Educating the Next Generation of Physician Informaticians
Session #80: March 6, 2018

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Professor and CI Fellowship Program Director, Geisinger Commonwealth School of Medicine
Conflict of Interest

Bruce Levy, MD, CPE

Has no real or apparent conflicts of interest to report.
...or does he?

- Forensic Pathologist
- Educator & Researcher
- Clinical Informatician
- Star Trek Fan
Agenda

• What is Clinical Informatics
• History of physician informaticians and their education
• Program for informatics education for physicians
  • Medical school, residency, fellowship, CME
• Educational innovations and new techniques for teaching informatics to physicians
  • Virtual opportunities
  • Retreats
• Educational EHR
Learning Objectives

• Describe the evolution of the roles and responsibilities of the physician informatician and CMIO

• Explain the purpose and goals of ACGME fellowship training and board certification in clinical informatics

• Identify the sub-competencies within clinical informatics that all physicians in the 21st Century need to know to be effective practitioners

• Design an effective educational program for medical students and residents in the relevant sub-competencies within clinical informatics
What is Clinical Informatics?
Informatics is the science of information

Study of how data is:
acquired, structured, stored,
processed, retrieved, analyzed,
presented and communicated
Definitions of Clinical Informatics

“…informatics in health care”
https://en.wikipedia.org/wiki/Health_informatics

“…promotes the understanding, integration and application of information technology in healthcare settings”
http://www.himss.org/library/clinical-informatics

“…the application of informatics and information technology to deliver healthcare services”
https://www.amia.org/applications-informatics/clinical-informatics
Definitions of Clinical Informatics

“Clinical informatics is the subspecialty of all medical specialties that transforms health care by analyzing, designing, implementing, and evaluating information and communication systems to improve patient care, enhance access to care, advance individual and population health outcomes, and strengthen the clinician-patient relationship.”

https://www.acgme.org/Portals/0/PDFs/FAQ/381_clinical_informatics_2017-07-01.pdf
Clinical Informatics is **NOT** the same thing as Health Information Technology
If you ask me...

**Information Technology**

emphasizes tools for data manipulation, not the content and meaning of the data

**Informatics**

emphasizes the content and meaning of the data, using tools from various disciplines, including IT
Is Clinical Informatics a medical subspecialty?

Clinical Informatics has been defined as a subspecialty of medicine.

Clinical Informatics is an integral part of the practice of medicine today.
Core Content of Clinical Informatics

From: Core content for the subspecialty of clinical informatics. Gardner and Overhage, et al. JAMIA 2009

Board Certification in CI

• First board certification exam in 2013
  • Over 1500 certified
• Practice pathway through 2022
• Fellowship pathway
History of Physician Informaticians and their Education
Origins of the PI/CMIO

• “Physician builders”
• Physicians conducting informatics research
• Physician directors of departmental systems (LIS)
• Rapid evolution and growth following HITECH into EHR implementations
PI/CMIO Functions in 2018

• Clinician
• Physician leader
• Translator/diplomat between clinical, HIT and operations
• Implementation, optimization and maintenance of clinical systems
• Development of tools to improve practice efficiency and meet regulatory requirements
• Increase interoperability of health data
• Data literacy, analytics and visualization
How have physicians been educated in informatics in the past

• On-the-job training
• AMIA 10 x 10
• Certificate and graduate degree programs in health informatics
• NLM fellowships
• Courses/certifications offered by other professional organization

For example, American Association for Physician Leadership Health IT certification
How well educated are current PI’s?

• Given the variation in training and experience among existing physician informaticians/CMIO, how can we judge their level of clinical informatics knowledge?

• Have these variations led to significant differences in physician effectiveness in their informatics roles?

• One possible way to answer these questions is to look to how physicians have qualified for the CI Boards through the practice pathway, and their pass rates on the examination.
CI Board Application Approval

- Percentage of applicants in practice pathway that met eligibility criteria has decreased annually

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<tr>
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<th>Applications Processed (#)</th>
<th>Applications Approved (#)</th>
<th>Percent Approved (%)</th>
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<td>Fellowship Pathway</td>
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Lehmann CU, et al. Five years of CI Board Certification in the USA (prepublication data)

Thanks to ABPM and Dr. Lehmann for sharing data!
Informatics Board Pass Rates

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<tr>
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<th>Took Exam (#)</th>
<th>Pass Exam (#)</th>
<th>Pass Rate (%)</th>
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<td>2013</td>
<td>488</td>
<td>445</td>
<td>91</td>
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<td>2014</td>
<td>367</td>
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<td>2015</td>
<td>400</td>
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<tr>
<td>2016</td>
<td>472</td>
<td>401</td>
<td>85</td>
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<td>TOTAL</td>
<td>1,727</td>
<td>1,495</td>
<td>87</td>
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Lehmann CU, et al. Five years of CI Board Certification in the USA (prepublication data).
Thanks to ABPM and Dr. Lehmann for sharing data!
What does this tell us?

• Physicians currently practicing clinical informatics appear to have adequate knowledge and experience to qualify for and pass the board examination

• However,
  – The CI fellowship curriculum is extremely broad
  – Clinical informatics is evolving rapidly
  – This data only applies to those PI's who have applied for and took the boards
  – What about everyone else?
How Do We Train the Physician Informaticians of Tomorrow?
Who needs informatics training?

• If clinical informatics is an integral part of the practice of medicine in the 21\textsuperscript{st} Century, then all physicians are informaticians and require informatics training
  – What do all physicians need to know?
• What level of informatics training do non-CMIO physician leaders require?
  – Section chiefs/directors, department chairs, CMO, others …
• Physicians pursuing academic/research careers
• Physicians within industry/physician entrepreneurs
Are your medical students ready?

CMS OKs medical students' notes in patient records

Written by Jessica Kim Cohen | February 09, 2018 | Print | Email

CMS updated the Medicare Claims Processing Manual to allow student documentation in patient records, beginning March 5.

The update revises how teaching physicians bill Medicare Administrative Contractors for services provided to Medicare beneficiaries. Under the update, a medical student may document evaluation and management services in a patient record, so long as the appropriate teaching physician verifies the information, according to a Feb. 5 agency notice.

Informatics Education at Geisinger

- Medical School
- Graduate School
- Residency
- Clinical Fellowships
- Clinical Informatics Fellowship
- Continuing Medical Education

#HIMSS18
Need to Know?
Core Content Outline

1. Fundamentals
   1.1. Clinical Informatics
   1.1.1. The role of clinical informatics in healthcare delivery
   1.1.2. Key informatics concepts, models, and practices
   1.1.3. Clinical informatics as a health policy tool
   1.1.4. International clinical informatics standards
   1.1.5. Informatics and patient safety
   1.1.6. Legal and regulatory issues
   1.1.7. The health system
   1.2. Determinants of health and population health
   1.3. Effective communications

2. Clinical Decision Making and Care Processes 3
   2.1. Clinical Decision Support
   2.1.1. The role and cognitive aspects of human decision making
   2.1.2. Decision science
   2.1.3. Application of clinical decision support technology
   2.1.4. Transformation of knowledge into clinical decision support
   2.1.5. Legal, ethical, and regulatory issues
   2.1.6. Quality and safety issues
   2.1.7. Supporting decision-making processes
   2.2. Clinical Decision Support for Patient Care
   2.2.1. Evidence searches
   2.2.2. Evidence pooling
   2.2.3. Clinical guidelines
   2.2.4. Implementation of guidelines as clinical algorithms
   2.2.5. Information retrieval and analysis
   2.2.6. Clinical decision support
   2.2.7. Knowledge management
   2.2.8. Methods of evidence analysis
   2.2.9. Principles of evidence-based practice
   2.2.10. Quality improvement strategies and techniques

3. Health Information Systems
   3.1. Information Technology Systems
   3.1.1. Computer Systems
   3.1.2. Architecture
   3.1.3. Networking
   3.1.4. Security
   3.1.5. Data
   3.1.6. Information systems and applications
   3.1.7. Health information systems and applications
   3.1.8. Knowledge management
   3.1.9. Integration of health care information systems
   3.1.10. Knowledge management

4. Leadership and Management
   4.1. Leadership Models, Principles, and Practices
   4.1.1. Development of effective leadership
   4.1.2. Development
   4.1.3. Negotiation
   4.1.4. Conflict management
   4.1.5. Collaboration
   4.1.6. Motivation

5. Information Systems
   5.1. Health Information Exchange
   5.2. Health Information Systems
   5.3. IT Infrastructure
   5.4. Patient Portal
   5.5. Telemedicine

6. Governance and Management
   6.1. Change management
   6.2. Effective communications
   6.3. Governance of IT systems and data
   6.4. Health Information Exchange
   6.5. Health Information Exchange
   6.6. Health Information Systems
   6.7. IT Infrastructure
   6.8. Patient Portal
   6.9. Telemedicine

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## Arc of Physician Training

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### Medical School
- Efficiently use EHR
- Data literacy

### Residency
- Reinforce EHR skills
- Data analytics

### Clinical Fellowship
- Reinforce EHR and data literacy/analytics
- Informatics and your clinical subspecialty
Informatics in Medical School

- Threaded throughout curriculum
- Use of educational EHR (eEHR) – more on this later

Hersh et al. From Competencies to Competence. In: Shachak Health Professionals’ Education… Elsevier, 2017
Informatics in Medical School

• Threaded throughout curriculum
• Use of educational EHR (eEHR)

• Learn fundamentals and use of the EHR
  • How health data is structured and organized – data literacy
  • Medical decision making (decision science and CDS)
  • Productivity tools common to all EHRs
  • Searching and finding data in the EHR
  • Leadership skills relevant to informatics
Informatics in Medical School

• Threaded throughout curriculum
  • Informatics principles and exercises are incorporated throughout medical school courses
  • Minimize requirement for additional lecture hours
    • Provide informatics content online
    • Utilize flipped classrooms
    • Emphasize exercises and problem solving
Informatics in Medical School

- Threaded throughout curriculum
- Faculty includes current physician and nurse informatician teams, including our CI fellows
- Collaborative team-based exercises with our graduate students
- Other medical student opportunities
  - Elective rotation in clinical informatics
  - Clinical Informatics Student Interest Group
Informatics for Residents

- Most residents have had little or no education in informatics in medical school
  - Reinforce/introduce informatics from medical school curriculum
- Incorporate e-EHR into resident simulation exercises
  - Patient interview/examination skills
  - Procedure simulations
  - Professionalism exercises
Informatics During Residency

• Incorporate data analytics skills
  • Extract data from the EHR and UDA
  • Analytics exercises within the e-EHR
  • Support for ACGME required quality/safety projects in production
    • Work with CI fellows, PI, NI, IT, informatics

• Elective rotations for residents
• Resident superuser group
PIER Scope and Sequence

HOW CAN PIER BE ADAPTED TO ALL RESIDENCIES?

PIER Essentials 1
- Informatics in Pathology Practice
- Information Systems Fundamentals
- Importance of Databases
- Introduction to LIS Standards
- Data Integrity Systems

Entry-Level Proficiency
ACGME Milestone Level 1
Instructional Hours: 6

Intermediate Proficiency
ACGME Milestone Level 3
Instructional Hours: 10-12

PIER Essentials 2
- LIS Components & Functions
- Specialized LISs & Middleware
- Data & Communication Standards
- Worklist Design
- Laboratory Health Care Information Systems

Basic Proficiency
ACGME Milestone Level 2
Instructional Hours: 10

Advanced Proficiency
ACGME Milestone Level 4
Instructional Hours: 10-14

https://apc.memberclicks.net/pier
What about residency faculty?

• One invaluable lesson from PIER is apprehension among residency faculty regarding providing or supporting informatics education

• How do we provide an informatics foundation to our residency faculty?
  • Train-the-trainer sessions
  • Online education
  • Continuing medical education
  • Faculty Development Sessions
Informatics During Clinical Fellowship

• Ensure that incoming fellows have adequate informatics skills and competence compared to Geisinger trained medical students/residents

• Incorporate informatics activities and projects into clinical fellowship
  • Informatics is focused to the needs of the subspecialty

• Informatics track for fellowships
Clinical Informatics Fellowships

• ACGME accreditation
• Two-year training program
• Hosted by nine different medical specialties (RRC)
• Open to all physicians
“Blended” Fellowships

- Clinical Fellowship
- Informatics Fellowship
Blended fellowships

• Combine clinical fellowship and clinical informatics fellowship
• Blending training will enhance the training for both programs
• Can we decrease the total time of training?
Blending Fellowships in Pathology

- Successful trial of blended training at UIC
  - Combined Surgical Pathology (1 year) and Clinical Informatics (2 years) into a single 2-year program
  - Alternating and combining experiences while providing complete curriculum

- Approved by the American Board of Pathology
  - Pathologists can qualify for both a pathology subspecialty and informatics boards based on a single 2-year blended fellowship
Other Blended Fellowships?

• Additional complexity of multiple boards to approve
• CHOP received approval for blended Pediatric CCM and CI fellowship
• Interest at Geisinger in:
  • Adult CCM and CI
  • Nephrology and CI
  • Others?
Continuing Medical Education

• How do we provide skills for established physicians in clinical informatics?

• How do you help practicing physicians maintain informatics skills and learn new techniques in a rapidly evolving area of medicine?

• How do we train current faculty to feel comfortable teaching informatics to their students?
CI Innovative Educational Techniques
Team-based education

• Physicians need to learn and work in teams with other health and IT professionals training in informatics

• Coordination with graduate and other educational programs in informatics
  • Faculty is teaching across programs
  • Overlap between courses?
  • Informatics exercises common to multiple educational programs and platforms
  • Regional educational activities
Virtual education

• Online educational courses (asynchronous v. live)
  • Courses across: disciplines
t      degree programs
      institutions
• CI fellowship virtual case conference
• CI fellowship retreats (not quite virtual….)


Educational EHR

• Use of educational EHR (eEHR)
  • An eEHR is an electronic health record populated by simulated (non-PHI) data
  • Students can use the eEHR to enter data on patients, and search/extract data for analysis
  • Students can be monitored and evaluated on their efficient use of eEHR

• By the time the student gets to clinical years and residency, they are facile in EHR usage
What Platform for the eEHR?

Commercial EHR training environment
• Fully developed/supported product
• It’s what they’ll use as 3rd/4th years

Dedicated teaching EHR
• Focus on educational needs
• Vendor neutral

AMA, Regenstrief Institute Help Increase EHR Training in Med Schools
For immediate release: Apr 19, 2017
Where are we at Geisinger?

- Undergraduate medical education – launch January 2019
- Residency/Clinical fellowships – educational opportunities available
  - Rotations, informatics grand rounds, and resident superusers
  - Building educational series and exercises for residents
- CI fellowship – since 2016
  - Blended fellowships are an option
- Continuing medical education – the final frontier
- Educational EHR under development with go-live in 2019
Geisinger’s Provider Informaticians

- Geisinger currently has 22 provider informaticians
  - 11 are certified in CI by ABPM/ABPath
  - 4 are current fellows in our ACGME-accredited CI fellowship
  - Representing the following medical specialties:
    Anesthesiology, critical care, family medicine, emergency medicine, geriatrics, internal medicine, nephrology, neurosurgery, ob/gyn, pathology, pediatrics, pharmacy, radiology and surgery
Summary

• Clinical informatics is the practice of medicine in the 21\textsuperscript{st} century

• All physicians need to be educated regarding informatics

• Informatics needs to be a thread in medical education that starts on the first day of medical school and extends throughout a physician’s professional career

• Curriculum needs to be flexible and evolve with the development of health informatics

• The education needs to be innovative, using virtual learning techniques and an educational EHR
You are the path to this future…
Lobby your academic affairs leaders
Inspire your students
Lead by example

The Path to the Future Begins Today
Questions

• If you wish to talk offline…
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  blevy2@geisinger.edu
  570-214-6364
  https://www.linkedin.com/in/bruceplevy/

• Please complete online session evaluation