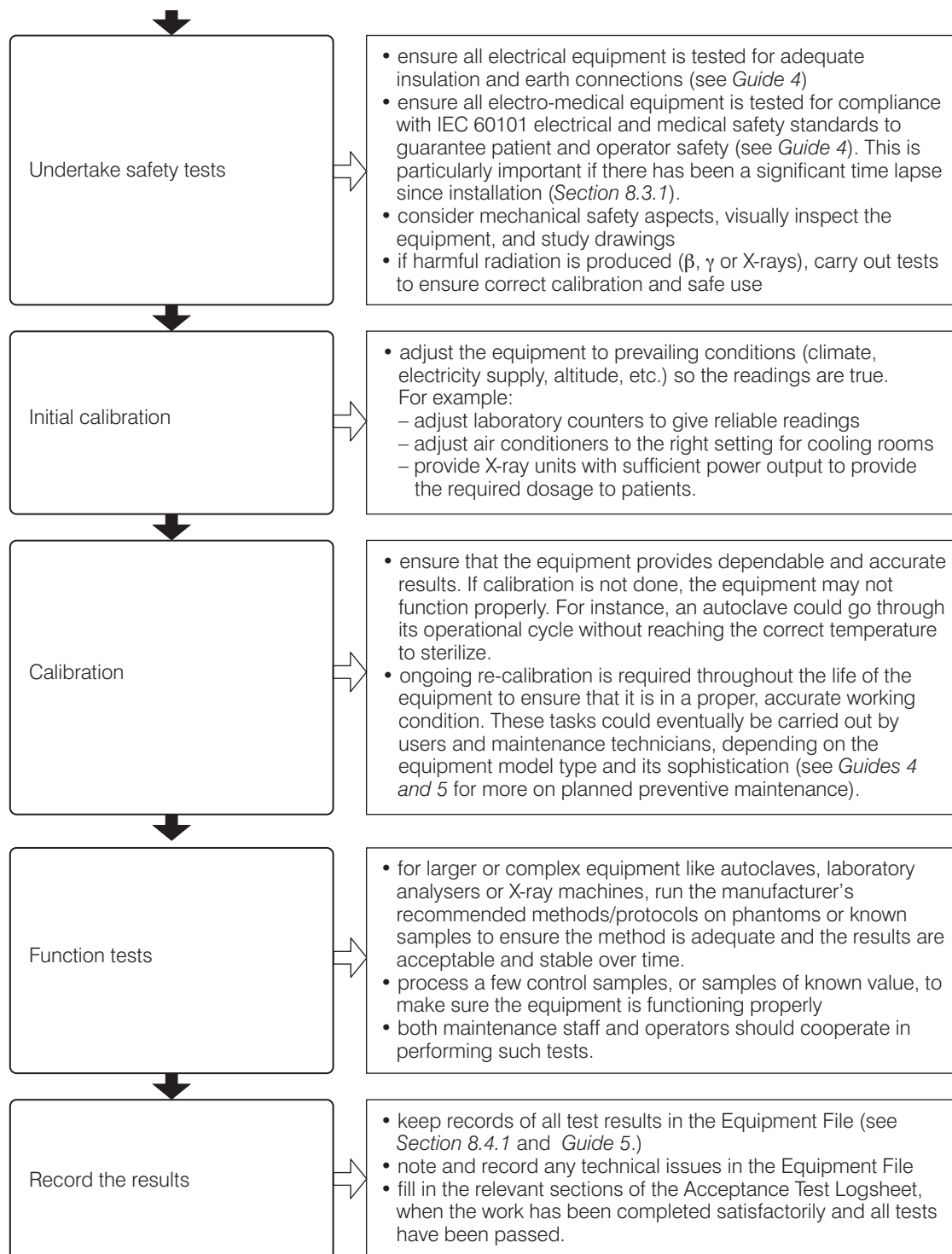
The technical and safety aspects of the equipment should already have been specified and considered during your selection process (*Section 6.3*). However, it is also essential to carry out performance and safety tests on each piece of equipment. Such tests validate that each piece of equipment is safe and is capable of performing its intended function. Performance and safety tests should be carried out regardless of whether equipment is purchased, donated, leased, or borrowed by the health facility. The Commissioning Team and any visiting installers are responsible for ensuring these tests take place.

The arrangements for commissioning are the same as those for installation, and are shown in *Figure 25*. Key procedures for commissioning are described in *Figure 26*.

Figure 26: Key Steps in the Commissioning Process

Step	Activity
Check the documentation	<ul style="list-style-type: none"> • make sure all the relevant documentation is available (for example, manuals, instructions) • place it where staff can easily gain access to it during commissioning • during commissioning check that everything that is mentioned in the documentation is available and functioning on the machine
Prepare the equipment for use	<ul style="list-style-type: none"> • fit the correct mains plug to the mains lead • attach any accessories • carry out any relevant warm-up processes (for example, with a boiler, ensure electrodes are activated, and carry out pre-burn runs, burn runs, blow throughs, etc.) • where applicable, allow the equipment to go through any built-in self-check or test programmes on start up (such as infant resuscitation tables, bench-top autoclaves, diathermy units) • where applicable, place the equipment 'on-charge' (such as defibrillators)

Continued overleaf

Figure 26: Key Steps in the Commissioning Process (continued)

Once the equipment has passed its safety, calibration, and function tests, the Commissioning Team is in a position to:

- ◆ officially accept that the equipment has been received in a satisfactory condition, and
- ◆ officially accept the equipment as your property.

This could trigger the payment for the goods only (*Section 8.5*). Payment for services can only occur when the training is finished (*Section 8.3.3*), if it was part of the purchase contract.

If the equipment has not passed the tests, you would start negotiations with the supplier and complaints procedures (*Section 8.6*). You do **not** accept or use the equipment until these issues have been resolved.

If a visiting team were involved, they may have their own handover certificate, which needs to be signed off by the Commissioning Team.

Once the equipment is accepted, you are in a position to provide your staff with training in its operation and maintenance.



- Tip**
- You should define the types of in-house staff who should attend commissioning in order to learn ‘on the job’, and ensure they attend.
 - Representatives from both the Commissioning Team and visiting team should sign the Acceptance Test Logsheet and test results, to avoid later disputes.
 - Do **not** train staff on equipment which has not been accepted.

8.3.3 Initial Training

Initial training a key training stage in a member of staff’s career that provides training in the range of skills required to make the best use of newly arrived equipment. Initial training takes place at the time of commissioning.

After successful installation and commissioning, the users and maintainers need training on the type of equipment and the model purchased. This training can take place straight after commissioning, with the installation team acting as the trainers. However, the training team often involves different people, such as those with clinical or training skills. In this case, the training may take place some time later when the training team has assembled.

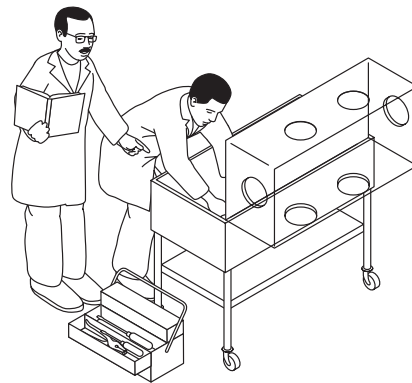
Ideally, the initial training occurs straight after commissioning. After the training, the equipment can be handed over to the user department for regular use (*Section 8.4.4*). However, if there is a delay before training can take place, you may have to consider whether to hand over the equipment before training staff. We recognize that there will be pressure to do this as all staff want to start using new equipment as soon as possible.

However, this should only be done if:

- ◆ the equipment is a type that has been used before
- ◆ the staff are familiar with the equipment
- ◆ you have experienced staff members in charge of its use, until the remaining staff can be trained.



Tip • Anyone using or working on equipment without proper training or authority whose actions result in an accident is likely to be found negligent.



Depending on the complexity of the equipment and your staff's previous experience of it, initial training can include (see *Guides 4 and 5*):

- ◆ good practice when handling the equipment
- ◆ basic 'dos and don'ts'
- ◆ how to operate the equipment (along with familiarization with the symbols and markings on the machine)
- ◆ the correct application of the equipment
- ◆ care, cleaning, and decontamination
- ◆ safety procedures
- ◆ planned preventive maintenance (PPM) for users
- ◆ PPM and repair for maintainers.

Did you know?

Evidence suggests that many incidents occur as a result of inadequate training of equipment users and maintainers. For example, as much as two-thirds of equipment malfunction is due to incorrect use by the operator. Faults with equipment are often due to the user re-assembling the unit or attaching accessories and consumables incorrectly.

A knowledgeable user will look after equipment better. Attaching a safety warning label to equipment will remind users of their responsibility to perform functional and safety checks before the machine is used.

While planning and budgeting for your equipment (see *Guide 2*), you should have estimated initial training costs for inclusion in your budget. Also, when preparing the purchase contract, or the donation agreement, you will already have decided who should undertake the work (*Section 6.4*). You have many options for in-house or external trainers, as described in *Section 8.1*.

However, as soon as the order is placed, the HTM Working Group or its smaller training sub-group (*Section 1.2*) should liaise with the chosen trainers so that they can:

- ◆ finalize the requirements, materials and other resources, and determine the need for contractors and the likely costs (*Section 5.1*)
- ◆ ensure all arrangements are in place for in-house or visiting training teams
- ◆ oversee the training
- ◆ complete the relevant section of the Acceptance Test Logsheet, when the work has been completed successfully.

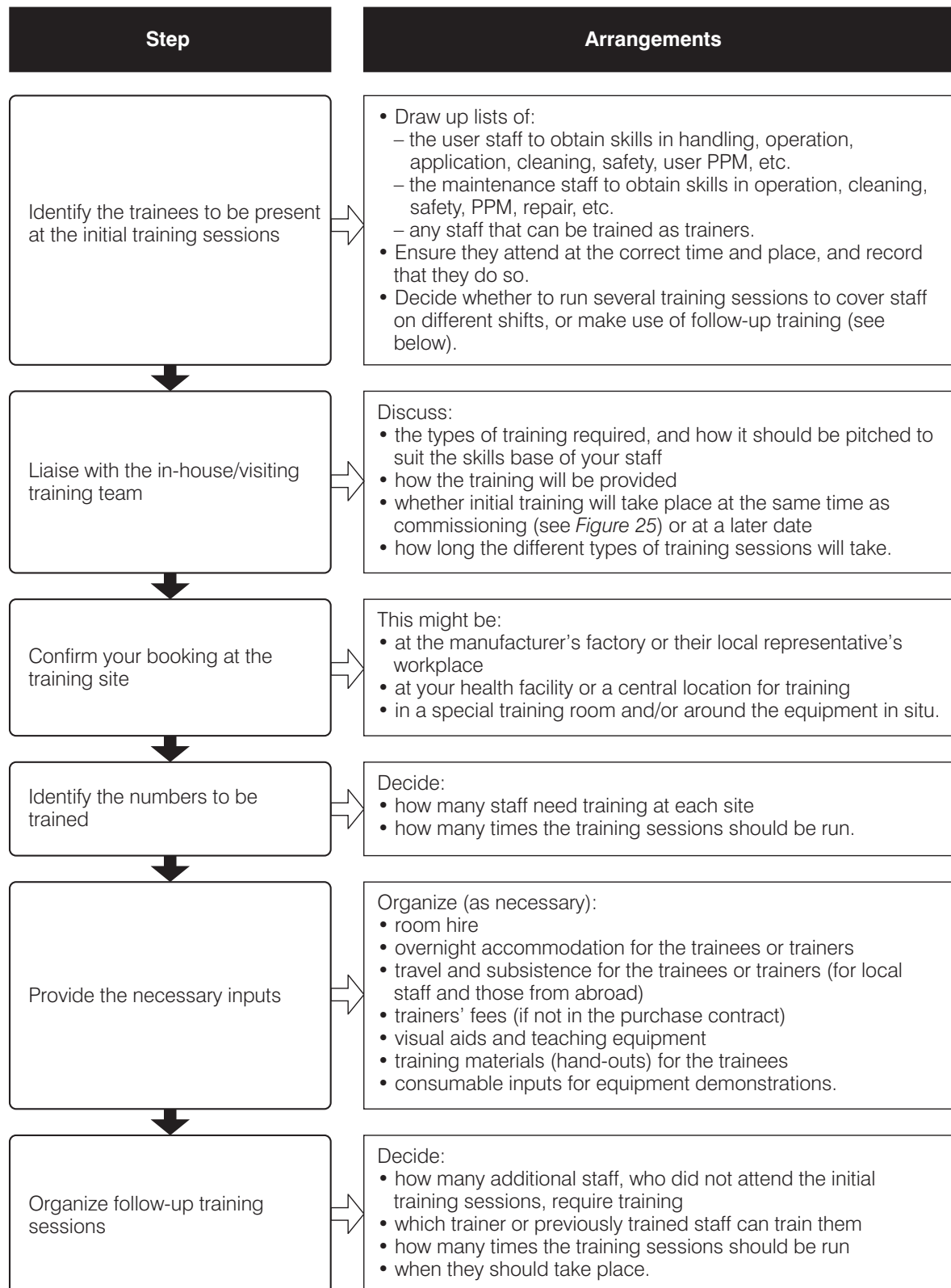
Figure 27 shows the common arrangements to make in order for initial training to take place effectively.

The level and nature of training provided depends on whether the equipment is:

- ◆ **A standard make and model.** If staff are familiar with the equipment, in-house staff could train new users and provide refresher training for other staff. The training sub-group (*Section 1.2*) should produce suitable and necessary training resources and handouts for the trainees, using the operator and service manuals, and any videos available (see *Guides 4 and 5*).
- ◆ **A new make or model.** If the equipment is unfamiliar, training should be carried out by the supplier or their representative, or by a central training team with knowledge of the equipment. The training sub-group should observe the training session, obtain copies of any overheads or handouts used, and compile their own training pack for future training (see *Guides 4 and 5*).

Sometimes in-depth training is given only to very few staff members who, at a later stage, will train the rest of the users. In this case, you need a training timetable to ensure the ongoing training occurs (see Equipment Training Plan in *Guide 2*).

Figure 27: Common Arrangements Required for Initial Training





Country Experience

After training was given on a new maternity unit at a health facility in Nepal, equipment breakdowns were significantly fewer and equipment life significantly longer.

For equipment in the mid-price range (for example, ultrasound machines), it is probably cost-effective to train a number of operators on the health facility site. For equipment in the high price range (for example, intensive care equipment, steam laundry equipment) it may be more cost-effective to send an appropriate individual to a busy clinical site for training and experience.

Proper training on X-ray machines will ensure that the operator allows sufficient time for the tube to warm up before stressing the tube with heavy exposure. This can still happen on much equipment despite the use of microprocessors to limit the possibility.

Training by the manufacturer can provide too much advanced theory and not enough practical experience, so it is essential to discuss your needs beforehand.



- Tip**
- You should ensure the chosen trainees turn up for the training sessions, and maintain records of the training that individual staff members have received.
 - You should establish a library of the training resources developed (see *Guides 4 and 5*).
 - The representatives of both the Commissioning Team and visiting training team should sign the Acceptance Test Logsheet, to avoid later disputes.

8.4 REGISTRATION AND HANDOVER

Once equipment and supplies have been officially accepted, you can register them in various health facility records and systems, process them, and store or use them as appropriate. The Commissioning Team is responsible for ensuring that all these activities take place.

8.4.1 Entering New Equipment Orders into Health Facility Records

All equipment and equipment-related supplies need to be entered into your health facility's records and systems. The most common records and systems are the:

- ◆ **Equipment Inventory** (manual or computerized). The HTM Manager should enter new major pieces of equipment onto your Equipment Inventory. The type of information recorded should identify the particular piece of equipment, its manufacturer and location (for an example, see *Annex 10*). The HTM Manager can gather this information from the Acceptance Test Logsheet (see *Annex 9*) and the Register of New Stocks form (see *Annex 11*).

In addition, the HTM Manager should allocate a unique **inventory code number** to each piece of equipment and ensure the equipment is labelled/marked with this code number. (See *Guide 2* on planning and budgeting for details of establishing and updating an equipment inventory and developing an inventory code numbering system.)

- ◆ **Equipment File** (manual or computerized). This acts as a service history for a particular piece of equipment. The HTM Manager should open a new Equipment File for each piece of equipment, and label the file with the equipment's inventory code number. The type of information recorded in this file at the acceptance stage should include details of the manufacturer/supplier and purchase contract terms (see *Annex 10*). Much of this information will be contained in the completed Acceptance Test Logsheet (*Section 8.1*), which should be the first document placed in this file with supplementary data as required.

Subsequent records placed in the Equipment File are of any maintenance work carried out so that the file becomes the equipment's service history. (See *Guide 5* for details of recording maintenance work undertaken and keeping service history files.)

- ◆ **Planned preventive maintenance (PPM) programme.** The HTM Manager should register equipment for any PPM carried out by maintenance staff (if it is taking place), and enter it onto their **PPM timetable** so that it gets attention at regular intervals. (See *Guide 5* for details of establishing PPM programmes and records for maintenance staff.)

On handover of the equipment to the user (*Section 8.4.4*), the HTM Manager should liaise with the Head of the User Department about registering the equipment for any user PPM taking place, and entering it onto their user PPM timetable. (See *Guide 4* on operation and safety for details of establishing user PPM programmes and records.)

- ◆ **Equipment card.** This is a piece of card or laminated sheet that is permanently kept with the equipment, or tied to it. It can provide users with a summary of the equipment care instructions (see *Guide 4*), and a summary service history, such as dates when routine inspections, testing, and servicing took place (see *Guide 5*).



- Tip** • Once the equipment has been checked and is confirmed as safe and ready for use, it is sensible to highlight this fact. Use a simple strip of tape placed across the main controls of the apparatus to clearly show that it has been tested. It is preferable to use printed warning notice tape, but other types could be used.

- ◆ **Register of New Stocks form.** This provides the Stores Controller with all the information required for entering each new piece of equipment and its supplies into the Stores stock control system (*Sections 8.4.3 and 8.4.4*). The Commissioning Team should (partially) complete this form by gathering information from the available contract, packing lists, or invoice, according to a standard format (see example in *Annex 11*). The type of information should identify the manufacturer/supplier's order codes, description, and batch sizes of the equipment, consumables, accessories, and spare parts.
The Stores Controller finishes completing the form by allocating and recording each item's unique stores code (*Section 8.4.3*). The Stores Controller provides copies of the finalized forms to the user departments and HTM Team so they can order the correct replacement items in future. The HTM Manager keeps this form in the relevant Equipment File.
- ◆ **Registering warranties.** You need to register the guarantee or warranty of the equipment (if applicable). The date of commencement and the period of the warranty which have been agreed with the supplier must be entered into all relevant procurement, finance, and maintenance records.



Tip • Be certain about when the warranty period starts.

8.4.2 Storing Manuals

Operator and service manuals should be supplied with the equipment, according to your purchase document (*Section 5.5.2*). It is important to make sure that manuals are kept in a safe place, and are not lost by staff. It is also important to make them widely available for use among users and maintenance staff. This can be done by:

- ◆ Storing the original copies in a safe place, such as the health facility's library, the director's office, the workshop library, the Main Stores office, or the HTM Service library.
- ◆ Making two photocopies of all operator manuals received, and giving one set to the head of the relevant user department, and the other to the HTM Team or workshop responsible for the equipment's maintenance.
- ◆ Making one photocopy of the service manuals received, and giving it to the HTM Team or workshop responsible for the equipment's maintenance.
- ◆ Asking for manuals or their content in other formats, such as CD-Rom, video, DVD.
- ◆ Scanning the printed documents into a computer to convert them into electronic copies, and making them easily available to maintenance staff at many locations.
- ◆ Recording in the Equipment File how the manuals were distributed. This helps with monitoring and updating the manuals in future.

8.4.3 Storage and Stock Control of Recurrent Orders of Equipment-Related Supplies

The Stores System

Your health service provider needs to decide where to store equipment, its consumables, accessories, and spare parts, as well as maintenance materials. In many countries the system is complex:

- ◆ Supplies stores, run by supplies staff, keep large equipment items, spare parts (such as replacement motors, replacement suction bottles, plumbing fittings), and maintenance materials (such as oil, tubing, pipes).
- ◆ Medical stores, run by pharmacists, keep equipment consumables (such as ECG recorder paper, ultrasound gel), accessories (such as diathermy probes, breathing circuits), small items of equipment (such as oxygen gauges, stethoscopes), and some spare parts for user PPM (such as ophthalmoscope bulbs, batteries).
- ◆ Workshop stores, run by maintenance staff, keep tools, test instruments, small spare parts and materials (such as nuts, bolts, o-rings, electronic components).
- ◆ Stores belonging to other programmes, such as the laboratory service or dental service, may keep consumables and user spare parts for their equipment, and be run by their own staff (such as laboratory technicians, dental technicians).

The drawbacks of such systems are that:

- ◆ many different types of people are responsible for different things
- ◆ it is easy and common for some items to be left out, with no one accepting responsibility for them
- ◆ staff without knowledge of healthcare technology (stores and pharmacy staff) have difficulty recognizing and ordering the equipment-related supplies
- ◆ general health service staff placed in charge of a store without knowledge of the stores system have difficulty keeping track of stocks
- ◆ staff requiring the supplies find it difficult to know how to access what they want.

There is a need to rationalize such situations. Ideally, bulk stocks of all equipment and their supplies would be stored together in one Main Store, whether at facility level or at the other levels in the distribution network (district, regional, central). If this store also stocks other health service supplies, there should be a separate section for the equipment and its supplies. In this way, the small quantities of varied technical items should not go missing and can be easily identified among the bulk of general items in the stores.

This Main Store then issues relevant stocks regularly to sub-stores in the user departments and maintenance workshops. All stores staff (whether in the Main Store or in the sub-stores) receive training in proper stock control and have illustrated catalogues to assist with identification. They will seek advice from the HTM Manager/Head of User Department if there is any doubt about the part to issue/order.



- Tip** • The main decision is whether to keep equipment and its supplies with all other general and medical supplies in the health storage system, or in a separate HTMS storage system.

Most stores systems have what are known as ‘stockable’ items. These are items which are automatically replenished when stocks run low, and are therefore always in stock. This is a common system for medical and general items, but is rarely in place for equipment-related supplies, making it very difficult to keep equipment functioning. You should therefore aim to make equipment-related items stockable too, including:

- ◆ equipment consumables
- ◆ commonly-used accessories
- ◆ the spare parts and maintenance materials required for PPM
- ◆ those parts and materials which experience tells you will be required for common repairs.

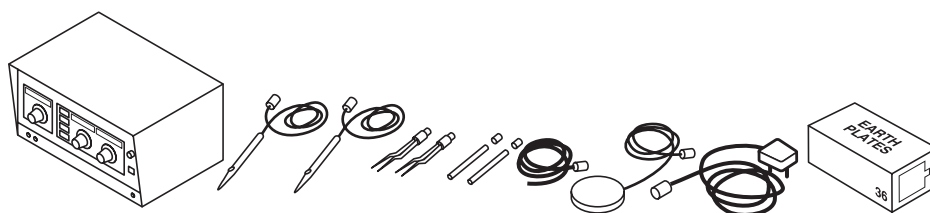
Less commonly used equipment-related items may remain as non-stockable items.

To make items stockable, you must have sufficient data to enter onto their stock cards such as their usage rates, stock levels, order dates, delivery times, required reorder levels and reserve stock levels.

All these issues are discussed in detail in *Guides 4 and 5*.

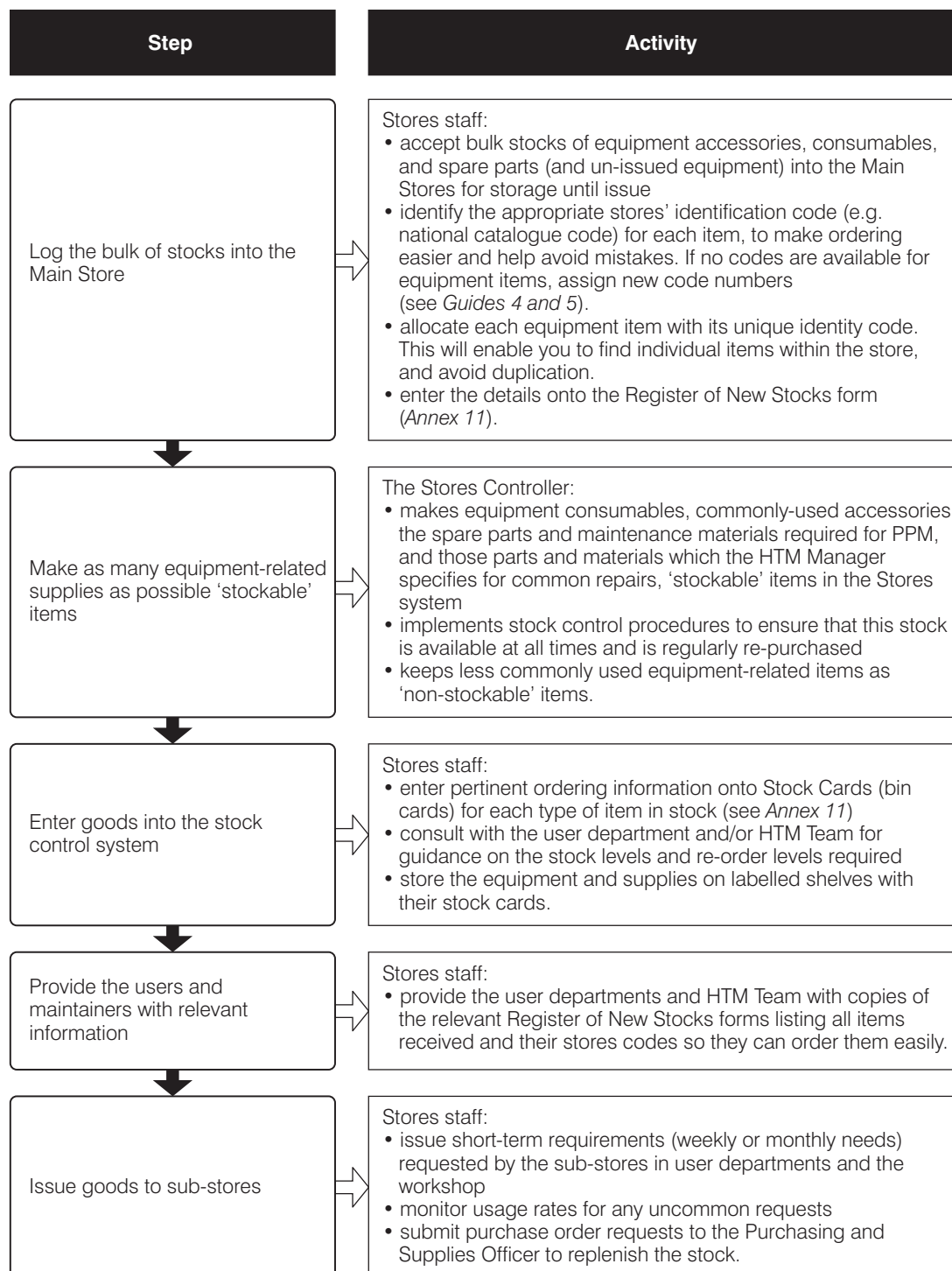
Entering Supplies into the Stock Control System

When handing over equipment to the user department (*Section 8.4.4*), the Commissioning Team issues them with an initial stock of accessories and consumables.



However, you should have a remaining bulk of supplies to cover a stock period (of one to two years) according to your purchase document (*Section 5.5.2*). These stocks must be officially entered into the stores stock control system. The Commissioning Team hands over these stocks to the Stores Controller with the completed Register of New Stocks form (*Section 8.4.1*). *Figure 28* shows the procedures required for storing them.

Figure 28: Procedures for Entering Equipment-Related Supplies into the Stores System



Note: the equipment itself is entered into the stores system at handover (Section 8.4.4).

8.4.4 Handover

Handover the formal presentation of new equipment, after its formal acceptance, to the user department or the health service provider’s representative who assumes responsibility for it.

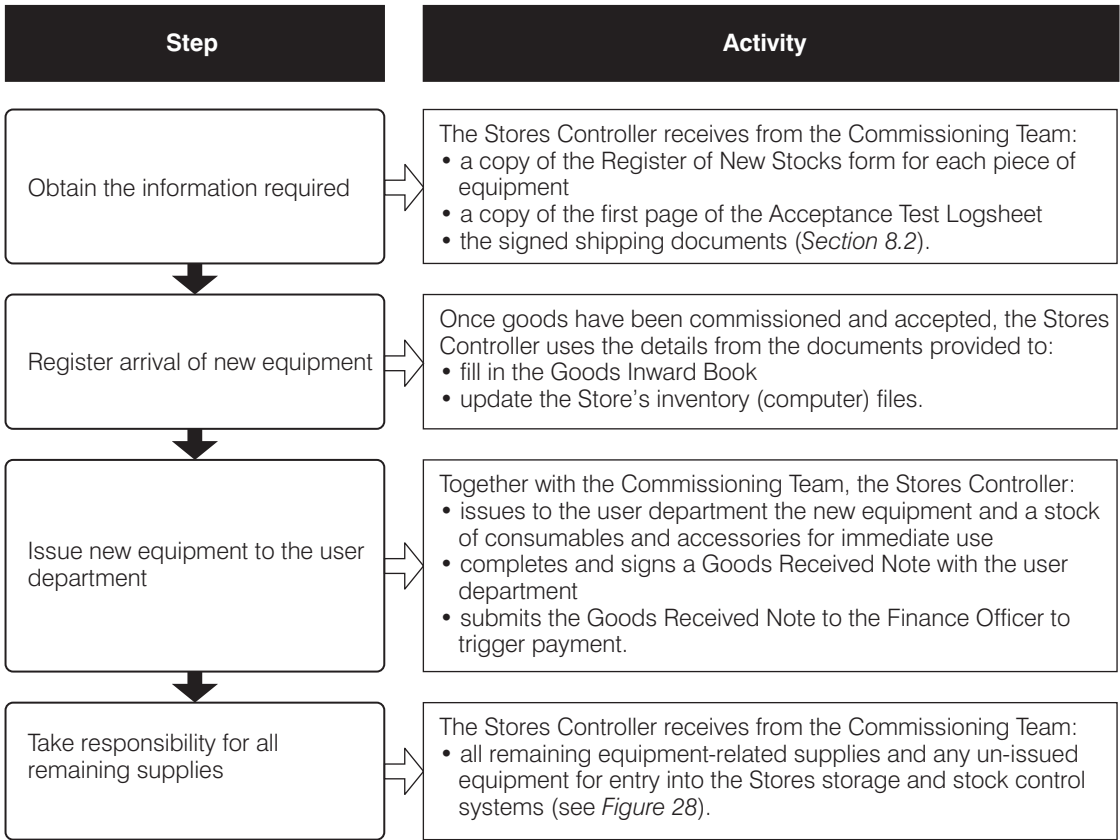
When the Commissioning Team signs off the fully completed Acceptance Test Logsheet, they are certifying that:

- ◆ the equipment **and** services provided are completed and satisfactory
- ◆ the equipment and services have been formerly accepted by the health facility
- ◆ payment can be made.

They must provide the Stores Controller with copies of the Register of New Stocks form and the first page of the Acceptance Test Logsheet so that he or she can carry out the official stores receiving procedure for equipment.

Figure 29 shows the procedures required to officially receive equipment into the stores system.

Figure 29: Procedures for Entering Equipment into the Stores System



Once initial training is over, the Commissioning Team and Stores Controller issue the new equipment and a stock of accessories and consumables for immediate use to the relevant user department. The amount allowed (for example, a week's or a month's supply) depends on many factors including cash flow, shelf life, climate and security. The Stores Controller must also get the user department to sign a Goods Received Note (see *Annex 11*). It is useful if the Security Manager also attends so that he is aware of new property belonging to the health facility, and where it is located.



- Tip** • At the time of official handover, the users and maintainers should start a programme of periodic inspection, testing, maintenance, and calibration to ensure equipment is maintained in a safe and effective operating condition. This process is known as Planned Preventive Maintenance (see *Guides 4 and 5*).

The Commissioning Team compiles a handover document, comprising:

- ◆ the signed delivery document, which transferred responsibility for the equipment to the health facility (*Section 8.2*)
- ◆ the completed and signed Acceptance Test Logsheet (including test results), which confirms:
 - the equipment is complete, safe, and working satisfactorily
 - the services were performed satisfactorily and are finished
 - both equipment and services can be paid for
- ◆ any additional handover certificate provided by a visiting installation team (*Section 8.3.2*).

They submit this to the Procurement Unit which makes various copies of these documents for different purposes, as follows:

- ◆ All signed delivery documents are filed for reference by the Stores Controller. They should usually be kept for a minimum of two years (or the time specified in the regulations of your organization).
- ◆ A copy of the Acceptance Test Logsheet (including test results), and any visiting teams' handover certificate are kept by the HTM Team in the relevant Equipment File (*Section 8.4.1*).
- ◆ A copy of the whole handover document is submitted to the Finance Officer to trigger payment.
- ◆ A second copy of the whole handover document goes to the supplier documenting the status and date of handover of the equipment.

The date of signing the Acceptance Test Logsheet may be an important reference point later on. For example, it may be used as the warranty commencing date, or the date when payment procedures can begin (*Section 8.5*).

If there are problems with goods or services, the Commissioning Team does not sign off the logsheet, but writes a Fault Report (see the last page of the Acceptance Test Logsheets for an example) explaining the problems and advising that payment be withheld until the problems have been corrected (*Section 8.5*). The Procurement Unit should notify the supplier or issuing store immediately – see *Section 8.6* for further information on complaints procedures.

Any equipment that fails the Acceptance Process must **not** be handed over to the user department, but should be left with the Commissioning Team (as long as the team is active). Alternatively such equipment can be handed over to the HTM Manager or to the supplier (if he was a member of the Commissioning Team and has an office locally), until it has passed the Acceptance Process.

8.5 WHEN AND HOW TO MAKE PAYMENTS

A well-organized payment system is important to ensure payments are made on time and according to purchase contracts. Managing money is a complex and responsible task, which is mainly carried out by finance officers or accountants. The Procurement Manager and HTM Working Group have little responsibility for handling money apart from petty cash. However, they are responsible for reporting to the finance department that equipment and services are acceptable and payment can be made.

Making Payments

Before instigating any payment, the Procurement Unit must ensure that the goods have been inspected and accepted, and that the order complies with contract terms and conditions (*Section 6.4*). In all payment cases, the Procurement Unit needs to:

- ◆ cross-check and compare the diverse delivery documents (such as the delivery note and packing lists) with the Purchase Order
- ◆ match and link the delivery documents and Purchase Order with the invoice.

After all these checks have been carried out, the Procurement Unit should avoid ‘double payment’ by:

- ◆ signing and stamping the invoice, and filling in all the relevant data for the Finance Office including: signature (all checks done), cost centre code and accounts code
- ◆ attaching the invoice to the delivery documents and Purchase Order
- ◆ submitting all the necessary documentation to the Finance Office for payment.

The Finance Office must make payments in accordance with the payment schedule described in the purchase contract (*Section 6.4*). For equipment and services, final payment should **only** be made by the Finance Office when they have received a completed and signed Acceptance Test Logsheets (from the Commissioning Team) and a Goods Received Note (from the Stores Controller).

If the Finance Office receives a Fault Report from the Commissioning Team because there are problems or discrepancies with the goods or service (*Section 8.4.4*), payments should be withheld until the problems have been rectified. **Only** when the problems with the goods and services have been satisfactorily rectified, can the Commissioning Team finally complete and sign off the Acceptance Test Logsheet and submit it, to trigger payment.

Exceptions

Some suppliers may have asked to be paid in advance or on delivery. You should only agree to this for local suppliers, or as part payment for foreign suppliers. In these cases, payment may be made in a number of ways. Either the Finance Office:

- ◆ uses petty cash
- ◆ raises the necessary cheque or cash on the basis of the Purchase Order (*Section 6.4*) and the invoice/delivery note
- ◆ uses a letter of credit which only pays when the supplier presents proof of shipping (*Section 5.5.2*).

In these cases, it is worth negotiating some form of phased payment so that you can retain a proportion of the money owed until you are sure you are satisfied with the goods or services provided (*Section 5.5.2*).

Payments by Others

If another organization (for example, an external support agency) purchases the goods or services on behalf of the health facility, then that organization is responsible for making the payments. The Commissioning Team needs to keep such organizations informed of any issues (such as delays or damage – see *Section 8.6*), and the Finance Officer submits all documents to the external purchasing organization for payment. The Finance Office uses the same documents as required by your health service provider, with supplementary paperwork if the external support agency requires it.

Closing Procurement Files

The Procurement Unit can close the file on each round of purchasing when:

- ◆ the contents of the Purchase Order is fully delivered and accepted
- ◆ all payments have been made
- ◆ the Finance Office agrees that there are no outstanding issues (such as a bond for the warranty period).

The closed files should be sent to the health facility's (or any other relevant) archives.



- Tip**
- Whatever payment method is used, the Procurement Unit should file all documents for reference, and keep them for at least two years (or the time specified in the regulations of your organization).
 - The HTM Manager should keep a record of warranty periods, and inform the Finance Office when future call-outs, parts, or labour are still free-of-charge under warranty terms.

8.6 DAMAGE TO GOODS, OR UNSATISFACTORY SUPPLY OF GOODS OR SERVICES

Occasionally, there may be problems with the goods or services supplied.

For instance:

- ◆ goods are damaged
- ◆ the order is received incomplete (for example, spare parts, accessories, or documentation are missing)
- ◆ the wrong product is received (for example, the wrong type or model of equipment)
- ◆ the equipment does not fulfil its function, as described in the specification
- ◆ the quality is inferior to the specification
- ◆ safety standards given in the purchase document are not met
- ◆ the supplier fails to provide agreed services (such as training)
- ◆ the supplier provides poor services (for example, there was a problem with the installation).

Your original purchase contract (*Section 6.4*) needs to include details of what to do if events of this kind occur. This should include conditions specified by both the buyer and supplier. In case of disagreement over specific paragraphs in specific documents, the priority of the documents must be stated in the contract.

If there are problems with the goods and services supplied, you should first try to establish exactly how the situation occurred and how it can most easily be remedied. Always contact the supplier immediately, and give him only objective facts about the problems. First use the telephone or e-mail and be friendly and polite, then follow up with written information. The person who should contact the supplier should:

- ◆ be senior enough to make decisions
- ◆ have enough clinical and technical knowledge to be able to give and understand relevant and detailed information about the product received and the damage/complaint.

If an external support agency purchased the goods or services, you should keep them informed while you make polite enquiries of the supplier. If it becomes clear that the issues can only be resolved through a legal contractual route, the external support agency should take responsibility for this.

If a health service store issued the goods, they should be notified of any discrepancies.

Damaged or Missing Goods

Once it is confirmed that the shipment received was incomplete or damaged, you should contact your insurance company who sends a surveyor and files an insurance claim. The supplier should also be notified immediately.

If the insurance company determines that:

- ◆ the damage was due to negligence on the part of the supplier (unsatisfactory packing, etc) – then the supplier should re-supply the item or provide money in kind (although this may have to be negotiated on a case by case basis)
- ◆ some items from the shipment are missing due to negligence on the part of the supplier – then the supplier provides the missing items
- ◆ some items were stolen – then the insurance company compensates.



Country Experience

A computer with an expensive screen had to be stored in a warehouse due to a one-week delay in installation. It was stolen from the warehouse.

The hospital's buying conditions stated clearly that the supplier was responsible for all items procured until the handover certificate was signed, and that the supplier was responsible for insuring the equipment up until installation was complete.

Since all routines at the warehouse had been followed, the supplier provided a new computer and screen.

The following remedial action is the normal procedure:

- ◆ The Commissioning Team does not sign off the Acceptance Test Logsheet, but writes a Fault Report to the Procurement Manager describing the problems (photographs of the damage help with insurance claims).
- ◆ The Procurement Unit:
 - notifies the relevant bodies (the manufacturer, supplier, carrier, or issuing store – depending on the contract), and any external support agency involved
 - checks whether the damage is covered by your insurance policy and, if you are covered, who is responsible (the buyer or supplier)
 - completes any insurance claim quickly (delays can lead to a claim becoming void).

- ◆ If responsibility lies with the supplier, you should send the goods back to the supplier.
- ◆ Depending on the terms and conditions, you may receive a refund, a credit, or goods may be replaced.
- ◆ If the responsibility lies with the buyer, then you will need to obtain replacements by placing another order.
- ◆ When any goods are rejected, the supplier/issuing store will not be paid (in full) until the complaint has been resolved (*Section 8.5*).

Inferior or Superior Equipment

If you discover that you have been supplied with an inferior product to the one offered, you have the right to reject the equipment.



- Tip** • Be aware that sometimes a model is discontinued and replaced during the purchase process, and that a new model is received. This is normally no reason for rejection.

If the equipment is similar in quality and function, you can request a discount – especially if the received goods introduce non-standard equipment when you ordered a standardized model.

If the equipment is of better quality, check that it is appropriate to your health facility (looking at factors such as level of technology, available skills and local climate). If the equipment is not suitable, reject it. If it is acceptable, do not pay more than the amount agreed for the original model.

When incorrect equipment is received, inform the supplier or issuing store immediately (and any external support agency involved). Take the remedial action detailed below for unsatisfactory services.

Unsatisfactory Services

If installation, commissioning or training provided by the supplier, their representative, or a contractor is unsatisfactory, the health facility has the right to reject any of these activities if they do not conform to the agreed contract. Alternatively, a discount could be acceptable to both parties.

If the supply of goods or services is unsatisfactory, the following remedial action should be taken:

- ◆ The Commissioning Team does not sign off the Acceptance Test Logsheet, but writes a Fault Report to the Procurement Manager describing the problems.
- ◆ The Procurement Unit notifies the relevant bodies (such as the manufacturer, supplier, their representative, or a contractor – depending on the contract).

- ◆ The Procurement Manager:
 - either makes personal contact with the supplier so that the necessary parties (supplier, representative, contractor, health facility) can decide what appropriate action should be taken
 - or, if the purchasing was carried out by an external support agency, reports the problems to them so that they can negotiate the contractual obligations with the supplier/contractor.
- ◆ When any services are rejected, the supplier/contractor providing them must redo the work, and will not be paid in full until they have done so (*Section 8.5*).

Box 48 contains a summary of the issues covered in this Section.

BOX 48: Summary of Procedures in Section 8 on Receipt, Commissioning, and Storage On Site

Process	HTM Working Groups	<ul style="list-style-type: none"> ◆ develop an Acceptance Test Logsheet covering all elements of the Acceptance Process (see <i>Annex 9</i>) ◆ establish a Commissioning Team of suitable health service staff (<i>Section 1.2</i>), joined by any external installation and/or training team when applicable ◆ ensure all resources required for the Acceptance Process are available (see <i>Box 46</i>)
	Procurement Manager	<ul style="list-style-type: none"> ◆ designates a suitable delivery/unpacking area ◆ arranges any lifting equipment required
	Stores Controller and team	<ul style="list-style-type: none"> ◆ sign delivery notes (acknowledging the number of packages and their condition only) ◆ unpack and inspect recurrent orders of equipment-related supplies (see <i>Figure 24</i>)
Receipt	Commissioning Team (and any external contractor)	<ul style="list-style-type: none"> ◆ unpacks and inspects new equipment orders (see <i>Figure 23</i>)
	Commissioning Team	<ul style="list-style-type: none"> ◆ designates a suitable space and office for commissioning, and space for training sessions ◆ ensures all the arrangements are in place for assembly, installation, commissioning, and initial training (see <i>Figures 25 and 27</i>) ◆ oversees all parts of the Acceptance Process
	Commissioning Team and/or any external contractor (if applicable)	<ul style="list-style-type: none"> ◆ carry out the work (see <i>Section 8.3.1</i> and <i>Figures 26 and 28</i>) ◆ complete the relevant section of the Acceptance Test Logsheet if the equipment passes and the work is satisfactory ◆ officially accept new equipment ◆ complete a Fault Report if there are problems with the goods or services
Assembly to Training		

Continued opposite

BOX 48: Summary of Procedures in Section 8 on Receipt, Commissioning, and Storage On Site (continued)

Registration/Handover	Commissioning Team/HTM Manager	<ul style="list-style-type: none"> enters the equipment onto the Equipment Inventory with its own inventory code number, and labels the equipment with it sets up an Equipment File for each piece of equipment enters the equipment into the PPM programme attaches an equipment card to the equipment completes a Register of New Stocks form registers the warranty copies and stores operator and service manuals appropriately hands over new equipment and its initial stock of supplies to the user department hands over the remaining bulk stocks of equipment-related supplies to the Stores Controller compiles the necessary documents to create a handover document and submits it to the Procurement Unit for appropriate distribution
	Health Management Teams and HTMS	<ul style="list-style-type: none"> choose the most appropriate storage system for equipment and equipment-related supplies (see <i>Guides 4 and 5</i>)
	Stores Controller and team	<ul style="list-style-type: none"> enter new equipment into the stores system (see <i>Figure 29</i>) get a Goods Received Note signed by the user department for new equipment liaise with the Security Manager about the location of new property enter equipment-related supplies into the stock control system (see <i>Figure 28</i>) file all delivery documents for at least two years
Payment	Procurement Unit	<ul style="list-style-type: none"> compiles all necessary signed documents and submits them to the Finance Office closes the Procurement Files and stores them for at least two years
	Finance Officer	<ul style="list-style-type: none"> pays the supplier/issuing stores according to the schedule in the purchase contract, only on receipt of a signed completed Acceptance Test Logsheet only uses payment in advance or on delivery where necessary, and arranges the payments as appropriate if another organization is purchasing the goods, processes the paperwork according to the rules of the external funding organization
	HTM Manager	<ul style="list-style-type: none"> keeps warranty records, and informs the Finance Office when work or parts are free under warranty terms
Complaints	Commissioning Team	<ul style="list-style-type: none"> submits a Fault Report if there are problems with the equipment or services
	Procurement Unit	<ul style="list-style-type: none"> identifies a suitable person to contact and negotiate with the supplier/issuing store, or passes the case to the external support agency that financed the purchase contacts the insurance company and claims the appropriate compensation (money, re-supply of goods, corrected work), or re-purchases
	Finance Office	<ul style="list-style-type: none"> only pays the supplier/contractor/issuing store when the complaints have been resolved.



9. HOW TO UNDERTAKE ACTION PLANNING AND MONITORING OF PROGRESS

Why is This Important?

Managing the activities described in this Guide will involve a cycle of actions.

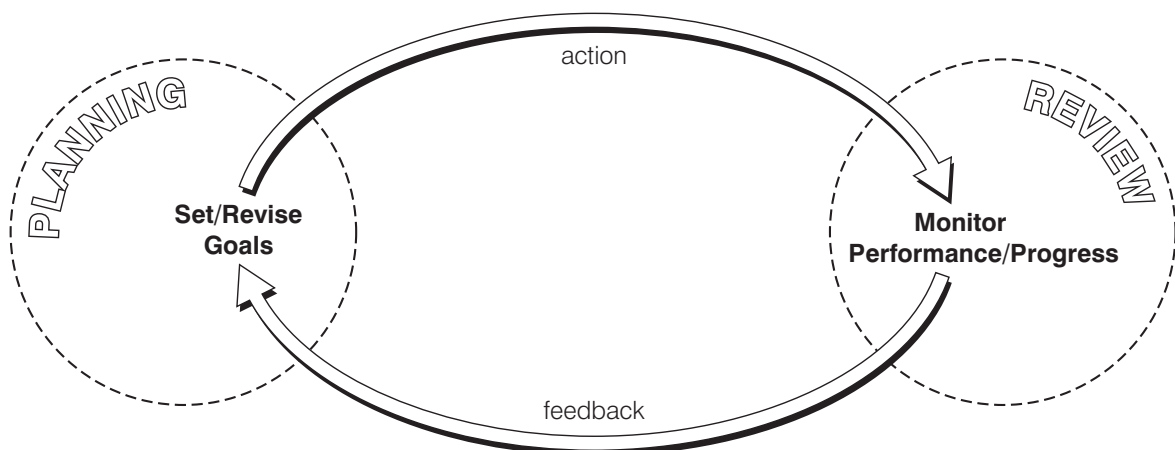
You need to monitor your performance, and set yourself goals so that you can improve. Then you monitor your progress, revise your goals, and review your progress again – thus undertaking a continuous cycle of planning and review.

Such evaluation helps you to ensure the quality of your work. This is one element of quality management – an important goal for managers.

The planning and review activities are interlinked in a cycle as shown in *Figure 30*, but it is necessary to start the discussion at some point in the cycle. This Section discusses the following:

- ◆ The planning process (setting goals) in *Section 9.1*.
- ◆ The review process (monitoring progress) in *Section 9.2*.

Figure 30: The Planning and Review Cycle



As can be seen from the procurement cycle in *Figure 6 (Section 2.2)*, your skills at procurement and commissioning can only improve if you obtain feedback regarding the performance of equipment, suppliers, contractors, and external support agencies. This helps you to find ways of undertaking procurement and commissioning in future that enable you to choose better equipment, suppliers, contractors, and external support agencies.

Logistics
the detailed coordination of
a large and complex operation
to move and supply equipment
and materials.

This Guide covers the wide range of activities known as 'logistics'. There are many different types of staff who should be involved in planning and reviewing their progress with this work, such as members of:

- ◆ Procurement Units
- ◆ HTM Teams
- ◆ HTM Working Groups and/or their various sub-groups (such as the Commissioning Team, the training sub-group, the project sub-group)
- ◆ Stores departments
- ◆ Transport departments.

The main outcome of the planning and review process is that you are able to evaluate your performance. This is important for ensuring the quality of your work (quality assurance), which is an essential component of quality management.

Aims of Quality Management

- ◆ client satisfaction
- ◆ cost efficiency
- ◆ compliance with laws

We recommend that quality management is introduced into the health management systems of all decentralized levels of the health service. It can help to improve staff attitudes, and this, in turn, can help staff handle the challenges connected with the many reforms and new management tasks they face (such as those described in this Guide). Important elements of quality management are:

- ◆ a management team approach
- ◆ supervision and evaluation
- ◆ participative leadership
- ◆ methods for encouraging staff
- ◆ individual responsibility and initiative
- ◆ control measures such as performance measurements and impact analysis
- ◆ community participation.

9.1 SETTING GOALS (ANNUALLY) FOR PROCUREMENT AND COMMISSIONING

Purpose

It is necessary for all groups involved in procurement and commissioning to have goals and plans which set out their priority activities. The goals and plans must be clearly defined so that they guide the work of:

- ◆ all departments and groups involved in procurement and commissioning
- ◆ the health facility or decentralized health authority level that these teams are based at
- ◆ higher levels of the same profession (for example, the HTMS, Central Stores, the Central Procurement Division)
- ◆ the health service as a whole.

The goals and plans will also enable staff and managers to monitor their own performance and progress with regard to procurement and commissioning activities.

Every team or department can benefit from an Annual Action Plan which contains clear, specific goals relating to its key activities. An action planning process should take place once a year, as standard practice. This is an opportunity for the members of the team to agree the range of activities (initiatives and changes) they want to implement, because they believe the activities will improve:

- ◆ their working environment
- ◆ their performance
- ◆ the service they provide.

There are boundaries and limitations to this planning process. The need for major investments in equipment should be discussed outside the annual action planning process, through activities such as the Equipment Development Planning exercise (see *Guide 2* on planning and budgeting). Similarly, ongoing shortages of staff or money are usually excluded from the annual action planning process, and should be addressed instead by higher authorities that can influence such issues.

Instead, we suggest that annual action planning should focus on improvements and changes that staff can undertake themselves, and that can be achieved with existing staff, equipment, facilities, and other resources.

Staff involved in procurement and commissioning activities should devise a wide range of initiatives and goals for all aspects of their work, such as:

- ◆ obtaining information about new products
- ◆ improving procurement skills
- ◆ implementing effective equipment acceptance procedures
- ◆ improving stock control of equipment-related supplies
- ◆ shorter bidding and delivery periods
- ◆ more successful installation and commissioning outcomes.



The planning process, and the plans themselves, should be clear and straightforward. This assists participation and produces goals that can be understood and used by all staff. Staff who are involved in setting goals and preparing plans are more likely to be committed to carrying them out. Thus, the planning process should incorporate representatives of all different types of staff, from all relevant disciplines.

We suggest that you hold an action planning seminar once a year. Such seminars can be held in various ways:

- ◆ Either across a ‘horizontal’ level of the health service, in other words, planning for the health service as a whole with participation from all disciplines (including those involved in procurement and commissioning), undertaken by your health facility or by your district health authority.
- ◆ Or across a ‘vertical’ professional programme within the health service (such as the procurement service, or maintenance service). In this case, representatives would meet from all the Procurement Units, for example, in your district, or region, or throughout the health service as a whole.

The main purpose is to establish an annual planning cycle which:

- ◆ reviews past performance, problems, and needs
- ◆ identifies solutions and sets specific goals for the year
- ◆ prepares an annual action plan for delivering improvements in the coming year
- ◆ monitors implementation
- ◆ starts back at the beginning again with another review the following year.

A full description of the process of running an action planning seminar is provided in *Guides 4 and 5*. At the meeting or seminar, each priority problem area identified is discussed, and solutions developed. For each solution or improvement, the meeting writes new targets, recommendations, and longer-term objectives, as well as indicators for the coming year (as described below).

The Annual Action Plan developed states the goals, the people, resources, and time required to achieve them, and how they will be measured (see below). Once ready, it needs to be communicated back to all staff.

Setting Goals

Three types of goals are required: targets, recommendations, and longer-term objectives.

i. Targets

Targets guide the work of all groups involved in procurement and commissioning activities, during the following year. They help to improve services and make sure the most important work gets done. Targets are one of the best tools for judging progress and work performance. We suggest that each unit/group should have between five and ten targets, following the ‘SMART’ target-setting process:

Specific	state what should be done and who will do it
Measurable	easy to measure, or easy to decide that the target has been achieved or if progress is being made
Achievable	possible to carry out with existing staff, equipment and money
Relevant	cover a priority problem or improvement
Time-bound	state when the activity should be completed by.

It will be clearer if targets are written down using the following headings, which can be used when the final plans are produced:

Target	By whom	How to measure	How to achieve	Timetable
Actions agreed, listed in order of priority	Names of persons who will be responsible	How progress will be determined (see indicators below)	Resources required	Time-frame for start and completion

ii. Recommendations

You will discover that some important problems cannot be overcome or improvements achieved unless extra supplies, staff, or funds are provided, or unless assistance is obtained from outside. In such cases, recommendations are required.

These should be:

Specifically addressed	to the person, official, department, organization, etc that is able to carry out the recommendation.
Reasonable	there is no point in asking for the impossible, such as 10 times more staff
Essential	there should be no easy way for the Procurement Unit/Commissioning Team to achieve the same results on their own.

iii. Longer-term Objectives

You will also discover some problems which cannot be solved in one year. Maybe they need large amounts of money, longer preparation, or plenty of time to achieve. Or maybe it is simply not possible to do everything at once. In such cases, longer-term objectives are required which will be carried forward to the next year, or for implementation later on.

How to Measure the Goals

Each goal must be easily measured, so that you can see if it has been achieved or if progress is being made:

- ◆ You need a way of determining if you are moving towards your goal – this is called an *indicator*. There will always be several possible indicators for each goal, and more than one way of measuring them.
- ◆ You need to know where you are starting from, in other words, what the situation is now – this is called the *baseline data*. The data chosen must be relevant to the indicator.

Box 49 provides an example of different ways of measuring a goal using indicators and baseline data.

BOX 49: Example of How to Measure a Goal

Goal:	Cut the time from tender invitation to equipment delivery to a minimum. Improving performance on three indicators at the same time would help you achieve this goal.
1st indicator:	Reducing the time from the tender closing date to the award of contract (if valued at more than US\$ 100,000) to less than 90 days
<i>Calculation required:</i>	Percentage of such contracts awarded within the 90 days $= \frac{\text{Number of such contracts awarded within the 90 days, in a given period}}{\text{Total number of such contracts awarded in that period}} \times 100\%$
<i>Baseline data:</i>	In a study of the current situation you find that in the previous year, only one out of three contracts were awarded in less than 90 days. Therefore your baseline data is 33%.
Your aim is to improve this situation by increasing this percentage.	
2nd indicator:	Reducing the time from awarding the contract to submitting a detailed order to less than 30 days
<i>Calculation required:</i>	Percentage of such orders submitted within the 30 days $= \frac{\text{Number of such orders submitted within the 30 days, in a given period}}{\text{Total number of such orders submitted in that period}} \times 100\%$
<i>Baseline data:</i>	In a study of the current situation you find that of the three contracts awarded in the previous year, only two of them had orders submitted in less than 30 days. Therefore your baseline data is 66%.
This performance is good, but you would like to increase this percentage.	
3rd indicator:	Reduction in warehouse storage of pieces of large equipment which will be installed by in-house staff
<i>Calculation required:</i>	Percentage of such equipment stored in the warehouse $= \frac{\text{Number of such pieces of equipment stored in the warehouse, in a given period}}{\text{Total number of such pieces of equipment installed in that period}} \times 100\%$
<i>Baseline data:</i>	In a study of the current situation you find that in the previous year, seven out of the ten large equipment items installed by in-house staff had to be stored in the warehouse.
Therefore your baseline data is 70%.	
Your aim is to improve this situation by decreasing this percentage.	

It is necessary to choose suitable indicators that are specific to all your annual goals. There are many possible indicators for all groups involved in procurement and commissioning, and the health service as a whole, so staff and managers should decide upon the most important activities (or statistics and results) to measure.

Examples of the types of indicators that can be used for equipment procurement and commissioning activities are those describing:

- ◆ Procurement Unit's performance
 - records kept
 - different procurement methods used
 - average time for awarding contracts
 - average time for making payments
 - number of bids/quotes per purchase
- ◆ Suppliers' performance
 - average lead time (time from receiving the order to delivering the goods)
 - compliance with contract pricing and other terms
 - decrease in partial shipments
 - compliance with packaging and labelling instructions
- ◆ Stores' performance
 - delivery time
 - number of requests for orders met
 - decrease of storage time in transit
 - decrease in instances when out of stock
 - equipment-related items made stockable
- ◆ Commissioning Team's performance
 - sites prepared on time
 - decrease in delays before installers arrive
 - acceptance process made standard practice
 - goods registered into all relevant records
- ◆ HTM Team/contractor's performance
 - installation cost (or price per square metre)
 - safety testing undertaken as a standard part of commissioning
 - correct training carried out for correct trainees.

The Procurement and Supplies teams, HTM Team and HTM Working Group should meet to agree on a few suitable indicators that can be measured easily and quickly (if possible). Positive indicators are preferable as they motivate staff. Sometimes it is useful to use common indicators for different teams, groups, and staff, so that their progress can be compared.

Once the indicators have been agreed, they need regular measuring and charting. The relevant Health Management Team will need to decide:

- ◆ how records of these indicators will be kept, for example, in a register, with a form, or on a chart (*Section 9.2*)
- ◆ who will be responsible for keeping them
- ◆ how regularly the results will be summarized (each month, for example)
- ◆ what form of charts and displays you will use to show the monthly summarized results (so that it is easy for people to see how they are progressing).

Projects with External Support Agency Assistance

Assistance can be received from external support agencies for both routine equipment procurement, and for major development projects involving equipment, as follows:

- ◆ Equipment for any health facility, decentralized health authority, or HTM Service may be procured using funds from external support agencies (ranging from small donors, to large multi-national organizations).
- ◆ Any health facility, decentralized health authority, or HTM Service may be involved in a large development project, which can be externally funded. Such a project may be set up across many sectors in the health service. If it involves a healthcare technology component, the HTM Service must be involved. The healthcare technology component could address a number of equipment-related issues, such as:
 - the purchase of equipment
 - improvements to health facilities
 - improvements to the HTM Service
 - support for healthcare technology management (including skills in procurement, stores management, etc).

The healthcare technology component could apply across the health facility, the district, or the health service as a whole, and over a longer time span than one year.

It is important to remember that the external support agencies financing both the routine procurement and the development projects will usually have drawn up goals of their own. These may be different to the departmental goals set annually, and will often have their own time frame. The HTM Working Group, or a smaller project sub-group (*Section 1.2*), should set goals and oversee the progress of externally-assisted projects. The HTM Working Group/project sub-group should use the principles already outlined concerning setting targets, recommendations and longer-term objectives, in consultation with the external support agency. For each element of any externally-assisted project it is necessary to:

- ◆ set goals and measurement indicators
- ◆ agree the time frame for reaching the goals set
- ◆ monitor progress
- ◆ report to the external support agency as required by them.



- Tip** • If you have many external support agencies funding procurement, you may find that they each have different monitoring and reporting requirements. This can be very time-consuming. Your health service provider organization should try to negotiate a common style of monitoring and reporting if at all possible.

9.2 MONITORING PROGRESS WITH PROCUREMENT AND COMMISSIONING

The identification of problems and needs is an important part of the management of equipment-related activities. All equipment-related activities should be monitored and evaluated, and the performance of equipment, staff, and departments should be supervised (this applies to all clinical, technical, and support departments). The results of such monitoring are useful for providing feedback to staff, Health Management Teams, and the Healthcare Technology Management Service.

Monitoring progress involves a number of different activities. The following monitoring activities are described in this Section:

- ◆ Monitoring progress against annual goals (as set in *Section 9.1*).
- ◆ Monitoring progress in general, using statistics and feedback.
- ◆ The audit process for development projects.

Monitoring Progress Against Annual Goals

Monitoring progress against goals is one of the best ways that staff, managers, and the health service provider can judge their work performance. Thus, it is necessary to follow up the plans and goals set, in order to ensure that they are put into practice. If this is not done and goals sit on a shelf gathering dust, then all the time spent planning will have been wasted.

Regular monitoring of progress against goals is essential throughout the year. This should be done using the measuring and charting methods introduced in *Section 9.1*. Displaying annual goals and progress towards them can be helpful to staff.



At the end of each year, it is essential to review and carefully analyze the results achieved on all the team/group's goals, before starting to develop the Annual Action Plan for the following year. This step is the most important – to review results on a regular basis **with the people who are doing the work**.

This is the time to give praise for good progress, or to find out what might be causing shortcomings or problems, and then seek a solution. If solutions are quite impossible it may be necessary to change the plans. If common indicators were used for different departments, groups, teams, and staff, it will be possible to compare their progress.

Monitoring Progress in General

Monitoring equipment-related activities can help to identify problems and needs. Thus the results of monitoring are useful for providing feedback to staff and senior management. By receiving feedback on their activities and answers to their queries, staff will benefit from experience, and feel a part of the system as a whole. In this way staff:

- ◆ will be informed
- ◆ can obtain support
- ◆ will feel involved and empowered
- ◆ can be encouraged to take responsibility.

Regular monitoring of activities and services is also essential for improving the quality of healthcare. Management need facts so that they can plan effectively, and need to know how equipment-related activities are being carried out. Thus, it is important to have some method of collecting information, such as compiling statistics.

The groups involved in procurement and commissioning activities need to gather and compile statistics. These will provide information on each group's progress and work performance in relation to equipment. They need to gather information in order to:

- ◆ be better managers
- ◆ improve the running of their group
- ◆ provide information to other people and bodies who need to know how the group is performing.

Feedback is essential to the procurement cycle (see *Figure 6* in *Section 2.2*). The Procurement Manager needs to obtain feedback from all relevant groups in the health facility who can provide information on the:

- ◆ operational performance and safety of equipment, accessories, and consumables
- ◆ reliability of equipment, spare parts, and maintenance materials
- ◆ performance of the installation, commissioning, and training teams (whether in-house or external)
- ◆ performance of the suppliers (whether companies or health service stores)
- ◆ performance of the stock control system
- ◆ performance of any carrier, freight forwarder, clearing agent, or hired transport company
- ◆ performance of the external support agency.

The information gathered should be provided to relevant bodies (at any level of the health service) so that they can use it to improve the next round of procurement, such as:

- ◆ the Specification Writing Group
- ◆ the Procurement/Tender Committee (adjudicating offers)
- ◆ the Commissioning Team
- ◆ staff who write purchase documents and contracts
- ◆ staff who approach external agencies for support
- ◆ staff who pre-qualify suppliers
- ◆ staff who install and commission equipment
- ◆ staff who train others.

It may be possible to incorporate this data gathering into some form of Procurement Information System as part of the existing Health Management Information System (see *Guide 1* on organizing HTM). This will enable 'evidence-based' planning to take place.

Statistics and feedback should be gathered regularly, for example on a monthly or quarterly basis. *Box 50* shows the sort of statistics that can be gathered and how to use them. You will need to decide which are the most useful ones for your health service.

The Procurement Manager and Chair of the HTM Working Group should start the monitoring by:

- ◆ selecting statistics relevant for the functioning of the unit/team
- ◆ deciding how the information should be collected, for example on well-designed Statistics Forms placed in Statistics Folders
- ◆ deciding who will carry out the data collection for the different statistics (this may require staff with particular skills and will also take time)
- ◆ analyzing and presenting the results in regular Logistics Activity Reports for senior management, and at meetings.

After monitoring has taken place for one or two months, the monitoring system could be expanded to include further statistics. Once Logistics Activity Reports are available for several periods, they can be presented as graphs or tables. Remarkable data or significant changes, as compared to previous/past months, should briefly be explained.



Tip

- Monitoring is not just a one-off activity but something that has to be carried out on a regular and systematic basis, to help improve the way you work and the service you provide.
- Monitoring requires the involvement of all staff. Before starting, you should discuss the reasons for monitoring with the people involved and make sure everyone knows what they are trying to achieve.

BOX 50: Examples of Statistics and Feedback to Gather and Their Use

Type of statistics	Examples
Workload and performance (statistics obtained by counting numbers)	<p>For the Procurement Unit, statistics such as:</p> <ul style="list-style-type: none"> ◆ the number of purchase requests received ◆ the numbers of purchases completed ◆ percentage of the budget spent. <p>For the Commissioning Team, statistics such as:</p> <ul style="list-style-type: none"> ◆ the number of commissioning jobs delayed due to different causes: <ul style="list-style-type: none"> - sites not prepared on time - lack of funds for materials or contractors - delivery delays - lack of equipment lifting machinery. <p>Similar statistics could be found for the stores department, the training sub-group, etc.</p>
Quality control of equipment and suppliers (information obtained by analysis)	<p>The Procurement Unit can:</p> <ul style="list-style-type: none"> ◆ track the number and value of contracts awarded in date order ◆ track the value of total purchases from each supplier by year ◆ track the performance of the supplier (and their representatives) for each contract ◆ monitor the performance of the equipment and equipment-related supplies over time, and ◆ feed this information back to relevant bodies, such as the Procurement/Tender Committee or the Specification Writing Group. <p>Such a monitoring system for the performance of equipment and suppliers should eliminate unreliable suppliers, and improve the quality of the equipment selected in the future.</p>
Quality control of the procurement process chosen (information obtained by analysis)	<p>The Procurement Unit and senior management can review the choices made in the procurement process, by recording any problems that occurred and the final outcomes. For example, was the correct:</p> <ul style="list-style-type: none"> ◆ model used for procurement? ◆ lot system used? ◆ purchasing method used? ◆ external support agency used? ◆ carrier/freight forwarder used? ◆ clearing agent used? ◆ freighting method and terms used?

Monitoring Progress With Externally Assisted Projects

The HTM Working Group (or its project sub-group) will have prepared the goals for any externally funded projects, whether routine procurement or large development projects (*Section 9.1*). Depending on what is being funded, different elements will be under scrutiny. Here are some examples:

If equipment is being purchased, you may need to monitor progress with:

- ◆ equipment procurement procedures
- ◆ site preparation work
- ◆ installation, commissioning, and acceptance procedures
- ◆ the stores system for equipment-related supplies
- ◆ training of maintainers and users
- ◆ utilization of new equipment.

If the procurement service is being improved, you may need to monitor progress with:

- ◆ procurement staffing levels
- ◆ procurement facilities – space, technical literature, computerization
- ◆ procurement systems – record-keeping, the tender process, the adjudication process
- ◆ writing and implementation of purchase documents and purchase contracts
- ◆ budgetary management and payment procedures.

If equipment management is being improved, you may need to monitor progress with:

- ◆ the formulation of equipment development plans
- ◆ development of management ‘tools’ such as an equipment inventory, specifications, contracts
- ◆ training plans.

Indicators will have been chosen to measure progress with the goals for such elements. For large projects, a standard Audit Form can be developed based on this monitoring structure, containing:

- ◆ a list of the elements involved in the project
- ◆ the aspects being developed for each element
- ◆ a record of the progress made (possible entered against a record of the goal set)
- ◆ a record of the date the audit was taken.

Such an Audit Form ensures continuity and consistency with subsequent audits of large projects. An Audit Process can be developed and agreed, and an Audit Team established to monitor progress regularly.

Box 51 contains a summary of the issues covered in this Section.

BOX 51: Summary of Issues in Section 9 on Action Planning and Reviewing Progress

Setting Goals	Health Service Provider	<ul style="list-style-type: none"> ensures there is an annual action planning process whether across ‘horizontal’ levels (within a health facility or district), or within a ‘vertical’ programme (for the procurement/supplies division as a whole)
	All groups involved in procurement and commissioning	<ul style="list-style-type: none"> set their targets, recommendations, and longer-term objectives each year, in order to improve their performance (after reviewing the previous year’s performance) develop suitable measurement indicators for these goals and gather baseline data (see <i>Box 49</i>) participate in the annual action planning seminar
	Health Management Teams (or their Project Sub-Group)	<ul style="list-style-type: none"> set the targets, recommendations, and longer-term objectives for any routine or large development projects for equipment, in consultation with the external support agency develop suitable measurement indicators for these goals
Monitoring Progress	Health Service Provider	<ul style="list-style-type: none"> ensures the Health Management Information System is developed to include factors that measure progress with procurement and commissioning of equipment
	All groups involved in procurement and commissioning	<ul style="list-style-type: none"> ensure progress against annual goals is monitored, displayed, and used to provide feedback to team members, as well as to develop improved goals for the following year design suitable statistics that are informative and easy to gather (see <i>Box 50</i>) use procurement and commissioning records and feedback from staff, for gathering and compiling statistics, enter them on Statistics Forms, and file them in Statistics Folders use the statistics and feedback to write Logistics Activity Reports for management
	Health Management Teams (or their Project Sub-Group)	<ul style="list-style-type: none"> ensure that progress against any goals (annual, regular, or project) is used to prompt the correct response, such as training, better budgets, different suppliers, etc ensure that progress against project goals is monitored and reported as required by the external support agency.



ANNEX 1: GLOSSARY

Acceptance process:	Activities undertaken when equipment arrives at an health facility, at the end of which the equipment will be operational and officially belong to the facility, such as receipt, unpacking, installing, commissioning, initial training, entering into Stores and onto records, payment.
Accessories:	For equipment, those items which connect the machine to the patient (e.g. leads, probes), assist with the use of the machine (e.g. trays, foot-switches), or adapt its performance (e.g. adaptors, lenses).
Administrative level:	See decentralized authorities.
Assembly:	The steps required to put equipment back together again if it was dismantled for shipment.
Autonomous:	Self-governing or independent.
Carrier:	A company which transports your goods (also see freight forwarder).
Central level:	Highest authority of your health service provider, such as Ministry of Health or Board.
Clearing agent:	A company that undertakes the importation of goods on your behalf. They deal with customs clearance for you and often arrange onward transportation of the goods, hence also known as a handling agent.
Commissioning:	A series of tests and adjustments performed to check whether, and ensure that, new equipment is functioning correctly and safely before being used.
Communication equipment:	Any equipment that is used for sending or receiving information, such as telephones, two-way radios, nurse-call systems, paging systems.
Consumables:	For equipment, those items which are used up during the operation of equipment (e.g. film, reagents, gel).
Contract:	A legally binding document between the buyer and a supplier for a specified period of time, which describes the goods and services being supplied.
Decentralized authorities:	Local units of an organization which have had authority transferred to them from the central level of the organization. For example, district, regional, provincial or diocesan health authority.
Demurrage charges:	The charges imposed on the buyer by Customs if they have to store your goods because you have delayed clearance or have not paid duty.
Direct order:	Contacting the supplier directly for a price, and placing an order.
Distribution centre:	A large health service store (such as one at central or zonal level) that receives orders of goods destined for many health facilities, holds them 'in transit', splits the contents and despatches the correct items to their final destinations.
Donation:	A (supposedly) free gift which can take the form of a donation of equipment, or a non-repayable grant with which to purchase the equipment. (Unforeseen expenses may be incurred when accepting a donation).
Donor:	See external support agency.

Electrical safety:	The guidelines, practices and procedures to ensure that people are protected from the fatal electrical risks posed by electrical supplies, installations, and equipment.
Energy sources:	A source of energy or power, such as generating sets, solar panels or transformers.
Equipment-related supplies:	Items which are essential for equipment use, such as consumables, accessories, spare parts and maintenance materials used with equipment.
Equipment users:	All staff involved in use of equipment, such as clinical staff (e.g. doctors and nurses), paramedical staff (such as radiographers and physiotherapists) and support services' staff (such as laundry and kitchen workers).
External support agency:	A body responsible for providing money, equipment, or technical support to developing countries on various terms, such as international donors, technical agencies of foreign governments, non-governmental organizations, private institutions, financial institutions, faith organizations.
External support	People working for external support agencies that health agency workers come into contact with, such as a country representative, desk officer, consultant, coordinating agency, director.
Fabric of the building:	Items which are part of the integral structure or framework of a building, such as doors, windows or roofs.
Facility:	See health facility.
Fire fighting equipment:	Equipment used to put out fires, such as fire blankets, buckets, extinguishers, hose and sprinkler systems.
Fixtures built into building:	Items which are not part of the integral structure of a the building but are installed into the fabric of the building, such as ceiling-mounted operating theatre lights, scrub-up sinks and fume cupboards.
Freight	Transport of goods in bulk.
Freight forwarder:	A carrier which provides the most comprehensive service, including shipment, customs clearance and onward transportation of the goods from the port to the final destination, hence also known as a forwarding agent.
Gantt chart:	A display of all activities that occur from placing an order until the goods arrive showing how long and when each activity should occur and used to monitor actual progress with each activity.
Handover:	The formal presentation of new equipment, after its formal acceptance, to the user department or the health service provider's representative who assumes responsibility for it.
Head of section:	Departmental managers, such as head of department, group leader, officer in-charge, senior operator.
Health facility:	Buildings where healthcare is delivered, ranging from small units (clinics, health centres), and small hospitals (rural, district, diocesan), to large hospitals (regional, referral).
Health facility furniture:	Furniture with a specific clinical use in health facilities, such as beds, cots, trolleys, infusion stands.

Health management team:	Health management body, such as facility management committee, district/regional/diocesan/central health management team, Board.
Health service provider:	A provider of health services, such as Ministry of Health or Defence, non-governmental organization, private institution, employer organization or corporation (for example, mine), faith organization.
Health system:	Comprises all organizations, institutions, and resources devoted to health actions (defined as any effort, in personal or public health services or through inter-sectoral action), whose primary purpose is to improve people's health. (Source: WHO).
HTM Manager:	Head of the HTM Team; ranging from a general member of health staff with some management skills in the smallest HTM Teams, to an engineering manager in the highest level HTM Teams.
HTMS:	Healthcare technology management service made up of a network of HTM Teams and HTM Working Groups.
HTM Team:	A body responsible for management of equipment, such as, equipment management team, maintenance management team, physical assets management team; part of the HTM Service.
HTM Working Group:	A working group, or standing committee responsible for making decisions on healthcare technology management issues; part of the HTM Service.
Indicator:	Something that will provide information which shows whether progress is being made towards achieving a goal.
In-house:	Activities undertaken by staff already employed by the health service provider organization (rather than using temporary hired labour or external contractors).
Initial training:	A key training stage in a member of staff's career which provides training in the range of skills required to make the best use of newly arrived equipment, and takes place at the time of commissioning
Installation:	The process of fixing equipment into place; can range from building equipment into the fabric of a room, to simply plugging it into an electric socket.
Inventory:	A systematic listing of stock (or assets) held. An <i>annual inventory</i> is prepared at the end of each year following a physical inspection and count of all items owned by an organization. The list gives details, such as location, reference number, description, condition, cost and the date the inventory was taken.
Laundry and kitchen equipment:	Equipment required for kitchen or laundry activities, such as cookers, cold rooms, washing machines, hydro-extractors, roller-ironers.
Lead time	Time interval between placing an order for equipment and receiving it.
Leasing:	Renting or hiring of equipment, or some arrangement that allows for deferred payment for equipment such as paying by instalments and leasing to buy.
Letter of credit:	The most secure way to pay for goods, this inter-bank document states that money is available in the buyer's bank for the contracted supplier to claim once the job has been completed and evidence is presented to show all contract terms have been met.

Life-cycle cost:	The recurrent cost required to keep equipment going throughout its life (e.g. fuel, consumables, maintenance, training, disposal).
Lifetime:	Lifespan, life expectancy. For equipment, the likely length of time that an item will work effectively, dependant on the type of technology and parts used in its manufacture.
Logistics:	The detailed coordination of a large and complex operation to move and supply equipment and materials.
Maintainers:	See maintenance staff.
Maintenance staff:	Staff responsible for maintenance of equipment, such as craftspeople, artisans, technicians, technologists, engineers.
Manager:	Any staff involved in the management of equipment-related activities. This could include administrator, nurse-in-charge, medical superintendent, chief executive, director, health secretary, medical practitioner, maintenance manager, policy-maker.
Medical electrical safety:	The guidelines, practices and procedures to ensure that people are protected from the fatal electrical risks posed by medical equipment. There are stricter requirements than for electrical safety as medical equipment comes into direct contact with patients' bodies.
Medical equipment:	Equipment used for medical purposes, including X-ray units, diathermy units, suction pumps, foetal doppler, scales, autoclaves, infant incubators, centrifuges.
Office equipment:	Equipment used in an office, such as computers, photocopiers, calculators, record systems.
Office furniture:	Furniture used in an office, such as desks, chairs or filing cabinets.
Plant, general:	Machinery such as boilers, lifts, air-conditioners, water pumps or compressors.
Pre-installation work:	Activities required in preparation for the arrival and commissioning of equipment, such as preparing the site at the health facility so the equipment can be installed, hiring lifting equipment, organizing or hiring warehousing space.
Procurement:	The process of obtaining goods and services in any way, such as through purchase, donation, loan or hire.
Procurement manager:	The official that is head of the Procurement Unit and in charge of managing the procurement process. Another term for a Purchasing and Supplies Manager.
Procurement officer:	The member of staff in the Procurement Unit whose job is to undertake the daily tasks involved in the procurement process. Another term for a Purchasing and Supplies Officer.
Procurement unit:	The group responsible for managing the procurement process for all goods that an organization requires. Another term for a purchasing unit or a procurement office.

Proforma invoice:	A legal document between the supplier and the buyer providing a complete breakdown of the supplier's quote and terms for the order, against which payment is made by the buyer. Most commonly used by buyers to allocate and arrange the transfer of funds via bank money transfer to international suppliers. Used by Customs in the country of destination to determine the customs value of imported goods.
Purchase document:	A set of papers where the buyer clearly states everything that they wish to purchase and the terms of the purchase, used by the buyer to obtain bids/quotes from potential suppliers.
Purchase order:	A sequentially numbered printed form (from a quadruplicate book) used by the buyer to place an order with a supplier, listing the details of all that is required. It is an official and binding document issued to the supplier authorizing the expenditure of funds for goods and services, and acknowledging that payment will follow. Once created, the necessary funds are dedicated from the relevant budget account (expenditure line) against the purchase order number.
Purchasing:	The acquisition of goods or services in return for money or equivalent payment.
Quality control:	A system of maintaining standards; testing a sample against specifications.
Quotation:	The stated price and terms provided by a supplier, when asked to do so, with a validity period for acceptance by the buyer. Usually several quotations are obtained for comparison. Obtaining the quotation can be done in a number of ways – request for quotes, national competitive bids, and competitive negotiation.
Registration:	The procedures for entering equipment and supplies, once officially accepted, into health facility records and systems, and processing them ready for storage or use.
Service supply installations:	Supply installations such as electrical installations, water and sewage pipelines, gas supplies.
Spare parts:	For equipment, those items which make up the machine, need replacing as they wear out, and may be specific to a particular model (e.g. bearings, bulbs, printed circuit boards).
Specification:	A detailed description of the design and materials used to make something; a standard (of workmanship, materials, etc.) required to be met in a piece of work. <i>Generic specifications</i> refer to a class or type of thing and do not specifically mention a brand name.
Standard:	A required or agreed level of quality or attainment set by a recognized authority, used as a measure, norm, or model for all aspects of health services and healthcare technology.
Standardization:	Rationalization, normalization, and harmonization. In other words, reducing the range of makes and models of equipment available in stock, by purchasing particular or named makes and models.
Stock:	In stores, this is the goods held by an organization for its own use. The 'equipment stock' is all the equipment assets owned by an organization.

Supply-period contract:	A contract drawn up to cover long-term arrangements, which awards a supplier with the contract to supply certain goods over a set number of years.
Support staff:	Additional types of staff in the health service besides medical personnel, such as planner, finance officer, procurement officer, stores controller, human resource officer.
Tendering:	A purchasing procedure whereby potential suppliers are invited to make a firm and unambiguous offer of the price and terms which, on acceptance, should be the basis of the subsequent contract. As the process is confidential, suppliers can provide an offer knowing that no other bidder can knowingly undercut them. As the bidding format is formal and 'transparent', no supplier can offer an extra incentive. The process can be either 'open' to anyone to respond to, or can be 'restricted' to a smaller group.
Training equipment:	Equipment required when running a training course, such as overhead and slide projectors, video and tape recorders.
Trigger:	Cause to happen.
Turnkey:	Approach where the supply of a package of equipment includes delivery, installation, commissioning, initial training, and handover to the client. It may also include design advice and building modification.
Users:	See equipment users.
Vehicles:	Any conveyance used for transporting people, goods, or supplies in the health service, such as ambulances, cold-chain motorbikes, mobile workshops, lorries, buses.
Walking aids:	Items used to aid mobility, such as wheelchairs, zimmer frames, crutches.
Waste treatment plant:	Any plant used to treat waste, including incinerators, septic tanks or biogas units.
Working group	A group of people set up to be responsible for a particular subject area, such as a standing committee, select committee, sub-committee.
Workshop equipment:	Equipment used in a workshop, such as hand tools, bench tools or test instruments.
Your organization:	See health service provider.

BOX 52: WHO’s Definition of the Technology Management Hierarchy

Equipment support:	undertaking maintenance and repair.
Equipment management:	using the equipment database (inventory and maintenance history) to help you make decisions for improving equipment support.
Asset management:	including cost and utilization information (life-cycle cost analysis) in the equipment database to help you make decisions on replacement and acquisition.
Technology assessment:	reviewing past, current, and future technologies to determine their efficacy and effectiveness, and to help you make decisions for capital planning and acquisition.
Technology management:	using: equipment equipment support equipment management asset management technology assessment to manage technology in health care from conception to retirement.

Source: Department of Health Service Provision, World Health Organization, 2000

ANNEX 2: REFERENCE MATERIAL AND CONTACTS

This Annex is in two parts, and provides information about:

Part i. Books, guidelines, databases, and websites

Part ii. Organizations, sources of publications in part i, resource and information centres.

i. Books, Guidelines, Databases, and Websites

The following books, guidelines, videos, databases, and websites are listed in subject categories according to the topics found in Sections of this Guide. For each publication, a brief description of the content and the main source(s) are included. Contact details for the source organizations are included in *Part ii*. Readers should note that many of the publications are available at low cost. In some countries it may also be possible to obtain these publications from local bookstores, as publishers and distributors increase efforts to ensure wider availability. Published prices may be flexible depending on the order size, discounts available and distribution method.



Tip • Many books and documents cover a variety of topics that appear in several Sections of this Guide. The first time they appear in this list they are described in full. For each subsequent entry only the basic details are provided.

Healthcare Technology Management Framework Issues

This material covers issues in *Sections 1 and 2*, such as healthcare technology management definitions, policy, regulations, guidance, and services. It is listed alphabetically by title. Further detailed information on this topic is provided in *Guide 1*.

Developing healthcare technology policy

Health care technology management No.1: Health care technology policy framework

Kwankam Y, Heimann P, El-Nageh M, and M Belhocine (2001). WHO Regional Publications, Eastern Mediterranean Series 24. ISBN: 92 9021 280 2

This booklet is the first in a series of four titles. It introduces the ideas of and behind health care technology management, defines terms relating to and sets objectives for health care technology management policy. It examines what should go in to such a policy, and the national policy framework and organization. Capacity-building and human resources issues are considered, as well as economic and financial implications. Attention is also given to legislation, safety issues, cooperation nationally and between countries, implementation, monitoring, and evaluation. See *Guide 1* for information on the three further titles in this Series:

No.2: Eastern mediterranean regional strategy for appropriate health care technology

No.3: Health care technology policy formulation and implementation

No.4: Country situation analysis.

Available from: WHO

Interregional meeting on the maintenance and repair of health care equipment: Nicosia, Cyprus, 24-28 November 1986

WHO (1987). WHO document WHO/SHS/NHP/87.5

This document provides a comprehensive discussion of the problem of non-functioning equipment and of proposed solutions. The major policies, recommendations, and strategies proposed by the conference on the issue of maintenance and repair of health care equipment are presented. It includes four Working Papers which cover in detail: maintenance and management of equipment, the proposed health care technical service, manpower development, and training.

Available from: WHO

Management of equipment

DHSS, UK (1982). Health Equipment Information No. 98

The aim of this booklet is to recommend a system of equipment management that, if fully implemented, would ensure that all equipment used in the British National Health Service was suitable for its purpose, was maintained in a safe and reliable condition, and was understood by its users. Its recommendations and procedures are structured into sections on equipment selection, acceptance procedures, training, servicing (maintenance, repair, and modification), and replacement policy. It also covers the management of inventories, equipment on loan, servicing, long-term commercial contracts, infection hazards.

Available from: Her Majesty's Stationery Office (HMSO).

Medical equipment in sub-saharan Africa: A framework for policy formulation

Bloom, G and C Temple-Bird. (1988). IDS Research Report Rr19, and WHO publication

WHO/SHS/NHP/90.7. ISBN: 0 903354 79 9

This book provides a good overview of the situation of medical equipment in Africa. Its approach to the analysis is to unpackage medical equipment technology into its component activities, such as planning, allocating resources, procurement, commissioning, operation, maintenance, training, etc. It provides good general policy formulation strategies to address the problems discussed.

Available from: WHO

Practical steps for developing health care technology policy: A manual for policy-makers and health service managers in developing countries

Temple-Bird, C (2000). Institute of Development Studies, University of Sussex, UK. ISBN: 1 85864 291 4

This book is a practical step-by-step guide for developing health care technology policy. It can be used by health service providers, regional and district health authorities, health facility managers, and external support agencies. It describes a process for developing health care technology policy which is collaborative, participatory, iterative, and involves community stakeholders. Guidance is provided on underlying management concepts, undertaking a situation analysis, running a ideas workshop, formulating policy, developing an implementation plan and procedures manual, as well as the resources required to complete these tasks.

Available from: Ziken International Consultants Ltd

Strategic medical technology planning and policy development

Raab M (1999). Swiss Centre for International Health. August 1999.

This paper discusses the challenge of the fast expansion in technologies, and the choices that have to be made to manage them. It looks at healthcare technology assessment, the elements and formulation of a healthcare technology policy, and the strategic planning process required.

Available from: SCIH

See *Guide 1* for further resources on, and examples of, developing healthcare technology policy.

Understanding healthcare technology management**International seminar for hospital technicians/engineers: February 1998, Moshi, Tanzania**

Clauss J (ed) (1998). FAKT

This document reports the results of intensive work by 38 national and international experts brought together from faith, public, and private agencies to strengthen equipment management measures in the health sector. It includes papers, with country examples, on healthcare technology management, using cost-sharing to finance maintenance, networking, structures of health care technical services, cash control for workshops, training, communication technologies, modification of medical and hospital equipment, energy supply and photovoltaics. There are also lists of standardized equipment for the Evangelical Lutheran Church of Tanzania and the Joint Medical Stores of Uganda, and a description of how they were developed.

Available from: FAKT

International workshop on healthcare technology management: 2-6 October 2000, Catholic Pastoral Centre, Bamenda, Cameroon

Clauss, J (compiler) (2000). FAKT

This document reports the results of intensive work by 35 national and international experts involved in setting up and operating systems for the sustainable management of healthcare technology. It includes papers, with country examples, on healthcare technology management, the role of stakeholders, public/private partnerships for providing HTM, financial management of maintenance organizations, and donations of healthcare technology.

Available from: FAKT

Medical equipment in Botswana: A framework for management development

Temple-Bird C L, Mhiti R, and G H Bloom (1995), WHO publication WHO/SHS/NHP/95.1

This book reports on the results of a study of the healthcare technology sector in Botswana, and the lessons learnt are of relevance to many other countries. The study was undertaken by unpackaging the sector into its component activities, such as planning, allocating resources, procurement, commissioning, operation, maintenance, training, etc. In this way the book provides good general healthcare technology management strategies to address the problems discussed. This book also describes how technical staff obtain their basic technical qualifications either as artisans at local Trade Testing Centres, or as technicians at the local Polytechnic, and provides an understanding of how such systems and qualifications work.

Available from: WHO

Medical technology management

David Y, and T Judd. (1993) BioPhysical Measurement Series, SpaceLabs Medical Inc.

ISBN: 0 9627449 6 4

This book looks at the appropriate management tools needed to make technology's role more clinically effective and cost-effective (based on the healthcare delivery system in the USA). It focuses on strategic technology planning principles, and how they contribute to improved patient outcomes. It also looks at a process for technology assessment and life-cycle cost analysis. It defines many common terms, and the role of useful committees, procedures, and forms.

Available from: SpaceLabs Medical Inc.

Physical assets management and maintenance in district health management

Halbwachs H (2000). GTZ document

This paper provides practical guidance to health workers involved in district health systems concerning health technology - one of the critical areas in managing health service delivery at district level. It presents the physical assets management approach, and elaborates on key strategies for maintenance, financing, quality control, monitoring indicators, cost-benefit analysis calculations, and a basic paper-based maintenance information system.

Available from: GTZ

The effective management of medical equipment in developing countries:

A series of five papers

Remmelzwaal B (1997). FAKT, Project Number 390

This document is aimed at the health workers, administrators, maintainers, and overseas aid workers who are involved in medical equipment management in developing countries. It examines the variation in performance with management of medical equipment in different countries, with the objective of identifying successful approaches. It addresses some of the managerial issues related to the conservation of equipment; allocation of human, financial and material resources; and acquisition and use. It looks at the structure for the HTM Service, and the HTM cycle. It includes an example spreadsheet layout to use as an inventory form, with various data collection codes.

Available from: FAKT

See *Guide 1* for more information on further relevant issues, such as health service definitions, the place of HTM in health systems, regulations, and standards.

Procurement/Logistics Management

This material covers issues in *Sections 2 to 9* on all aspects of managing the procurement and logistics process. It is listed alphabetically by title.

Tip

- The sources in this section cover many topics in the procurement cycle. Sources that cover a single topic are listed in the sections that follow, each of which is dedicated to an individual topic. When looking for a specific topic, always check this first general section to see if any sources cover the subject matter you are interested in.

Equipping hospitals and other health care facilities in developing countries.

Cooper-Poole, J. (1979) in *Approaches to planning and design of health care facilities in developing areas*, Vol 3., Kleczkowski, B.M. et al. (eds), WHO Offset Publication No 45. ISBN: 92 4 1700459

This paper discusses selection of equipment and describes the steps necessary to ensure that the equipping of a hospital proceeds smoothly. The importance of design briefs, operational policies and procedures, local conditions, equipment schedules, the purchasing programme, choice of suppliers, maintenance, spares, tender procedures, commissioning, and the defects liability period are discussed. *Available from: WHO*

How to assess health services logistics with particular reference to peripheral health facilities

Battersby A (1985). WHO, Geneva, Switzerland. WHO SHS/85.9

This handbook sets out to help mid-level managers (such as District Medical Officers) who wish to improve logistics, particularly for their primary health care programme. The first step towards such improvement is to assess the various elements of logistics. This handbook has two halves: i) checklists for each part of the logistics system, and ii) supporting material for each checklist. Mid-level managers can use the checklists to enable them to define the strengths and weaknesses of their logistics system, and formulate strategies for improvement.

Available from: http://whqlibdoc.who.int/hq/1985-86/SHS_85.9.pdf

Humanitarian supply management and logistics in the health sector

Emergency Preparedness and Disaster Relief Program, PAHO and Department of Emergency and Humanitarian Action, WHO (2001). PAHO/WHO, Washington DC, USA. ISBN 92 75 12375 6

The acquisition, storage, mobilization and distribution of supplies to the victims of a disaster require a minimum framework of logistical organization that permits efficient handling and better use of resources. This book provides guidelines to manage this process. It points out that countries and organizations should incorporate the topic of logistics into their planning and preparedness for disasters, and stresses that each step in the supply chain should be seen as a critical and interrelated link. This book is the result of many years of practical experience (especially thanks to the use of the SUMA methodology). Despite the fact that it places emphasis on drugs and pharmaceutical supplies, the techniques and procedures that it proposes are multi-sectoral in nature and can be used in any type of emergency operation.

Available from: PAHO, WHO

Managing drug supply: the selection, procurement, distribution, and use of pharmaceuticals, 2nd edition

Management Sciences for Health /WHO (1997). Kumarian Press, Connecticut, USA

MSH and the WHO collaborated to produce the second edition of this book, providing a comprehensive revision of the well-known textbook that was first published in 1981. Its 48 chapters provide a complete overview as well as step-by-step approaches on how to manage pharmaceutical systems effectively. Although aimed at drug supply, many of the principles, policies, procedures, and methods can be adapted for equipment and other supplies.

Available from: <http://www.msh.org>

Medical supplies and equipment for primary health care: A practical resource for procurement and management.

Kaur M, and S Hall (2001). ECHO International Health Services Ltd. ISBN: 0 9541799 0 0

This book is intended for health workers and those responsible for the procurement and management of medical supplies and equipment at primary healthcare level. It covers guiding principles for selecting supplies and equipment, provides guidelines for ordering and procurement, storage and stock control, care and maintenance, and considers decontamination and safe disposal of medical waste. The manual also discusses the use of standard lists as a tool for encouraging good procurement practice and includes model lists of medical supplies and equipment required for primary health care activities in both health facilities in the community, and basic laboratory facilities.

Available from: TALC

Official dictionary of purchasing and supply

Compton HK, and DA Jessop (2001). Liverpool Academic Press, Wirral, UK. ISBN: 190350001X

This dictionary contains all the most up-to-date and relevant terminology for the modern business practitioner. It includes coverage of correct procedures for purchase, supply, selling and general trading and is recommended to students and practitioners of the Chartered Institute of Purchasing and Supply (CIPS).

Available from: major internet bookshops

Operational principles for good pharmaceutical procurement

WHO (1999). WHO, Geneva, Switzerland. WHO/EDM/PAR/99.5

The document is composed of four chapters: i) a brief problem statement illustrating the need for improvements in procurement practices; ii) four strategic objectives for pharmaceutical procurement that apply to any health system, whether public or private; iii) twelve operational principles for good pharmaceutical procurement, grouped into four categories (management; selection and quantification; financing and competition; supplier selection and quality assurance); iv) practical implementation of the twelve principles, and mechanisms to improve the performance of the procurement system. Although aimed at drug supply, many of the objectives, principles, procedures, and mechanisms can be adapted for equipment and other supplies.

Available from: http://whqlibdoc.who.int/hq/1999/WHO_EDM_PAR_99.5.pdf

Purchasing and supply chain management, 6th edition

Lysons K, and M Gillingham (eds) (2002). Prentice Hall. ISBN: 027365764X

This book takes an integrated approach by drawing on the many disciplines from ethics and human resources to suppliers, sourcing and strategy that all contribute to a full knowledge of purchasing practice and techniques. The sixth edition has been substantially revised, with 3 new chapters, to take account of recent developments. The book covers the syllabus of the CIPS in respect of the Foundation Stage subjects: 'Introduction to supply and materials management' and 'Legal and procurement processes', and the Graduate Diploma, Professional Stage core and option subjects: 'Purchasing and supply chain management 1 – Strategy', and 'Purchasing and supply chain management 2 – Tactics and operations'. It also largely covers the specialist options of 'Stores and inventory management', 'Commercial relationships', and 'International purchasing'.

Available from: major internet bookshops

The handbook of logistics and distribution management, 2nd edition

Rushton A, Oxley J and Croucher P (2001). Kogan Page, London, UK. ISBN: 0749433655

Logistics and distribution management is a major industrial and economic function – a subject of great scope and importance. Thus this second edition of a popular and practical handbook looks at the logistics function as a whole and explores all stages of the supply chain, from raw materials through to the final distribution of the finished product. The major topics covered are: concepts of logistics and distribution, planning for logistics, procurement and inventory decisions, warehousing and storage, freight transport, information and supply-chain management. Richly illustrated throughout with diagrams and photographs, this new edition is an invaluable guide for distribution, logistics and supply-chain managers, as well as students taking logistics-related degrees and professional qualifications.

Available from: major internet bookshops

The role of the logistics manager in contraceptive procurement: A checklist of essential actions, guidelines for logistics managers

United Nations Population Fund (1999). UNFPA, New York

The purpose of this guidebook is to provide a brief checklist of essential actions to help logistics managers worldwide ensure that service programmes always have adequate supplies of contraceptives and other products that they need for clients. The guidebook begins with an overview of the re-supply systems that logistics managers must direct; it elaborates the actions that would ensure that each stage of the re-supply process is completed before initiating actions that depend upon the completion of previous tasks; and it includes a list of the principal sources of technical information with which the logistics manager should be familiar. Although aimed at contraceptive supply, many of the principles, policies, procedures, and methods can be adapted for equipment and other supplies.

Available from: <http://www.unfpa.org/>

Strengthening logistic support to primary health care: A programme for action

WHO (1992). WHO document WHO/SHS/NHP/92.1

This booklet discusses logistics requirements (procurement, storage, transport, and maintenance of equipment and supplies) for primary health care. It provides strategies and country experiences for policy and planning, procurement, logistics operations management, maintenance and repair, transport, communications, management information systems, training and supervision of logistics staff, as well as monitoring, evaluation and operations research.

Available from: WHO

Regulations and standards

This material covers issues in *Sections 3.3.2, 5.5.2 and Annex 4* on assured quality and safety. It is listed alphabetically by title.

A guide for the development of medical device regulations

Cheng M (2002). Essential Drugs and Technology Programme, Division of Health Systems and Services Development, PAHO. ISBN: 92 75 12372 1

This publication has been prepared to guide regulatory authorities in all countries of the Region of the Americas in ensuring the safety, efficacy and quality of medical devices. It aims to provide guidelines for countries seeking to develop a regulation program for medical devices, at all stages in their life. It is based on, and provides an overview of, the regulatory methods in Canada, the USA, and the European Union.

Available from: PAHO, WHO

ANSI website: www.ansi.org

American National Standards Institute, which administers and coordinates US voluntary consensus standards and conformity assessment systems. The site contains catalogues of American Standards, as well as IEC and ISO standards.

CEN website: www.cenorm.be

European Committee for Standardization, which prepares European Standards in specific sectors of activity and promotes technical harmonisation in Europe. The site contains a catalogue of European Standards, many of which cover a wide range of healthcare technology.

CENELEC website: www.cenelec.org

European Committee for Electrotechnical Standardization, which develops European electrotechnical standards adopted from the international bodies such as the IEC and ISO. The site includes an online catalogue of European and international standards, many of which cover a wide range of healthcare technology.

Emergency Care Research Institute (ECRI, USA) products

This organization produces a variety of products on healthcare technology. They are available as hard copy and as software regularly renewed by subscription, with special rates for developing countries. The data is comprehensive and primarily written for the US audience, and the software is sophisticated. The products cover various issues, such as:

- ◆ **Healthcare standards directory**
- ◆ **SELECTplus** (equipment procurement advisory service)
- ◆ **HECS 4 for Windows** (includes inventory management software)
- ◆ **Health devices source book** (a directory of manufacturers and distributors for the US market, their contact details, products, and typical price ranges)
- ◆ **Healthcare product comparison system** (a reference guide for selecting equipment)
- ◆ **ECRI spec** (a database of specifications, instructions to bidders, and terms and conditions, etc)
- ◆ **Health technology assessment information service**
- ◆ **Health devices alerts database**
- ◆ **Health technology trends newsletter**

Available from: ECRI

European Union's Directorate General 3 (Enterprise) website: <http://dg3.eudra.org>

The EU website providing information on pharmaceuticals, biotechnology, and medicines.

IEC website: www.iec.ch

International Electrotechnical Committee, which sets standards for the safe manufacture of electrical healthcare technology. There is a wide range of specific standards for medical electrical equipment falling under the standard numbers IEC 60101–1, 2, and 3.

ISO website: www.iso.ch

International Organization for Standardization, which is a worldwide federation of national standard bodies responsible for the development of international standards and related activities. The standards most frequently referred to are those in the ISO 9000 range covering quality management for businesses.

Medicines and Healthcare Regulatory Agency (MHRA, UK) products

This agency of the UK government (formerly the Medical Device Agency) ensures medical devices and equipment meet appropriate standards of safety, quality, performance, and effectiveness, are used safely, and that they comply with relevant Directives of the European Union. The MHRA produces a variety of publications, such as:

- ◆ **Medical device alerts** (replacing former hazard notices, safety notices, device alerts, advice notices, etc.)
- ◆ **Device bulletins** (replacing former evaluation reports)
- ◆ **Device evaluations**
- ◆ **Advice on a wide variety of safety topics** (visit the website, click on contacts, then medical devices, then search under a subject area such as decontamination, or laundry for example).

Available from: MHRA

NICE website: www.nice.org.uk

National Institute of Clinical Excellence, which provides guidance to the UK National Health Service (NHS) on current best practice covering both health technologies (from medicines to diagnostic techniques) and the clinical management of specific conditions.

Ways to Obtain, and Sources of, Equipment

This material covers issues in *Section 3.3* on purchasing, donations, and leasing of equipment, as well as the role of external support agencies in providing equipment, *Section 3.4* on second-hand equipment, and *Section 4.3* on different types of supplier. It is listed alphabetically by title.

Cost-effective aid for developing economies

Halbwachs H (1999). GTZ, Eschborn, Germany

This paper explains that as funds for aid are dwindling, there needs to be a more effective utilization of resources. It presents strategies and criteria which would help aid used to supply equipment to be more cost effective.

Available from: GTZ

Emergency Care Research Institute (ECRI, USA) products

ECRI

Guidelines for health care equipment donations

WHO (1997). WHO document WHO/ARA/97.3

This document presents guidelines that aim to improve the quality of equipment donations, not to hinder them. They are not an international regulation, but intended to serve as a basis for national or institutional guidelines, to be reviewed, adapted and implemented by governments and organizations dealing with health care equipment donations. They provide detailed guidance and checklists for both the potential donor and recipient. The guidelines are based on extensive field experience and consultations with many experts internationally. They also merge together several earlier documents, including the two listed below.

Available from: WHO

Guidelines for medical equipment donations

American College of Clinical Engineering (1995). ACCE, Plymouth Meeting, USA

This document summarizes the recommendations of an ACCE committee that was formed to discuss ways to improve the effectiveness of donations of equipment. It is divided into five sections: i) helps the donor screen out equipment that should not be considered for donation, ii) assists the donor to find the right recipient, through a careful evaluation of their clinical needs and resources for operating and maintaining equipment, iii) helps the donor and recipient to plan and prepare for the donation, iv) provides a discussion on successful transfer of goods, including assembly, packaging, shipping, documentation, customs clearance, unpacking, and installation, v) evaluates each donation so both parties can learn how to avoid past mistakes and improve future transactions.

Available from: <http://www.accenet.org/secure/donationguidelines.html>

Guidelines on medical equipment donations

Churches' Action for Health (1994). World Council of Churches' publication

This paper is a guide for those accepting and making donations, and is also useful for those planning to buy equipment. It clearly lays out in point form the responsibilities of the recipient and the responsibilities of the donor.

Available from: WCC

Health care equipment for developing countries: The conflict between needs and interests

Halbwachs H (1992). GTZ, Eschborn, Germany

This paper discusses the supply of equipment by technical cooperation agencies and charitable organizations to developing countries, and the problem of much of the equipment failing to work shortly after receipt. It looks at the roles of the donor and the recipient, the issue of gifts and second-hand goods, the life-cycle cost of equipment, and equipment requirements and standardization.

Available from: GTZ

Making health care equipment: Ideas for local design and production

Platt A, and N Carter (1990). ITDG Publishing

In this book, healthcare practitioners, planners and artisans will find ideas and designs for equipment that can be made locally in relatively small workshops. Alternative materials and fabrication methods are described to meet differing local circumstances.

Available from: ITDG Publishing

Management of equipment

DHSS, UK (1982). Health Equipment Information No. 98

Policy position: Donating and selling used medical equipment

International Medical Device Group (1992). pp 295-296 in *Health Devices*, Vol 21(9)

This paper discusses the pitfalls in the donation or sale of used medical equipment, ending with three recommendations for donors and recipients.

Available from: ECRI

The right equipment in working order

Bloom GH et al (1989). Reprinted from World Health Forum, Vol 10, No. 1, pp 3 – 27. WHO, Geneva, Switzerland

This document contains a series of papers that discuss planning and budgeting issues for healthcare technology in developing countries. They contain cost estimates (as a percentage of the capital stock value), financial planning implications, constraints and strategies. They also discuss the different roles of the users, donors, manufacturers, and their local representatives if procurement of equipment is to be successful.

Available from: WHO

Equipment Specifications and Placing Orders

This material covers issues in *Section 5.5.2* on generic equipment specifications and technical data, and *Section 6.5* on placing orders. It is listed alphabetically by title.

District health facilities: Guidelines for development and operation

WHO Regional Publications: Western Pacific Series No 22 (1998). ISBN: 92 9061 121 9

This revised and expanded book presents detailed, richly illustrated guidelines for the planning and design of district hospitals including the efficient utilization of space and easy movement of people, equipment, and supplies, as well as project planning. It also provides extensive information on the selection and maintenance of medical and laboratory equipment, including specifications for a basic radiological system and a general-purpose ultrasound scanner. Additional material covers sanitation and waste management, emergencies and disasters, the procurement of essential drugs, and test instruments.

Available from: WHO

District laboratory practice in tropical countries (part 1)

Cheesbrough M (1998). Tropical Health Technology. ISBN:0 9507434 4 5

A valuable resource aimed at those responsible for the organization and management of district laboratory services but can also be adapted for use by health centres. Covers selection and procurement of laboratory equipment and supplies, including lists of requirements with brief specifications and indicative (1997) prices. It covers parasitological tests, clinical tests and training of personnel, as well as covering all types of safety issues for laboratories.

Available from: TALC, THT

District laboratory practice in tropical countries (part 2)

Cheesbrough M (2000) Tropical Health Technology. ISBN:0 9507434 5 3

Covers microbiological, haematological and blood transfusion techniques required at district level.

Available from: TALC, THT

Emergency Care Research Institute (ECRI, USA) products

ECRI

Examples of equipment specifications and technical data

A number of health service providers have developed their own equipment specifications, package of inputs to purchase, national technical data, and supply contracts. For example, more information can be obtained from:

- ◆ Dr P Asman, Biomedical Engineering Unit, Ministry of Health (Room 33, MOH Building), PO Box M-44, Accra, Ghana. Email: nchtm@africaonline.com.gh
- ◆ Ministry of Health, PO Box 7272, Kampala, Uganda. Email: info@health.go.ug, website: www.health.go.ug/support_system.htm
- ◆ Dr N Forster, Under Secretary: Health and Social Welfare Policy, Ministry of Health and Social Services, Private Bag 13198, Windhoek, Namibia. Email: nforster@mhss.gov.na
- ◆ Ziken International, contact: info@ziken.co.uk

Future use of new imaging technologies in developing countries.

Report of WHO Scientific Group (1985). WHO Technical Report Series No.723. WHO, Geneva, Switzerland

This document discusses the use of ultrasound and computed tomography and the specifications for the required equipment.

Available from: WHO

Medical supplies and equipment for primary health care: A practical resource for procurement and management.

Kaur M, and S Hall (2001). ECHO International Health Services Ltd. ISBN: 0 9541799 0 0

Physical asset planning and management software (PLAMAHS)

This software package holds information, and supports analysis, on: the equipment inventory, equipment models and standards, existing and planned facilities, procurement support, and maintenance support. The software holds various digital images, model equipment lists, specifications, price and other financial data, and templates for forms, etc., and has a security system. It has been designed especially with developing countries in mind, is available at special rates for developing countries, and HEART can assist with the set up and initial training requirements.

Available from: HEART Consultancy

Practical laboratory manual for health centres in East Africa,

Carter J and Olema O (1998). AMREF

Practical laboratory manual providing information necessary to establish, select and use laboratory tests for patient management. Also includes material on implementation of safe working practices, reporting and recording test results, keeping an inventory of supplies and equipment, ordering supplies and maintaining equipment.

Available from: AMREF

Selection of basic laboratory equipment for laboratories with limited resources

Johns ML and ME El-Nageh (2000). ISBN: 9290212454

This book provides a framework to help laboratory workers, supply officers and decision makers to choose and buy laboratory equipment and consumables. Includes information on maintenance and energy requirements for laboratory equipment, quick reference buyer's guides and equipment data specification sheets provide easy reference for equipment buyers. The framework can be adapted to guide general equipment purchasing.

Available from: WHO

Surgical instruments: A pocket guide (2nd edition)

Papanier Wells M, and M Bradley (1998). ISBN: 00721678017

A pocket guide listing and describing surgical instruments: sharps/dissectors, forceps, clamps, retractors, suction tips, dilators, endoscopic instruments, internal stapling devices, and most commonly used instrument sets for a variety of surgical procedures. Includes a picture of the instrument with a brief description explaining the uses, varieties, and alternative names.

Available from: major internet bookshops

UNICEF supply catalogue (formerly the UNIPAC catalogue)

UNICEF

This catalogue lists products with their specifications under categories such as: immunization and cold chain; medical devices and kits; water, environment, sanitation and engineering; education, communication; etc. View it online at www.supply.unicef.dk/Catalogue.

Available from: UNICEF Denmark

See *Guide 2* on planning and budgeting for more information on material that includes model equipment lists.

Evaluation and Choice of Equipment

This material covers issues in *Section 3.2* on issues to consider when choosing equipment including healthcare technology assessment, and *Section 6.3* on evaluating equipment. It is listed alphabetically by title.

A pocket book for safer IV therapy (drugs, giving sets and infusion pumps)

M Pickstone (ed.) (1999). ISBN: 094 867232 3

This pocket book has been written to help clinical staff deliver safe IV therapy. It covers the calculation of drug dose, the make-up of drug solutions and the selection of infusion devices and associated equipment.

Available from: major internet bookshops

Appropriate medical technology for developing countries: Report of IEE 1st seminar in February 2000

IEE Medical Focus Group. Report 00/014

This document contains papers on appropriate products that have been designed for use in developing countries, such as an anaesthetic machine, diagnostic instruments for primary health care, laboratory equipment, and an incinerator. It also contains discussions on issues such as solar power, repair and maintenance of equipment, selection and procurement options, and sustainability.

Available from: IEE

Appropriate medical technology for developing countries: Report of IEE 2nd seminar in February 2002

IEE Healthcare Technologies Professional Network. Report 02/057

This document contains papers on appropriate products that have been designed for use in developing countries, such as a healthcare technology management information system, laboratory equipment, a growth monitor, observation of respiratory dysfunction, a virtual doctor system, solar energy, ophthalmic examination and surgical equipment. It also contains discussions on issues such as a global medical devices nomenclature, management systems, the use of Cobalt 60 teletherapy for cancer, a call for a biomedical instrument development centre, and an update of the anaesthetic machine, diagnostic tools for medical surveillance, and an incinerator.

Available from: IEE

Appropriate medical technology for developing countries: Report of IEE 3rd seminar in February 2004

IEE Healthcare Technologies Professional Network. UK ISSN: 0963 3308, reference no.: 03/10408

This document contains mainly scientific papers on research and design work being undertaken on appropriate products and techniques for developing countries.

Available from: IEE

Consumer guide for the purchase of x-ray equipment

Holm T (2000). WHO Collaborating Centre for General and Continuing Radiological Education, University of Lund, Sweden. WHO/DIL/00.1

This guide includes discussions on: choice of equipment for diagnostic imaging at large primary health care centres and small hospitals; the World Health Imaging System for Radiography (WHIS-RAD) – infrastructure, staffing and components; a summary of the technical specifications for the WHIS-RAD unit; and a variety of sample forms.

Available from: http://whqlibdoc.who.int/hq/2000/WHO_DIL_00.1.pdf

Developing health technology assessment in Latin America and the Caribbean

PAHO (1998). PAHO. ISBN: 92 75 073777

This publication is aimed at policy-makers and health care professionals. The first part provides an introduction to health technology assessment: why it is important, who does the evaluations, when and how the evaluations are done. The second part looks at health technology in Latin America and the Caribbean, and PAHO's recommendations for promoting health technology assessment.

Available from: PAHO

District health facilities: Guidelines for development and operation

WHO Regional Publications: Western Pacific Series No 22 (1998). ISBN: 92 9061 121 9

District laboratory practice in tropical countries (part 1)

Cheesbrough M (1998). Tropical Health Technology. ISBN:0 9507434 4 5

District laboratory practice in tropical countries (part 2)

Cheesbrough M (2000) Tropical Health Technology. ISBN:0 9507434 5 3

Health technology assessment: Methodologies for developing countries

PAHO (1989). PAHO. ISBN: 92 75 12023 4

This publication reviews the main concepts and methodologies involved in assessing the effectiveness, safety, cost, and social impact of health technologies, and discusses the potential contributions of such assessments to improving health care delivery in developing countries. It discusses how the methodologies must be adapted for developing countries, using results from actual examples.

Available from: PAHO

Infusion systems

Medicines and Healthcare Regulatory Authority (1995). MDA Device Bulletin, No. DB 9503 (May 1995)

This publication addresses many aspects of the use and selection of infusion systems. Its purpose is to raise awareness of the nature of infusion systems, their advantages and their potential risks, with a view to reducing the number of adverse incidents that arise from their use. It describes the different types of infusion devices, risks and applications, training programmes, safety recommendations, purchasing, and management responsibilities.

Available from: MHRA

Medicines and Healthcare Regulatory Agency (MHRA, UK) products

MHRA

Selection of basic laboratory equipment for laboratories with limited resources

Johns ML and ME El-Nageh (2000). ISBN: 9290212454

Technology assessment in healthcare

Raab M (2000). Swiss Centre for International Health

This paper discusses and calls for the need to undertake health care technology assessment in developing countries, in order to make the best use of new technologies. It presents some strategies for starting this process.

Available from: SCIH

See *Guide 2* on planning and budgeting and *Guide 4* on operation and safety for more information on material that covers equipment needs. See *Guide 1 or 5* for training institutes that offer courses on healthcare technology assessment.

The Receipt and Acceptance Process

This material covers issues in *Section 7* on receipt and distribution, and *Section 8* on installation, commissioning, registration, and storage. It is listed alphabetically by title.

A guide to power conditioning and power back-up

Huys J (1996). FAKT, Basler Mission, and HEART Consultancy

This document is an introduction to guide you through the terminology and information regarding power conditioning and power back-up. It is aimed at health workers facing problems with ensuring power quality for any electrical equipment, and ensuring power is available when you need it. It deals with the problems which can occur in the mains supply, and an explanation about the main measures which can be taken for power conditioning and power back-up (including advice on suppressing electro-magnetic interferences and radio frequency interference, and advice on different types of uninterruptible power supplies). It is meant for anybody involved in the decision-making process for the procurement and installation of such equipment.

Available from: FAKT

Care and safe use of hospital equipment

Skeet M and Fear M. (1995). VSO. ISBN: 0 9509050 5 4

This book provides practical advice for health service staff about proper management of the type of equipment found in district hospitals or health centres. It includes guidelines on preventive maintenance and servicing, simple user instructions, checklists for correct and safe use of equipment, and basic technical information for training of first-line maintenance staff. The information is easily accessible to those without a technical background. It includes advice on many topics relating to safety and testing such as checking power supplies, gas cylinders, disinfection and sterilization.

Available from: TALC, VSO

Clinical engineering service departments: Establishment, scope of work and organization

Raab M (1999). Swiss Centre for International Health, Basle, Switzerland

This paper discusses the issues that prompted the evolution of clinical equipment support services, the resources and staff required when establishing clinical engineering service departments, and their scope of work, including details of necessary documentation and reporting using inventories and other recorded data, as well as acceptance testing of equipment.

Available from: SCIH

Commissioning health care facilities

Steele PA, Little FA, and Littlewood, P (1983) in *Approaches to planning and design of health care facilities in developing areas*, Vol 4. Kleczkowski, B.M. et al. (eds). WHO Offset Publication No 72. ISBN: 924 1 70072 6

This paper covers commissioning of health care facilities as a whole, and discusses the component parts involved in that process. It discusses the commissioning programme, operational policies, organisational development, training, phasing of occupancy, and evaluation. The commissioning programme is broken down into a number of tasks which include: scheduling and specifying, the tender procedure, processing and issue of orders, manufacture and delivery, receipt/installation, calibration and demonstration. In addition, monitoring of suppliers, coordination of mechanical and electrical services, and equipment maintenance are discussed in the section on equipment.

Available from: WHO

District health facilities: Guidelines for development and operation

WHO Regional Publications: Western Pacific Series No 22 (1998). ISBN: 92 9061 121 9

How to manage a health centre store

Battersby A (1994). Healthlink Worldwide (formerly AHRTAG).

Describes in detail the structure and organization of a store or dispensary, methods of arranging stocks, stock control, and basic dispensing.

Available from: Healthlink Worldwide

Maintenance and repair of laboratory, diagnostic imaging, and hospital equipment

WHO (1994). ISBN: 92 4 154463 5

A practical manual for maintenance and repair of basic laboratory and diagnostic equipment, as well as anaesthetic machines, operation room equipment, and ultrasound and X-ray generators. Intended for use in settings that do not have technicians or engineers with specialist expertise. The manual uses line drawings and numerous checklists for inspection and cleaning, good working practices, routine operation and maintenance. It is also useful as a training aid. It includes advice on many topics relating to safety and testing such as disinfection, gas cylinders, laboratory hazards, radiation hazards, and hazards from other types of equipment.

Available from: WHO

Management of equipment

DHSS, UK (1982). Health Equipment Information No. 98

Medical supplies and equipment for primary health care: A practical resource for procurement and management.

Kaur M, and S Hall (2001). ECHO International Health Services Ltd. ISBN: 0 9541799 0 0

Spare parts and working materials for the maintenance and repair of health care equipment: Report of workshop held in Lübeck, August 1991

Halbwachs H, and C Temple-Bird (eds) (1991). GTZ, Eschborn, Germany

This book, mainly aimed at maintenance technicians, covers the maintenance requirements for common items used at district level (anaesthesia equipment, infant incubators, X-ray equipment, suction pumps, autoclaves and laundry equipment) including some advice on safety testing and test instruments. It also includes information on workshops, procurement and stock control of parts, and an equipment inventory code numbering system.

Available from: GTZ

Technician's handbook for compression refrigerators – Part D: How to keep stocks of spare parts

WHO Expanded Programme on Immunization (1984). EPI/TECH.HB/D, Document EPI/LOG/84/20 in *Refrigerators use, maintenance and repair series*, WHO, Geneva.

This booklet contains a series of case studies to help the reader learn about spare parts management. Although designed for vaccine refrigerators, it can be applied to any spare parts. It has sections covering how to choose and order spare parts, how to keep track of stocks of spare parts, how to decide who should keep the stocks, and how many parts should be kept at each level of the health service. It contains exercises and case studies for each topic.

Available from: WHO

The division for the supply of medical spare parts in the health system of Kenya

Paton J, Green B, and J Nyamu (1996). Ministry of Health, Nairobi/GTZ, Eschborn, Germany

This paper describes how a Division for the Supply of Medical Spare Parts was set up and is run in the health system of Kenya, financed through the use of a revolving fund.

Available from: GTZ

Developing Skills, Managing Change, and Monitoring Progress

This material covers issues in *Section 2.1* on managing change, *Section 2.2* on developing skills, *Section 8.3* on initial training, and *Section 9* on target-setting and monitoring progress. It is listed alphabetically by title.

A book for midwives

Klein, S (1996). Hesperian Foundation. ISBN: 0 942364 23 6

This book provides practical information on antenatal care, labour, birth and post-partum care. It also includes a section on making teaching materials and low-cost equipment.

Available from: TALC

District health care: Challenges for planning, organization and evaluation in developing countries (2nd edition)

Amonoo-Larston R, Ebrahim G, Lovel H, and J Rankeen (1996). MacMillan. ISBN: 0 333 57349 8

This book contains practical support and advice intended for those in the planning, management and evaluation of health services at district level. It covers a wide range of topics based on country experience, including: staff motivation, teamwork, developing management skills, managing change, managing conflicts, and staff development; managing finances; monitoring and evaluation; as well as district health needs, plans, organization and management.

Available from: TALC

Healthcare technology: Training skills for hospital technicians and engineers

FAKT (1999). FAKT Technical Library Data Sheet

This paper discusses the major objectives of training both on- and off-the-job. It then provides practical guidance on how to undertake on-the-job training effectively by using the PESOS procedures (prepare, explain, show, observe, supervise). It explains each step in detail. Although written for maintenance staff, its advice is just as useful for any other types of staff.

Available from: FAKT

Hospital technology: Communication – a vital skill for successful healthcare technical service management

FAKT (1999). FAKT Technical Library Data Sheet

This paper discusses the importance of communication for both working in a team and working in an organization/network. It provides advice on how to communicate effectively, its importance, the barriers that exist, how to promote effective communication, the role of the head of department, methods to use, and related reading. Although written for maintenance staff, its advice is just as useful for any other types of staff.

Available from: FAKT

How to make and use visual aids

Harford, N and N Baird (1997). VSO. ISBN: 043592317X

This booklet describes a number of useful and practical methods for making visual aids quickly and easily, using low cost materials.

Available from: TALC, VSO

Management support for primary health care: A practical guide to management for health centres and local projects

Johnstone P, and J Ranken, (1994). FSG Communications Ltd, Cambridge, UK. ISBN: 1 87118 02 4

This practical user-friendly book gives support and guidance to leaders in health centres and other local projects to help stimulate and maintain primary health care (PHC) in their surrounding communities. Aid workers, and others unfamiliar with PHC and basic management techniques may also benefit. Includes sections which will assist with staff motivation, such as teamwork and team effectiveness; managing oneself, others and tasks; and managing change, as well as sections on planning and monitoring progress.

Available from: TALC

Medical administration for frontline doctors: A practical guide to the management of district-level hospitals in the public service or in the private sector (2nd edition)

Pearson C (1990). FSG Communications Ltd, Cambridge, UK. ISBN: 1 871188 03 2

This book provides information for doctors who combine wide clinical responsibilities with administration and support for primary health care services. It covers a wide range of topics, with country examples, including: management structures; infrastructure and maintenance; buildings, support services, and equipment; hospital supplies; training; outreach programmes; and wider responsibilities in the district and above. It includes advice on many safety topics such as cleaning procedures, linen handling, earthing, lightning protection, and fire prevention.

Available from: TALC

On being in charge: A guide to management in primary health care (2nd edition)

McMahon R, Barton E, and M Piot (1992). ISBN: 9241544260

This practical guide aims to improve the managerial skills of middle level health workers. The text is reinforced with practical examples, questionnaires and illustrations that help relate the information to health workers' own experiences. Topics include identifying health problems, assigning priorities to their solution, planning and implementing programmes, and evaluating results. Also serves both as a training and reference guide, covering all aspects of primary health care management including equipment and drugs.

Available from: WHO

Physical assets management and maintenance in district health management

Halbwachs H (2000). GTZ document

Training health personnel to operate health-care equipment: How to plan, prepare and conduct user training – A guide for planners and implementors

Halbwachs H, and R Werlein, (1993). GTZ, Eschborn

The aim of this book is to ensure that users are in a position to operate equipment and plant without causing failure or malfunction. Part one addresses the planner/administrator developing user courses and gives information about methods, course organization, finances, etc. Part two discusses interesting issues for the implementers i.e. how to design a course, teaching methods and teaching aids, conducting a course, etc. This practical guide provides sample checklists, questionnaires, worksheets, tests, certificates, etc.

Available from: GTZ

Transfer of learning: A guide for strengthening the performance of health care workers

Intrah/PRIME II/JHPIEGO (March 2002)

This book is for health care workers involved in training and learning interventions and enables them to transfer their newly acquired knowledge and skills to their jobs, resulting in a higher level of performance and sustained improvement in the quality of services at their facilities.

Available from: free online at <http://www.prime2.org/prime2/section/70.html>

See *Guide 1* for literature that discusses health management information systems, since such systems should gather data that is useful for managing the procurement process and monitoring progress, such as information on equipment needs and use of supplies.

Software for Procurement and Logistics

This material covers the areas in procurement and logistics where computer software programs may be of assistance. For information on deciding when and how to computerize your records, see the GTZ book by Halbwachs and Miethe that appears first in the list. The material is listed alphabetically by title.

Computerizing maintenance for health care facilities in developing countries

Halbwachs H, and B Miethe (1994). GTZ, Eschborn, Germany

This book describes the documentation and analysis required if healthcare technology management is to be undertaken effectively (such as inventory management, planned preventive maintenance timetabling, costs analysis). It illustrates that for large stocks of equipment such work is made easier with the aid of computers. The book goes on to describe when and how to computerize equipment and maintenance records, including details of hardware and software requirements and products available. It includes details of the sort of data to be collected for effective healthcare technology management.

Available from: GTZ

Software for managing the procurement process

Software for managing the procurement process is available that can assist with tasks such as needs assessments, bills of quantities, preparation of and monitoring progress with purchase orders. It is useful once you have mastered a manual paper system, procure large enough or sufficiently complicated quantities of goods, and can obtain sufficient training of staff. There are a variety of products available with different advantages, for example:

- ◆ The PLAMAHS software produced by HEART Consultancy, listed in the sections above. This package provides needs assessment for an unlimited range (in number and levels) of health facilities at once. (Confidential) costs estimates can be generated, and bills of quantities with detailed specifications can be produced. The advantage of this software is that HEART has designed it especially with developing countries in mind, offers it at special rates for developing countries, and can assist with the set up and initial training requirements.
- ◆ Tailor-made commercial procurement management software products have many features, however they are often complex and expensive. These products can be found by searching for procurement management software on the internet.
- ◆ The ECRI products, listed in the sections above. Although none of these products actually assist you to manage the procurement process as described above, certain products can assist with specific aspects of the process such as identifying equipment standards, writing specifications and purchase documents, providing procurement advice, and comparing different equipment makes and models.

Project planning software

Software is available that can help you to timetable projects, and make Gantt charts to monitor progress. It is useful once you have mastered a manual paper system, have a large enough or sufficiently complicated project, and can obtain sufficient training of staff. None of these programs have been tested by the authors of this Series of Guides, and therefore cannot be vouched for. The freeware and shareware programs are listed at websites: www.tucows.com, and www.download.com, where user opinions and reviews can be assessed.

◆ **Freeware**

- Project Engine website: www.projectengine.nu/
- PM Plan website: www.pmpln.com/

◆ **Shareware**

- Planbee website: www.guysoftware.com/planbee.htm
- ConceptDraw website: www.conceptdraw.com/en/products/project/main.php
- Minuteman website: www.minuteman-systems.com/
- Project Planner by Smartworks website: www.smartworks.us/htm/project.htm

◆ Commercial

- Microsoft Project website: <http://office.microsoft.com/en-us/FX010857951033.aspx>
- Project Kickstart website: www.projectkickstart.com/
- Twiddlebit website: www.twiddlebit.com/purchase.htm

Stock control software

Stock control of items in stores is an area where simple computer software programs can be of assistance once you have mastered a manual paper system, have a large enough store (for example, at central level), and can obtain sufficient training of staff. The following products can be viewed on the internet and should provide either a full demonstration CD of the software to study, or use of a shareware program free of charge for a set period of time:

- ◆ Website: www.easy4you.net/EN/stock.htm
Low cost stock control and invoicing package for small to medium size businesses, provided as shareware software.
- ◆ Website: www.microsoft.com/BusinessSolutions/Navision/supplychain.aspx
Navision sales and stock management software is suitable for medium to large scale businesses, and is available in various building blocks. Navision is used by several central/national medical stores in Africa, but requires a lot of training
- ◆ Website: www.requisoft.com/stock/stock.html
Requisoft Stock software controls and manages an organization's stock, and allows you to browse through your stock records. It can be used on its own or as a module of the Requisoft Procurement system.
- ◆ Website: www.artisan.co.uk/products/index.php?p=Stock
Artisan stock management and control software is comprehensive, and includes complex assembly component and works order systems.

See *Guide 2* for information about inventory software and planning and budgeting software.

Accessing Information

These websites are sources of information concerning many aspects of health service delivery. They are locations where there is, or may be, information about healthcare technology management and equipment procurement and commissioning.

Africa online: Health website: <http://bamako.africaonline.com/afol/index.php>

Provides links to health information sites related to Africa. The links are organized into the following categories: health information, health news, events, African organizations, international organizations, schools and hospitals in Africa, projects, publications and health services

AFRO-NETS (African networks for health research and development)

website: www.afronets.org

Forum for exchanging health research information in and between East and Southern Africa.

AJOL (African journals online) website: www.inasp.org.uk/ajol

Offers free online access to tables of contents and abstracts of over 70 journals published in Africa.

Charities (of the USA) website: www.duke.edu/web/gleaning/Charity.html

This site contains a listing of contact details for charities throughout the USA, many of which work in the health field.

Deliver website: www.deliver.jsi.com

USAID funded project focusing on supply chain logistics for health products in developing countries from estimating demand for supplies, and maintaining optimal supply levels, to proper storage guidelines.

Eurasia health knowledge network (EHKN) website: www.eurasiahealth.org

Specialises in the health information needs of the Former Soviet Union (FSU) and Central and Eastern Europe (CEE). Site links to clinical practical guidelines, medical textbooks, and other educational materials, many in Russian and other regional languages

EU public procurement website:

http://europa.eu.int/comm/internal_market/publicprocurement/index_en.htm

This site contains information about the rules and procedures for public sector procurement under European Union-funded projects.

FIN: Free international newsletters: www.healthlink.org.uk

Healthlink produces this publication that lists over 130 print and electronic health-related newsletters and magazines which are available free to readers in developing countries.

Free medical journals website: www.freemedicaljournals.com

This site is a comprehensive, up to date list of medical journals available free on the internet.

GATE (German Appropriate Technology Exchange): www5.gtz.de/gate/

The GATE Information Service seeks to improve the technological knowledge of organizations and individuals involved in poverty alleviation projects and to develop information and knowledge management systems of organizations.

Global Medical Devices Nomenclature (GMDN) website: www.gmdn.org/index.xalter

The GMDN is a collection of internationally recognized terms used to accurately describe and catalogue medical devices. It is a classification system developed to allow for the classification of all medical devices put onto the market as defined by the European Standards body (CEN). It is intended to replace the older national device nomenclatures such as UMDNS (USA), CNMD (Canada), NKKN (Norway), JFMDA (Japan), in order to promote consistency in terminology around the world. The system has been accepted by the International Organization for Standardization (ISO).

Health exchange website: www.healthcomms.org

Explores issues, ideas and practical approaches to health improvement in developing countries and provides a forum for health workers and others to share viewpoints and experiences in this area.

HealthNet news website: www.healthnet.org/medpub

Weekly newsletter distributed to health professionals in Africa, Asia and Latin America. Features current, practical, clinical and public health information.

HIF-net at WHO discussion group

Discussion list dedicated to issues of improving access to reliable health information in resource-poor settings. To join, email your name, affiliation and professional interests to: health@inasp.info

HINARI (Health inter-network access to research initiative) website: www.healthinternetwork.net

WHO initiative offering free/discounted access to journals from six leading publishers.

HNP flash website: www.worldbank.org/hnpflash

A free monthly electronic newsletter dedicated to sharing knowledge regarding the latest technical developments in the fields of health, nutrition, population, and reproductive health.

IATA (International Air Transport Association) website: www.iata.org

This organization defines the standards for dangerous goods regulations and provides advice on safe procedures for carrying certain goods by air.

ID21 health website: www.id21.org/health

An internet based development research reporting service for health policy makers and development practitioners on global health issues. Latest research summaries are provided on a searchable website, by email and in a quarterly publication.

IEE healthcare technologies professional network website: www.iee.org/pn/healthtech

The Institution of Electrical Engineers of the UK provides internet sites for a wide variety of engineering professions, with the aim of enabling people to communicate with their peers around the world and access the latest global industry news and key information sources. One of their professional networks focuses on healthcare technologies. It has also hosted a series of seminars on **Appropriate medical technology for developing countries**, and their reports can be obtained from the IEE.

INCOTERMS 2000 website: www.iccwbo.org/index_incoterms.asp

This site explains the current definitions and regulations on International Commercial Trade Terms for transporting goods. It also provides a wallchart describing the Incoterms that can be downloaded.

INFRATECH discussion group

WHO forum for global exchange of information on infrastructure and health care technology issues

To subscribe send an email to LISTSERV@LISTSERV.PAHO.ORG enter in text: subscribe infratech 'your full name'.

International health exchange website: www.ihe.org.uk

Provides training, information and advice to health workers in emergency aid and development situations. This site also provides information about jobs and health development issues.

International journal of technology assessment in health care website:

www.cambridge.org/uk/journals/journal_catalogue.asp?historylinks=ALPHA&mnemonic=THC

This journal serves as a forum for professionals interested in the assessment of medical technology, its consequences for patients, and its impact on society. It covers the generation, evaluation, diffusion, and use of health care technology through essays, research notes, regular columns on technology assessment reports, and sections devoted to particular topics. Sometimes there are articles with particular relevance to developing countries. In 1994, the Cambridge University Press produced a book of reprints called **Technology assessment in health care for developing countries**.

Email: journals-subscription@cambridge.org.

International Monetary Fund (IMF) website: www.imf.org/external/fin.htm

This site provides current data on exchange rates for selected currencies, and the exchange rates between currencies and the SDR, as well as information about IMF loans.

KAR (Knowledge and research programme on disability and healthcare technology) website:

www.kar-dht.org, and for the latest projects being funded use website: www.disabilitykar.net/

This is the Knowledge and Research Programme on disability and healthcare technology of the UK governments's Department for International Development (DFID). It supports a range of projects on development and use of appropriate disability and healthcare technologies in developing countries.

The website also provides links to:

- ◆ **Disability and healthcare technology newsletter** produced every six months describing the progress and findings of the projects funded;
- ◆ **KaR global database** on healthcare technology publications, organizations, manufacturers, training institutions, etc.

New computerized transit system website:

www.hmce.gov.uk/channelsPortalWebApp/channelsPortalWebApp.portal?_nfpb=true&_pageLabel=pageVAT_ShowContent&id=HMCE_PROD_010319&propertyType=document

This site describes the New Computerized Transit System (NCTS) for registering regular shipments on the internet or by email, tracking their progress on the internet, and the shipper's Trader Identification Number (TIN) which is linked to the NCTS.

Programme for appropriate technology in health (PATH) website: www.path.org

PATH identifies, develops and applies appropriate technologies to public health problems in developing countries.

Safe injection global network (SIGN) alliance website: www.who.int/injection_safety/sign/en

This is a network/discussion group for safe injection issues from technical, managerial, and operational issues to policy development, consensus formation and advocacy. It covers a wide range of topics, such as whether to use reusable or disposable items. The alliance produces the electronic newsletter **SIGNpost**. The site is hosted by WHO.

Special Drawing Rights (SDR) fact sheet website: <http://fx.sauder.ubc.ca/SDR.html>

This site provides a good explanation of the SDR (Special Drawing Rights) international currency. The information is provided by the Sauder School of Business, University of British Columbia, Canada.

Sphere project www.sphereproject.org

Seeks to develop a set of universal minimum standards in core areas (water supply and sanitation, nutrition, food aid, shelter and site planning and health services) of humanitarian assistance in disaster response.

TechNet (Technical network for strengthening immunisation services) website:

www.technet21.org

Forum focusing on improving management and operational logistics for health service delivery in developing countries, in particular, immunisation services.

The manager's electronic resource center website: <http://erc.msh.org>

The ERC website is an electronic information resource and communication service for health managers, containing more than 150 ready-to-use management tools in various languages. A key feature is:

- ◆ **The health manager's toolkit**, includes spreadsheet templates, forms for gathering and analyzing data, checklists, guidelines for improving organizational performance, and self-assessment tools that allow managers to evaluate their organizations. Tools cover areas such as strategic planning, developing information systems, cost and revenue analysis, sustainability, drug and supply management.

World Bank procurement website: www.worldbank.org (then click on Projects and Operations, followed by Procurement/Tender)

This site provides access to guidelines for using World Bank funds for purchasing, up-to-date rules for bank procurement, their procurement manual, technical notes on procuring health sector goods, and standard bidding documents for health sector goods.

WHO: Health technology and pharmaceuticals website: www.who.int/technology

This WHO site provides information on pharmaceutical and health technology developments with a particular focus on developing countries. It includes links to blood transfusion safety and clinical technology, essential drugs, medicines, vaccines and biologicals.

WHO: Management of health services (MAKER) website: www.who.int/management

This WHO site provides information, publications, and country experiences on all types of management issues for health services, such as facility management, resource management, and district management.

ii. Organizations, Sources of Publications in Part i, Resource and Information Centres

For the following institutions we have included the name, address, contact details, a brief description of the various services they offer, and additional contact details for further relevant activities.

AfriAfya

AMREF Building, PO Box 30125, Nairobi, Kenya

Tel: 254 2 609520, fax: 254 2 609518, email: info@afriafya.org, website: www.afriafya.org

Established by Kenya-based health agencies, AfriAfya provides community access to relevant and appropriate health knowledge and information in an interactive manner. As well as a section on HIV/AIDS there is a news centre, message board and discussion forum on their website.

Amazon Bookshop

PO Box 81226, Seattle, Washington 98108-1226, USA

Website: www.amazon.com or www.amazon.co.uk

Internet bookshop

American College of Clinical Engineering (ACCE)

5200 Butler Pike, Plymouth Meeting, Pennsylvania PA 19462, USA

Tel: 1 610 825 6067, website: www.accenet.org

The ACCE is an organization of clinical engineers experienced in the management and support of medical devices and technology. The purpose of the ACCE is to establish a standard of competence and to promote excellence in the practice of clinical engineering in the United States and around the world. Many ACCE members are based in overseas facilities or have broad international experience. Their International Committee is able to offer training and consultation worldwide (write to the Chairperson of the International Committee at ACCE or email: icchair@accenet.org).

AMREF International (African Medical and Research Foundation)

Resource Centre, AMREF Headquarters, Langata Road, PO Box 00506 – 27691, Nairobi, Kenya
Tel: 254 2 501301/2/3, fax: 254 2 609518, e-mail: amref.info@amref.org, website: www.amref.org
Publishes practical books, journals and other literature for health workers, and provides advice on primary health care. Runs training courses and seminars.

BOND (British Overseas NGO's for Development)

Website: www.bond.org.uk

A network of more than 260 UK based voluntary organisations working in international development and development education. BOND works to promote the exchange of experience, ideas and information by acting as a broker for a variety of relationships and by collating and distributing information.

Chartered Institute of Purchasing and Supply (CIPS)

Easton House, Easton on the Hill, Stamford, Lincolnshire, PE9 3NZ, UK

Tel: 44 1780 756777, fax: 44 1780 751610, email: info@cips.org, website: www.cips.org

British professional body concerned with all aspects of purchasing and supply. It offers qualifications in this field, and provides many specialist and technical services for its members. Excellent source of purchasing books for both practitioners and students.

Dentaid

Giles Lane, Landford, Salisbury, Wiltshire, SP5 2BG, UK

Tel: 44 1794 324249, fax: 44 1794 323871, email: info@dentaid.org,

website: www.dentaid.org/cm/general/whatwedo

This charitable organization tests and refurbish donated dental equipment, package them into complete surgeries, and sends them to charitable projects all over the developing world. It also includes an installation and maintenance manual, and a kit of dental instruments.

DFID (Department for international development)

Website: www.dfid.gov.uk

UK government's department for international development assistance.

ECHO International Health Services Ltd

ECHO International Health Services is no longer trading as it used to. Its services can be accessed as follows:

- i. the charitable foundation can be contacted at:
ECHO, Ullswater Crescent, Coulsdon, Surrey, CR5 2HR, UK
Tel: 44 208 6602220, fax: 44 208 6680751, website: www.echohealth.org.uk/intro2.html
- ii. the trading branch of the business (wholesale providers of medical supplies and equipment) is now:
Durbin PLC, 180 Northholt Road, South Harrow, Middlesex, HA2 0LT, UK
Tel: 44 208 8696500, fax: 44 208 8696565, email: cataloguesales@durbin.co.uk,
website: www.durbin.co.uk
- iii. ECHO publications are still available from TALC (see below).

ECRI (Emergency Care Research Institute)

5200 Butler Pike, Plymouth Meeting, Pennsylvania 19462-1298, USA

Tel: 1 610 825 6000 ext 5368, fax: 1 610 834 1275, website: www.ecri.org

Offers guidance and advice on health care technology, planning, procurement and management; and health technology assessment and assistance.

Elsevier Health Science

Elsevier Books Customer Services, Linacre House, Jordan Hill, Oxford, OX2 8DP, UK

Tel: 44 1865 474110, fax: 44 1865 474111, email: eurobkinfo@elsevier.com,

website: www.us.elsevierhealth.com

Books published by WB Saunders, Mosby, Churchill Livingstone, and Butterworth-Heinemann are now all members of the Elsevier Science, Health Sciences Division.

European Union (EU)

http://europa.eu.int/comm/development/index_en.htm

EU site for international development and aid.

FAKT (Consultancy for Management, Training, and Technologies)

Gansheidestrasse 43, D-70184 Stuttgart, Germany

Tel: 49 711 21095/0, fax: 49 711 21095/55, email: fakt@fakt-consult.de, website: www.fakt-consult.de

Non-profit consultancy firm, that provides information on appropriate hospital and medical equipment and training in healthcare technologies. FAKT is not a supply organisation.

FIATA (International Federation of Freight Forwarders Associations)

Website: www.fiata.com

The largest non-governmental organization in the field of transportation, representing approximately 40,000 forwarding and logistics firms. Its objectives are to act as advisors to international bodies dealing with transportation, disseminate information, improve freighting services by promoting standard documents and trading conditions, assist with insurance, electronic data exchange (EDI), and vocational training. They have developed a uniform format for freight forwarding forms.

Global Directory of Health Information Resource Centres

Health Information for Development (HID) Project, PO Box 40, Petersfield, Hants, GU32 2YH, UK

Tel: 44 1730 301297, fax: 44 1730 265398, email: iwsp@payson.tulane.edu,

website: www.iwsp.org/directory.htm

This is a directory of health information resource centres that is arranged alphabetically by country. Between January 2000 and May 2001, Health Information for Development (HID) compiled a Global Directory of Health Information Resource Centres (HIRCs). This is available from their website. The Directory is updated on an ongoing basis.

GTZ (Deutsche Gesellschaft für Technische Zusammenarbeit – German government technical aid agency)

Division of Health and Education, PO Box 5180, D-6236, Eschborn, Germany

Tel: 49 6196 791265, fax: 49 6196 797104, email: Friedeger.Stierle@gtz.de

Website: <http://www.gtz.de/de/4030.htm>

Friedeger Stierle is the contact for the GTZ's healthcare technology management programme, and any articles or documents on HTM.

HAMLO (Hulp aan Medische Laboratoria in Ontwikkelingslanden)

Wilhelminapark 52, 3581 NM Utrecht, The Netherlands

Website: www.nvml.nl/html/hamlo.asp

This committee of the Dutch Association of Medical Laboratory Technologists gives assistance to laboratories in developing countries. This includes technical advice and supplying literature, acquiring new equipment and materials, also surplus equipment from Dutch laboratories and adapting this to the needs of the country requiring the equipment. HAMLO also assists laboratory technologists who want to work in developing countries to get in touch with development agencies and gain appropriate knowledge and experience.

Hands to Clinical Labs of Third World Countries Inc.

Public Health Labs, 176 Broadway, Paterson, New Jersey 07505, USA

Tel: 1 201 881 3972

This organization offers several types of technical assistance to laboratories in developing countries including training for laboratory personnel, short-term assignment of volunteer US laboratory workers as consultants, and supplying of surplus equipment from US laboratories.

Healthlink Worldwide

Cityside, 40 Adler Street, London, E1 1EE, UK

Tel: 44 20 7539 1570, fax: 44 20 7539 1580, email: info@healthlink.org.uk, website:

www.healthlink.org.uk

Publishes a range of free and low-cost newsletters, resource lists, briefing papers and manuals about health and disability. Publications include HIV testing: a practical approach which is a briefing paper on HIV counselling and laboratory testing.

HEART Consultancy

Quadenoord 2, 6871 NG Renkum, The Netherlands

Tel: 31 317 450468, fax: 31 317 450469, email: jh@heartware.nl, website: www.heartware.nl

Consultancy firm working in all aspects of healthcare technology management in developing countries. It also produces and supplies the PLAMAHS software package for managing the inventory, model lists, maintenance, and procurement needs for your healthcare technology stock. HEART also undertakes research and training, and produces publications on many aspects of sterilization for developing countries. It has developed a basic testkit for performance testing of sterilizers, and can identify suppliers that still manufacture basic sterilizers (manually operated/fuel heated).

HMSO (Her Majesty's Stationery Office)

Website: www.hmso.gov.uk

Publishers of material produced by departments of the UK government.

Humanitarian Information for All

c/o Human Info NGO vzw and Humanity CD Ltd, Oosterveldlaan 196, B-2610 Antwerp, Belgium

Fax: 32 3 449 75 74, email: humanity@humaninfo.org, website: www.humaninfo.org

The goal of this organization is to disseminate health care information free-of-charge in developing countries. Thus, their Medical and Health Library makes publications available on the internet. Refer to their homepage to find the large list of publications available.

Intermediate Technology Development Group (ITDG) and ITDG Publishing

The Schumacher Centre for Technology and Development, Bourton Hall, Bourton-on-Dunsmore, Rugby, CV23 9QZ, UK

Tel: 44 1926 634400, fax: 44 1926 634401, email: enquiries@itdg.org.uk, website: www.itdg.org

The Development Group is a charity concerned with the research and development of 'appropriate' technologies for application in developing countries. It has worked on topics such as, alternative electrical supplies, access to water, disability aids, medical supplies. It also undertake consultancies. The Publication Division produces and disseminates books and journals covering aspects of health, development, and appropriate technology. It can be contacted at:

Tel: 44 1926 634501, fax: 44 1926 634502, email: itpubs@itpubs.org.uk, website: www.itdgpublishing.org.uk.

International Dispensary Association (IDA)

PO Box 37098, 1030 AB Amsterdam, The Netherlands

Tel: 31 20 4033051, fax: 31 20 4031854, email: info@ida.nl, website: www.ida.nl/en-US

This international non-profit supply organization is very well known in the pharmaceutical sector for essential drug supply to developing countries. It also supplies basic medical equipment, medical supplies and laboratory equipment to developing countries.

International Electrotechnical Commission (IEC)

IEC Central Office, 3 rue de Varembe, P.O. Box 131, CH - 1211 GENEVA 20, Switzerland

Tel: 41 22 919 02 11, fax: 41 22 919 03 00, email: info@iec.ch, website: www.iec.ch/

Sets the standards for the safe manufacture of medical equipment.

International Society for Technology Assessment in Health Care (ISTAHC)

c/o Institute of Health Economics, 1200, 10405 Jasper Avenue, Edmonton, Alberta, Canada T5J 3N4

Tel: 780 448 4881, fax: 780 448 0018, email: info@HTAi.org, website: <http://www.htai.org/>

International non-profit body with regional branches, it researches and disseminates information concerning health technology assessment. It produces the **International journal of technology assessment in health care**, and has a Special Interest Group on developing countries' issues:

International Society for Technology Assessment in Health Care – Special Interest Group (ISTAHC-SPIG)

Health Technology Research Group, Medical Research Council (MRC)

PO Box 19070, Tygerberg 7505, Cape Town, South Africa. Tel: 27 21 938 04 13, fax: 27 21 938 03 85.

Joint Medical Store (JMS)

PO Box 4501, Kampala, Uganda

Tel: 256 41 269699 or 268482, fax: 256 41 267298, email: sales.jms@imul.com

Not-for-profit mission medical store supplying pharmaceuticals, medical supplies and equipment, with a technical department to deal with maintenance issues and capital equipment. Supplies the public and non-profit health sector in Uganda, East Africa and Great Lakes region.

Medical Research Council South Africa (MRC-SA)

PO Box 19070, 7505 Tygerberg, South Africa

Tel: 27 21 9380911, fax: 27 21 9380200, email: info@mrc.ac.za, website: www.mrc.ac.za

The MRC-SA's mission is to improve the nation's health status and quality of life through relevant and excellent health research aimed at promoting equity and development. They have a WHO Collaborating Centre for Essential Technologies in Health, at website:

www.mrc.ac.za/innovation/whocollaborating.htm

Medicines and Healthcare Regulatory Agency (MHRA)

Hannibal House, Elephant and Castle, London, SE1 6TQ, UK

Tel: 44 0207 972 8000, email: devices@mhra.gsi.gov.uk, website: www.mhra.gov.uk

Offers guidance, advice, and regulations on medical device quality, safety, performance, use, and standards.

Mission for Essential Drugs and Supplies (MEDS)

PO Box 14059, Nairobi, Kenya

Tel: (+254 2) 544244/5, fax: (+254 2) 545062 or 540993, email: sahibu@africaonline.co.ke

Not-for-profit mission medical store supplying pharmaceuticals, medical supplies and equipment to mission organisations and not-for-profit organisations in East Africa and Great Lakes region.

PAHO (Pan American Health Organization)

Pan American Sanitary Bureau, Regional Office of the World Health Organization, 525 Twenty-third Street, N.W. Washington, D.C. 20037, USA

Tel: 1 202 974-3000, fax: 1 202 974-3663, website: www.paho.org/

The Pan American Health Organization (PAHO) is an international public health agency working to improve health and living standards of the countries of the Americas. It also serves as the Regional Office for the Americas of the World Health Organization. Antonio Hernandez is the contact for healthcare technology issues, email: 1hernana@paho.org

Quality Assurance Research and Policy Development Group (QARPDG)

Philippine Health Insurance Corporation (PhilHealth), CityState Center, 709 Shaw Blvd., Brgy. Oranbo, 1600 Pasig City, Philippines

Fax: 632 637 9693, email: madz_valera@yahoo.com, contact: Dr. Madeleine Valera (Vice President)

PhilHealth is a government owned and controlled corporation that was the main organizer of the 3rd Asian Regional Health Technology Assessment Conference in 2004, and is the source for the conference proceedings.

Replacement Parts Industries Inc. (rpi – “The Alternate Source”)

20338 Corisco Street, Chatsworth, California 91311, USA

Tel: 1 800 221 9723, or 1 88 882 8611, fax: 1 818 882 7028, email: moreinfo@rpiparts.com, website: www.rpiparts.com

This supplier acts as an alternate source of quality and competitively priced replacement parts for well-known makes of healthcare equipment. The catalogue is divided into sections according to equipment types (such as sterilizers, dental equipment, centrifuges, infant incubators, lamps/bulbs) and provides information on which parts will fit which make of machine. There are descriptions and illustrations to simplify identification. It not only covers current models, but also parts for older models of equipment that you may still own. The company also offers technical assistance on repair solutions.

RS Components Ltd.

Birchington Road, Corby, Northants, NN17 9RS, UK

Tel: 44 1536 201234, fax: 44 1536 405678, email: general@rs-components.com, website: rswww.com

Supplier of equipment, supplies, parts, and components for a wide range of engineering professions such as electrical, electronic, mechanical, heating, ventilation, air-conditioning, plumbing, welding, pneumatics, computing, automotive. Also a source of textbooks, technical data books, technical literature, and training videos for all these engineering fields.

Source (International Information Support Centre)

The Wellcome Trust Building, Institute of Child Health, 30 Guildford Street, London, WC1N 1EH, UK

Tel: 44 20 7242 9789 ext 8698, fax: 44 20 7404 2062, email: source@ich.ucl.ac.uk, website:

www.asksource.info

The Source Centre has a unique collection of over 20,000 health and disability related information resources. These include books, manuals, reports, posters, videos, and CD-Roms. Many materials are from developing countries and include both published and unpublished literature.

Swiss Centre for Development Cooperation in Technology and Management (SKAT).

Website: www.skat.ch/dc/publ/publ.htm

SKAT works internationally in the areas of water and sanitation, architecture and building, transport infrastructure, and urban development. They also publish the **SKAT newsletter**

Swiss Centre for International Health (SCIH)

Swiss Tropical Institute, Socinstrasse 57, PO Box, CH-4002 Basle, Switzerland

Tel: 41 61 284 82 79, fax: 41 61 271 86 54, email: martin.raab@unibas.ch,

website: www.sti.ch/francais/scih/scih.htm

Undertakes consultancies in healthcare technology management in developing countries and countries in transition.

TALC (Teaching Aids at Low Cost)

PO Box 49, St. Albans, Herts, AL1 5TX, UK

Tel: 44 1727 853869, fax: 44 1727 846852, email: talc@talcuk.org website: www.talcuk.org/

UK registered non-profit charity specialising in supplying affordable books, slides and teaching aids on health and community issues in developing countries, with a particular focus on materials for PHC and district levels.

Technologie Transfer Marburg (TTM)

Auf der Kupferschmiede 1, D-35091 Colbe, Germany

Tel: 49 6421 87373 0, fax: 49 6421 87373 73, email: ttm@ttm-germany.de, website: ttm-germany.de

This international non-profit supply organization offers a range of products and services such as procurement and installation of appropriate equipment for medical projects, to advisory and planning services, and product development and training.

Third World Network

Email: twnet@po.jaring.my, website: www.twinside.org.sg

The Third World Network is an independent non-profit international network of organizations and individuals involved in development issues. Its website offers articles and position papers on a variety of subjects related to developing countries, including trade, health, biotechnology and bio-safety.

Transaid (Transport for Life)

137 Euston Road, London, NW1 2AA, UK

Tel: 44 20 7387 8136, fax: 44 20 7287 2669, email: info@transaid.org website: www.transaid.org

A charity working in the field of international transport management. Thus unique organization works with many sectors, including health, to ensure that transport resources are efficiently and effectively used. Their aim is to develop local capacity in transport and logistics management. They produce a newsletter **Hub and spoke**, and have developed the **Transaid transport management handbook**.

Tropical Health Technology (THT)

14 Bevills Close, Doddington, March, Cambridgeshire PE15 OTT, UK

Tel: 44 1354 740825, fax: 44 1354 740013, email: thtbooks@tht.ndirect.co.uk,

website: www.tht.ndirect.co.uk

Charity concerned with supporting and improving laboratory services in the developing world. Primary focus is laboratory services, information and technology. Specializes in supply of laboratory equipment, books, bench aids, slide sets and microscopes.

UNICEF (United Nations Children's Fund)

UNICEF House, 3 UN Plaza, New York 10017, USA

Tel: 1 212 326 7000, fax: 1 212 887 7454, email: jando@unicef.org, website: www.unicef.org

It provides a wide range of resource materials, journals, books, videos, games and posters for children's programmes. Your regional or field office will offer advice on all aspects of child health care and

UNICEF materials – contact details are on the website. The goods contained in UNICEF's **Supply Catalogue** are supplied by the UNICEF Supply Division, UNICEF Plads, Freeport, 2100

Copenhagen OE, Denmark. Tel: 45 3527 3527, fax: 45 3526 9421, email: supply@unicef.org.

World Bank (WB)

www.worldbank.org

One of the world's largest sources of development assistance including health, nutrition and population projects

World Council of Churches (WCC)

PO Box 2100, 1211 Geneva, Switzerland

Tel: 41 22 791 6111, fax: 41 22 791 0361, email: info@wcc-coe.org, website: www.wcc-coe.org

International fellowship of churches that produces publications and newsletters. Recent publications include **Guidelines on medical equipment donations**.

World Health Organization (WHO)

20 Avenue Appia, CH-1211 Geneva 27, Switzerland

Tel: 41 22 791 2476 or 2477, fax: 41 22 791 4857, website: www.who.int/en/

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ANNEX 3: POLICY ISSUES

Additional information on developing policies is provided in *Guide 2* on planning and budgeting.

Deciding When to Procure

This aspect of the purchasing and donations policies is described in *Section 3.1*, where the reasons for procuring equipment and their order of priority are detailed.

Deciding What to Procure

To help you obtain **only** equipment which is appropriate to your needs, your purchasing and donations policies should clearly specify the 'good selection criteria' to employ. These issues are discussed in *Section 3.2* and summarized in *Box 53*.

BOX 53: Example of Good Selection Criteria for Purchasing and Donations of Equipment

Indicators of appropriateness	Criteria
Appropriate to setting	<p>Equipment should be:</p> <ul style="list-style-type: none"> ◆ suitable for the level of facility and service provided ◆ acceptable to staff and patients ◆ suitable for operator skills available ◆ suitable for the local maintenance support capabilities ◆ compatible with existing equipment and consumable supplies ◆ compatible with existing utilities and energy supplies ◆ suited to the local climate, geography and conditions ◆ able to be run economically with local resources.
Assured quality and safety	<p>Equipment should be:</p> <ul style="list-style-type: none"> ◆ of sufficient quality to meet your requirements and last a reasonable length of time ◆ made of materials that are durable and hard-wearing (for example, aluminium bends easily compared to iron or stainless steel) ◆ made from material that can be easily cleaned, disinfected, or sterilized without rusting (for example, a polymerized finish or an epoxy coating) ◆ made of materials that do not easily break (for example, polycarbonate rather than glass) ◆ manufactured to meet internationally recognized safety and performance standards (see <i>Annex 4</i>) ◆ suitably packaged and labelled so that it is not damaged in transit or during storage ◆ provided by reputable, reliable, licensed manufacturers, or registered suppliers.

Continued overleaf

BOX 53: Example of Good Selection Criteria for Purchasing and Donations of Equipment (continued)

Indicators of appropriateness	Criteria
Affordable and cost-effective	<p>Equipment should be:</p> <ul style="list-style-type: none"> ◆ available at a price that is cost-effective. Quality and cost often go together (for example, the cheaper option may be of poor quality and ultimately prove to be a false economy) ◆ affordable in terms of costs for freight, insurance, import tax, etc. ◆ affordable in terms of installation, commissioning, and training of staff to use and maintain them ◆ affordable to run (for example, cover the costs of consumables, accessories, spare parts and fuel over its life-time) ◆ affordable to maintain and service ◆ affordable to dispose of safely ◆ affordable in terms of the procurement process (for example the cost of a procurement agent or foreign exchange) ◆ affordable in terms of staffing costs (for example, costs of any additional staff or specialization training required).
Ease of use and maintenance	<p>You should choose equipment:</p> <ul style="list-style-type: none"> ◆ for which you have the necessary skills in terms of operating, cleaning, and maintenance ◆ for which instructions and manuals are available to you in a suitable language ◆ for which staff training is offered by the supplier ◆ for which local after-sales support is available with real technical skills ◆ which offers the possibility of additional technical assistance through service contracts ◆ which comes with a warranty/guarantee, covering a reasonable length of time, for which you understand the terms. (For example, does it cover parts, labour, travel, refunds or replacements?) ◆ which offers a supply route for equipment-related supplies (for example, consumables, accessories, spare parts) ◆ which offers assured availability of these supplies for a reasonable period (up to 10 years).
Conforms to existing policies, plans and guidelines	<p>You should choose equipment:</p> <ul style="list-style-type: none"> ◆ according to your purchasing and donations policy ◆ according to your standardization policy ◆ according to the technology level described in the Model Equipment Lists and Generic Equipment Specifications (see <i>Guide 2</i> on planning and budgeting) ◆ which is deemed to be suitable, having studied available literature and compared products (see <i>Figure 8 in Section 3.2</i>) ◆ which is deemed to be suitable, having received feedback regarding previous purchases (<i>Section 9.2</i>).

Deciding When to Replace Equipment and How to Dispose of It

Every health service provider should have replacement and disposal policies for equipment containing, as a minimum, the following elements:

Overview

In summary, to replace and dispose of equipment it is necessary to have the following:

- ◆ technical skills to identify those items ready for replacement
- ◆ good procurement practices which enable you to finance and purchase replacement items **in good time**
- ◆ courage and determination to take equipment out of service when necessary, even if the users want to keep using it
- ◆ a formal method for condemning equipment
- ◆ a formal method for disposing of the equipment, safely and in an environmentally sound way
- ◆ a formal method so that the disposal of equipment triggers the purchase of a replacement item.

All these formal methods are described in *Guide 4* of this Series.

Valid replacement criteria

Each health facility should replace equipment **for valid reasons only**, which should be defined. Suggested valid reasons and criteria for condemning equipment are provided here:

- i. Equipment will **only** be replaced when one of the following valid reasons has been fulfilled:
 - a. it is worn out beyond repair (has reached the end of its natural life)
 - b. it is damaged beyond repair
 - c. it is unreliable – faulty, old, unsafe
 - d. it is clinically or technically obsolete
 - e. spare parts are no longer available
 - f. it is no longer economical to repair.

and one of the following valid reasons has also been fulfilled:

 - g. utilization statistics are available to show that it is still required
 - h. a demonstrated clinical or operational need still exists.
- ii. Equipment will **not** be replaced simply because:
 - ◆ it is old
 - ◆ staff do not like it
 - ◆ a newer model has arrived on the market.

Judging when it is time to condemn equipment

Senior maintenance staff need to study the equipment, and judge:

- ◆ whether the equipment fulfils any of the valid replacement criteria (see above)
- ◆ whether the equipment has outlived its (internationally/locally) advised typical ‘lifetime’ (see *Guides 2 and 4*)
- ◆ the equipment’s track record and state of health, as documented in its service history records (see *Guide 5*)
- ◆ whether it will be necessary to override the average expected lifespan and condemn the equipment early, or even to extend the lifespan of the equipment.

For expensive equipment, it may be helpful to obtain an evaluation from the supplier.

Deciding how to dispose of equipment

Once equipment has been condemned, you need a formal policy to oversee its disposal. This should cover:

- ◆ how it should be disposed of safely
- ◆ how it can be disposed of as promptly as possible
- ◆ how it can be disposed of in an environmentally sound way according to your 'Waste Management and Hygiene Plan'
- ◆ how you can strip off the useful spare parts before the equipment is disposed of.

These issues are discussed in *Guide 4* on operation and safety.

The condemning and disposal of equipment should trigger the purchase of a replacement piece of equipment. It is preferable to plan for replacements before they are needed and, where possible, you should identify likely replacement needs within your annual Equipment Inventory update and annual plans (see *Guide 2*). These activities should be timed to take place ahead of the next procurement cycle, which usually takes place annually.

ANNEX 4: EXAMPLES OF IMPORTANT SAFETY AND PERFORMANCE STANDARDS

All equipment should meet international, regional, or national safety and performance standards (see *Annex 2*). The most important standards include:

- ◆ **IEC (*International Electrotechnical Commission*)** – these are international standards for the **electrical safety** of any electrical and electromechanical equipment (such as refrigerators). IEC 60101 is the international standard specifically addressing **medical electrical safety** that manufacturers must conform to if medical equipment is to be electrically and mechanically safe for use by staff with patients. As part of their responsibilities, maintenance staff should also safety test equipment to ensure it meets these standards (see *Guide 4* on operation and safety).
- ◆ **ISO (*International Organization for Standardization*)** – these are international standards for industry, technology and business, with special standard series for **quality management and systems in any field**. ISO 9000-9004 is a series of standards covering the quality of manufacturing processes, design and development, construction, installation, and servicing. ISO standards do not currently exist for all equipment, but do apply to a range of medical devices (for example, ISO 13485 and ISO 13488). ISO standards, however, do not have a status of official standards unless they are adopted by a competent national authority. ISO is made up of its members. A member body of ISO is the national body ‘most representative of standardization in its country’. Examples are BSI (British Standards Institution, UK), ANSI (American National Standards Institute, US), DIN (Germany), SAI (Australia).
- ◆ **EU standards** are developed through the organs of EU, EFTA, and the three European standardization organizations CEN, CENELEC and ETSI. Directives are issued by the EU authorities and the standardization organization prepares the technical standards according to the directives. These become standards to be adopted nationally. There are three main medical devices directives for Europe. These are: i) 90/385/EEC for active implantable medical devices; ii) 93/42/EEC covers vigilance and compliance in general for medical devices; iii) 98/79/EC for in-vitro diagnostic medical devices. **CE markings** indicate that a product meets European Union directive standards of **performance and safety** and, for example, apply to all sterile medical supplies.
- ◆ **American Standards** are adopted from the international work of organizations like the IEC and ISO, or are developed nationally. ANSI is the national organization that facilitates national standards development by accrediting procedures of standardization organizations. All new medical equipment has to be approved by the Food and Drug Administration (**FDA-approval**) before it can be commercialized.
- ◆ **Pharmacopoeia specifications** – quality specifications for the most commonly used drugs and some medical supplies, such as bandages, tape, and swabs. Important pharmacopoeias include the British (BP), European (EP), United States (USP), and the WHO’s International Pharmacopoeia (IP).
- ◆ **Manufacturer’s Certificates** – these are validated by the government of the exporting country confirming that the **exported device is approved for domestic use in the exporting country**. In this way, the importing country can be assured of the same risk exposure as the citizens of the exporting country
- ◆ **Export Certificates** – allow manufacturers to **export equipment that is not manufactured for the exporting country’s domestic sale or use**. At present, there is no uniform certificate for different countries, so it is wise to be cautious in interpreting such ‘export certificates’. (Note: the WHO export certificate at present only applies to pharmaceutical products).

- ◆ **Good Manufacturing Practices (GMP)** – where this has been introduced, a manufacturer's Quality System is audited and monitored to **ensure standards of production and safety** are maintained and are consistent. GMP has recently been established for manufacturers of equipment. (For example, quality system standard for medical devices: 1128 in Japan, and 21 CFR part 820 in USA)
- ◆ **Registration or Licensing** – of manufacturers, wholesalers, importers, and retail outlets by a local regulatory authority.

Note: be aware that:

- ◆ apparently standard quality certificates may indeed be based on varying parameters
- ◆ export certificates and GMP are both issued by authorities in the country of origin, and their value depends upon the capacity and diligence of the issuing Regulatory Authority.

ANNEX 5: EVALUATING SUPPLIERS

This annex helps you to assess your suppliers by providing:

- ◆ a pre-purchase evaluation questionnaire for suppliers in *Box 54*
- ◆ suggested criteria for evaluating new suppliers in *Box 55*
- ◆ suggested criteria for evaluating current and past suppliers in *Box 56*
- ◆ the characteristics that make a good supplier in *Box 57*.

BOX 54: Pre-Purchase Evaluation Questionnaire for Suppliers

Supplier

- ◆ Full trading name and address of supplier
- ◆ Full trading name and address of manufacturer (if the manufacturer is not the supplier)
- ◆ Certificate from the manufacturer authorising to sell the specified product to the intended market
- ◆ Product group and range
- ◆ Specific products by type
- ◆ Is there a local representative/agent/distributor in country? (Provide name and address of same)
- ◆ Type of agency agreement – exclusive, non exclusive, other (specify)
- ◆ Equipment already sold to the country (indicating quantities, places available)
- ◆ Equipment available in the region (references)
- ◆ Turnover and past performance if available
- ◆ Copy of the company profile
- ◆ Literature of the product offered
- ◆ Any specialist knowledge or expertise
- ◆ References

Their local agent/representative/distributor

- ◆ Name and address of the local agent/representative/distributor
- ◆ Type of agency agreement (exclusive, non exclusive, other)
- ◆ Date of expiry of the agency agreement
- ◆ References of equipment already sold in the country
- ◆ Details of service contract if available
- ◆ Details of available workshop facilities, transport, technical personnel etc.
- ◆ Company profile
- ◆ Any other qualification agent/representative/distributor wish to state.

BOX 55: Suggested Criteria for Evaluating New Suppliers

Issue	Criteria
Status	<ul style="list-style-type: none"> ◆ Is the supplier a primary manufacturer or a distributor? ◆ If a manufacturer, does the supplier manufacture all products in-house? ◆ If a distributor, who is the primary manufacturer? ◆ Is the distributor selling exclusively for a particular manufacturer or representing several companies? ◆ Is it a known high quality manufacturer?
Quality Control	<ul style="list-style-type: none"> ◆ Does the manufacturer use GMP, ISO standards, or equivalent (see <i>Annex 4</i>)? ◆ Does the supplier have an on-site quality control laboratory? ◆ What tests are routinely performed during and after the manufacturing process? ◆ Are special tests performed for suitability in tropical environments?
Inspection	<ul style="list-style-type: none"> ◆ What official government agencies or international organizations have inspected the manufacturing facilities? ◆ What are the results of the most recent inspection? ◆ What certification documents are available from the national regulatory authority concerning the supplier's status and compliance with their regulations?
Personnel and facilities	<ul style="list-style-type: none"> ◆ What are the qualifications of key production and quality control personnel? ◆ What is the capacity of the supplier's plant(s)? ◆ Does the supplier have a local representative near you? ◆ What is the capacity of the supplier's representative (for example, does it have a workshop, skilled personnel, spare parts stocks)?
Trade references	<ul style="list-style-type: none"> ◆ What other local or foreign public procurement offices and health facilities buy from the supplier? ◆ How long has the supplier served the above groups? ◆ What is the experience of these customers with regard to the supplier's quality and service?
Financial status	<ul style="list-style-type: none"> ◆ Is the supplier financially stable? ◆ Will the supplier remain in existence for the entire contract period?
Local reputation	<ul style="list-style-type: none"> ◆ How is the supplier regarded by knowledgeable professionals on issues of: participation, delivery times, adherence to delivery instructions, provision of documents, packing and labelling, product shelf life, compliance to contract financial terms, after sales service? ◆ Is the supplier well established and well respected? ◆ Is any information available from public sources (such as newspapers or trade journals) concerning the supplier's performance locally or in other countries?
Quality of products and services	<ul style="list-style-type: none"> ◆ Have any complaints been received concerning product quality for this supplier? ◆ Have any complaints been received concerning the quality of services provided by this supplier (such as installation, commissioning, and initial training)? ◆ Have any complaints been received concerning the quality of after-sales support from this supplier?

Continued opposite

BOX 55: Suggested Criteria for Evaluating New Suppliers (continued)

Issue	Criteria
Environmental/ Ethical/ Encouragement of economy in developing countries	<ul style="list-style-type: none"> ◆ Does the supplier adhere to your ethical/environmental policies? ◆ Does the supplier adhere to the ethical/environmental policies of the external support agency funding the procurement? ◆ Does the supplier's goods, manufacturing, services, or representatives provide benefits to your national economy (for example, increase the capacity of your industrial sector)?

Adapted from: Management Sciences for Health, 2002, 'Managing drug supply', MSH, Boston, USA

BOX 56: Suggested Criteria for Evaluating Current and Past Suppliers

Issue	Criteria
Participation record	<ul style="list-style-type: none"> ◆ Has the supplier accepted an award of bid/quotation and subsequently failed to deliver? ◆ Has the supplier attempted to alter or withdraw bids after submission? ◆ Has the supplier promised after-sales support, then failed to provide it?
Response to enquiry	<ul style="list-style-type: none"> ◆ Has the supplier adequately responded to all enquiries and within a reasonable period of time? ◆ Did the supplier provide regular updates on the status of outstanding orders?
Delivery time	<ul style="list-style-type: none"> ◆ What was the supplier's average promised lead time? ◆ What was the actual lead time for the last round of procurement? ◆ What percentage of shipments were late? How many days (weeks, months) late? ◆ What additional costs were incurred due to late shipments?
Adherence to delivery instructions	<ul style="list-style-type: none"> ◆ Did the shipments arrive under proper shipping conditions (for example, cool/cold store for heat sensitive goods)? ◆ Did the shipment arrive at the correct port? ◆ Did the supplier send full shipments as requested, or were there partial shipments and how many?
Provisions of documents	<ul style="list-style-type: none"> ◆ Were advance copies of documents provided according to contract terms? ◆ Did shipments arrive with all required documents correctly filled out and signed? ◆ Were adequate site preparation instructions provided? ◆ Were adequate training materials provided? ◆ If required documents were omitted, how did the supplier correct the problem?
Packing and labelling	<ul style="list-style-type: none"> ◆ Was labelling complete and adequate for proper use? Was it in the correct language? ◆ Did the supplier ship the correct package size? Were the correct contents and quantities in each package? ◆ Were there specific examples of loss due to damage to packaging during shipments? ◆ Did external packaging protect the product from damage during transport in country?

Continued overleaf

BOX 56: Suggested Criteria for Evaluating Current and Past Suppliers (continued)

Issue	Criteria
Product shelf life	<ul style="list-style-type: none"> ◆ Did the products comply with contractual terms for remaining shelf life? If not, how many were shipped with shelf life less than specified? ◆ Did the supplier replace items that did not have acceptable remaining shelf life or allow the return for credit or exchange of goods nearing their expiration date?
Compliance to contract financial terms	<ul style="list-style-type: none"> ◆ Did all invoices comply with contract pricing terms? ◆ Were all shipments correctly insured and shipped, according to financial terms in the contract? ◆ Were there any problems obtaining compensation or reimbursement for lost or damaged goods? ◆ Were there any problems obtaining compensation or reimbursement for poor services (such as commissioning and training)?
Quality of products and services	<ul style="list-style-type: none"> ◆ Have complaints been received concerning product quality for this supplier? ◆ Did the supplier cooperate in making samples available and paying for any quality control tests performed by quality assurance agencies? ◆ Have any complaints been received concerning the quality of services provided by this supplier (such as installation, commissioning, and initial training)? ◆ Have any complaints been received concerning the quality of after-sales support from this supplier?
Information available from supplier	<ul style="list-style-type: none"> ◆ Did the supplier make suggestions concerning ways in which the buyer could reduce costs (for example, combining or splitting orders or altering delivery schedules)?

Adapted from: Management Sciences for Health, 2002, 'Managing drug supply', MSH, Boston, USA

Choosing a good supplier will save you time and money. A good supplier is someone who has the characteristics shown in *Box 57*.

BOX 57: Characteristics that Make a Good Supplier

Characteristic	Features
Is interested and thorough	<ul style="list-style-type: none"> ◆ is friendly and professional and shows an interest in your enquiry ◆ takes an interest in small things as well as big things ◆ asks questions before giving a quotation ◆ genuinely understands your needs and talks to you in details about your requirements
Offers a good deal	<ul style="list-style-type: none"> ◆ is able to meet your needs ◆ is willing to suggest to you ways in which you can save costs ◆ chooses the best and most cost effective solution, and settles on a firm price ◆ offers equipment which is affordable and of acceptable quality and safety ◆ provides a package of inputs including guarantees and warranties
Has a good reputation	<ul style="list-style-type: none"> ◆ has done a good job for others, and is reliable ◆ inspires confidence in their level of aptitude and service ◆ lets you know if your expectations are unrealistic and is willing to discuss alternatives
Has the resources required	<ul style="list-style-type: none"> ◆ is willing to provide installation and commissioning, if applicable ◆ provides training linked to the purchase; if unable to provide this makes recommendations on the best source of training ◆ has demonstrable capacity to service and maintain the equipment, preferably based locally to you ◆ can offer after-sales services as a standard or available on request ◆ can offer repair and service contracts as standard practice
Is a recognized firm	<ul style="list-style-type: none"> ◆ is registered or licensed as a supplier by their national authorities ◆ is known by your national regulatory body ◆ has a capacity to supply that you can verify ◆ has set complaints procedures.

ANNEX 6: OBTAINING APPROPRIATE DONATIONS

This annex helps you to obtain appropriate donations (both gifts of equipment and those purchased using grants from aid agencies), by providing:

- ◆ summary guidelines for recipients of donations
- ◆ summary guidelines for providers of donations
- ◆ a sample equipment donation request form.

i. Summary Guidelines for Recipients of Donations

If no national donation regulations are available, you can develop your own by referring to the guidelines outlined in *Figure 31*.

Figure 31: Summary Guidelines for Recipients of Donations to Ensure they are Appropriate

Issues	Considerations
Check your policies and plans	<ul style="list-style-type: none"> • Do you have a donations policy? You will be in a much stronger position to negotiate the contents of a donation if you have a policy. • What equipment and supplies are needed and in what quantities? Prioritize the list of items you plan to request. • Can you provide potential donors with clear and comprehensive information about the items needed and how they will be used? The items requested should comply with your specifications, standardization practices, Model Equipment List, etc. • Do national regulations allow these goods to be imported?
Investigate the donor and the goods on offer	<ul style="list-style-type: none"> • Does the donor have the capacity to fulfil the request? • Before agreeing to accept a donation, check whether the goods being offered: <ul style="list-style-type: none"> – conform to national policy, or the WHO or WCC equipment donation guidelines (see <i>Annex 2</i>)? – are suitable for your facility and staff? – only require spare parts and consumables that can be afforded using available recurrent budgets? • Before agreeing to accept a donation, check whether the equipment will come with its relevant accessories, consumables, manuals and some spare parts, so that it can function and be used? • Before agreeing to accept a donation, confirm whether the donor will be responsible for covering the costs of transport, freight, insurance, import duties, customs clearance, and installation and commissioning costs, if applicable? If not, do you have money set aside for this? • If the goods include reagents or sterile supplies, check whether these will have an adequate expiry date (at least a year, or half the shelf life if the expiry date is less than a year)? • Do the goods on offer conform to your 'good selection criteria' (<i>Section 3.2</i>)? • Who will be responsible for the package of inputs required throughout the remaining useful life of the equipment?
Use your normal Acceptance Process (<i>Section 8</i>) as with all other goods	<ul style="list-style-type: none"> • If pre-installation work is required, the recipient should prepare the site and personnel for receiving equipment and notify the donor when all preparations are complete. • When donations are received, the recipient must check packaging for damage. You must make sure that equipment is fully functioning and is supplied with the relevant and agreed manuals, spare parts, consumables, and accessories. You must also check expiry dates and labelling of the recurrent supplies. • The recipient must confirm receipt of donated goods with the donor, including information about the condition and appropriateness of the goods. • The recipient should keep a record of all donations received.
Refuse donations if necessary	<ul style="list-style-type: none"> • Refuse inappropriate donations and provide an explanation of the reasons for refusal. • Keep a record of all donations received that you have not requested, and inform donors of unsolicited donations.

ii. Summary Guidelines for Providers of Donations

If no national donation regulations are available, you can develop your own by referring to the guidelines outlined in *Figure 32*. The guidelines can also be used by potential external support agencies to help them decide whether or not to make a particular donation.

Figure 32: Summary Guidelines for Providers of Donations to Ensure they are Appropriate

Issues	Considerations
Ensure there is a need/request for a donation	<ul style="list-style-type: none"> • Only provide donations in response to requests and expressed needs. • Know or find out about the recipient. • Confirm the need for the donation, and check the recipient's capacity and financial resources to handle donations. • Consider whether a donation of goods is the most appropriate form of support. (In some cases, a cash donation may be more effective. For example, it may be cheaper to procure a hospital bed locally than to transport a donated bed from overseas). • Coordinate your donations with other donors, to ensure there is no duplication.
Involve the recipient	<ul style="list-style-type: none"> • Ensure the equipment conforms to the national/facility Equipment Development Plan, and consult recipients on equipment requirements, and preparation of specifications and purchase documents. • Check donations conform to national requirements regarding selection of equipment. • Check that the recipient provides clear specifications of the items required. • Involve the recipients in the evaluation process and final recommendations on equipment to be purchased for donation. • Before sending donations, obtain consent from the recipient. • Donors should confirm what items are being sent and when these will arrive so that the recipient can plan to receive them.
Only offer good quality products	<ul style="list-style-type: none"> • Donors should make sure that they donate appropriate healthcare technology and supplies. • Equipment should be in full working order and be supplied with all technical documents and enough consumables and spare parts for at least two years. • Check the quality and safety specifications of donated equipment. Donors should avoid supplying equipment that does not meet up-to-date technical and safety specifications. Although, this does not mean the equipment has to be a sophisticated model. • Check with recipients whether the donation is acceptable. If you are offering alternatives, check that these alternatives are acceptable.
Do not forget the additional costs involved in the donation	<ul style="list-style-type: none"> • Clarify and agree who will cover the costs of international and local transport, freight and insurance, warehousing, customs clearance, storage and handling, installation and on-going support costs. • Provide the recipient with detailed information regarding the installation, operation and maintenance of equipment.

iii. Sample Equipment Donation Request Form

If you want an external support agency to donate equipment, you need to fill in some form of request. Box 58 provides a sample of such a form.

BOX 58: Sample Form to Use When Requesting Donations of Equipment

EQUIPMENT DONATION REQUEST
Note: Fill in a form for each type of equipment requested even when several units are needed. Attach sheets with more additional information if there is not enough space on this form
1. Requester Identification: <ul style="list-style-type: none"> - Name of institution - Name of department - Street address - City, state/region - Country, Postal code - Phone, Fax and Email - Contact person and title - Date and signature
2. Equipment Identification: <ul style="list-style-type: none"> - Equipment name - Universal code for the equipment type, if known (such as the UMDNS code) - Clinical applications - Quantity requested - Sample brands and models - Accessories needed
3. Request Justification: <ul style="list-style-type: none"> 3.1 Procedure(s) that will be performed using the requested equipment, with estimated number per month 3.2 Explain why the resources (equipment, methods, procedures etc) presently available are not satisfactory 3.3 When equipment is being requested to complement or replace existing equipment or services, please describe the resources presently available 3.4 Compare the expected demand and the production capacity of the equipment being requested
4. Readiness to Absorb the Technology: <ul style="list-style-type: none"> 4.1 Human resources available (indicate additional training if necessary) 4.2 Material resources (additional equipment and devices needed) 4.3 Space and special installation available or planned 4.4 Maintenance requirements (in-house services, external contracts, etc) 4.5 Financial considerations (for installation, operation and maintenance)

Adapted from: American College of Clinical Engineers, 1995, 'Medical equipment donation request form', ACCE, Chicago, USA

ANNEX 7: SPECIFICATION AND TECHNICAL AND ENVIRONMENTAL DATA

This annex provides:

- ◆ an example of a long generic equipment specification. In *Guide 2* there is an example of a more complex one, for an infant incubator.
- ◆ a sample Technical and Environmental Data Sheet.

i. Generic Equipment Specification

OPERATING TABLE, HYDRAULIC, 4-SECTION

1. APPLICABLE DOCUMENTS

This specification should be read in conjunction with the 'Technical and Environmental Data Sheet', and all goods offered must conform to the details specified in it and be able to function in the prevailing conditions described.

2. REQUIREMENTS

2.1 GENERAL DESCRIPTION

To supply: ONE x general purpose hydraulic operating table, manually operated, to be used in theatre.

2.2 OPERATIONAL REQUIREMENTS

Note: supplier to complete 'Reply' and 'Remarks' sections.

	Reply	Remarks
2.2.1 Four section table top with 360 degree rotation.		
2.2.2 Full length radio-translucent top and X-ray cassette tunnel with cassette tray.		
2.2.3 A mattress divided in sections with an antistatic conductive rubber coating, of at least 5cm thickness.		
2.2.4 Movements available must be the following at a minimum: Trendelenburg forward +15 degrees Trendelenburg reverse - 30 degrees Lateral tilt left and right 15 degrees Head section adjustment + to -45 degrees Leg section adjustment 95 degrees Height adjustment (hydraulic) 71cm-101cm		
2.2.5 All movements to be easily controlled manually by hand or foot.		
2.2.6 The table must have antistatic castors for mobility and brakes for stability during use.		

Continued opposite

2.2 OPERATIONAL REQUIREMENTS (continued)

	Reply	Remarks
2.2.7 The leg section must be removable or collapsible for gynaecological and urological procedures while the top part should be able to transverse (top to bottom) for correct patient positioning.		
2.2.8 Table size to be approximately 55cm x 190 cm.		
2.2.9 The movement and control must be by hydraulic systems, and gas struts.		
2.2.10 The table to have side bars along the full length of both sides for the attachment of accessories.		

2.3 PHYSICAL CHARACTERISTICS

	Reply	Remarks
2.3.1 The table shall have a stainless steel frame and rails.		
2.3.2 The pedestal must also be clad in stainless steel plates for easy cleaning and to prevent water and cleaning fluid from entering the unit.		

2.4 SAFETY FEATURES

	Reply	Remarks
2.4.1 The apparatus must comply with international safety standards.		
2.4.2 The hydraulic and gas strut system must be of sufficient quality to positively maintain any selected position throughout the operation.		

3. ACCESSORIES

	Reply	Remarks
3.1 4 x Accessory clamps, circular socket, Direct-On		
3.2 2 x Accessory clamps, circular socket, End-On		
3.3 2 x Arm Supports, perspex		
3.4 1 x 'D' – shaped ankle pillow		
3.5 1 x Patient restraint strap		
3.6 1 x Narrow arm table		

Continued overleaf

3. ACCESSORIES (continued)

	Reply	Remarks
3.7 1 x Anaesthetic screen with sleeve		
3.8 1 x Pair of shoulder rests, with pads and accessory clamps		
3.9 1 x Pair of spare pads for shoulder rests		
3.10 1 x Pair of lithotomy supports, with sleeves and straps, and accessory clamps		
3.11 1 x Pair of spare sleeves for lithotomy supports		
3.12 1 x Pair of spare straps for lithotomy supports		
3.13 1 x Head stabilizer, doughnut pattern, adult, diameter 20cm x 5cm high and 10cm hole		
3.14 1 x Head stabilizer, doughnut pattern, child, diameter 15cm x 5cm high and 8cm hole		
3.15 1 x X-ray cassette tray suitable for table, end loading with flexible handle, for size of cassette up to 43cm x 34cm, trigger straightens 1.2m handle for loading		
3.16 Container of suitable hydraulic oil if required for initial table assembly.		

4. DOCUMENTATION

	Reply	Remarks
4.1 Supply an operating manual in English for the unit.		
4.2 Supply a service manual in English for the unit.		
4.3 Supply a list of recommended spare parts required for maintenance for the unit, in English.		

5. SPARE PARTS

	Reply	Remarks
5.1 Supply a set of only the recommended essential spare parts for 24 months for maintenance and repair.		
5.2 A list of each of each part and its price must be attached to this offer.		

Continued opposite

6. DELIVERY

	Reply	Remarks
6.1 Package the table, accessories, manuals, and spare parts together in one load.		
6.2 Crate the goods for transport and label it as follows: 1 x machine for health facility X.		
6.3 The cost of freighting the goods by sea and road DDP to health facility X, in country Y must be stated.		
6.4 The cost of insuring the shipment must be stated.		

7. INSTALLATION/COMMISSIONING/TRAINING

	Reply	Remarks
7.1 Full technical guidelines must be provided for table assembly and commissioning by the client.		
7.2 The cost of demonstration of the units and training of health facility staff in the use and maintenance of the machine, by your local representative, must be stated.		

8. WARRANTY

	Reply	Remarks
8.1 A guarantee period must be stated (a minimum of 18 months from the date of shipment).		

9. AFTER SALES SUPPORT

	Reply	Remarks
9.1 After sales support must be available in country Y or in the region, with maintenance capabilities and facilities, and spare parts stock holdings.		
9.2 Details of the availability and location of spare parts must be stated.		
9.3 Details of the availability and location of maintenance facilities must be stated.		
9.4 Details of the cost and terms for maintenance support must be stated.		

Continued overleaf

10. SUMMARY OF PRICES (detailed as follows:)

	Reply (total prices)	Remarks (showing options and alternatives)
1. Basic unit		
2. Accessories as detailed		
3. Documentation		
4. Spare parts for maintenance and repair for 24 months		
5.1 Crating		
5.2 Delivery		
5.3 Insurance		
6.1 Assembly and commissioning instructions		
6.2 Training by local representative		
7 Maintenance support by local representative		

Note: supplier to attach to this summary:

- ◆ *the lists of all accessories, consumables, spare parts, and manuals in the offer, showing their unit and total prices.*
- ◆ *the lists showing the breakdown of travel, accommodation, labour, subsistence, materials, and any other costs for the installation/commissioning/training offered.*
- ◆ *the list showing the breakdown of the rates and costs of travel, accommodation, labour, subsistence, parts, and any other items that apply to the maintenance contract during the warranty period, and post-warranty.*
- ◆ *the details describing after-sales support availability.*

ii. Sample Technical and Environmental Data Sheet for Suppliers

You can provide all tenderers, bidders, or suppliers with Technical and Environmental Information in order to ensure that the equipment they are offering to supply conforms to the prevailing national or local climate and conditions. The sample sheet in *Box 59* contains examples of the sort of entries you could include, which you can modify according to your own situation. Such a data sheet can be developed for a country, a district, or a facility.

BOX 59: Sample Technical and Environmental Data Sheet for Suppliers

Example Entries for Health Facility X	
Electricity Supply	
Source:	Mains / generating set / solar panels / none
Type:	three-phase 550V, 50Hz / 380V, 50Hz single phase 220V, 50Hz etc
Fluctuation:	There is some problem with: <ul style="list-style-type: none"> a) mains fluctuation, approximately ± 10 per cent in both the voltage and frequency supplied b) mains cut-off (black out) c) spikes, not necessarily on the mains supply but when large plant items cut in such as lift motors d) power only available for 2 hours a day etc. Suppliers should check/modify their power supply units if necessary, or state if voltage stabilisers or a UPS is required alongside their products.
Water Supply	
Quality:	Hard water (high mineral or salt content) / soft water / sediment in water/ etc Suppliers should check/modify their equipment with filters, softeners, or descalers if necessary, or state if such units will be required alongside their products.
Pressure:	48psi, mains supply close at hand / pressure unknown – borehole supply / pressure unknown – mains supply to subterranean tank
Problems:	<ul style="list-style-type: none"> ◆ water supplies are frequently cut-off, or the electricity supply to the water pumps is cut off ◆ very low pressure, or machines suddenly being without any water at all. Suppliers should state if a back-up water storage tank or water pump is required with their products

Continued overleaf

BOX 59: Sample Technical and Environmental Data Sheet for Suppliers (continued)

Example Entries for Health Facility X	
Environment	
Height above sea-level:	4,500 – 5,000 feet where the health facility is located. Suppliers should check whether this will affect motors, pressure vessels, etc.
Temperature:	<ul style="list-style-type: none"> ◆ Average temperature in winter inside health facility 16°C ◆ Average temperature in summer inside health facility 32°C ◆ There is no air-conditioning, even in the operating theatres. <p>Suppliers should state if air-conditioning is essential for the correct operation of their products.</p>
Humidity:	<p>High at 80 per cent. / very low and arid</p> <p>Suppliers should check their products and, if necessary, carry out the following actions:</p> <ul style="list-style-type: none"> ◆ tropicalize their printed circuit boards (provide them with a polymerized coating) ◆ replace rubber components which will perish with metal ones ◆ enclose silica gel or use other drying strategies ◆ use cotton not plastic ◆ use stainless steel or epoxy-coated metals which will not rust <p>etc.</p>
Dust:	<p>There are problems with:</p> <ul style="list-style-type: none"> ◆ dust getting into equipment and clogging up filters. <p>Suppliers should consider checking/modifying their equipment with additional course filter protection.</p>
Vermin:	<p>There are problems with:</p> <ul style="list-style-type: none"> ◆ rats chewing through wiring <p>Suppliers should consider checking/modifying their equipment with metal vermin guards.</p>
Manufacturing Quality	
Standards:	Equipment to conform to the relevant International Standards (IEC, ISO), or otherwise to the relevant National Standards, which relate to the safe manufacture of quality medical and hospital equipment.
Language	
Language:	<p>All documents and manuals to be in English / French / Spanish or appropriate language</p> <p>All labels and markings on machines to be in English / French / Spanish or appropriate language.</p>
Level of Technology of Equipment	
Preferences	<ul style="list-style-type: none"> ◆ more manual, less automatic ◆ more electro-mechanical, and less micro-processor controlled ◆ easily used and maintained ◆ robust ◆ to withstand the climate and conditions described above ◆ with technically-skilled after sales support available locally <p>etc.</p>

ANNEX 8: INTERNATIONAL COMMERCIAL TERMS (INCOTERMS) FOR TRANSPORTATION OF TRADE GOODS

Incoterms define the rights and obligations of both the buyer and seller, with respect to:

- ◆ the party responsible for packing, transport, transport insurance, transport/customs clearances and documentation (*Box 60*)
- ◆ the party which pays for these activities (*Box 61*)
- ◆ at which point the responsibility passes from seller to buyer (end of *Box 60*).

This eliminates any possibility of misunderstanding and subsequent disputes.

The purchase contract should specify the specific responsibilities of both the supplier and buyer. The division of costs between the supplier and buyer, shown in *Box 61*, is in accordance with Incoterms. But the rights and obligations under Incoterms can be overridden or expanded by the purchase contract which, when accepted by both parties, will take precedence. For example, under CIF and CIP arrangements, the buyers can request additional insurance to cover the rest of the journey.

BOX 60: Guidance on the Responsibilities of the Seller/Buyer for Incoterms

Responsibility Incoterms	Incoterms abbreviation	Suitable for:	Seller delivers to:	Export Issues: license, authorizations, customs
Ex Works (at a named place)	EXW	All transport modes	Buyer collects at seller premises	Buyer
Free Carrier (to a named place)	FCA	All transport modes	Goods export cleared and delivered to buyer's carrier or another person nominated by the buyer	Supplier
Free Alongside Ship (at a named port of shipment)	FAS	Sea / inland waterway only	Named port of shipment	Supplier
Free On Board (at a named port of shipment)	FOB	Sea / inland waterway only	Named port of shipment	Supplier
Cost and Freight (to a named port of destination)	CFR	Sea / inland waterway only	Named destination port	Supplier
Cost Insurance and Freight (to a named port of destination)	CIF	Sea / inland waterway only	Goods insured and delivered to named destination port	Supplier
Carriage Paid To (a named place of destination)	CPT	All transport modes	Named destination point	Supplier
Carriage and Insurance Paid (to a named place of destination)	CIP	All transport modes	Goods insured & delivered to named destination point	Supplier
Delivered At Frontier (a named place)	DAF	All transport modes	Named frontier	Supplier
Delivered Ex Ship (at a named port of destination)	DES	Sea / inland waterway only	Named destination port	Supplier
Delivered Ex Quay (at a named port of destination)	DEQ	Sea / inland waterway only	Duty paid and delivered to named destination port	Supplier
Delivered Duty Unpaid (to a named place of destination)	DDU	All transport modes	Named destination point	Supplier
Delivered Duty Paid (to a named place of destination)	DDP	All transport modes	Duty paid and delivered to named destination point	Supplier

Continued opposite

BOX 60: Guidance on the Responsibilities of the Seller/Buyer for Incoterms (continued)

Import Issues: license, authorization, customs	Contract of carriage	Contract of insurance i.	Transfer of Risks (loss/ damage) when goods are (notified as):
Buyer	Buyer	Either	Placed at disposal of buyer at named place – supplier's premises
Buyer (including transit through any country)	Buyer	Either	Delivered into the custody of the carrier at named place
Buyer	Buyer	Either	Delivered alongside vessel at named port of shipment
Buyer	Buyer	Either	Passed across ship's rail – named port of shipment
Buyer	Supplier	Either	Passed across ship's rail at port of shipment
Buyer	Supplier	Supplier	Passed across ship's rail at port of shipment
Buyer	Supplier	Either	Delivered to first carrier's custody
Buyer	Supplier	Supplier	Delivered to first carrier's custody
Buyer	Supplier	Either	Delivered to named place of delivery at the frontier
Buyer	Supplier	Either	On board vessel at usual unloading point in named destination port
Buyer	Supplier	Either	Placed at disposal of buyer on quay at destination port
Buyer	Supplier	Either	Placed at disposal of buyer at named destination point
Supplier	Supplier	Either	Placed at disposal of buyer at named destination point

i. Where shown as 'either' (supplier or buyer), the purchase contract should specify who will take out insurance.

BOX 61: Guidance on the Division of Costs Between the Seller/Buyer for Incoterms

<div>Division of Costs</div> <div>Incoterms</div>	Inco-terms abbrevi-ation	Checking, packaging, marking of goods	Export Issues: license, authoriz-ations, customs	Pre-shipment Inspection (PSI ii.) – if applicable	Pre-carriage – delivery to main carrier (inc. forwarder)	Loading charges (export)
Ex Works (at a named place)	EXW	Supplier	Buyer	Buyer	Buyer	Buyer
Free Carrier (to a named place)	FCA	Supplier	Supplier	Buyer	Supplier	Subject to named place of delivery
Free Alongside Ship (at a named port of shipment)	FAS	Supplier	Supplier	Buyer	Supplier	Buyer
Free On Board (at a named port of shipment)	FOB	Supplier	Supplier	Buyer	Supplier	Supplier
Cost and Freight (to a named port of destination)	CFR	Supplier	Supplier	Buyer	Supplier	Supplier
Cost Insurance and Freight (to a named port of destination)	CIF	Supplier	Supplier	Buyer	Supplier	Supplier
Carriage Paid To (a named place of destination)	CPT	Supplier	Supplier	Buyer	Supplier	Supplier
Carriage and Insurance Paid (to a named place of destination)	CIP	Supplier	Supplier	Buyer	Supplier	Supplier
Delivered At Frontier (a named place)	DAF	Supplier	Supplier	Buyer	Supplier	Supplier
Delivered Ex Ship (at a named port of destination)	DES	Supplier	Supplier	Buyer	Supplier	Supplier
Delivered Ex Quay (at a named port of destination)	DEQ	Supplier	Supplier	Buyer	Supplier	Supplier
Delivered Duty Unpaid (to a named place of destination)	DDU	Supplier	Supplier	Buyer	Supplier	Supplier
Delivered Duty Paid (to a named place of destination)	DDP	Supplier	Supplier	Buyer	Supplier	Supplier

i. Where shown as 'either' (supplier or buyer), the purchase contract should specify who will take out insurance.

Continued opposite

BOX 61: Guidance on the Division of Costs Between the Seller/Buyer for Incoterms (continued)

Provision of transport document (or EDI iii.)	Freight charge(s) – main contract of carriage	Unloading charges	Import Issues: license, authorization, customs	Import Duty (if applicable)	On-carriage – delivery to named frontier/ destination point or place	Insurance i
Buyer	Buyer	Buyer	Buyer	Buyer	Buyer	Either
Supplier	Buyer	Buyer	Buyer	Buyer	Buyer	Either
Supplier	Buyer	Buyer	Buyer	Buyer	Buyer	Either
Supplier	Buyer	Buyer	Buyer	Buyer	Buyer	Either
Supplier	Supplier	Buyer	Buyer	Buyer	Buyer	Either
Supplier	Supplier	Buyer	Buyer	Buyer	Buyer	Supplier
Supplier	Supplier	Buyer	Buyer	Buyer	Buyer	Either
Supplier	Supplier	Buyer	Buyer	Buyer	Buyer	Supplier
Supplier	Supplier	Buyer	Buyer	Buyer	Buyer	Either
Supplier	Supplier	Buyer	Buyer	Buyer	Buyer	Either
Supplier	Supplier	Supplier	Buyer	Supplier	Buyer	Either
Supplier	Supplier	Buyer	Buyer	Buyer	Supplier	Either
Supplier	Supplier	Buyer	Supplier (buyer assists)	Supplier	Supplier	Either

ii. The buyer must pay the cost of Pre-Shipment Inspection, except when such inspection is mandated by authority of the country of export. iii. EDI – electronic data interchange (an electronic format for doing electronic transactions).

ANNEX 9: SAMPLE ACCEPTANCE TEST LOGSHEET FOR EQUIPMENT

ACCEPTANCE TEST LOGSHEET

Only when this form has been satisfactorily completed should the Registration Box be filled in by the HTM Manager.

REGISTRATION BOX

ALLOCATED INVENTORY NUMBER

EQUIPMENT TYPE

DESTINATION LOCATION

ACCEPTANCE DATE

WARRANTY EXPIRY DATE

MAINTENANCE CONTRACT WITH

HEALTH FACILITY

NAME OF EQUIPMENT

TYPE/MODEL

ORDER NUMBER SERIAL NUMBER

COST IN US\$ DATE RECEIVED

FUNDING SOURCE

MANUFACTURER SUPPLIER/AGENT

ADDRESS ADDRESS

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PHONE PHONE

FAX FAX

DETAILS OF ALL ACCESSORIES, CONSUMABLES, SPARE PARTS AND MANUALS RECEIVED
ARE LISTED ON PAGE SIX OF THIS FORM.

ACCEPTANCE CHECKS**1. DELIVERY**

Undertaken by:

Witnessed by: Name Position Date

	Yes/ done	No/ not done	Corrected if applicable
a) Representative of supplier present?
b) Correct number of boxes received?
c) After unloading, visible damage to the boxes?
d) If damaged, has this been stated on the delivery note and senior management informed?

Comments

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2. UNPACKING (refer to invoices and shipping documents)

Undertaken by:

Witnessed by: Name Position Date

	Yes/ done	No/ not done	Corrected if applicable
a) Visible damage to the equipment?
b) Equipment complete as ordered?
c) User/operator manual as ordered?
d) Service/technical manual as ordered?
e) Accessories as ordered?
f) Consumables as ordered?
g) Spare parts as ordered?

Comments

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3. ASSEMBLY (refer to manuals)

Undertaken by:

Witnessed by: Name Position Date

	Yes/ done	No/ not done	Corrected if applicable
a) Are all parts available?
b) Do they fit together?
c) Mains lead with plug included?
d) Do all the accessories fit?			
e) Are markings and labels OK?
f) Any damage?

Comments

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4. INSTALLATION (refer to manuals)

Undertaken by:

Witnessed by: Name Position Date

	Yes/ done	No/ not done	Corrected if applicable
a) Was the work carried out satisfactorily?
b) Were technical staff present as learners?

Comments

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5. COMMISSIONING/TESTING

Undertaken by:

Witnessed by: Name Position Date

	Yes/ done	No/ not done	Corrected if applicable
a) Were electrical, mechanical, gas, radiation safety tests and performance checks carried out in accordance with the test sheets on pages 7 to 9 of this form?
b) Was the work carried out satisfactorily?
c) Were technical staff present as learners?
d) Were operators present as learners?			

Comments

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6. ACCEPTANCE – to be certified by the HTM Manager only

	Yes/ done	No/ not done	Corrected if applicable
a) Is the equipment accepted?
b) If rejected, have the shortcomings been summarized on page 10 of this form?			
c) If so, has a report gone to senior management and formal complaints procedures started?
d) Should payment be withheld pending corrections?
e) Is payment approved?

Comments

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7. TRAINING

Undertaken by:

Witnessed by: Name Position Date

	Yes/ done	No/ not done	Corrected if applicable
a) Were the expected training courses given?
b) Were the training courses satisfactory?
c) Were suitable operators present?
d) Were suitable technical staff present?

Comments

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8. REGISTRATION – to be undertaken by the HTM Manager

	Yes/ done	No/ not done	Corrected if applicable
a) If accepted, has an inventory number been allocated?
b) Has the Registration Box on Page 1 of this form been filled in?
c) Has the Stores Controller been provided with the location for the equipment and all necessary data, so that the Stores Receiving Procedure can be followed and a Goods Received Note completed?
d) Have the accessories, consumables, spare parts, and manuals all been issued to the correct holding authorities?

NAME

SIGNATURE

DATE

NOW PLACE THIS FORM AS THE FIRST RECORD IN THE EQUIPMENT FILE/SERVICE HISTORY
(see *Guide 5*)

Describe and quantify all items received, and complete a Register of New Stocks form (see *Annex 11*):

ACCESSORIES RECEIVED

- | | |
|----|----|
| 1. | 2. |
| 3. | 4. |
| 5. | 6. |
| 7. | 8. |

CONSUMABLES RECEIVED

- | | |
|----|----|
| 1. | 2. |
| 3. | 4. |
| 5. | 6. |
| 7. | 8. |

SPARE PARTS RECEIVED

- | | |
|----|----|
| 1. | 2. |
| 3. | 4. |
| 5. | 6. |
| 7. | 8. |

MANUALS RECEIVED

- | | |
|----|----|
| 1. | 2. |
| 3. | 4. |

COMMISSIONING/TESTING PROCEDURES (see manuals and relevant technical standards)**i. ELECTRICAL INTEGRITY TESTS**

Undertaken by:

Witnessed by: Name Position Date

Classification (applies to medical equipment only)

Fill as applicable

- a) Class I - II - III?
- b) Type B - BF - CF?
- c) Type AP - APG?

	Yes/ done	No/ not done	Corrected if applicable
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Mains Connection

- | | | | |
|----------------------------------------------|-------|-------|-------|
| a) Are cables and plugs intact? | | | |
| b) Is cable colour code correctly connected? | | | |
| c) Are connectors intact? | ..... | ..... | ..... |
| d) Are the fuses correct? | ..... | ..... | ..... |
| e) Is equipment protection correct? | ..... | ..... | ..... |
| f) Is voltage setting correct? | ..... | ..... | ..... |
| g) Is there an earth terminal? | ..... | ..... | ..... |

Electrical Measurements with Safety Tester

- | | | | |
|--------------------------------------------|-------|-------|-------|
| a) Is protective earth continuity correct? | ..... | ..... | ..... |
| b) Is insulation resistance correct? | ..... | ..... | ..... |
| c) Are the leakage currents correct? | | | |
| d) Is the voltage measurement correct? | | | |

Comments

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ii. MECHANICAL INTEGRITY TESTS

Undertaken by:

Witnessed by: Name Position Date

	Yes/ done	No/ not done	Corrected if applicable
a) Are knobs and switches intact?
b) Do the wheels/castors move?
c) Are the handles intact?
d) Are the mechanical movements okay?

Comments

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iii. GAS INTEGRITY TESTS

Undertaken by:

Witnessed by: Name Position Date

	Yes/ done	No/ not done	Corrected if applicable
a) Are the cylinders full?
b) Are appropriate gauges available?
c) Is there a cylinder key?
d) Is the pressure reading correct?
e) Is the cylinder colour code correct?
f) Are the hoses and fittings correct?
g) Is the system leaking?

Comments

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iv. RADIATION INTEGRITY TESTS**Undertaken by:****Witnessed by:** Name Position Date

	Yes/ done	No/ not done	Corrected if applicable
a) Is the kV calibration correct?
b) Is the mAs calibrated correctly?
c) Was the line voltage compensation performed?
d) Was the exposure test correct?
e) Were the step wedge test results correct?
f) Were the small and large focus calibrations done?

Comments

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v. PERFORMANCE TESTS (see manuals for manufacturer's recommendations)**Undertaken by:****Witnessed by:** Name Position Date

	Yes/ done	No/ not done	Corrected if applicable
Note: carry out all operational tests as specified by the manufacturer			
a) Are the function verification tests correct?
b) Is the equipment calibration acceptable?

Comments

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FAULT REPORT – to be completed by a member of the Commissioning Team
(describe any shortcomings with the equipment or services provided)

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NAME

SIGNATURE

DATE

ANNEX 10: EQUIPMENT DATA TO RECORD

There is no hard and fast rule about the location for storing particular pieces of information. However, the decision should be made based on practical considerations. The Equipment Inventory, which may be kept manually or entered in a computer, needs to be easily updated. The Record Sheet for taking the inventory has limited space, and the staff taking the inventory must be able to find most of the information required on the actual piece of equipment being inventoried. Therefore you must prioritize the most useful information to keep on the inventory. All other relevant data can be kept in the maintenance file for the equipment. See *Guide 2* on planning and budgeting for details of designing your Equipment Inventory.

Data to Record on the Equipment Inventory

As a minimum the following data should be gathered when taking an equipment inventory:

- ◆ date inventory taken
- ◆ health facility name
- ◆ department
- ◆ section
- ◆ location/room where equipment is used
- ◆ type of equipment
- ◆ inventory code number (your own number)
- ◆ name of manufacturer
- ◆ model name and/or number
- ◆ manufacturer's serial number (factory number)
- ◆ year made or bought
- ◆ supplier bought from
- ◆ status/condition
- ◆ your property or leased.

Other information about the equipment should also be kept on file, but does not necessarily have to form part of the inventory (see below).

Other Types of Equipment Information to Keep

Additional information about the equipment should be gathered from manuals, invoices, contracts, and delivery documents. This data should be kept in the maintenance service history of the equipment – the Equipment File (see *Guide 5*), and includes:

- ◆ the address of the manufacturer and local agents
- ◆ the address of the supplier and local representative
- ◆ technical ratings
- ◆ when the warranty expires
- ◆ the price paid
- ◆ any external funding agency involved
- ◆ stocks of consumables, accessories, and spare parts received
- ◆ results of inspection tests undertaken on commissioning
- ◆ the frequency of PPM required
- ◆ details of any maintenance contract and maintenance contractor
- ◆ maintenance history.

ANNEX 11: STORES FORMS

Whenever new equipment and its equipment-related supplies arrive, the Commissioning Team should enter relevant details onto a Register of New Stocks form (shown in *Figure 33* over page) which is handed over to the Stores Controller so that he has sufficient information to make them a part of the stores system. The Stores Controller must complete a Goods Received Note for all equipment and supplies received (shown in *Figure 34* over page).

For the bulk stocks of equipment-related supplies (that arrive with new equipment) and the regular recurrent orders for these supplies, stores staff will allocate them their correct stores code numbers. The stores staff registers each type of item on a Stock Card (bin card) that is stored with the items on labelled shelves. The type of information that should be recorded for re-ordering purposes is shown in *Figure 35*.

Figure 35: Sample Stock Card (Bin Card)

Stock Card (Bin Card)						
Item description:					Card no:	
Unit/pack size:			Cost:		Item code no:	
Maximum level:			Minimum/Reorder level:		Location:	
Reserve stock level:			Order quantity:		Lead time:	
Date	Received from/ issued to	No. received	No. issued	New balance	Remarks	Signature

Once a month the information on the stock cards is transferred to a Stock Control Ledger (stores record book). It is simpler to make an order using the summary in the stock control ledger than using all the individual stock cards. The stock control ledger is also a useful tool for analyzing stock management and reviewing the accuracy of stock levels. *Figure 36* shows two different sample layouts for the ledger.

Figure 36: Sample Layouts for the Stock Control Ledger

Stock Control Ledger					
Item description:			Item code no:		
Unit/pack size:			Order quantity:		
Date	Quantity received	Quantity used	Balance	Quantity to order	Signature

Example 2:

Stock Control Ledger						
Item description:			Item code no:			
Unit/pack size:			Order quantity:			
Date	Previous count (physical)	Amount received	Amount used	Present count (physical)	Quantity to order	Signature

When ordering supplies from some form of health service store, staff use a Stores Requisition and Issue Voucher (see *Figure 37* over page). It acts as both a requisition voucher for goods from stores and a record of the items issued. Its multiple copies can be used by both the user department as a record of the goods ordered and by stores staff for stock management purposes. When ordering supplies from suppliers, a Purchase Order is used (see *Figure 38* over page).

Figure 33: Example of a Register of New Stocks Form

Register of New Stocks Form						
To be completed by the Commissioning Team				To be completed by the Stores Controller		
Type of stock	Description	Part number	Quantity		Unit price (US \$)	Stores Code
			Expected	Arrived		
1. Equipment Type: Manufacturer: Local supplier:	Single-bottle Suction pump, model: VP25 Eschmann Bros and Walsh Ltd Address: Peter Road, Lancing, West Sussex, BN15 8TJ, UK Tel: 00 44 1903 753322, Fax: 00 44 1903 767841 None	82-157-07	3	3	715.00	
2. Accessories and consumables already given to users during commissioning	Polysulfone jars, two-litre Rubber type jar top assembly Sealed disposable bacterial filter Connecting tube Right-angled connector	744093 743057	3 3 6 3 3	3 3 6 3 3	68.35 62.16	
3. Consumables	Sealed disposable bacterial filter (4 x box of 10)	82-961-70	3	3	62.40	
4. Spare parts	Disposable hydrophobic filters Suction tubing, anti-static neoprene 6.35mm id (per metre) Fuse 2-Amp delay 034-342 Jar top assembly (VP458) Filter assembly 3413/Y Vacuum control valve Vacuum gauge Semi rotary switch green new type Poly jar Right-angled connector (filter to tube) O-ring Diaphragm Valve assembly Plate, upper diaphragm Connector, inlet/exhaust Plate, lower diaphragm Screw M6 x 57 Float valve cage assembly Valve seat, rubber, float valve Tubing, neoprene 6.53mm id (per metre)	82-929-14 696766 712954 711776 712949 743077 696499 744093 745261 743044 745259 743043 745258 745267 743042 733589 733506 710828	9 6m 6 3 6 6 3 4 10 4 2 4 2 2 2 2 4 6m	9 6 3 6 0 3 0 4 10 0 0 0 0 0 0 0 0 0	3.75 1.85 86.95 15.40 1.50 33.60 16.85 68.35	

Figure 34: Sample Goods Received Note

Health facility

Goods Received Note

Serial number

Supplier:

Invoice/Delivery note number:

Date:

Order number:

Location:

Allocation:

(from originating order)

(accompanying the goods)

(Department to be charged)

	Description of goods	Unit	Price	Quantity ordered	Quantity received	Expiry date	Comments
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							

The items listed above were received in good order, per the specifications set out in the originating order referred to above. Any discrepancies are noted under comments.

Received by : (first person)

Checked by : (second person - from stores)

1. Supplier's copy

2. Accounts department

3. Stores copy

4. Fast copy (remains in book)

Figure 37: Sample Stores Requisition and Issue Voucher

Store Requisition and Issue Voucher							
Health facility		Serial number					
Requesting department		Date					
Requested by (Officer)		Authorized by (Department Head)					
	Stores code No.	Description	Unit of issue	Quantity		Cost	
				Ordered	Supplied	Unit	Total
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
				Total cost			
Approved by (Budget holder)		Issued by (Stores)		Date			
		Collected by (Requesting officer)		Date			
Copies: 1. Requesting department 2. Stores file 3. Fast copy (remains in book)							

Figure 38: Sample Purchase Order Form

Purchase Order						
Organization		Serial number		Stamp of Issuing Officer		
To (Supplier)		Date of contract/quote				
Despatch to (Facility/Dept.)		Submitted for payment to (Dept.)				
		Allocation/Expense heading				
Item	Quantity	Description	Part no./ Stores code	Rate or Unit price	Amount	Remarks
Price based on/ includes			Sub-total			
		i) Collection from:	Less discount			
		ii) Delivered by road to:	Net			
		iii) Delivered by rail to:	Transport			
		iv) Delivered by air to:	TOTAL			
		v) Other/specify:				
Signature of issuing officer		Approved by		Date		
Title of issuing officer		Title of authorizing officer		(Director/Administrator)		
Copies: 1. Supplier 2. Stores 3. Finance 4. Fast copy (remains in book)		On receipt		Signature of receiving officer		
				Date		
				Discrepancy report no.		

ANNEX 12: SOURCE MATERIAL/BIBLIOGRAPHY

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