Healthcare Informatics and Health Information Technology: A Discussion on Content and Educational Strategies

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Objectives

- The use of health information technology
  - The use of electronic records
  - Other important roles HIT plays**
- Fundamentals of healthcare informatics
  - Basic content and concepts
  - A quick crash course**
- Teaching strategies: basic healthcare informatics
  - Sample learning activities
  - Real world examples
  - Integrating concepts across multiple classes

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HIT: Defined

- The use of hardware and software to store, retrieve, and share health information
  - Goal: improve communication and clinical decisions (Brailer, 2006)
- Types of HIT
  - Computerized physician order entry, clinical decision support
  - Computers, electronic medical records, Internet
  - Emerging technologies: mobile devices (smartphones, tablets), text messaging, "apps", social media sites

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Informatics: Defined

- The study of the application of computer and statistical techniques to manage data
- The science and art of turning **data into information** for the purposes of problem-solving and decision-making
  - **This includes collecting, analyzing, and using data to inform decisions**

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A Brief History

- Global health care needs
- Targeted initiatives
- Athletic training efforts

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A Brief History: Global Health Care Needs

- Crossing the Quality Chasm (IOM, 2001)
  - Landmark document identifying the gap between the care we should receive and the care we do receive
  - A call for systems change including use of health information technology (HIT) and informatics
- Health Profession Education (IOM, 2003)
  - Identification of **core competencies** for health care education
  - Evidence-based practice, interprofessional practice, professionalism, quality improvement, **informatics**

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A Brief History: Targeted Initiatives

- HITECH Act
  - Part of the 2009 American Recovery and Reinvestment Act (ie, "Stimulus package" in response to Great Recession)
  - Earmarked $34 billion to incentivize use of electronic health records
  - Aim was to create a national health information network to collect large amounts of **data** (eg, big data) to then use to improve quality of care, improve patient safety, and lower costs
- TIGER Initiative
  - Nursing profession established specific competencies for practicing nurses to work in a "new system" supported by HIT and use of **informatics**

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A Brief History: Athletic Training Efforts

- Athletic Training Education Competencies
  - Use of health care informatics identified as core competency for post-professional education in 2013 (CAATE, 2013)
  - Use of health care informatics identified as core competency for professional education in 2020 standards (CAATE, 2018)
- Professional Calls to Action
  - Athletic Training Research Agenda: calls for research in areas of HIT (including the generation of "big data") and health care economics (Eberman, 2018)
  - "Research at the point of care: using electronic medical record systems to generate clinically meaningful evidence" (Marshall and Lam, JAT, 2020)

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ATSU Perspective: HIT and informatics

- Our program views HIT and informatics as foundational to the core competencies
- That is, HIT and informatics are integral to achieving the remaining core competencies
  1. Evidence-based practice
  2. Patient-centered care
  3. Interdisciplinary collaboration
  4. Professionalism
  5. Quality improvement

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HIT: Evidence-Based Practice

- Literature search
  - Identify appropriate search engines and databases
  - Systematic approach to searches
    - Appropriate use of keywords
    - Search techniques (eg, Boolean)
- Information and knowledge management
  - Use of appropriate software (eg, reference software)
  - Ensure that evidence is available at point-of-care

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HIT: Patient-Centered Care

- Patient engagement
  - Inclusion of patient as an active member of the health care team (Coulter, 2012)
  - Benefits: enhanced decisions, improved safety, and better outcomes (Longtin, 2010; Davis, 2011; Stewart 2000)
  - Two-way communication is key (Holzmueller, 2012)
    - Frames clinician-patient relationship as a partnership
    - Challenges*
      - Lack of time (clinician) and health literacy (patient)

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HIT: Patient-Centered Care

- Bridging the gap between clinician and patient
  - Internet: patient decision tools
    - Dartmouth Decision Points, Choosingwisely.org
- Bridging the gap between clinician and patient
  - Emerging technologies: text messaging, mobile devices, smart phone apps, social media
- Telehealth
  - Use of technology to provide patient care
    - Benefits: reduce travel time, reduce costs, reduce disparity for underserved and/or rural communities

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HIT: Interdisciplinary Collaboration

- Like patient-centered care, communication is key
  - This gets at the sub-competency of effective communications
  - Rich discussions to be had regarding communicating with other healthcare professionals

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HIT: Professionalism

- Privacy
  - HIPAA and FERPA regulations
  - Management and storage of protected health information
- Ethics
  - Maintaining professionalism in a digital world
    - Communications using email and texting
    - Blurring the personal-professional lines in social media

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HIT: Quality Improvement

- The use of informatics to support QI initiatives
  - Collect practice data
  - Analyze data and identify practice gaps
  - Implement a QI effort to address gaps

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The Data-to-Wisdom Continuum

- Data
  - Raw characters without meaning
- Information
  - Processed data that identifies patterns and/or that creates meaning
- Knowledge
  - Connecting interrelated concepts to form one concept
- Wisdom
  - Applying knowledge at the right place and at the right time

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Context: The Use of Data by Businesses

- Examples
  - Google
  - Facebook
  - Netflix
  - UPS
  - Amazon
- Benefits
  - Inform and improve decision making
  - Revamp and refine operations
  - Improve performance

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Context The Use of Data in Health Care

- Similar benefits to businesses
  - Inform and improve clinical decisions
  - Improve performance at point-of-care
  - Enhancing overall quality of care
- Long-term goals in healthcare
  - Predictive analytics
  - Personalized medicine
- Example
  - Atul Gawande's book, "Better"
  - Use of patient data led to improvement in patient health and safety

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Using Patient Data to Improve Care

- Patient documentation can be an excellent source of data
- Major considerations
  - High-quality data relies on the clinician's ability to document patient care in a systematic, structured, and standardized manner
  - Privacy and confidentiality
    - Best to follow HIPAA guidelines: eg, remove protected health information to de-identify patient records

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Methods for Collecting Data

- Spreadsheet software (eg, Excel)
  - Can use functions (eg, drop-down menus) and formulas to support data collection and analysis
- Electronic medical records (EMR) can be a 2-for-1
  - A good EMR will allow for:
    - #1: comprehensive clinical documentation of patient care
    - #2: analyses of clinical practice characteristics
  - Should incorporate and capture all practice characteristic variables
    - eg, sport, injury, ICD codes, CPT codes, fee schedules

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Real-Life Example: Practice Characterization

- Informatics assignment
- Primary objective: learn how to turn data into information
  - Get into the habit of collecting data: basis for quality improvement
  - Frame as a practice characterization project

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Step 1: Identify a Practice Component

- Basic components of clinical practice
  - Injury characteristics
  - Treatment characteristics
  - Value characteristics
- Pose a SIMPLE but clinically important question
  - What types of (and how many) injuries do I manage annually?
  - What is the average duration of care per injury?
  - What are the outcomes at return-to-play for patients with ankle sprain injuries?

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Step 2: Identify the Variables Needed

- What variables are needed to answer your question?
- Injury characteristics
  - Patient demographics
    - Age, sex, sport
  - Injury demographics
    - MOI, body part, side, diagnosis (ICD-9/ICD-10 codes)

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Step 3: Create a System and Process for Data Collection

- System
  - Spreadsheet software
  - Electronic medical record
- Process
  - When and how will the data be collected?
  - Must ensure data quality and integrity

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Step 4: Collect and Analyze the Data

- Basic Excel functions can facilitate data collection and analysis
- Data validation
  - Drop-down menus for stock variables
    - eg, gender: male, female; sport: soccer, volleyball, etc.
    - Preserves data integrity for analysis
- Pivot table
  - Aggregates data to produce basic reports

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Step 4: Collect and Analyze the Data

- Mathematical functions
  - Frequency counts (sum)
  - Averages (avg)
  - Calculations between columns (eg, multiplication)
- When in doubt, use YouTube as a reference

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Step 5: Reflect on Findings

- Presentation of findings
  - Demonstrate ability to turn data to information
- What did you learn about your clinical practice?
  - How can you use the information in a meaningful way?
- What challenges did you face while collecting data and how can you address them moving forward?
  - Workflow issues: improve systems and processes

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Linking Informatics and QI

- STEEP: six aims of improvement
  - Using patient data to assess STEEP
- Case study: Athletic Training Practice-Based Research Network
  - Use of Ottawa Ankle Rules
  - Example of studying clinical practice using real-life patient documentation and implementing a solution to address the problem

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Turning Data into Information

Other avenues to access sport-related injury data: sport-specific databases

- National Electronic Injury Surveillance System (NEISS)
- NCAA Injury Surveillance System (Datalyst)
- Athletic Training Practice-Based Research Network (AT-PBRN)

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Summary

- The use of health information technology
  - Goes beyond electronic records
  - Be on the lookout for academic EMRs
- Fundamentals of healthcare informatics
  - Start with the data-to-wisdom continuum
  - Use real-life examples
- Teaching strategies: basic healthcare informatics
  - Get their hands dirty → Go COUNT something interesting!
  - Collect, extract, process, and/or analyze data

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Thank You!

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