1 ◻️ **Improving Patient Care at the Point-of-Care: The Use of Health Information Technologies During Routine Clinical Practice**

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2 ◻️ **Objectives**

- The use of health information technology (HIT) and informatics as a competency for the 21st century clinician
  - From global calls to athletic training competencies

- Facilitating patient care through the use of HIT
  - Evidence-based practice*, patient-centered care, and quality improvement

- The role of informatics in improving patient care
  - What is it? Why is it important? How can we teach it?

3 ◻️ **HIT and Informatics: An Overview**

- Calls for action
  - Revitalizing the Health Professions (PEW, 1995)
  - Crossing the Quality Chasm (IOM, 2001)
- Targeted initiatives
  - HITECH ACT (2009)
  - TIGER Initiative: Nursing (2009)
- Athletic training
  - Athletic Training Education Competencies (CAATE, 2011)
  - Post-Professional Core Competencies (CAATE, 2013)

4 ◻️ **HIT and Informatics: An Overview**

- At A.T. Still University
  - HIT and Informatics play essential role in the pillars of patient care
    1. Evidence-based practice
    2. Patient-centered care
    3. Quality improvement

5 ◻️ **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
  - Clinical decision support, computerized physician order entry
  - Computers, electronic medical records, Internet

– Emerging technologies: mobile devices (smartphones, tablets), text messaging, "apps", social media sites

6 ▥ 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

7 ▥ 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 health literacy (patient) and time (clinician)

8 ▥ HIT: Patient-Centered Care

- Bridging the gap between patient and clinician
  - Internet: patient decision tools
    - Choosingwisely.org, Dartmouth Decision Points

9 ▥ HIT: Patient-Centered Care

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  - Emerging technologies: text messaging, mobile devices, smartphone apps, social media

10 ▥ Considerations: Privacy and Security

11 ▥ Considerations: Preserving Professionalism

12 ▥ HIT: Quality Improvement

- System → Process → Outcome

13 ▥ 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*

- Journey from data to wisdom

14 ◼ **Data to Wisdom Continuum**
- Data: numbers with no inherent meaning

- Information: interpreted or patterned data with meaning

- Knowledge: integrating multiple sources of information to create one coherent idea

- Wisdom: utilizing knowledge at the right place and at the right time

15 ◼ **The Power of Informatics:**
The Age of "Big Data"

16 ◼ **Turning performance into a science**

17 ◼ **Informatics Assignment**
- Primary objective: Learn how to turn data into information
  – Develop a habit of collecting data
    - *Basis for quality improvement

- Assignment framed as a practice characterization project
  1. Identify a practice component to characterize
  2. Identify variables needed to characterize the practice component
  3. Create a system and process by which to collect the needed data
  4. Aggregate data and create a report

18 ◼ **Step 1: Identify a Practice Component**
- Basic components of clinical practice
  – Injury characteristics
  – Treatment characteristics
  – Value characteristics
  – Other: budget, inventory, daily sign-in

- Develop 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 of ankle sprain injuries?

19 ◼ **Step 2: Identify Variables**
- 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)

20 **Step 3: Create a System and Process**
- System
  - Creating the appropriate environment
    - Electronic medical record
    - Spreadsheet software (eg, Excel)

- Process
  - Develop procedures for collecting data during care
    - When and how will the data be collected?
    - How to optimize data quality and integrity?

21 **Excel: organization**
- Each column should represent one variable
  - For example, for injury characteristics:
    - Date of injury
    - Time of injury
    - Sex
    - Sport
    - Body part
    - Body side

22 **Excel: drop-down menus (data validation)**

23 **Excel: basic functions**

- Data validation
  - Drop-down menus for stock variables
    - eg, gender: male, female; sport: soccer, volleyball, etc.
  - Preserves data quality and integrity for analysis

24 **Excel: drop-down menus (data validation)**

25 **Excel: basic functions**
- Turning data into information

- Pivot table
  - Aggregates data to produce basic reports

- Mathematical functions
  - Frequency counts (sum)
  - Averages (avg)
  - Calculations between columns (eg, multiplication)

26 **Excel: basic reports (pivot tables)**

27 **End of Project Report**
- Presentation of findings
  - Demonstrate ability to turn data to information

- What did you learn about your clinical practice?
  - How can you use the information?

- What challenges you faced while collecting data and how can you address them moving forward?
  - Workflow issues: improve systems and processes

28 **Electronic medical record**
- EMRs 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

29 **AT-PBRN EMR**

30 **More In-Depth Analysis (Lam et al, 2014)**
- 4,215 lower extremity disorders were diagnosed between October 2009 – October 2013 within the AT-PBRN

- Patient characteristics
  - Patient demographics
    - Male=1,778, female=1,543, age=17.1±2.1 yrs, height=169.5±12.6 cm, mass=68.1±16.2 kg
  - Injury demographics
    - Most commonly injured body parts: ankle, knee, hip/thigh
    - Most commonly diagnoses (ICD-9) by body part: sprain/strain of ankle, knee pain, sprain/strain hip thigh

31 **More In-Depth Analysis (Lam et al, 2014)**
- Treatment characteristics
  - Hot or cold pack [CPT 97010 (32.4%)], therapeutic exercise [CPT 97110 (22.3%)]
  - Average number of treatments provided per episode of care (EOC) was 1.79±0.86
  - The average duration of care was 15.1±42.3 days
  - Average number of EOC's was 6.2±10.0 per injury

- Value characteristics
  - Average total cost of care was $202.38±374.88 per injury
  - Average cost per EOC was $67.11±39.69

32 **Turning data into information**

Other avenues: sport-specific databases

- National Electronic Injury Surveillance System (NEISS)

- NCAA Injury Surveillance System (Datalyst)

- Athletic Training Practice-Based Research Network (AT-PBRN)

33 ▢ **Summary**
- The use of HIT and informatics are essential competencies for the present day clinician

- HIT can help support many aspects of clinical practice aimed at improving patient care
  – MUST consider privacy, security, and professionalism issues

- Informatics: the simple task of "counting" can be extremely powerful
  – Start simply and take advantage of available data

34 ▢ **Thank you!**
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