



Healthcare Data Quality & Monitoring *Playbook*

3C's to build a robust healthcare
data quality strategy

challenges



checks



cure



Introduction

The healthcare industry has made significant strides to support interoperability across the care continuum, but incomplete and poor data quality remains a challenge. In this brief playbook, we share key challenges, important quality checks and a 4-step approach to enhance data quality.

In this playbook we focus on the following 3C's to build a robust healthcare data quality strategy:-

- Healthcare Data Quality **Challenges**
- Healthcare Data Quality **Checks**
- Healthcare Data Quality **Cure**

Let's get started >

Healthcare Data Quality Challenges



Incorrect Syntax

Data fields contain data in a wrong format i.e. Name written as A7354 or Gender coded as 'M' instead of 'Male'. These entries may be processed and eventually must be rejected from the destination systems leading to increased lead times

Incorrect Semantics

Syntax for the message fields is correct i.e. DoB in range and is a number. Although syntax is correct, the semantics may not be i.e. some data is from the future too old i.e. DoB in 2020 etc.



Missing Fields

Common for claims data, many fields considered as mandatory (depending on payor) may not be present in the EDI. Consequently, these claims are rejected and must be reprocessed

Healthcare Data Quality Challenges



Record Mismatch

Values sometimes look correct but are not i.e. SSN number entered for some other person. These errors will increase lead time and must be tallied manually

Unusable Fields

Values sometimes look correct but do not make sense in the real-world scenario i.e. DoB passed as 1988 but Age recorded as 40



Dependencies

Some values themselves being correct but may error out if another field is dependent on them i.e. Encounter ID coming but related Diagnosis field missing

Healthcare Data Quality Checks

Completeness

The proportion of stored data against the potential of "100% complete"

Example

Data sent in an HL7 messages missing Patient Name, which is a minimum required data for CMS Common Clinical Data Set

Uniqueness

Nothing will be recorded more than once based upon how that thing is identified

Example

Two messages received with the same MSH headers & PID, OBR details and recorded twice will lead to inconsistencies in data update

Validity

Data are valid if it conforms to the syntax (format, type, range) of its definition

Example

SSN numbers are supposed to be numeric. If any SSN is received with special characters or all zero area number, it's invalid data

Healthcare Data Quality Checks

Accuracy

The degree to which data correctly describes the "real world" object or event being described

Example

Blood Group of a patient is entered in the system as 'V+' which, although syntactically correct, doesn't match any real-world blood groups & hence not relevant

Consistency

The absence of difference, when comparing two or more representations of a thing against a definition

Example

Two different CDA messages send a critical patient information correctly, but recorded in different tags making the two messages different

Timeliness

The degree to which data represent reality from the required point in time

Example

Blood Pressure data received correctly as 120/80 in an HL7 message, but shows observation record from 1990 which holds no relevance today

Healthcare Data Quality **Cure**

Step 1 – Improve Source

The quality of data is as good as what's feeding into the system. Data quality can be improved by capturing better data at source systems (EHR, PACS, LIS, HIS, etc.) and reducing input errors (mature processes, user training, electronic entry, etc.)

What's needed

- Source quality trends
- Training & processes
- Feedback mechanisms

Watch out for

- Human factor
- Cumbersome to implement
- No guarantee of success

Step 2 – Add Quality Rules

Data quality can be improved by introducing quality KPIs or rules in the workflow. E.g. average error rate, most accurate fields / sources, defaulting clinics / geographies, etc.

What's needed

- Rules / KPI definitions
- Custom scripts on IEs
- Centralized processing
- Near real-time results

Watch out for

- Scripting of rules in IE is effort intensive
- Database rules struggle to keep up with real-time data
- Rules need to be developed again for a new setup

Healthcare Data Quality **Cure**

Step 3 – Quality Monitoring

Regular monitoring and checking of quality and trends ensure improvement in quality of data and also helps protect it

What's needed

- Relevant quality KPIs
- Real-time monitoring
- BI Dashboards
- Decision support

Watch out for

- Most methods today are reactive
- Lack of specialized KPIs and dashboard
- Multiple tools needed in a single ecosystem

Step 4 – Error Correction

Data quality can be improved by actioning on identified gaps through manual / auto effort

What's needed

- Error identification
- Correction tools
- Integrated ecosystem
- Time & resources

Watch out for

- Error identification can be time consuming & reactive
- Manual effort for correction
- Multiple rules required at every stage

Takeaways

1

Healthcare systems today use integration engines and custom adapters to achieve seamless data translation, transformation and mapping

2

With thousands of interfaces and multiple integration engines between source and destination, setting up interoperability becomes complicated and work-intensive

3

Integration engines aren't entirely equipped to find an answer to the challenges that data quality and monitoring pose

4

Existing integration engines need a complementary platform that can enhance data quality, manage / create rules configurations, and provide a unified view of monitoring every aspect of data

5

This enables healthcare systems to track data quality in real time to further clinical decision support, regulatory compliance and overall care delivery

CitiusTech's Healthcare Data Quality & Interoperability Solution

Achieve in-flight healthcare data quality monitoring with CitiusTech's [Healthcare Interop Quality Monitoring Platform – H-IQM](#), an end-to-end solution with 1,500+ pre-built data quality measures and a proprietary data quality rules authoring module

- Data Quality Rules Engine with a library of 1,500+ pre-built data quality and monitoring rules and provision to create custom data quality rules

- Tight integration with interface engines (incl. Mirth, Cloverleaf) and standard healthcare data feeds (HL7, FHIR, CSV, EDI etc.)

- GUI based guided decision making and interface engine agnostic actionable dashboards

- Real-time data quality tracking (incl. quality trends and recommendations) & source traceback

- Cloud-hosted solution with minimal on-premise footprint – for easy and cost-effective deployment

CitiusTech: accelerating innovation in healthcare

CitiusTech enables healthcare organizations to drive clinical value chain excellence, across integration & interoperability, data management (EDW, Big Data), performance management (BI / analytics), AI/ML (predictive analytics, Machine Learning, AI) and digital engagement (mobile, IoT).

CitiusTech helps customers accelerate innovation in healthcare through specialized solutions, healthcare technology platforms, proficiencies and accelerators. With cutting-edge technology expertise, world-class service quality and a global resource base, CitiusTech consistently delivers best-in-class solutions and an unmatched cost advantage to healthcare organizations worldwide.

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