Educational Implications of a Changing Clinical Future

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Today’s Agenda

- Might history guide us when looking forward?
- Current state observations and likely implications
- Future state projections and potential implications
Conclusions

- Clinical care delivery will change
- Academic medicine should be in the forefront of creating a new care model
- Changes in the clinical delivery of medicine require a new model of medical education predicated on a vision for clinical care
Medical Education till 1870

- Prerequisites
  - Afford tuition
- Year 1: four months of lectures
- Year 2: same lectures as year 1
- Graduation requirements:
  - Pass 5/9 five minute oral quizzes
- Enter practice
Then the world changed......
Civil War
Promise of Scientific Medicine
Revolution in Medical Education

- 1870’s – 1880’s Michigan, Harvard and University of Pennsylvania pioneered educational reform

- Prerequisites

- Learning by doing
  - Basic sciences
  - Clinical experience

“Harvard, Pennsylvania, Michigan and John Hopkins represented a qualitatively new approach to medical education”

Ludmerer, *Learning to Heal*
Lessons from History

- Envisioned the goal, worked toward the ideal
- 40 year process
- Codified in state medical licensure laws following 1910 Flexner report
Impetus for change was external

Medical School faculty were the architects of change
Today’s Context: impetus for change

- **Cost of healthcare – federal deficit**
- **Physician shortage**
  - 52,000 primary care physicians by 2025
  - 124,000 full-time equivalent physicians by 2025
- **National quality metrics**
Federal Financial Crisis

- National debt = GDP
- Healthcare spending approaching 20% of GDP
  - Government pays for 50% of healthcare
- Projected increases in Federal spending 2010-2021
  - Medicare and Medicaid $800B
  - Interest on debt $600B
  - Social Security $580B
  - Other mandated expenditures $180B
  - Defense $180B
  - Discretionary $90B
  - Offsetting revenue $200B

Center for Health Care Quality and Payment Reform, 2012
Today’s Context: impetus for change

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OECD Health Data 2012

Professionally active physicians per 1,000 population

Today’s Context: impetus for change

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- Physician shortage
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Question

- What will the practice of medicine be like in 2030?

- Will this evolve gradually or disruptively?
My View: US needs a “new” care system

Healthy

Prevention and health maintenance
APN
Dentist
Pharmacy
Alternative providers
“Block Moms”
Technicians
YMCA (DM prevention)

Chronic disease management
Physicians
APN, PA

Acute disease diagnosis and treatment
Physicians
APN, PA

Complex disease management
Physicians

Diseased
Since the clinical care model drives medical education:

WHAT ARE THE IMPLICATIONS FOR MEDICAL EDUCATION?

WHAT WILL MEDICAL EDUCATION BE LIKE IN 2020?
Crystal Ball

- Competency based progression will replace time based advancement
  - Educational programs will certify competency
- Process of education will be flexible
  - “mass customization”
- Differentiated learning pathways based on career goals
  - Medical school and GME training will merge
- Greatest challenge will be continuous professional development
Competency – based education focuses not on the process of education, but on the results of the educational process.

Fundamental difference from most educational “reforms” that focus on process – PBL, discipline based, organ systems, etc.
Competency – based Education

“The beginning is the end”

At each level trainees are evaluated against progress towards the end goal.

- achieve competency – advance to next level
- time independent
- transparent to learners and faculty
- Potential – prepare for lifetime of self-regulated learning
Crystal Ball

- Process of education will be flexible
  - “mass customization”

- Differentiated learning pathways based on career goals
  - Medical school and GME training will merge
Flexible / “Mass Customization”

- Path to competence is student driven
- Array of learning experiences available
  - Build on personal learning style
    - Vodcasts, simulations, serious games
  - Clinical context foundation for learning

Learning is experience. Everything else is just information.

Albert Einstein
Crystal Ball

- Differentiated learning pathways based on career goals
  - Medical school and GME training will merge
Professional Development

- Maintenance of competency / licensure
- Fellowship / subspecialty training
- Residency milestones
- MS graduation competencies
- Initial differentiation based on career path
- Constants
- Demonstrated competencies on entry
Foundation: Constants

- Signs and symptoms to physiology = diagnostic reasoning
- Genetics, epigenetics to disease predilection and intervention = prognostic reasoning?
  - What will be the equivalent heuristics?
- Therapeutic reasoning
  - Pharmacogenetics, personalized medicine
- Communication skills
  - Patients, families, boards, community, advocacy
- Language of medicine
- Team membership and leadership
  - Individual and collective accountability
- Data extraction, synthesis and interpretation
- Economics of healthcare
- Learning experiences – technology for information transfer, simulations, serious games
Professional Development

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Clinical system requires physicians who:

- Manage chronic disease
- Manage complex disease
- Diagnose and treat serious acute disease
  - Diagnosticians
  - Proceduralists
Initial Differentiation: Care Management

- Disease based population management
  - Hypertension, asthma, diabetes

- Multiple chronic diseases (Medicare patients ≥ 5 chronic conditions see 14 physicians / year; ~ 76% of Medicare expenditures)

- Complex care management – concierge to coordinate complex care system
  - Von Hippel Lindau
  - Special needs children

- Societal expectation – optimize patient function, eliminate waste and redundancy, coordinate care, efficiency
Care Management: Curriculum

- Transition management (coordinated handoffs)
- Health care system and community resources assessment
- Conflict management
- Negotiation skills
- Understanding use of automated control processes
- Learning experiences—ACO care manager rotation; embed in guideline development team, quality metric analysis and improvement team
Diagnose and treat serious acute disease

- Rapid application of technology and intellect to diagnosis
- **Societal expectation** – accurate, expeditious diagnoses
Diagnosticians: Curriculum

- Wide spectrum of diseases
  - Illness scripts
- In-depth imaging
- Laboratory diagnosis and guidance
  - Metabolomics, pharmacogenomics
- Epidemiology and prior probability
  - Pitfalls of diagnostic reasoning
    - premature closure, recall bias
- Learning experiences – Real and virtual patients, comprehensive case studies, clinical laboratory rotations, masters in action
Prodceduralist

- High end surgery routine procedures
- Supervision of “procedural technicians”
  - Colonoscopy
  - Low risk surgeries
- Societal expectations - efficient, minimal variability, results guaranteed
Proceduralist: Curriculum

- Anatomic structural relationships
  - Dissection
  - Imaging
- Lean / Six-sigma / quality and efficiency enhancement tools
  - Flow – Care Maps
  - Systems analysis skills to understand process improvement
- Advanced team management
- Learning experiences - Simulation center, quality improvement teams
“The beginning is the end”

At each level trainees are evaluated against progress towards the end goal.

- Achieve competency – advance to next level
- Graduation from medical school, seamless transition to residency
  – Residency “Milestone” time 0
Dreyfus Model of Skill Acquisition

Responsibility extends to others and the environment
Sense of responsibility increases with experience
Sense of responsibility arises from actively making decisions
Still does not experience personal responsibility
Only feels responsible to follow the rules

Scope of vision & Range of capability
- Follows specific rules for specific situations. Rules are not conditional. “Only capable of following the rules”
- Begins to create and identify conditional rules. “Rules have nuance and become conditional in nature”
- Learns organizing principals. Information sorting by relevance begins
- Uses pattern recognition to assess what to do. Uses rules to determine how to do it
- No analysis or planning. Pattern recognition extends to plan as well as action “Just does what works”

Novice
Advanced beginner
Competent
Proficient
Expert
Professionalism

Recognizes the importance and priority of patient care, with an emphasis on the care that the patient wants and needs; demonstrates a commitment to this value.

Is aware of basic bioethical principles and is able to identify ethical issues in clinical situations.

Interpersonal & communication skills

Identifies team-based care as the optimal approach and is able to describe and appreciate the expertise of each team member, including the patient and family.

## ACGME Milestones for graduating MS

### Practice-based learning and improvement

- Describes basic concepts in clinical epidemiology, biostatistics, and clinical reasoning.
- Categorizes the study design of a research study

### Systems-based practice

- Can describe systems theory and the characteristics of high-reliability organizations.
- Understands the epidemiology of medical errors and the difference between medical errors, near misses, and sentinel events.
- Can define human-factors engineering.

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*Nasca, Philibert, Brigham, Flynn. The Next GME Accreditation System – Rationale and Benefits; NEJM, 2012.*
Caveats

ACGME competencies and Milestones a frame
Measurement is central

- Balancing ease of measurement versus what is important
  - Reductionist, psychometrically driven versus holistic

- Anchored in end goal, achievable – not compilation of committee’s interests

- Sampling versus comprehensive assessment of competencies
Miller’s Hierarchy of Learning

**KNOWS**
- Fact Gathering, MCQ, Essay Exam, Oral Exam

**KNOWS HOW**
- Interpretation/Application, Case Presentation, Low fidelity simulation, Essay Exam, MCQ, Oral Exam

**SHOWS HOW**
- High Fidelity Simulations, OSCE, Clinical Performance Exams

**DOES**
- Performance Integrated into practice. Chart audit, patient outcomes, logs, observations

Integrated into practice. Chart audit, patient outcomes, logs, observations.
Conclusions

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- Changes in the clinical delivery of medicine require a new model of medical education predicated on a vision for clinical care
“The best way to predict the future is to invent it.”

Alan Kay
QUESTIONS / DIALOGUE