Use of Electronic Data for Feedback in Learning and Practice

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References

Blumenthal, D (2010). Launching HITECH. *New England Journal of Medicine*. 362: 382-385.
Ellaway, RH, Graves, L, et al. (2013). Medical education in an electronic health record-mediated world. *Medical Teacher*. 35: 282-286.
Hersh, W (2009). A stimulus to define informatics and health information technology. *BMC Medical Informatics & Decision Making*. 9: 24. http://www.biomedcentral.com/1472-6947/9/24/
Hersh, WR, Weiner, MG, et al. (2013). Caveats for the use of operational electronic health record data in comparative effectiveness research. *Medical Care*. 51(Suppl 3): S30-S37.
Hersh, WR, Weiner, MG, et al. (2013). Recommendations for the use of operational electronic health record data in comparative effectiveness research. *eGEMs (Generating Evidence & Methods to improve patient outcomes)*: In press.
Lucey, CR (2013). Medical education: part of the problem and part of the solution. *JAMA Internal Medicine*. 173: 1639-1643.
Nightingale, F (1863). Notes on Hospitals. London, England, Longman, Green, Roberts, Longman, and Green.
Safran, C, Bloomrosen, M, et al. (2007). Toward a national framework for the secondary use of health data: an American Medical Informatics Association white paper. *Journal of the American Medical Informatics Association*. 14: 1-9.
Shortliffe, EH (2010). Biomedical informatics in the education of physicians. *Journal of the American Medical Association*. 304: 1227-1228.
Shortliffe, EH (2011). President's column: subspecialty certification in clinical informatics. *Journal of the American Medical Informatics Association*. 18: 890-891.
Smith, M, Saunders, R, et al. (2012). Best Care at Lower Cost: The Path to Continuously Learning Health Care in America. Washington, DC, National Academies Press.
Stead, WW, Searle, JR, et al. (2011). Biomedical informatics: changing what physicians need to know and how they learn. *Academic Medicine*. 86: 429-434.
TenCate, O (2013). Nuts and bolts of enstrustable professional activities. *Journal of Graduate Medical Education*. 5: 157-158.
Tierney, MJ, Pageler, NM, et al. (2013). Medical education in the electronic medical record (EMR) era: benefits, challenges, and future directions. *Academic Medicine*. 88: 748-752.

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Who said this and when?

- "I am fain to sum up with an urgent appeal for adopting … some uniform system of publishing the statistical records of hospitals. There is a growing conviction that in all hospitals, even in those which are best conducted, there is a great and unnecessary waste of life … In attempting to arrive at the truth, I have applied everywhere for information, but in scarcely an instance have I been able to obtain hospital records fit for any purposes of comparison … If wisely used, these improved statistics would tell us more of the relative value of particular operations and modes of treatment than we have means of ascertaining at present."

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Who and when...

- Florence Nightingale, *Notes on Hospitals*, London: Longman, Green, Roberts, Longman, and Green, 1863
  - The first informatician?
- She does have a Web site (and museum in London)
  - www.florence-nightingale.co.uk

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Some more recent wisdom

- Stead (2011)
  - Quantity and complexity of information in medicine requires a fundamental paradigm shift as the number of facts per decision rises
- Shortliffe (2010)
  - Focus of medical practice is as much on information as patients, yet we teach much less about it, including its acquisition (electronic health record [EHR], searching) and use (quality, safety)
- Blumenthal (2010)
  - Information is "the lifeblood of medicine" and health information technology (HIT) is destined to be "the circulatory system for that information"

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Toward a "continuously learning healthcare system" (Smith, 2012)

- Records immediately updated and available for use by patients
- Care delivered the has been proven "reliable at the core and tailored at the margins"
- Patient and family needs and preferences are a central part of the decision process
- All healthcare team members are fully informed about each other's activities in real time
- Prices and total costs are fully transparent to all participants in the care process
- Incentives for payment are structured to "reward outcomes and value, not volume"
- Errors are promptly identified and corrected
- Outcomes are routinely captured and used for continuous improvement

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21st century physicians will interact with data in many ways (Safran, 2007)

- In addition to documentation using the electronic health record (EHR), will need competency in "secondary" uses of data, including
  - Health information exchange
  - Personal health records
  - Quality measurement and improvement
  - Predictive analytics to identify and act upon outliers
  - Clinical and translational research
  - Public health surveillance

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They will need to recognize the limitations of such data

- Caveats (Hersh, 2013)
  - Inaccurate
  - Incomplete
  - Transformed in ways that undermine meaning
  - Unrecoverable for secondary uses
  - Unknown provenance
  - Insufficient granularity

- Recommendations (Hersh, 2013)
  - Adaptation of "best evidence" approaches
  - Processes to evaluate availability, completeness, quality, and transformability
  - Creation of tools to manage data and their attributes
  - Development of methods for comparative validation of data
  - Standardized reporting methods for data and their attributes
  - Appropriate use of informatics expertise
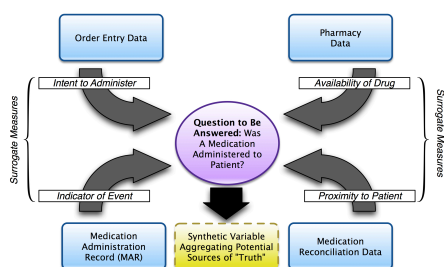
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This will require new physician competencies

- In addition to being able to use the EHR and other HIT for patient care, physicians will need to
  - Find and apply the most recent information and best evidence
  - Provide population-based health management
  - Engage patients in their care, including via electronic means
  - Identify patients at risk for complications and/or higher resource use
  - Participate in quality measurement and improvement efforts
- Physicians will need to adapt to having their decisions, performance, activities, etc. monitored

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Along the spectrum of electronic data for feedback in learning and practice

Medical School   Residency   Practice

Focus

Knowledge → Skills → Accountability

Examples

E-Folio → Procedure Logs → Quality Measurement

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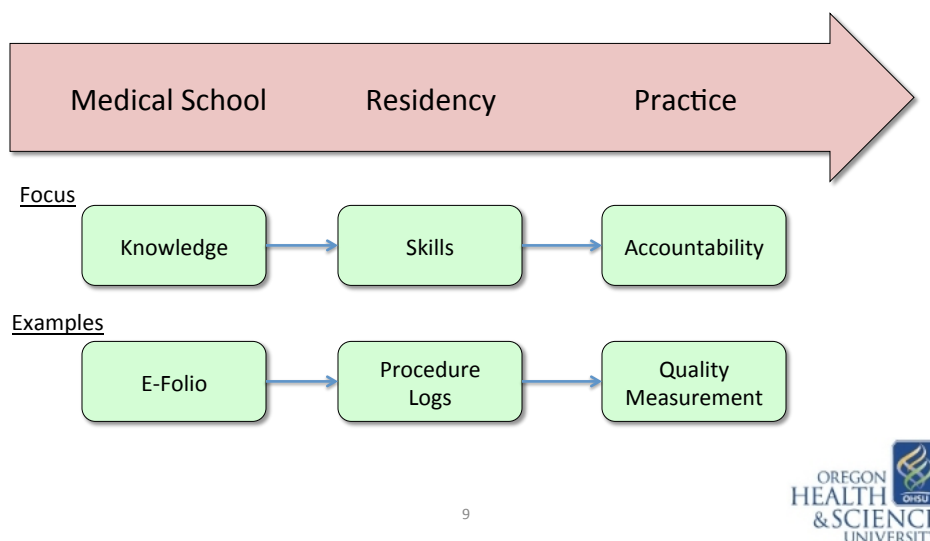
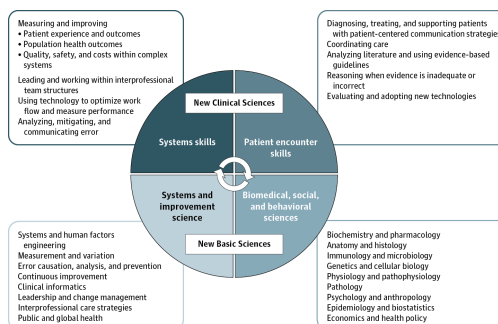## Requirements for this data-driven future (Lucey, 2013)

- Need "a fundamental reframing of the medical school and residency experience: one in which knowledge and skills in patient-centered, data-driven, collaborative, continuous improvement of clinical microsystems are integrated with and are of equal importance to traditional basic science and clinical skills"

Measuring and improving
• Patient experience and outcomes
• Population health outcomes
• Quality, safety, and costs within complex systems
Leading and working within interprofessional team structures
Using technology to optimize work flow and measure performance
Analyzing, mitigating, and communicating error

Diagnosing, treating, and supporting patients with patient-centered communication strategies
Coordinating care
Analyzing literature and using evidence-based guidelines
Reasoning when evidence is inadequate or incorrect
Evaluating and adopting new technologies

New Clinical Sciences

Systems skills | Patient encounter skills

Systems and improvement science | Biomedical, social, and behavioral sciences

New Basic Sciences

Systems and human factors engineering
Measurement and variation
Error causation, analysis, and prevention
Continuous improvement
Clinical informatics
Leadership and change management
Interprofessional care strategies
Public and global health

Biochemistry and pharmacology
Anatomy and histology
Immunology and microbiology
Genetics and cellular biology
Physiology and pathophysiology
Pathology
Psychology and anthropology
Epidemiology and biostatistics
Economics and health policy

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Aligning informatics with curriculum transformation

- How and where to integrate into curriculum?
- How to optimize student learning and workflow while maintaining professionalism and patient privacy? (Ellaway, 2013)
- How to align with other competency frameworks, such as ACGME and entrustable professional activities? (Tierney, 2013; Ten Cate, 2013)

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Also need to develop capacity in clinical informatics

- Recognized as subspecialty (of all specialties) by ABMS in 2011 (Shortliffe, 2011)
  - Area of biomedical informatics focused on healthcare and individual health (Hersh, 2009)
- Administered by American Board of Preventive Medicine (ABPM)
- Training pathways
  - "Grandfathering" (practice and non-traditional fellowship pathways) through 2018
  - ACGME-accredited fellowships starting in next 1-2 years, required after 2018
- Clinical informatics subspecialists will be members of healthcare team leading use of data and information

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