eHealth Quality Concepts

Foundational Curriculum:
Cluster 9: Quality, Safety & Security
Module 16: Quality and Safety in eHealth
Unit 1: eHealth Quality Concepts
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Unit Objectives

• Define health care quality, quality assurance and data and information quality in healthcare
• Describe the components of quality development in information systems (including requirements development, validation, testing, user feedback and environments, etc.)
• Explain the importance of data quality in clinical interventions, research and biomedicine/emerging medical technology
• Explain quality control measures in HIT/eHealth/health informatics
• Describe dashboards, key indicator metrics, performance reports and other methods of quality assurance and control that may be useful in research and biomedicine initiatives
• Explain how technology can provide data to support quality improvement
• Explain how quality outcomes are developed, validated and benchmarked in practice to improve quality across the healthcare setting
• Describe the limitations of metrics, the difference between quantitative and qualitative data and the concept of dynamic quality

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The Institute of Medicine defines **health care quality** as the degree to which health care services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge.

Quality of care plays an important role in describing the **iron triangle** of health care, which defines the intricate relationships between quality, cost, and accessibility of health care within a community.
Health Care Quality (cont’d)

• The Institute of Medicine uses six domains to measure and describe quality of care in health:
  – **Effectiveness**: Relates to providing care processes and achieving outcomes as supported by scientific evidence
  – **Efficiency**: Relates to maximizing the quality of a comparable unit of health care delivered or unit of health benefit achieved for a given unit of health care resources used
  – **Equity**: Relates to providing health care of equal quality to those who may differ in personal characteristics other than their clinical condition or preferences for care
  – **Patient centeredness**: Relates to meeting patients' needs and preferences and providing education and support
  – **Safety**: Relates to actual or potential bodily harm
  – **Timeliness**: Relates to obtaining needed care while minimizing delays
Health Quality Measures

• Measures used to assess and compare the quality of health care organizations are classified as either a structure, process, or outcome measure.

• Known as the **Donabedian Quality Framework**, this classification system was named after the physician and researcher who formulated it.
Donabedian Quality Framework:

- Structural quality of care includes
  - Factors making high-quality care easier or harder
  - E.g. hospital location, volume, nature of the hospital

- The quality of the care process includes
  - Healthcare content and activities
  - Screening, guidelines,…

- The quality of outcomes in care include
  - Changes that affect the quality of care
  - Mortality, morbidity, functionality
Health Quality Measures (cont’d)

- **Structural Measures:** the characteristics of institutions and providers
  - Structural measures give consumers a sense of a health care provider’s capacity, systems, and processes to provide high-quality care.
  - For example:
    - Whether the health care organization uses electronic medical records or medication order entry systems.
    - The number or proportion of board-certified physicians.
    - The ratio of providers to patients.

- **Process Measures:** the facets of care and documentation
  - Process measures indicate what a provider does to maintain or improve health, either for healthy people or for those diagnosed with a health care condition. These measures typically reflect generally accepted recommendations for clinical practice.
  - For example:
    - The percentage of people receiving preventive services (such as mammograms or immunizations).
    - The percentage of people with diabetes who had their blood sugar tested and controlled.
  - Process measures can inform consumers about medical care they may expect to receive for a given condition or disease, and can contribute toward improving health outcomes. The majority of health care quality measures used for public reporting are process measures.
• **Outcome Measures:** the results for patients and populations
  - Outcome measures reflect the impact of the health care service or intervention on the health status of patients.
  - For example:
    • The percentage of patients who died as a result of surgery (surgical mortality rates).
    • The rate of surgical complications or hospital-acquired infections.
  - Outcome measures may seem to represent the “gold standard” in measuring quality, but an outcome is the result of numerous factors, many beyond providers’ control
  - Risk-adjustment methods—mathematical models that correct for differing characteristics within a population, such as patient health status—can help account for these factors
IT and Informatics in Quality

• **IT quality is ensured by standards for reporting**
  – Quality Reporting Document Architecture (QRDA) for quality reports (Alschuler, 2007)
  – Hospital Quality Measures Format (HQMF) for individual measures
  – Use of IT does not guarantee better quality → when used appropriately, human errors can be minimized

• **Informatics research include studies on quality and performance**
  – Patients choosing top-performing hospital or surgeon had one-half the mortality of those who chose one in lowest quartile (Jha, 2006)
  – Process measures in hospitals predict small differences in mortality in MI, CHF, and pneumonia (Werner, 2006)
  – Systematic review finds scant evidence for documented benefit in quality of care (Fung, 2008)
  – Patients have difficulty understanding; better approach consists of a framework and plain language (Hibbard, 2010)
Quality Assurance in Health Information Systems

- **Quality assurance (QA)** is a method for preventing mistakes and deficiencies in technologies and other products and avoiding problems when delivering solutions or services to consumers.

- Health information systems may contribute in different ways to quality assurance.

- Quality assurance activities can include assessing the quality of care, monitoring quality indicators, supporting clinical care evaluation studies, and auditing concurrently the ongoing process of care using reminders or decision support techniques.

- **Data and information quality (DIQ)** defines quality of data and information such as completeness, accessibility, timeliness and accuracy in healthcare information.

- DIQ is important for many applications that provide real-time information, multimedia content or time-critical services.

- The lack of adequate DIQ support has impaired the adoption of many eHealth systems.
Methods of Quality Assurance

- A **dashboard** is an easily readable view of the key performance components, e.g. financial performance, quality of care, human resource performance.

- **Key performance indicator** (KPI) metrics are a quantitative measure of healthcare performance and quality; they can be either general or can specifically measure a certain service or part of care.
Quality Development in Information Systems

- Requirements development includes determining the needs and conditions for new or altered information system. Also the requirements of the stakeholders need to be considered, to ensure that they are not conflicting with the system requirements.

- Validation includes ensuring that the designed product meets the requirements and needs stated in the previous phase.

- Testing is performed to ensure that the product works as it is supposed to, and to fix any bugs or unintended actions in various situations.

- User feedback is given by the test group and customer on the usability of the product, and also if they see any mistakes in the product.

- User environments is the experience of the information system user: how the visual scene and functionality are designed in the system desktop.
Importance of Data Quality

Data quality is important not only in clinical interventions, but also in research and biomedicine/emerging medical technology

• Data quality is very important, not only from the patient safety point-of-view, but also for healthcare administration (although these points can also be applied to care directly)
  – Cost → Poor data quality causes failures of IT projects and systems and can result in high costs to an organization or provider
  – Compliance → poor data quality is a risk for legal and reputational consequences. Missing data causes distorted statistics and inaccurate information.
  – Decision making → poor data quality leads to poor and difficult decision making, and even wrong decisions may occur
Importance of Quality Control Measures

• Quality is essential when working with human lives: poor quality treatment causes errors and adverse effects, it may be even lethal for the patient

• Quality is concerned in every aspect of care: electrical and mechanical safety, radiation, privacy and information security, equality in treatment and service

• Even when quality control measures that are not followed do not prove harmful, they can still negatively affect the overall experience of the care process
How health IT supports quality improvement

- Health IT tools aim to reduce costs and improve patient health outcomes by tracking health care delivery performance measures and by monitoring how possible changes affect patient experience and care coordination across care settings.

- Examples:
  - **EHR** enables data collection, extraction, analysis, reporting and tracking. EHRs can improve patient care and facilitate population-level assessments.
  - **Registries** (e.g. specific disease registry) can identify gaps in care.
  - **Decision support systems** can help making decisions that are consistent with higher quality care.
Quality Improvement Measures

- **Quality Indicators** (QIs) are measures of health care quality that use readily available healthcare data. Quality organizations such as AHRQ (Agency for Healthcare Research and Quality (US)) develops quality indicators to provide health care decision makers with tools to assess their data.

- QIs are used to highlight potential quality concerns, identify areas that need further study and investigation, and track changes over time.

- Design of quality performance measurement systems should aim to improve performance and incorporate quality indicators.
Quality Improvement Measures (cont’d)

• Quality indicators and metrics are viewed as fundamental resources in the discovery of quality performance data

• Organizations and providers use these indicators and metrics to validate and interpret their own results, and benchmark the results against regional, national, and international quality measures and objectives

• Increasing the effectiveness of using performance feedback requires an achievable benchmark method that can be developed from quality indicators
Concepts in quality research

• **Metrics**, as well as their limitations, need to be considered when conducting research. Metrics in quality include:
  – specificity
  – accuracy
  – precision

• **Quantitative data** can be calculated and computed and it can be expressed numerically (e.g. the amount of the apples on the table)

• **Qualitative data** can be observed but cannot be computed and the classification of objects is based on attributes and properties (e.g. the color of the apples)

• **Dynamic quality** means that something can be recognized before it can be statistically analyzed (e.g. the beauty of music)
Limitations of quality data

• Limitations of quality metrics: Limitations of administrative data may be compounded when measuring performance at the individual physician level, as sample sizes are small and patient populations are heterogeneous.

• Both administrative and medical record data alone have limitations for measuring quality of care.

• Hybrid data bring together both administrative data and medical record data to build on the strengths of each and to compensate for some of their respective weaknesses, however:
  – For example, relying on administrative data alone to estimate quality indicators, researchers found significant underestimation and instability in health data rankings, compared with results from hybrid data.
Unit Review Checklist

- Described the components of quality development in information systems (including requirements development, validation, testing, user feedback and environments, etc.) (TB03)
- Explained the importance of data quality in clinical interventions, research and biomedicine/emerging medical technology (TB04)
- Explained quality control measures in HIT/eHealth/health informatics (TB08)
- Described dashboards, key indicator metrics, performance reports and other methods of quality assurance and control that may be useful in research and biomedicine initiatives (TB01)
- Explained how technology can provide data to support quality improvement (TB02)
- Explained how quality outcomes are developed, validated and benchmarked in practice to improve quality across the healthcare setting (TB07)
- Described the limitations of metrics, the difference between quantitative and qualitative data and the concept of dynamic quality (TB09)
1. Describe the phases of quality development in IT systems.

2. Describe the differences between qualitative and quantitative data.
Unit Exam

1. “Maximizing the quality of a comparable unit of health care delivered or unit of health benefit achieved for a given unit of health care resources used” refers to which domain of healthcare quality?
   a) Effectiveness
   b) Efficiency
   c) Equity
   d) Timeliness

2. “The intricate relationships between quality, cost, and accessibility of health care within a community” defines which of the following concepts?
   a) Health Care Quality
   b) The Iron Triangle
   c) The Donabedian Quality Framework
   d) Quality Assurance
3. Quality Indicators (QI)
   a) Are measures of health care effectiveness
   b) Concentrate on quality concerns that should be fixed here and now
   c) Use readily available health care data
   d) All of the above

4. Health IT tools can help
   a) Improve care quality
   b) Monitor how possible changes in health care affect patient experience
   c) Track health care delivery performance measures
   d) All of the above
5. Which of the following statements are true?
   a) Data quality is very important, not only from the patient safety point-of-view
   b) Poor data quality is not a legal or reputational risk
   c) When quality control measures are not followed, they have no effect on patient or staff perception or satisfaction.
   d) Lack of DIQ support has no real effect on the adoption of eHealth systems

6. Outcome measures are most accurately reflected by:
   a) Processes to provide high-quality care
   b) What a provider does to maintain or improve health
   c) Specific quality measures used for public reporting
   d) The overall impact of the health care service or intervention on the health status of patients