GLOBAL CLINICAL ENGINEERING ALLIANCE™

SEPTEMBER 29
6:00-7:00 PM UTC

WEBINAR

Why GCEA is important for our Profession

MLADEN POLUTA

GCEA Founders Council Member and Director of Health Technology at Western Cape Department of Health, South Africa

STEFANO BERGAMASCO

IFMBE CED Secretary, GCEA Founders Council Member, and Italian Association of Clinical Engineers, Italy

YADIN DAVID

GCEA Interim President, Founders Council Member, and Global CE Journal Editor-In-Chief, USA

TOM JUDD

IFMBE CED Board Chair and GCEA Founders Council Member, USA

REGISTER FOR FREE
https://bit.ly/3ke5pnC

Why the Global Clinical Engineering Alliance (GCEA) Is Important

Dr. Yadin David, Ed.D., P.E., C.C.E., C.N.A.F.E.

Editor-in-Chief, Global Clinical Engineering Journal www.globalce.org

Founders Council, Global Clinical Engineering Alliance www.GlobalCEA.org

President, Biomedical Engineering Consultants, LLC www.BiomedEng.com

Ass. Prof. (adj.), University of Texas School of Public Health https://sph.uth.edu/about/deans-note

Our challenge

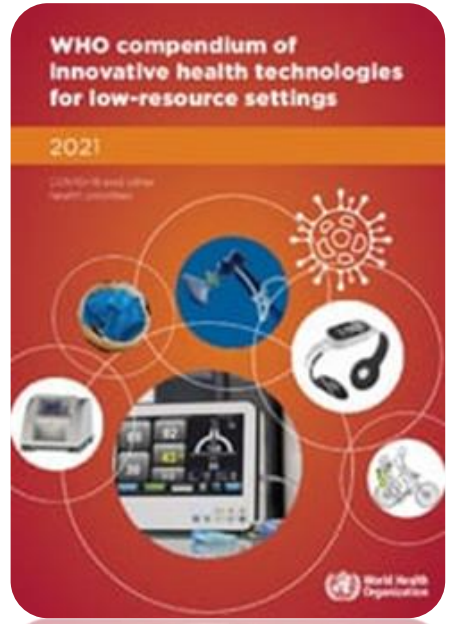
- Becoming and sustaining a profession
- Educate health & wellness related community about our scope of expertise (BoK and BoP)
- Advocate academic education, training and credentialing programs towards future thinking of problem-solving methodologies
- Strengthening capacity for engaging with policy, regulatory & decision makers regarding safety, quality, accessibility, performance and effectiveness of health technology life cycles and its management
- Understand the relationship between patient (customer) experience and technological tools performance through collaborations with other stake-holders
- Demonstrate benefits derived from guiding funds to applied point-of-care research
- Build and expand representation in and engagement with regional/international technical bodies developing and adopting standards, regulations, guidelines & recommendations in healthcare technologies and systems (ISO, IEC, ANSI, ITU, CISPR, IEEE, CEN, WHO)
- Build recognition & impact through uniquely dedicated clinical engineering organization

Global Clinical Engineering Alliance (GCEA)

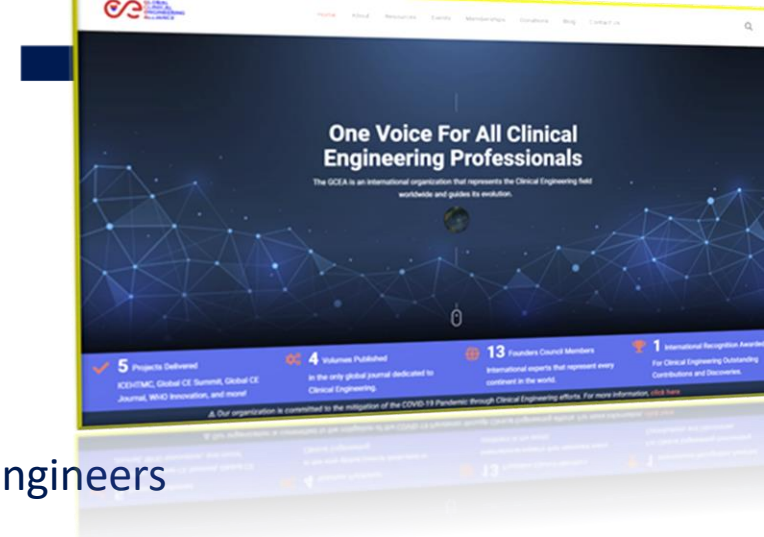
- A registered not-for-profit organization created by Clinical Engineers for CE (from every continent - North & South America, Europe, Africa, and Asia)
- Uniquely dedicated to the Clinical Engineering field (engineers, technologists, technicians)
- Aims to Maximized the benefits from healthcare technology and Clinical Engineering practitioners for the benefit of patients and their care providers, while minimizing the technology risks and costs. (credit Professor Dan Clark, UK). To increase information exchange, build capacity and expertise and promote awareness of the CE field
- Provides international networking between and across healthcare stake holders (including patients), associations, global agencies, governments, academia, and industry, that leverage knowledge, competence, recognition, professional service, to empower optimal improvement in patient experience everywhere
- Created a not-for-profit Foundation to encourage funding of collaborative research and studies of point-of-care engineering and technology issues

Global Clinical Engineering Alliance (GCEA)

- Initiated education program (webinars and courses) that clarifies the link between technology, engineering and patient's outcomes
- Completed international review of technological innovations addressing COVID-19 needs in LMICs for WHO Compendium 2021
- Maintains COVID-19 vetted publications (with CED) in promoting and supporting of CE community https://www.globalcea.org/hcu
- Established & posted an international recognition program, with a global call-for-nominations, for Collaborative Capacity Building Award that recognizes excellence in international Clinical Engineering collaboration programs
- Lead professional tenets that include Global Clinical Engineering Summit, Global Clinical Engineering Day, Global Clinical Engineering Journal, International Clinical Engineering & Health Technology Management Congresses (the 4th ICEHTMC)
- Collaborating with IFMBE/CED on the establishment of common professional thresholds intended for global CE certification program



Global Clinical Engineering Alliance



Vision for professional Future

- The only international organization that created by, for, and governed by Clinical Engineers
- Presents unified voice thus acts as Professional organization uniquely qualified to represent the common interests of clinical engineering practitioners everywhere
- Develops & publishes surveys/consensus on clinical engineering role and advocating recognition of the unique contributions made by CEs to improve healthcare programs' outcomes
- Through inspiring leadership, will create alliances with other healthcare professions to optimally serve patients' and system's interests, and Engage them with International Congress of Clinical Engineering and Health Technology Management, the Global Clinical Engineering Summit, the Global Clinical Engineering Journal, and now the Global Clinical Engineering Alliance.
- COVID-19, sadly & unfortunately, taught us that no one is an island, that we need to be better connected for the next disaster, and to Promote professional education and credentialing standards so we will become equal member of the healthcare & wellness team. Join GCEA Because….

Together we can make it better!

GLOBAL CLINICAL ENGINEERING ALLIANCE

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9. David Yadin , Saide Calil, Nicolas Pallikarakis, Mladen Poluta, Stefano Bergamasco, Daniel Clark, Tom Judd, James Wear, Keiko Fukuta, Shauna Mullally, Wayne Morse Global Clinical Engineering Journal, Vol. 4, No. 2, June 1, 2021 Is Clinical Engineering an Occupation or Profession

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Thank you!

תודה!

XieXie!

Obrigada!

Grazie!

Gracias!

Ευχαριστώ!

ありがとうございました!

Yadin David

David@biomedeng.com

Why GCEA is important for our profession

Why did AIIC join GCEA?

Stefano Bergamasco, Italian Clinical Engineers Association – GCEA – IFMBE/CED

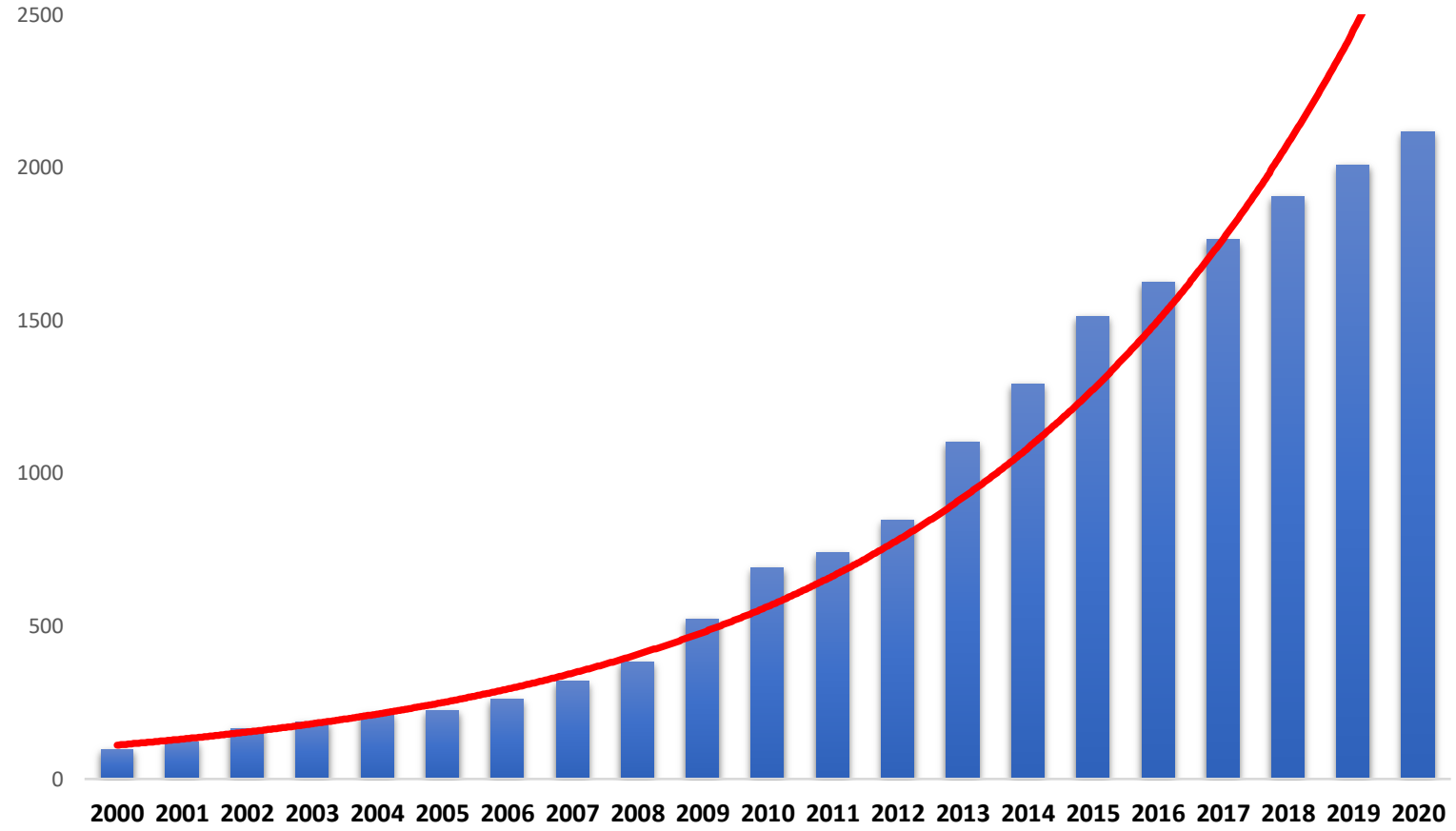
The Italian Clinical Engineers Association

- AIIC was founded in 1993 and aims to contribute to the dissemination of knowledge and the advancement of scientific, technical and organizational knowledge in the field of Clinical Engineering. In particular, the Association protects the professional figure of the Clinical Engineer and has the purpose of disseminating Clinical Engineering Services within healthcare structures as a governing element of healthcare technologies.
- AIIC has 6 board members + President and Past-president, and has 30 regional delegates

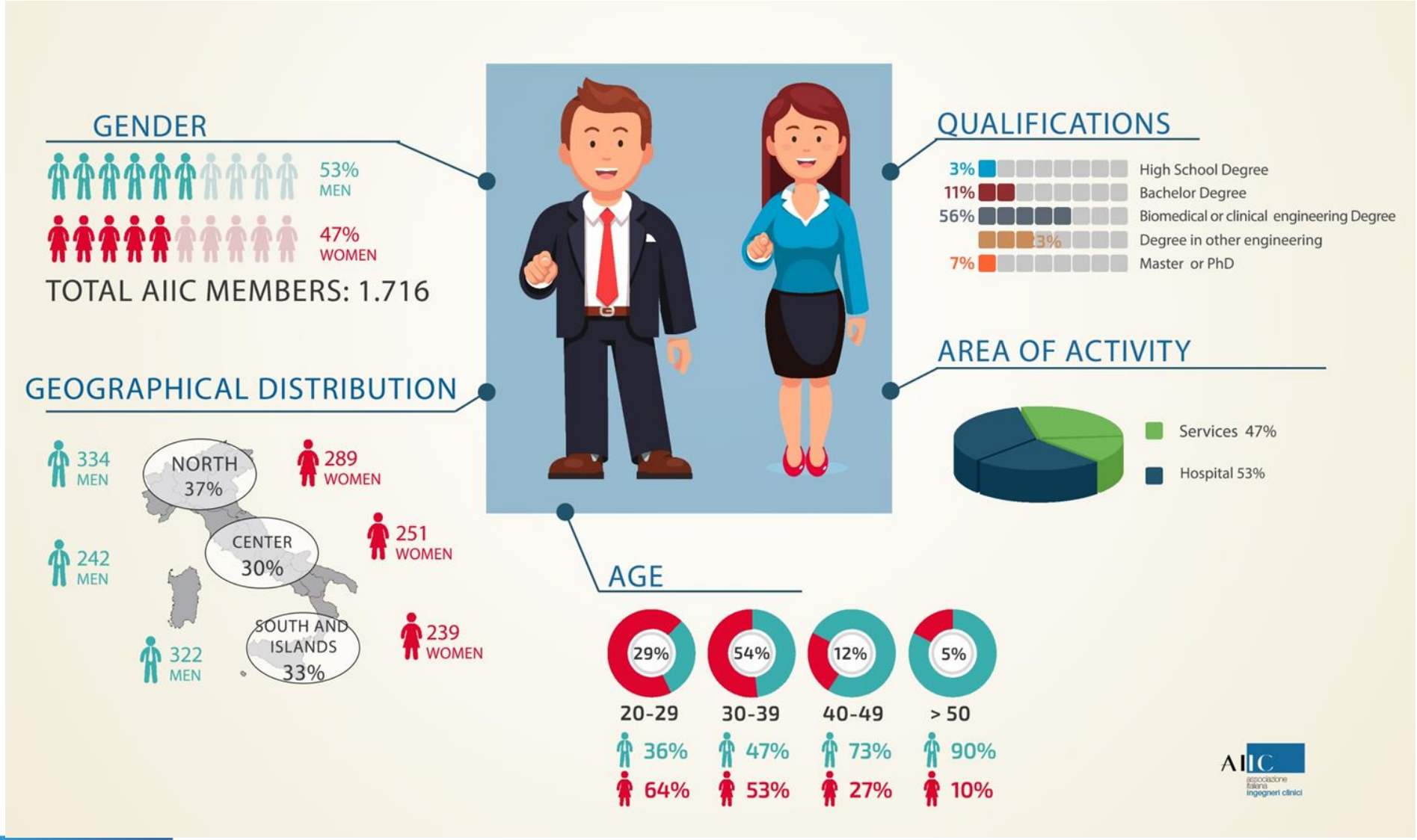
AIIC
associazione
italiana
ingegneri clinici

AIIC members growth

AIIC members



AIIC members identikit



AIIC committees

- Members' management
- Organization of congresses/conferences
- Relationship with the National Council of Engineers
- Training
- Health Technology Assessment
- Telemedicine
- Information & Communication Technology
- **International activities**

- + a series of thematic working groups

AIIC strategic goals

- Partnerships (with Universities, Industry, Institutions, …)
- Professional development (webinars, training courses, …)
- Professional recognition
- Research and data analysis
- Growth of the association

AIIC international activities

- AIIC is affiliated to **IFMBE** (2 CED board members, 8 CED collaborators), **EAMBES**, and now **GCEA**
- AIIC is promoting the creation of a **European Clinical Engineering Federation**
- Active participation to the **Global CE Day**
- ICEHTM 2015: **Clinical Engineering Teamwork Award**
- Collaboration with **CERN** (European Organization for Nuclear Research) and **WHO** (World Health Organization)
- III International Clinical Engineering and Health Technology Managenement Congress – **ICEHTMC, 21-22/10/2019 in Rome**
- 2021 ACCE/HTF **International Organization Award**

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AIIC strategic goals and current international activities are aligned with the founding principles of GCEA

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Why was GCEA created?

Join us

- For Clinical Engineering (CE) Professionals to be recognized for their unique contribution to healthcare delivery.
- To combine strength and leverage for change, engaging national society leaders to address healthcare challenges, and provide networking across societies.
- To improve harmonization and promotion of international CE education.
- To provide a platform to discuss & address challenging healthcare issues.
- To contribute to the definition of laws and regulations worldwide in the field of medical technology.
- To encourage CE practices and processes.

This is a common experience with other national clinical engineering associations

TOWARDS AN EUROPEAN CLINICAL ENGINEERING ASSOCIATION

Stefano Bergamasco – Chair - AIIC Associazione Italiana Ingegneri Clinici/GCEA Global Clinical Engineering Alliance, Palmanova – ITALY
Yadin David - Co-Chair - Global Clinical Engineering Alliance GCEA, Houston – USA

ITALY - Umberto Nocco - AIIC Associazione Italiana Ingegneri Clinici
FRANCE - Christophe Parret AFIB Association Francaise des Ingenieurs Biomedicaux
GERMANY - Frank Rothe FBMT Fachverband Biomedizinische Technik
SPAIN - Raquel Canovas Paradell - SEEIC Sociedad Española de Electromedicina e Ingeniería Clínica
IRELAND - Brian Kearney - BEAI Biomedical/Clinical Engineering Association of Ireland
HOLLAND - Roland Loeffen - BMTZ BioMedische Technologen in de Zorg
GREECE - Aris Dermitzakis - ELEVIT Hellenic Society of Biomedical Technology
BOSNIA AND HERZEGOVINA - Lejla Gurbeta Pokvic - DMBIUBIH Bosnia and Herzegovina Medical and Biological Engineering Society

Key messages from the speakers (-> need of international relationships)

- Recognition of the clinical engineering profession
- Provide support to each other
- Exchange of knowledge
- Standardization and dissemination of maintenance and regulatory guidelines
- Need for the voice of CEs to be heard (by hospital administrators, politicians, general public)
- Increase lobbying and legislation for CEs
- Need to fight disinformation
- Need to improve collaboration at local, national, international level

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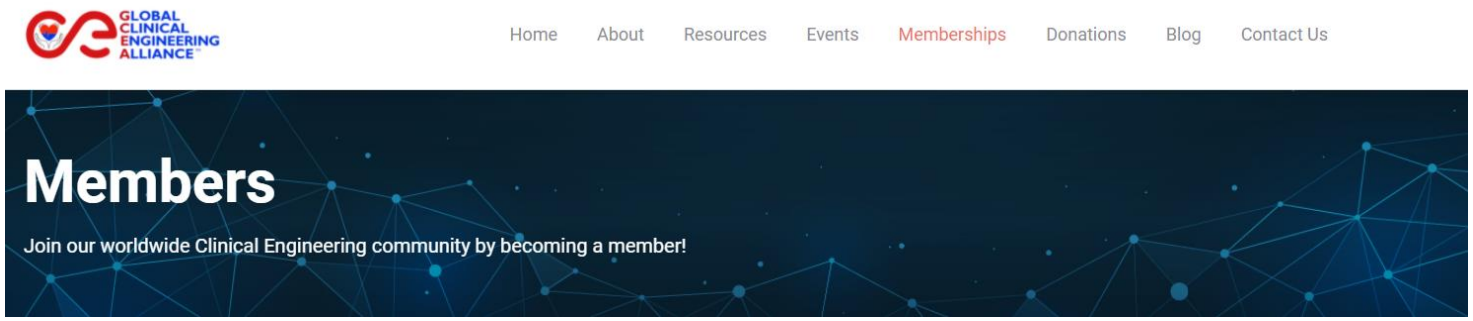
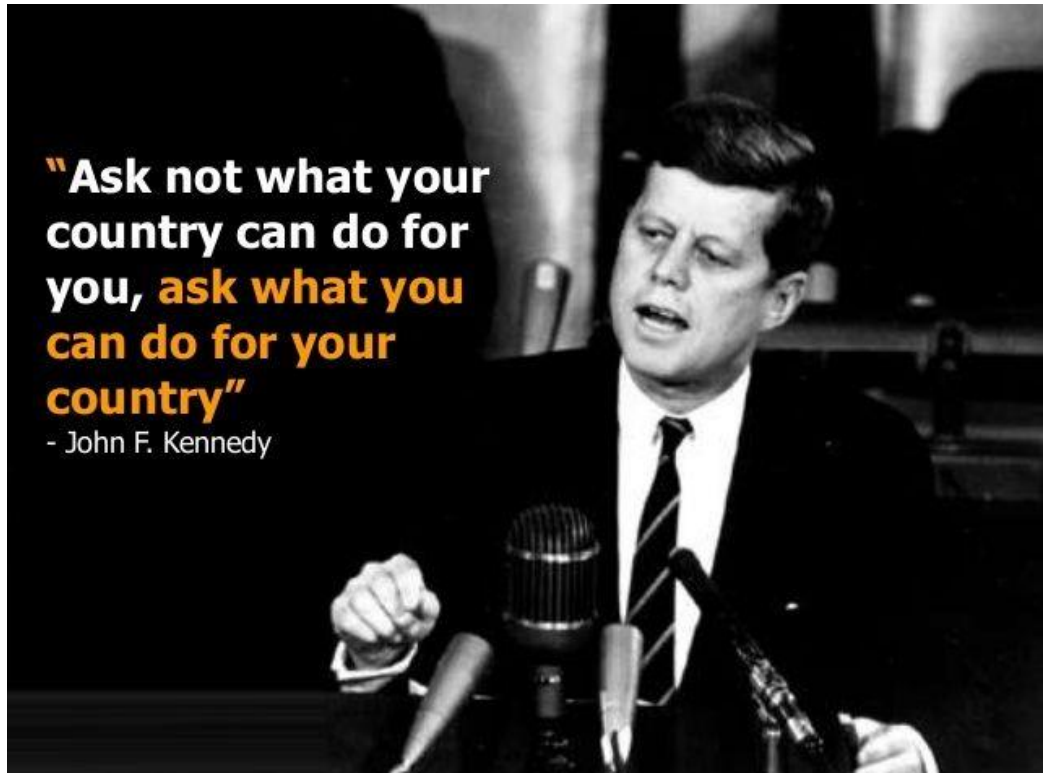
AIIC joined GCEA as one of the first affiliated organizations



Process completed in September 2021

(easy registration form and quick response from GCEA)

AIIC has the resources (active members, international committee) and the experience to provide value to GCEA



AIIC will benefit from GCEA membership AND will contribute to GCEA for the benefit of all member organizations

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AIIC invitation and call for action to other clinical engineering associations

Join **NOW**! It is important to give GCEA the strenght it needs to start operating in an effective way

Any association, big or small, can join and be part of GCEA. No special efforts are required (**it's all voluntary work!**)

We can work at **regional level** (e.g. European Clinical Engineering Federation) and at **global level** (GCEA) at the same time. General goals are perfectly aligned; specific objectives and strategies can be different; time and effort based on priorities

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Thank you!

Stefano Bergamasco

stefano.bergamasco@medtechprojects.com

Why GCEA is Important to Our Profession

A Systems Perspective

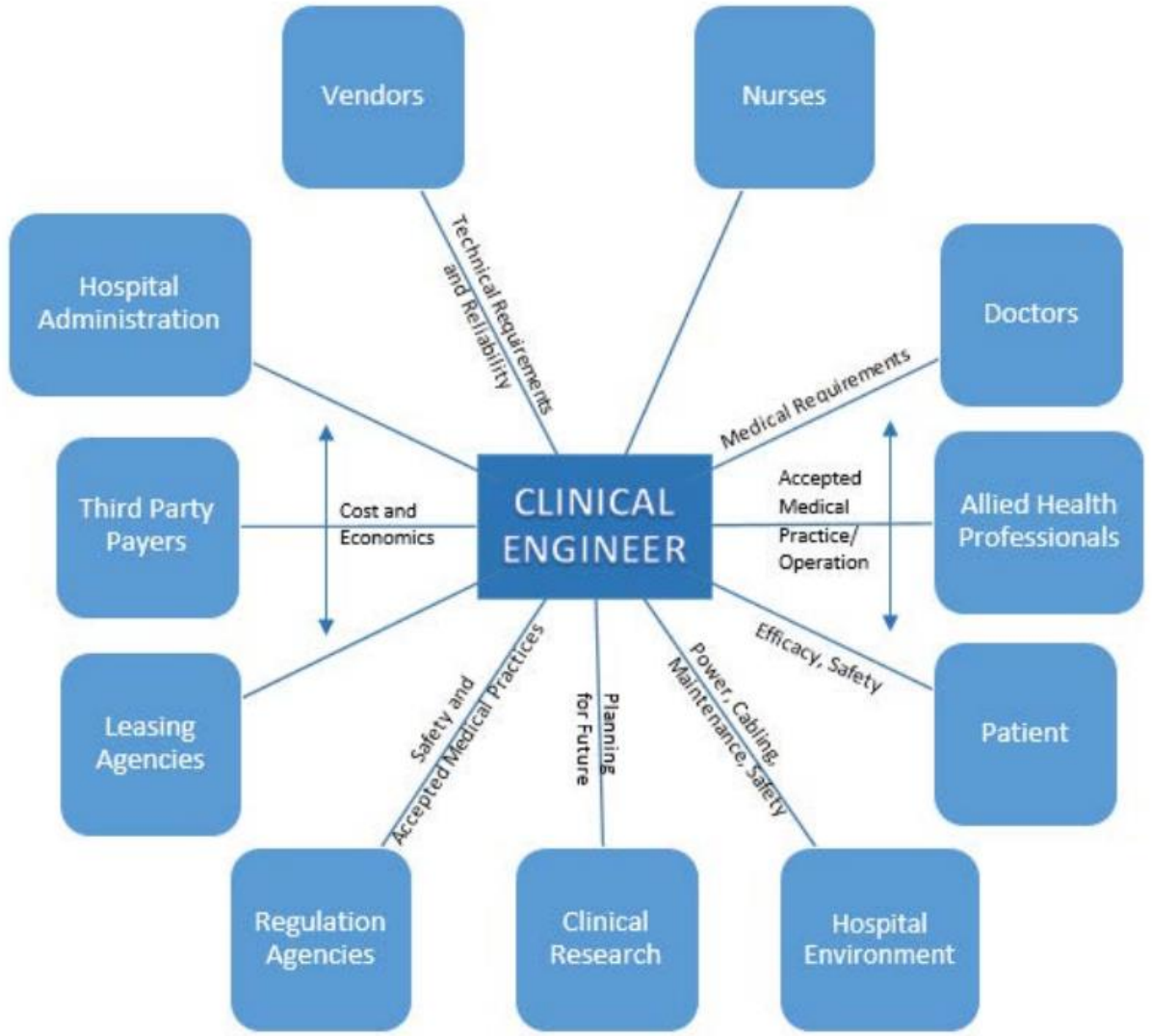
Mladen Poluta

Board Member, IFMBE Clinical Engineering Division

Exco Member, South African Health Technology Assessment Society

Former Director: Health Technology, Western Cape Department of Health, South Africa

Clinical Engineering Interfaces



Source: **Human resources for medical devices: the role of biomedical engineers** *(Figure 9.1)*

WHO Medical Device Technical Series
WHO 2017

Clinical Engineering BoK/BoP

Global Clinical Engineering Journal

GlobalCE

Received September 6, 2019, accepted October 30, 2019, date of publication November 9, 2019

Analysis of IFMBE-CED 2017 Worldwide Clinical Engineering Survey

By L. Nascimento[1], S. Calil[1], T. Judd[2], Y. David[3]

[1] Department of Biomedical Engineering - School of Electrical and Computer Engineering. University of Campinas, Brazil

[2] Chair, IFMBE Clinical Engineering Division. Associate Editor, Health Technology and Quality, The Permanente Journal

[3] Biomedical Engineering Consultants, LLC, University of Texas School of Public Health

TABLE 1. New Subjects Added to the Set of Knowledge of clinical engineering in the Last 18 Years (based on personal observations)

1970 – 1980	1990 – 2015
• Medical Equipment Management • Safety • Procurement • Education • Individual Product Management • Individual Thinking	• Medical Equipment Management → Technology Management • Safety → Risk Management • Procurement • Education • Disaster Preparedness • Cost Control (TCO. LCC) • Technology Assessment • Telemedicine (Homecare) • Project Management • Contract Management • Mobile Healthcare (Events. Transports. Group Assistance) • Home Care • Quality Management • Information Technology (Interoperability) • Human Factor Engineering • Forensic Analysis • Artificial Intelligence • Systems Integration And Management • Soft skills (Writing. Communication. Supervision) • Team Practicing

LCC = life cycle costs; TCO = total cost of ownership

Clinical Engineering BoK/BoP

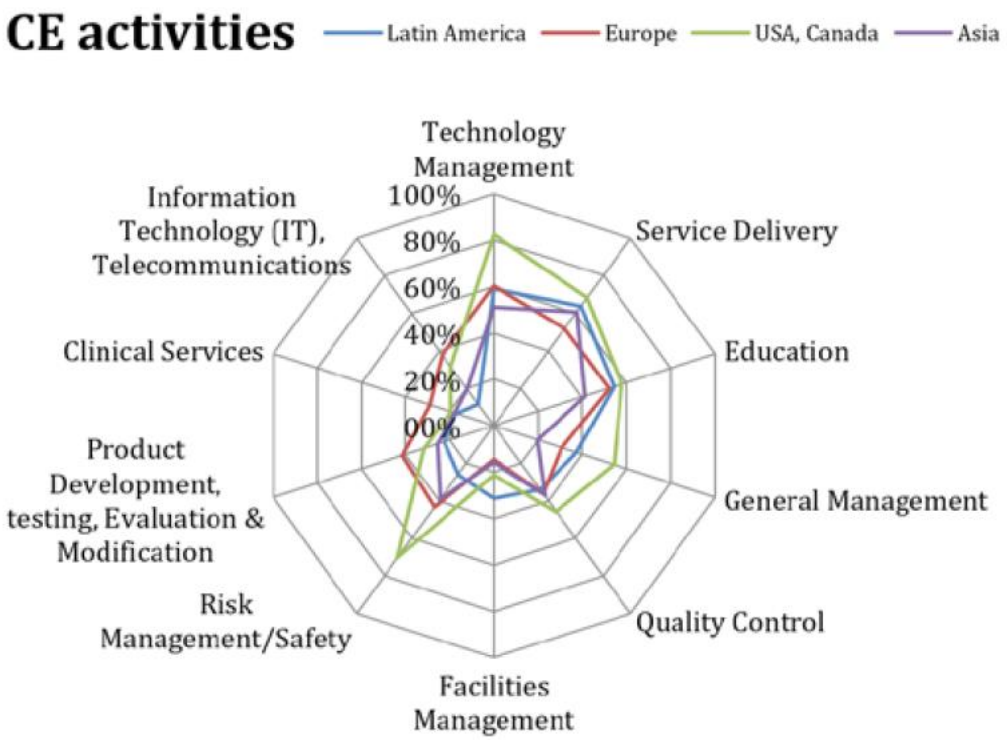
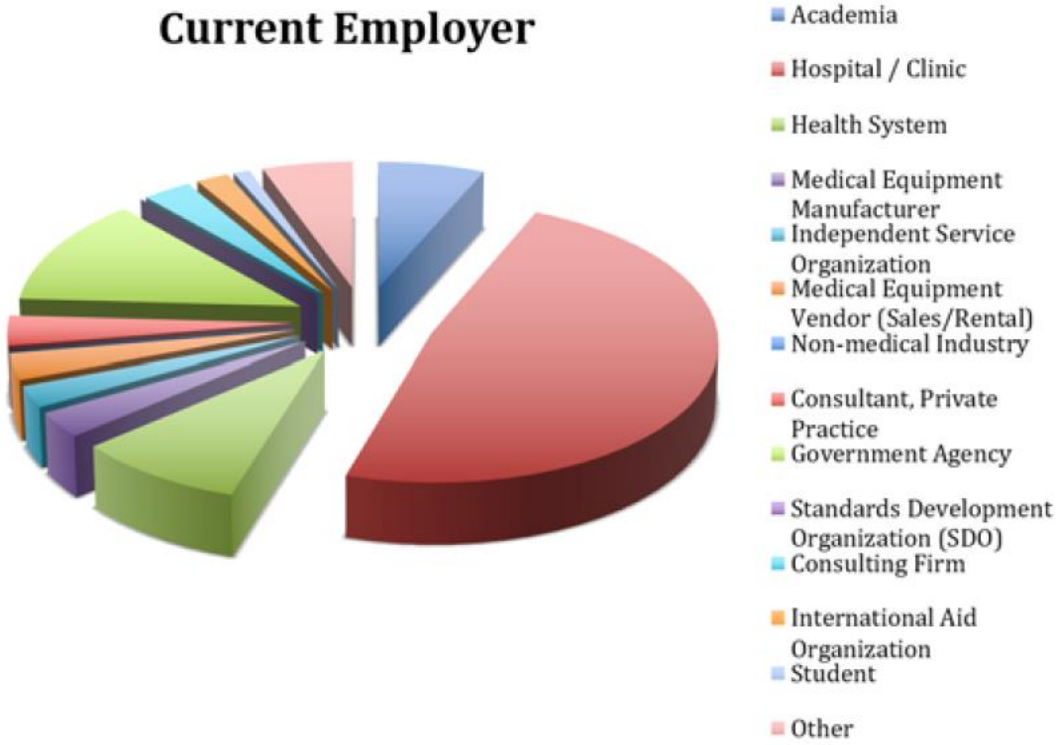
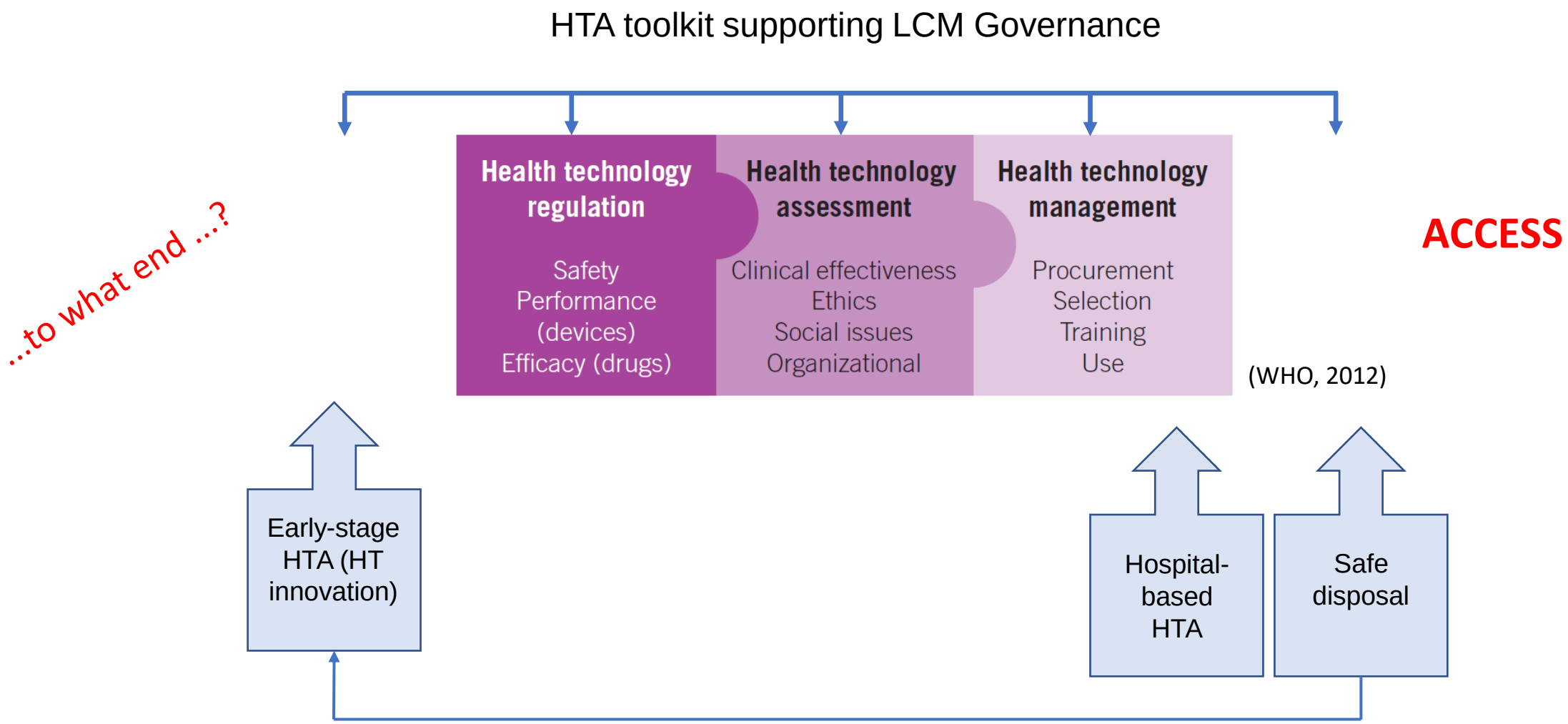


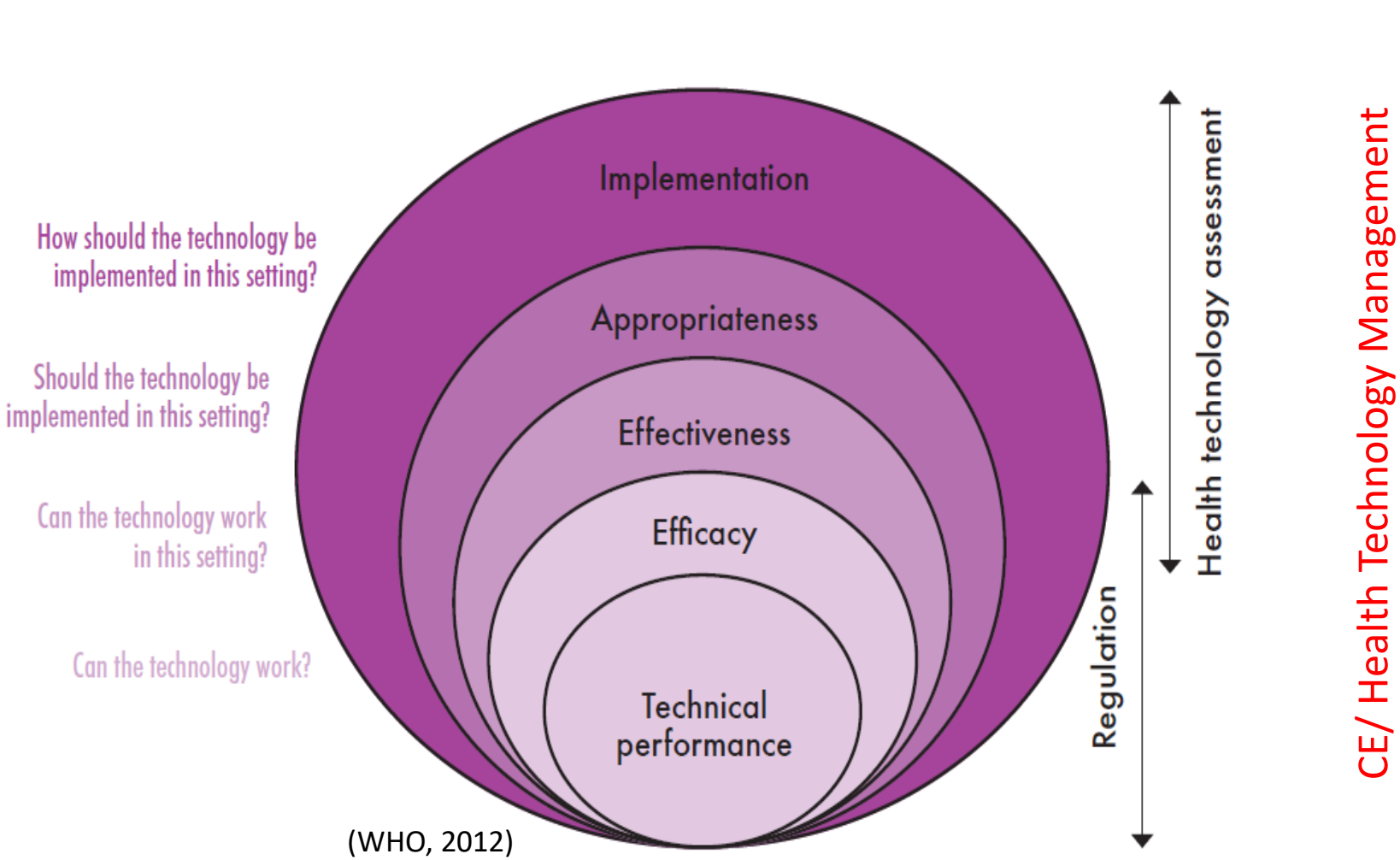
FIGURE 2. Percentage of the types of employers of clinical engineers worldwide.



CE Practitioners as HT Life-Cycle Custodians



Technology Implementation



(WHO, 2012)

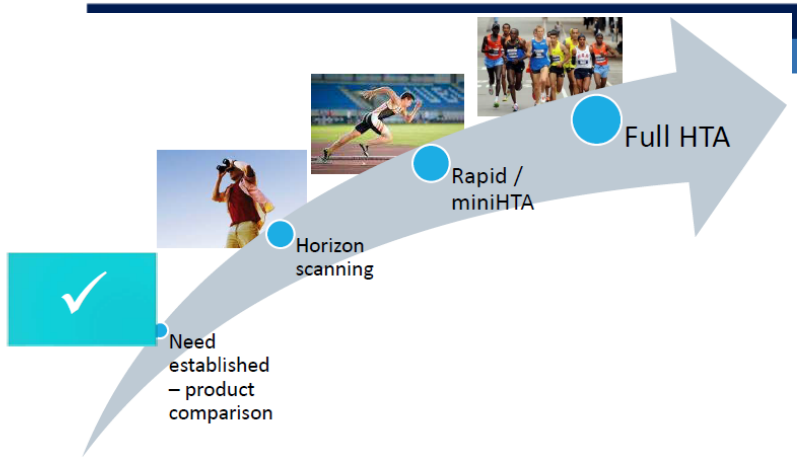
HTA Evaluation Domains

- **Efficacy:** Does the technology affect health status in ideal clinical trial circumstances?
- **Effectiveness:** Does the technology affect health status when the intervention is adopted in the community?
- **Efficiency:** Does the technology affect health status to the maximum extent at least cost?
- **Equity:** Who benefits (e.g. rich/poor or young/old) from the technology and what are the relative weights assigned to differing distributions of benefit?
- **Appropriateness & Feasibility**
- **Cost** (initial / implementation)
- **Safety**
- **Organisational & Societal Impact**
- **Ethical & Legal**

Numerous linkages to CE/HTM

.. co-ordinated by CE/HTM practitioners in support of decision-making ..

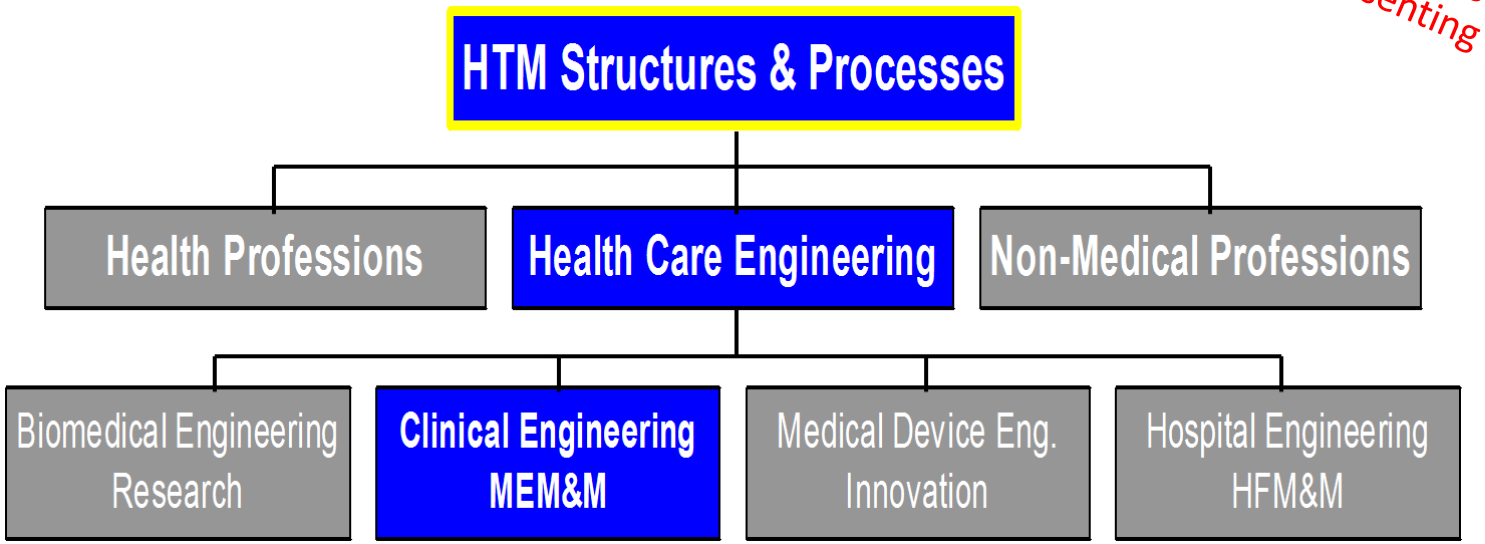
HTA Stakeholders



Organizations/individuals	Types of decisions
Government agencies	Regulatory approval, reimbursement , public health programs
Health care professionals (HCP)	Adoption of technologies
Hospitals, health care administrators	Equipment procurement, availability procedure
Private sector insurance	Scope and extent of coverage
Patients, care givers	Guidance for treatment and support, access to services
Academia	Information for future HCP

It takes a village .....

.... explore mutual recognition and collaboration with bodies representing these professions ...



* **Medical Physicists, Clinical Technologists/Technicians, Radiographers, etc.**

+ Hospital Managers & Administrators ....

‘Back to Basics’ (Engineering BoK/BoP)

The World Federation of Engineering Organizations:

- The peak body for professional engineering organizations
- Founded in 1968
- Under the auspices of UNESCO
- 100+ national professional engineering institutions
- 12 international and continental/regional professional engineering institutions
- Representing 30 million engineers

Engineering for Sustainable Development

The International Engineering Alliance (IEA) and the benchmark Framework for Graduate Attributes and Professional Competencies (GAPC)

- IEA is an umbrella organisation that provides governance for the three Accords and four Agreements that provide international multilateral recognition of graduate attributes and professional competencies across 30 countries.
- For graduation after tertiary engineering education course*:
  - Washington Accord – Professional Engineer usually 4-5 years
  - Sydney Accord – Engineering Technologist usually – 3-4 years
  - Dublin Accord – Engineering Technician usually -2 years
- After graduation for professional registration, after a period of work experience:
  - Intl. Professional Engr. Agreement – Prof. Engineer
  - Intl. Technologist Engr. Agreement – Eng. Technologist
  - Intl. Associate Engr. Agreement – Eng. Technician
  - APEC Engineering Agreement – APEC Region- Prof. Engineer

* Note: The duration of academic formation will normally be at least sixteen years (Washington Accord), fifteen years (Sydney Accord) and 13 years (Dublin Accord).

Engineering for Sustainable Development

https://www.wfeo.org/wp-content/uploads/members/Webinars/WFEO_IEA_GAPC/

INTERNATIONAL ENGINEERING ALLIANCE

INTERNATIONAL ENGINEERING ALLIANCE

GRADUATE ATTRIBUTES & PROFESSIONAL COMPETENCIES

PROUDLY SUPPORTED BY:

World Federation of Engineering Organizations
Fédération Mondiale des Organisations d'Ingénieurs

unesco

PREAMBLE

The International Engineering Alliance is pleased to announce that all Accords and Agreements have approved revisions to its Graduate Attributes and Professional Competencies (GAPC) international benchmark. The review, supported by UNESCO, was undertaken by a joint IEA-WFEO Working Group who engaged extensively with IEA signatories, WFEO members and WFEO partners representing academics, industry and women globally. They reflect requirements for new technologies and engineering disciplines, new pedagogies and values such as sustainable development, diversity and inclusion and ethics. They are well positioned to support the engineering role in building a more sustainable and equitable world.

Our thanks to UNESCO and WFEO for their constant support and endorsement and to the GAPC Working Group members, who commenced this work three years ago and who have worked tirelessly to bring this to fruition.

... opportunity to advance CE

IEA Constituent Agreements

Washington Accord	International Professional Engineers Agreement
Sydney Accord	International Engineering Technologists Agreement
Dublin Accord	APEC Engineer Agreement
	Agreement for International Engineering Technicians

Graduate Attributes and Professional Competences

Approved Version 4: 21 June 2021

This document is available through the IEA website: http://www.ieagreements.org

Executive Summary

Many accrediting bodies for engineering qualifications have developed outcomes-based criteria for evaluating programs. Similarly, many engineering regulatory bodies have developed or are in the process of developing competence-based standards for registration. Educational and professional accords for mutual recognition of qualifications and registration have developed statements of graduate attributes and professional competence profiles. This document, which is a revised version that takes into account the present-day state of engineering activities, presents the background to these developments, their purpose, and the methodology and limitations of the statements. After defining general range statements that allow the competences of the different categories to be distinguished, the paper presents the graduate attributes and professional competence profiles for three professional tracks: engineer, engineering technologist, and engineering technician.

... templates for CE-related capacity building

https://www.wfeo.org/wp-content/uploads/members/Webinars/WFEO_IEA_GAPC/IEA-Grad-Attr-Prof-Competencies-v4-Approved-21062021.pdf

NDoH Request to ECSA : Professional Registration of Clinical Engineering Practitioners

CE PRACTITIONERS STEERING COMMITTEE MEETING - 5 MARCH 2002

Framework for Health Technology Policies -
National Health Technology Management System

ENGINEERING COUNCIL OF SOUTH AFRICA

ECSA
ENGINEERING COUNCIL OF SOUTH AFRICA

INTERNATIONAL REGISTER

What is an International Register?

The International Engineering Alliance (IEA) is a global non-profit organisation which comprises of members and signatories from 36 jurisdictions within 28 countries. The IEA seeks to improve engineering education and competence globally. It fulfils this mission through its constituents: education agreements that are concerned with standards, best practice accreditation processes and mutual recognition of accredited engineering programmes and agreements for defining and recognising professional competence. The Engineering Council of South Africa (ECSA) is a member of the IEA.

ECSA maintains international registers for Engineers, Technologists and Technicians. These registers are regulated by three competency agreements namely; International Professional Engineers Agreements (IPEA), International Engineering Technologists Agreement (IETA) and Agreement International Engineering Technicians (AIET). The engineering qualifications are governed by the Washington Accord, Sydney Accord and Dublin Accord for Engineers, Technologists and Technicians respectively.

Each member of IEA keeps their own section of the international register within their Jurisdiction. If you are registered in the international register section of South Africa, registrants are entailed to use the following postnominal:

- International Professional Engineer -Int PE (SA)
- International Engineering Technologist – Int ET (SA)
- International Engineering Technician – Int ETn (SA)

GLOBAL CLINICAL ENGINEERING ALLIANCE

The Future of Clinical Engineering:

The Challenge of Change

STEPHEN L. GRIMES

"It's not the strongest of the species that survives, nor the most intelligent, but the one most responsive to change."
—Charles Darwin

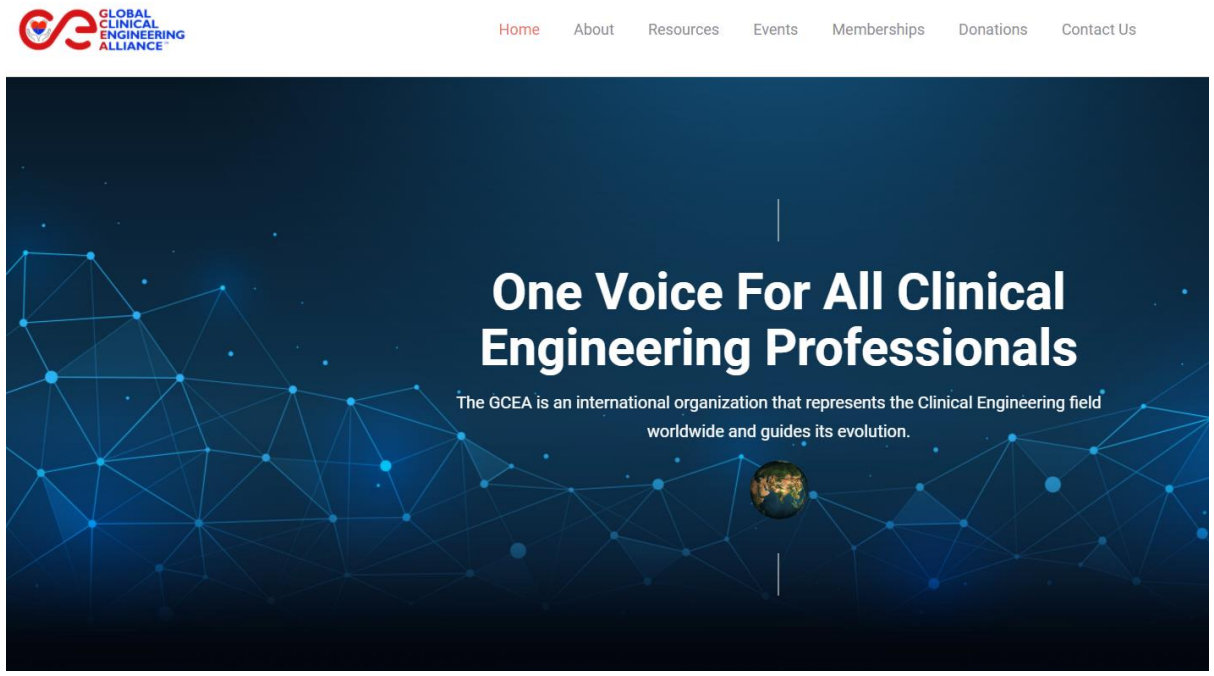
"It's not the progress I mind, it's the change I don't like."
—Mark Twain

"Change is good. You go first ..."
—Dilbert

IEEE ENGINEERING IN MEDICINE AND BIOLOGY MAGAZINE - MARCH/APRIL 2003

Covid-19 pandemic response forged new linkages and collaboration

Post Covid-19 'new normal'



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Thank you !

Mladen Poluta
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Why GCEA is Important to Our Profession: IFMBE CED Perspective

Tom Judd, IFMBE CED Board Chair, USA

IFMBE
Clinical Engineering Division

Global CE Brand

- Since 2015, the Global CE Community has come together, resulting in the following milestones.

	Global CE Brand	2015	2019	2020	2021
1	***IFMBE CED*** Board & Collaborator (B&C) growth	40	100	250	420
2	***IFMBE CED*** B&C Countries Represented	20	70	110	165
3	***Global CE*** Congresses-ICEHTMC (2015, 2017, 2019) 1000 participants (70 countries) *Expect 1500 (120 countries)	~500 (2015 & 2017)	1000 participants (70 countries)		*Expect 1500 (120 countries)
4	***Global CE*** Summits (2015, 2017, 2019):	Global Community! https://ced.ifmbe.org/blog/message-tom-judd-june-2020.html			
5	***Global CE*** Day (since 2015):	Honoring Individuals & Societies! https://www.globalcea.org/globalceday			
6	***Global CE*** Journal (since 2018)	CE Evidence-Based Publications! https://globalce.org/index.php/GlobalCE			
7	***Global CE*** Alliance (since 2020)	One Voice for all CE Professionals! https://www.globalcea.org/home			
8	***Global CE*** Partnership with WHO	Modern Era since 2009: Sharp Focus Together re COVID19 2020-2021			
9	***WHO-GCEA-CED*** 2020-2021 Innovation Compendium	Had 50 colleagues from 37 countries give field-based evaluation of 33 global innovations for WHO			
10	***Global CE*** Weekday COVID19 e-Newsletter	Hacking Coronavirus Repository! 340+ since March 2020 https://www.globalcea.org/hcu			
11	***Global CE*** Training / Webinars	2019 3rd ICEHTMC Rome	30	10+ (+ many country-based programs)	
12	***Global CE*** WhatsApp (daily colleague sharing)	50	150	200 (+ many country-based groups)	
13	***Global CE*** Blogs	Unlocking CE Potential! (2021) https://ced.ifmbe.org/blog/2020-clinical-engineers-potential.html			
14	***Global CE*** Internships (3 months each, began in 2020, 3rd group now)	Giving Young Practitioners Global CED Perspective! https://ced.ifmbe.org/about-us/ced-volunteer-internship.html			

IFMBE
Clinical Engineering Division

IFMBE CED & the *Global CE Community*

- So IFMBE CED has created the global CE Network.
  - We are all very thankful for this growth and global impact!
- But what have we learned that is missing?
  - See ***International Survey of Clinical Engineering Professionals***, *Global CE Journal*, October 2020, https://globalce.org/index.php/GlobalCE/article/view/111/57. A total of 667 responses from 89 countries were received.

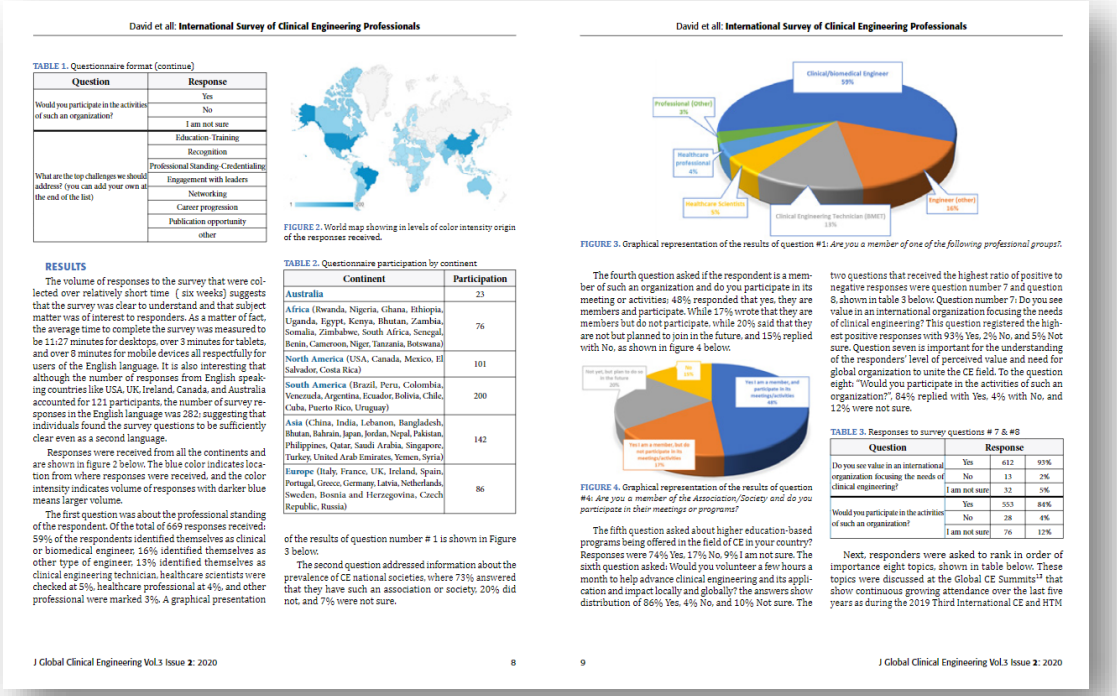

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TABLE 1. Questionnaire format (continue)

Question	Response
Would you participate in the activities of such an organization?	Yes
	No
	I am not sure
What are the top challenges we should address? (you can add your own at the end of the list)	Education-Training
	Recognition
	Professional Standing-Credentialing
	Engagement with leaders
	Networking
	Career progression
	Publication opportunity
	other

FIGURE 2. World map showing in levels of color intensity origin of the responses received.

RESULTS

The volume of responses to the survey that were collected over relatively short time (six weeks) suggests that the survey was clear to understand and that subject matter was of interest to responders. As a matter of fact, the average time to complete the survey was measured to be 11:27 minutes for desktops, over 3 minutes for tablets, and over 8 minutes for mobile devices all respectfully for users of the English language. It is also interesting that although the number of responses from English speaking countries like USA, UK, Ireland, Canada, and Australia accounted for 121 participants, the number of survey responses in the English language was 282; suggesting that individuals found the survey questions to be sufficiently clear even as a second language.

Responses were received from all the continents and are shown in figure 2 below. The blue color indicates location from where responses were received, and the color intensity indicates volume of responses with darker blue means larger volume.

The first question was about the professional standing of the respondent. Of the total of 669 responses received; 59% of the respondents identified themselves as clinical or biomedical engineer, 16% identified themselves as other type of engineer, 13% identified themselves as clinical engineering technician, healthcare scientists were checked at 5%, healthcare professional at 4%, and other professional were marked 3%. A graphical presentation

TABLE 2. Questionnaire participation by continent

Continent	Participation
Australia	23
Africa (Rwanda, Nigeria, Ghana, Ethiopia, Uganda, Egypt, Kenya, Bhutan, Zambia, Somalia, Zimbabwe, South Africa, Senegal, Benin, Cameroon, Niger, Tanzania, Botswana)	76
North America (USA, Canada, Mexico, El Salvador, Costa Rica)	101
South America (Brazil, Peru, Colombia, Venezuela, Argentina, Ecuador, Bolivia, Chile, Cuba, Puerto Rico, Uruguay)	200
Asia (China, India, Lebanon, Bangladesh, Bhutan, Bahrain, Japan, Jordan, Nepal, Pakistan, Philippines, Qatar, Saudi Arabia, Singapore, Turkey, United Arab Emirates, Yemen, Syria)	142
Europe (Italy, France, UK, Ireland, Spain, Portugal, Greece, Germany, Latvia, Netherlands, Sweden, Bosnia and Herzegovina, Czech Republic, Russia)	86

of the results of question number # 1 is shown in Figure 3 below.

The second question addressed information about the prevalence of CE national societies, where 73% answered that they have such an association or society, 20% did not, and 7% were not sure.

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FIGURE 3. Graphical representation of the results of question #1: *Are you a member of one of the following professional groups?*

The fourth question asked if the respondent is a member of such an organization and do you participate in its meeting or activities; 48% responded that yes, they are members and participate. While 17% wrote that they are members but do not participate, while 20% said that they are not but planned to join in the future, and 15% replied with No, as shown in figure 4 below.

FIGURE 4. Graphical representation of the results of question #4: *Are you a member of the Association/Society and do you participate in their meetings or programs?*

The fifth question asked about higher education-based programs being offered in the field of CE in your country? Responses were 74% Yes, 17% No, 9% I am not sure. The sixth question asked: Would you volunteer a few hours a month to help advance clinical engineering and its application and impact locally and globally? the answers show distribution of 86% Yes, 4% No, and 10% Not sure. The two questions that received the highest ratio of positive to negative responses were question number 7 and question 8, shown in table 3 below. Question number 7: Do you see value in an international organization focusing the needs of clinical engineering? This question registered the highest positive responses with 93% Yes, 2% No, and 5% Not sure. Question seven is important for the understanding of the responders' level of perceived value and need for global organization to unite the CE field. To the question eight: "Would you participate in the activities of such an organization?", 84% replied with Yes, 4% with No, and 12% were not sure.

TABLE 3. Responses to survey questions # 7 & #8

Question	Response		
Do you see value in an international organization focusing the needs of clinical engineering?	Yes	612	93%
	No	13	2%
	I am not sure	32	5%
Would you participate in the activities of such an organization?	Yes	553	84%
	No	28	4%
	I am not sure	76	12%

Next, responders were asked to rank in order of importance eight topics, shown in table below. These topics were discussed at the Global CE Summits[13] that show continuous growing attendance over the last five years as during the 2019 Third International CE and HTM

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GLOBAL CLINICAL ENGINEERING ALLIANCE™

IFMBE
Clinical Engineering Division

IFMBE CED & the *Global CE Community*

- Key Findings
  - "The establishment of a global alliance to clearly identify the field of clinical engineering; to promote public awareness; to form liaisons with government agencies and other healthcare decision makers, will improve global cooperation and inter CE societal relations that will serve patients as well.
  - The survey highlighted the state of CE (national) associations, networking, professional challenges, and the desire for more international cooperation that leads needed professional development programs."
- CED can identify best practices, but – by charter – is limited how to optimally partner with various organizations, eg, national societies and other global entities, to implement solutions.
  - One example: IFMBE CED – *although an endorsed NGO of WHO* – could not readily receive funds to conduct contracual work with WHO for its *2021 LMIC Innovation Compendium*, whereas a partnership of CED and GCEA could and did so.

IFMBE
Clinical Engineering Division

Global CE Community & Joint Collaboration

- CE / BME Capacity Building for Health Technologies (HT)
  - Education & Training
    - Grow the CE/BME workforce to meet national needs
      - Identify best practices of CE Competencies
      - Implement Country & Region specific training to implement best practices
  - Credentialing
    - Ensure the CE/BME workforce meets defined global standards of competencias
    - Empower existing Credentialing structures, create new where necessary
- WHO Partnership / Impact
  - Enable Countries and Regions to participate in global initiatives
    - Example of the WHO 2021 Innovation Compendium
  - Demonstrate evidence-based impact with healthcare decision-makers
    - Policy: help Ministries of Health set & implement appropriate HT national policy, eg, for Telehealth & Digital Health
- Recognition / Collaboration
  - Internal to the Profession
    - Help build and nurture national CE societies
      - Now over 100 national CE societies affilated with CED
    - Research
      - Partner with CE-HTM focused WHO Collaborating Centers & various national Centers of Excellence
      - Receive and disburse funding from global entities to conduct research and implement solutions
  - Externally to the Profession
    - Raise Public Awareness
      - As the WHO WHA meetings of 2020 and 2021 have done, focused on *Ventilator* and *Oxygen system* global needs
    - Utilize Alliances with NGOs and other global entities to address major HT challenges, examples:
      - Sustainable Oxygen delivery systems, eg PSA plants
      - Create national Spare Parts needed directory for COVID equipment, etc.

With the overarching goal of improving global healthcare clinical & business outcomes, the scope of these roles is beyond IFMBE CED's ability to address, but in partnership with GCEA, all is possible!

GLOBAL CLINICAL ENGINEERING ALLIANCE™

Thank you!

Tom Judd

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Q&A

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