Accelerating Change In Medical Education
The Integration of Performance Improvement in Medical Education

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Objectives

1. Define the knowledge dilemma and how our current approach to medical education may be restricting our potential

2. Describe characteristics of the ‘ideal medical school graduate’ that the 11 projects strive to produce and how they propose to do it
The phenomenal strides in every branch of scientific medicine have tended to overload it with detail. To winnow out the wheat from the chaff and to prepare it in an easily digested shape for the tender stomachs of the first and second year students taxes the resources of the most capable teachers.

Osler, 1899
Impact on Curriculum

Second year medical students at one institution were assigned required readings that totaled **62** hours per week.

For the bewildered student, the elemental curriculum combines the properties of both gases and of crystals: like the former, it is intangible and difficult to contain, and it expands promptly to fill whatever space is available; like the latter, it grows by continuous accretion of substance from the surrounding medium.

Trainees in cardiac imaging reading 40 papers a day, five days a week, would take over 11 years to bring themselves up to date with the specialty.

But by the time they had completed that task, they would have to catch up on another eight years’ reading. **

Any physician would have to read 150 journals/month or 7,700 articles per year to stay informed.

R. Smith, BMJ, 2010; Ioannidis, JAMA, 2005
All major reports on medical education since 1910 are remarkably consistent in citing the need to cope with the burgeoning medical knowledge and excessive mastery of facts.

1. Information Fatigue Syndrome

"Information stress sets in when people in possession of a huge volume of data have to work against the clock to save lives or money and become stressed because even with their wealth of knowledge they still think they do not have all the facts they need."
2. Quality of Medical Knowledge

1. About one third (32%) of all highly cited studies have replication problems
   • 49 studies; >1000 citations
   • 44% replicated; 24% unchallenged
   • contradictory findings; different magnitude of effects
     Ioannidis, JAMA, 2005

2. Reviews are fallible
   • Previously published papers – embedded 14 errors
   • Experienced reviewers – identified only 3 errors noted (even after training)

Schroter, BMJ, 2004
3. Impact on Student and Patient
Medical Education Emphasizes Heuristics: Rules of Thumb

- Occam’s Razor: The simplest solution to a clinical problem is most often correct.

- Availability: Recent clinical experience will guide new experience.

- Sutton's Law – ‘obvious’ diagnoses more often explain symptoms than ‘non-obvious’ ones.
Heuristics Form the Basis of Intuition in Medicine

• Aware of knowing something without having to discover or perceive it
• Accomplishing the ‘routine’
• Addressing complex clinical situations that don’t have an immediate visible evidence base (NICU sepsis example)
• Using advanced pattern recognition skills of Radiologists = ‘Search Superiority’

NICU - Crandall & Getchell-Reiter, 1993; Meadow, et al 2002
Radiol – Norman et al 1992; Wood et al 2013
Pattern Recognition

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Azanmig huh?
Yaeh and I awlyas tghuhot slpeling was ipmorantt!
Counting Exercise

Count the number of times the team in the white shirts pass the ball.
“Our propensity for certain types of error is the price we pay for the brain’s remarkable ability to think and act intuitively. Heuristics play the odds: sometimes, particularly under unusual circumstances, these rules of thumb lead to wrong decisions.”

Graber, Acad Med 2002
Bias

Why did you miss dx past year?

✓ Didn’t know enough about the disease
✓ Was influenced by a ‘similar’ case
✓ Was in denial of an ‘upsetting’ diagnosis
✓ Was in too much of a hurry
✓ Let the consultant convince me
✓ Didn’t reassess the situation
✓ Patient had too many problems at once

Bordage, 1999
Biases

• Posterior probability -- decision about this patient is unduly influenced by what has gone on before in physician’s and or patient’s past

• Sutton’s slip -- dx possibilities other than the obvious are not given enough consideration

• Anchoring -- tendency to ‘lock on’ to salient features in the initial presentation and failing to adjust

Croskerry, Acad Med 2003
Surgical Resident Example: Simulation Setting

- 50 year old man with multiple trauma (MVC) – Level 1
- Excellent resident – Attendings want to work with this resident
- Patient begins to crash
• Resident orders Atropine -- was perfect until this moment
Biases

• **Posterior probability** -- decision about this patient is unduly influenced by what has gone on before in physician’s and or patient’s past

• **Sutton’s slip** -- dx possibilities *other than the obvious* are not given enough consideration

• **Anchoring** -- tendency to ‘lock on’ to salient features in the initial presentation and failing to adjust

Croskerry, Acad Med 2003
Ambulatory Care Case (Part I)

• The patient presents in the office with left shoulder pain

• This doctor’s previous patient had MS and was in acute crisis - she had to be sent to the ED

• This patient with shoulder pain was lifting a motorcycle engine into place four days ago when pain developed. Doctor had a long relationship with the patient. He is young, strong, and an alcoholic.

• This patient had called earlier and another doctor on call had recommended Advil

• But the pain persisted

• At this visit
  - Shoulder and cardiac exam normal
  - EKG normal
• Did not admit to ED despite the severe pain
• Next day the patient died of an MI en route to the ED
• Why didn’t the doctor send the patient to the ED?
  o Two patients in a row to the ED? Never happened before
  o Didn’t believe this was his heart based on what I knew about him (young, strong, alcoholic) and test results
  o Also knew he would argue with me about going to the ED because ‘that’s the type of patient he was’
Educating for errors and poor patient outcomes?

- Entrapped in a knowledge dilemma (too much, dubious quality)
- Teach about diseases (heuristics) … not medical problems
- Clinical skills are taught by apprenticeship
  - Use pattern recognition with little reflection
  - Teaching style is inappropriate for ‘higher order’ learning
  - Our primary excuse is that we have insufficient time
RPF Application Process

Stage 1. Five page Letter of Interest
119 of 141 apply

Stage 2. Invitation to submit full proposal
30 invited

Stage 3. Selected schools form Consortium
11 receive $1 Million
AMA Accelerating Change in Medical Education Consortium

- Indiana University
- Mayo Medical School
- New York University
- Oregon Health & Science University
- Pennsylvania State University
- The Brody School of Medicine at East Carolina University
- The Warren Alpert Medical School of Brown University
- University of California, Davis
- University of California, San Francisco
- University of Michigan
- Vanderbilt University
“If you don’t know where you are going you’ll end up someplace else”

Yogi Berra
Evolving medical education

Moving care from:
- Acute
- One physician
- One patient
- Clinic

Moving care to:
- Chronic
- Teamwork
- Population health
- Community
The ‘Ideal Graduate’

One who can engage in reflection, self-assess personally and professionally (Mayo)

A student who not only acts **but** reflects on that action and approaches patient care as a complex adaptive challenge (Penn State)
The ‘Ideal Graduate’

The solitary hero physician identity must yield to a physician who commits to personal excellence and favors interdependence over autonomy . .  (UCSF)

Someone who can humbly accept data to continuously reflect on his/her individual knowledge and performance, interpret data, and work in teams to navigate complex adaptive systems (Oregon)
The Event: “We had 208 seconds to plan and problem-solve”

- The co-pilot and I had to take on different roles than what typically would be done according to protocol. I decided early on that we were best served by me using my greater experience in the [A320] to fly the airplane.

- Additionally, I felt like I had a clear view out the left-hand and forward windows of all the important landmarks that I needed to consider. They would be easier for me to see. And ultimately the choice of where we would go and what flight path we would take would be mine.

Air and Space Magazine (Smithsonian) interview with Captain ‘Sully’ Sullenberger 2.18.2009
So how will the schools produce the ideal graduates?

How will they change the culture from attaining knowledge and skills to practice based learning and expertise?
So how will the schools produce these graduates?

Unifying thread: Change the focus from attaining knowledge to critically using knowledge and skills

Old
  • Reading and memorizing
  • Knowledge testing

New
  • Practicing (real and simulated)
  • Competency assessment
ACE Focus on EPAs and Competencies

- Identify System Failures and Contribute to a Culture of Safety and Improvement
- Participate as a Contributing and Integrated Member of an Interprofessional Team
- Form Clinical Questions and Retrieve High Quality Evidence to Advance Patient Care
ACE schools will make ‘authentic learning’ accessible and create “dynamic healthcare system of learning that fully integrates learning with patient care . . .”
Authentic accessible teaching context – Indiana, New York, Vanderbilt, Michigan and Oregon

Health System Database

Virtual/Real Health Center

Electronic Health Records

Health Outcomes

Health System Performance

Patient Panels

Patient Satisfaction

Electronic Portfolio

Mentoring → Evaluation → Flexible Progression
Brown, UCSF, Mayo and Penn State

Medical School & Health Care System

authentic  reciprocal  interdependent
interprofessional integrated

Quality Patient Care

Medical Science

Health Care System 1st
ACE Schools will Expand the Perspective of Healthcare Delivery

The physician of the future will require the skill of data-based advocacy across groups or populations of patients. *(NYU)*

Population health (quality, safety, and social determinants of health) should be taught from the beginning of medical school and integrated longitudinally throughout the educational program leading to the MD. *(Brown)*
Embedding Learners in the HC system will . . .

Give learners greater responsibility and enable them to function as a member of a team . . . help them thrive despite the vulnerability and risk that underlies the quest for constant improvement.

(Vanderbilt)

Have a real impact on patient and systems outcomes . . . enable students to feel they have the power and responsibility to effect change,

(Penn State)
Teamwork

Trauma Bay: MVA – 70 yr old woman with multiple trauma
Brody, UC Davis and Brown

Within this broader perspective a sub-set of learners will focus on healthcare disparities and become Leaders in Primary Care
Experts Learn from Experience

To study medicine without books is like sailing in uncharted sea, but to study medicine from books alone is like never going to sea at all.

Osler
Integrated ACGME Competency Diagram

- Medical Knowledge
- Professionalism
- Interpersonal and Communication Skills
- System-based Practice

Practice-based Learning
- Expertise

Patient Care
Thank You!