A New Medical Curriculum for the 21\textsuperscript{st} Century

Michael F Lubin MD FACP
Professor of Medicine
Visiting Professor
University of Tokyo
Summary

- The old Emory curriculum
- Why change?
- The new curriculum overview
- The four parts of the new curriculum
  - Foundations (Human basic health and disease)
  - Applications (basic clinical medicine)
  - Discovery (student research)
  - Translation (further clinical information + back to basics)
- What kind of doctor are we trying to make?
Emory University’s 20\textsuperscript{th} Century Curriculum

\begin{itemize}
  \item A standard American Curriculum
    \begin{itemize}
      \item The first year:
        \begin{itemize}
          \item Anatomy, embryology, physiology, biochemistry, cell biology, histology, neurobiology
        \end{itemize}
      \item The second year:
        \begin{itemize}
          \item Pathology, pathophysiology, microbiology, immunology, pharmacology, physical diagnosis
        \end{itemize}
    \end{itemize}
\end{itemize}
Emory University’s 20th Century Curriculum - PROBLEMS

- There were many hours of lecture on most days; some laboratory sessions
- There were many bored and exhausted students many of whom did not go to class
- It was so bad--There was a “transcript team” - a few people who went to class and took notes for the rest of the class!!!
Emory University’s 20th Century Curriculum

• The third year: 12 months of clerkships
  • 3 months of internal medicine
  • 2 months of surgery
  • One and a half months of pediatrics
  • One and a half months of obstet gynecol
  • One and a half months of psychiatry
  • One month of neurology
  • One month of family medicine
  • Two weeks Radiology
  • One week dermatology
Emory University’s 20th Century Curriculum

- Fourth year (8 months):
  - One month internal medicine sub-internship
  - One month surgical subspecialty
  - One month Emergency Medicine
  - 4 months of electives
  - One month of vacation (internship interviews)
Is there another way? 1994

- **After only 40 or 50 years**, someone asked: might there be a better way?
- So they “fiddled around” a bit around the edges
- In 1994, they decided to cut back on some lectures and add some Problem Based Learning:
  - First year (M1)- 6 cases for 3 weeks (2 hour sessions)
  - Second year (M2)- 8 cases for 2 weeks (2 hour sessions)
  - A case presentation was made and there was discussion with a basic science professor and a clinical professor. Students were to ask the questions and find the answers - variable success
  - Two new courses: biostatistics and preventive health
Real Progress!!

- In 2004, (only 10 years later?!?) Dean Tom Lawley decided the time was right for a new curriculum
- Why?
- Plan to build a $15 million education building (many teaching rooms; simulation rooms; OSCE rooms)
- Time to try something new and different
Why?

● Explosion of knowledge and new disciplines
  ● Molecular biology
  ● Nano-medicine
  ● Biomedical engineering
  ● Informatics- computer science
  ● Decision making systems
  ● Robotics
  ● New imaging technologies
What is the desired “Product”?

- What kind of MDs do we want to produce?
- Characteristics
  - Superb clinicians (as before)
  - Passionate about medicine and making a difference
  - Understand the social, psychologic and economic issues of the society
  - Curious about medicine and creative thinkers
  - Lifelong learners
  - Future leaders of medicine
Guiding Principles- Theory

- Culture Change for the School of Medicine- medical education will be clearly valued and explicitly supported
- More Integration- both horizontal (across disciplines) and vertical (across years)
- Early introduction to clinical medicine
- Flexibility
- Discovery (research) phase for creativity, curiosity
Guiding Principles - Practice

- Reduced lecture time
- Increase use of patient simulators
- Excellent faculty mentoring
- Extended exposure to master clinicians
- Capstone Course at the end - some return to basic science
Guiding Principles-What to Teach

- Competency based curriculum
  - Clinical practice
  - Application of medical knowledge
  - Critical analysis
  - Professionalism
  - Lifelong learning
  - Effective communication
  - Moral reasoning and ethics
  - Personal awareness and wellness
How to Do It--"Society" System

Faculty Involvement

- The Old Legacy System (formerly led by each of four deans)
- Now 1 leader and 3 additional faculty in each society (8-9 students/faculty)
- 30% pay supplied by Dean’s Office directly for teaching!! This is new!!
- Faculty serve as clinical skills & small group teachers
- Long term relationship/advising
Society System - Close Supervision

● There are 4 societies
● Each is led by one major “mentor” responsible for care of 36 students but major care of 9 students
● There are three sub-mentors in each society who care for 9 students each
● Total of 16 mentors who watch over their respective groups for all 4 years but particularly during the Foundation Phase
Mentor + Role Model + Parent

- These faculty are great influences on the students.
- They MENTOR- help them figure out what is important and help them with projects and getting others to help them.
- BUT- they also are ROLE MODELS for how doctors work, behave, how they dress, how they take responsibility, etc.
- They keep track of (PARENT) their students, keep them on the right track, discipline them when necessary and give them feedback, and give them support too.
Four Educational "Phases"

- Phases that integrate the curriculum and cross departmental lines
- Foundations of Medicine (15 months)
- Application of Medical Science (12 months)
- Discovery Phase (5-10 months) or more
- Translation Phase (8 months)

We will discuss each of these phases in detail
Educational “Phases”

• Foundations of Medicine (15 months)-
  • core knowledge of basic and clinical sciences
  • Early introduction to patient care->
  • Longitudinal out patient clinic experience
  • Elective time
  • Volunteer experience

(More detail later)
Educational “Phases”

- Applications of Medical Science (12 months)
  - Core knowledge of basic medical specialties

- Discovery Phase- (5-10 months)
  - This is entirely new!!
  - Specific area of enquiry chosen by the student in lab science, clinical research, public health or health policy
  - Generation of new knowledge and to introduce research to all students
Educational “Phases”

● Translation of Medical Sciences (7-8 months)
  ● Time to explore more specialized areas of medicine, complete advanced competencies in clinical medicine, and prepare for residency

● Also- Maximize unique resources at Emory-Georgia Institute of Technology, Carter Presidential Center, Centers for Disease Control and Prevention
Overview of New Curriculum

Year 1
- Foundations of Medicine

Year 2
- Foundations of Medicine
- NBME Part I
- Application of Medical Sciences

Year 3
- Application of Medical Sciences
- Discovery Phase

Year 4
- Translation of Medical Sciences
Foundations: Competencies

- Medical Knowledge
- Problem Solving
- Professionalism
- Clinical Skills
- Self Development
- Communication
- Interpersonal skills
Back to Foundations: Educational Theory

- Teach key concepts without unnecessary detail and avoid duplication!! -(try to avoid “burnout”)
- New modes of teaching (PBL, simulations, standardized patients) keep students interested and curious
- Have clinicians and basic scientists work together to form the curriculum and teach
- Decrease time to 18 months (rather than 24) and decrease lecture time- < 2 hours a day
- More faculty interaction
Changing Principles-
Different “Angle of Attack”

- Foundations of Medicine Phase
  - THIS WILL BE THE OPPOSITE OF PREVIOUS EMORY AND MOST CURRICULA!!
  - Begin with the study of the whole living human and the society and environment where they live
  - Next: integrated analysis of organs, biologic systems and the study of cells
  - Sub-cellular anatomy and physiology
FOUNDATIONS OF MEDICINE CURRICULUM

Year 1

Foundations: Healthy Human
- Prologue I: Development
- Neural Function
- Exercise
- Genetics & Evolution
- Aging

Foundations: Human Disease
- Prologue II: Skin, Bones, Muscles & Joints
- Pulmonary
- Cardiac
- Gastrointestinal
- Renal & Genitourinary

Becoming a Doctor/Continuity Clinic

Year 2

Foundations: Human Disease
- Endocrine
- Hematology
- Neuroscience I
- Neuroscience II
- Summation

Review

Board Exam

Applications Phase

Becoming a Doctor/Continuity Clinic
Self Study
Clinical Rotations

Designates Vacation Time
Foundations: Healthy Human

- Begin with some cases as “Hooks”
- Healthy Human- biosphere, population health, social medicine (School of Public Health, Centers for Disease Control)
- Cognition and behavior
- Homeostasis
- Organ structure and function
- Tissue studies
- Cellular and molecular biology
- Evolutionary biology----> leading back to Biosphere!!
Foundations: Healthy Human

- Other pieces of the puzzle
- Human anatomy
  - Anatomical dissection remains
  - BUT-
  - Anatomical models
  - Major use of imaging
    - Xrays/ CT/ MRI
Foundations: Healthy Human

Prologue I: 3 weeks
• Week 1: Orientation
• Week 2: Week on the Inpatient service (HOOK!)
• Week 3: next slide----->
# Prologue - Week 3

<table>
<thead>
<tr>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
</tr>
</thead>
<tbody>
<tr>
<td>Determinants of health</td>
<td>Threats to health</td>
<td>Becoming a patient</td>
<td>Becoming a doctor</td>
<td>Balance</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Patient presentation</th>
<th>Global threats to health</th>
<th>HIV epidemic</th>
<th>Cultural context: the healer</th>
<th>Homeostasis</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Definition of health and disease</th>
<th>Poverty, environment</th>
<th>Becoming a patient: pt interview</th>
<th>Social contract with society</th>
<th>Reflective writing about culture and</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>The determinants of health</th>
<th>Small Group Dr/Pt; Dr in society;</th>
<th>OSCE suite Physical exam; hand</th>
<th>OSCE suite Physical exam:</th>
<th>Maintenance of personal health</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th></th>
<th>HPI with group leader and standard pt</th>
<th>Washing; inspection; vital signs ENT</th>
<th>same</th>
<th>Small group Discussion reflective writing</th>
</tr>
</thead>
</table>

- **OSCE suite**: OSCE suite Physical exam; hand
- **HPI with group leader and standard pt**: HPI with group leader and standard pt
- **Washing; inspection; vital signs ENT**: Washing; inspection; vital signs ENT

**Note:**
- The table outlines the topics and activities for each day of the week, focusing on health determinants, patient presentation, and related educational activities.
Foundations: Healthy Human

The Healthy Human: 13 weeks
- Embryology Tissues Cells (ETC): Weeks 4-6
- Neural Function: Weeks 7-9
- Exercise: Weeks 10-11
- Nutrition: Weeks 12-13
- Endocrine Control: Week 14
- Genetics and Evolution: Weeks 15-16
- Aging and Death: Week 17
<table>
<thead>
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<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
</tr>
</thead>
<tbody>
<tr>
<td>Case Presentation: Skin as Study of epithelia</td>
<td>Epithelia</td>
<td>Embryology: Mechanisms of Birth Defects</td>
<td>Basic Cell 1: Basic Organization</td>
<td>Review Session</td>
</tr>
<tr>
<td>Epithelia Lab and Basic Intro. To Skin</td>
<td>Embryology:</td>
<td>Basic Cell 2: Membrane Structure/Function</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Basic Mechanisms of Differentiation</td>
<td>Ectoderm</td>
<td>Ectoderm</td>
<td>Basic Cell 3: Exocytic Route, Mitochondria</td>
<td></td>
</tr>
<tr>
<td>Morphogenesis and Cell Interactions</td>
<td>Endoderm</td>
<td>Basic Cell 4: Endocytic Route, Peroxisomes</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>1-2:45pm SG Discussion:</strong></td>
<td><strong>1-2:45 pm OSCE Suite-O&amp;S Societies Physical Exam:</strong></td>
<td><strong>1-2:45 pm OSCE Suite-H&amp;L Societies Physical Exam:</strong></td>
<td><strong>Quiz / Test</strong></td>
</tr>
<tr>
<td></td>
<td>Read/watch and discuss pt's experience of illness, autonomy</td>
<td>Skin, Cardiac and Lung (basic) incl draping</td>
<td>Skin, Cardiac and Lung (basic) incl draping</td>
<td></td>
</tr>
</tbody>
</table>
Foundations: Healthy Human

- Mini clerkship
- Three week experience in physical diagnosis and clinical exposure
FOUNDATIONS OF MEDICINE CURRICULUM

Year 1

Foundations: Healthy Human
- Prologue I
  - Development
  - Neural Function
  - Exercise
  - Genetics & Evolution
  - Aging

Foundations: Human Disease
- Prologue II
  - Skin, Bones, Muscles & Joints
  - Pulmonary
  - Cardiac
  - Gastrointestinal
  - Renal & Genitourinary

Becoming a Doctor/Continuity Clinic

Year 2

Foundations: Human Disease
- Review
- Board Exam
- Applications Phase

Becoming a Doctor/Continuity Clinic
- Self Study
- Clinical Rotations

Designates Vacation Time
Foundations: Human Disease
Abnormal and Normal

- Prologue II: Basic Pathology, Microbiology, Pharmacology
- Skin, Muscle, Bones, Joints: 4 wks
- Pulmonary: 5 wks
- Cardiovascular: 5 wks
- Gastrointestinal: 4.5 wks
- Renal/GU: 4.5 wks
- Endocrine/Reproduction: 4 wks
- Hematology: 3 wks
- Neurosciences: 9 wks
- Summation: 2 wks
- Review: 4 wks
# Phase II: Pulmonary module

<table>
<thead>
<tr>
<th>Time</th>
<th>MONDAY 2/4</th>
<th>TUESDAY 2/5</th>
<th>WEDNESDAY 2/6</th>
<th>THURSDAY 2/7</th>
<th>FRIDAY 2/8</th>
</tr>
</thead>
<tbody>
<tr>
<td>8-9</td>
<td>Case: Cystic Fibrosis</td>
<td>Anatomy: Clinical Thorax</td>
<td>OPEN</td>
<td>OPEN</td>
<td>Pathology: Pneumonia</td>
</tr>
<tr>
<td>9-10</td>
<td>Genetics of Cystic Fibrosis</td>
<td>Anatomy Lab 6 - Thorax</td>
<td>Structural Basis Resp Function</td>
<td>Cilia / Lab Overview</td>
<td>CO and other problems</td>
</tr>
<tr>
<td>10-11</td>
<td>Infections in Cystic Fibrosis</td>
<td></td>
<td>Common Pulmonary Pathogens 1</td>
<td>Cell Biology and Histology: Laboratory</td>
<td>Soc Small Groups: AW clear, infxn, bronch</td>
</tr>
<tr>
<td>11-12</td>
<td>Organization of the Thorax</td>
<td></td>
<td>Common Pulmonary Pathogens 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-2</td>
<td>Pulmonary H&amp;P</td>
<td>Clinic (Lister and Harvey)</td>
<td>Clinic (Osler and Semmelweis)</td>
<td></td>
<td>Radiology of the Thorax</td>
</tr>
<tr>
<td>2-5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Anatomy Lab 6 - Thorax</td>
</tr>
</tbody>
</table>
Foundations: Human Disease

• Elective time (summer of first year)
  • Can be in many areas: basic science, public health, ethics, administration
  • Meant to help identify an area of study for Discovery Phase
• Medical Service Project: work with underserved populations- Atlanta, rural Georgia, other countries
• Capstone session- comprehensive review of the 15 months of Foundation!
Application Phase

Foundations of Medicine | NBME Part I

Rotation A | Rotation B

Applications of Medical Sciences

B | Rotation C | Rotation D | Discovery Phase

Introductory week for each rotation
Application Phase

- Clinical Blocks interspersed with a week of preparation (knowledge and skills)
- Increase in Out-Patient experience
- Ongoing mentoring by Society Advisor
- Working in of foundation sciences as possible
- Continue emphasis on responsibility to the patient
- Complete these rotations before career decisions must be made!
- More elective time to figure out choices of career
Application Phase

- One week of initial orientation overall
  - Legal issues (privacy, notes)
  - Working with a ward team
  - Presentations
  - Information system use
- One day comprehensive OSCE - identify students who need additional help and if there are sites that need to do a better job of teaching these skills
Application Phase

- Rotations
  - Internal Medicine
  - Surgery
  - Pediatrics
  - Obstetrics/Gynecology
  - Neurology/Psychiatry
Application Phase

- One week introduction to core skills of rotation
- Also discussion of basic science that is applicable
  - Examples- surgical techniques
  - Psychiatric interviewing skills
  - Physical exam skills
  - Pathophysiology
- Core reading assignments
  - Clinical readings
  - Basic science readings
Application Phase

● Faculty Development Will be Critical !!
  ● Teaching faculty will have to be compensated for these activities
  ● Teaching faculty will have to be promoted for their teaching activities if we are to have at least some senior faculty do the teaching
  ● Importance of faculty mentoring!!
Discovery Phase

• Foundation for understanding and appreciating basic science, clinical and population research

• Demonstrate what research can do to improve the health of patients and the public at large

• Develop a respect for critical necessity of continued discovery

• Identify students who are interested in research as a career
Discovery Phase

- 5-9 months
- Mentored and involves discovery/creativity
- An end-product (abstract, paper, or just “published” at Emory) approved by the mentor
- Can add a tuition free year
- Flexibility in timing
  - Delay until after clinical electives
  - After the MPH or MS year
Discovery Phase

- Student is not a passive observer!
- At end, student will prepare a report
- All reports will be published in the Emory Student Journal of Medicine
  - (will probably be electronic for low expense)
- Students can use other elective time and summers to do more research and make more progress
Discovery Phase

• Students can use this research for
  • MD/PhD
  • MD/MPH
  • MD/MS
  • MD/MBA
  • Perhaps even MD/JD or MD/DTheology
Translation Phase

- 3 Electives
- 2 Months for Interviewing/Vacation/Electives
- 4 Required Courses
- Senior Clerkship (sub-internship) in Medicine, Pediatrics, OB/GYN or Surgery
- Intensive Care Clerkship (Medical, Surgical, Pediatric, Neurologic…..)
- Emergency Medicine Clerkship
- Weekly continuity clinic again
- Capstone Course
Translation Phase

- Capstone Course (uncertain content)
- 1) Difficult Doctor/Patient interactions
- 2) Doctor/Doctor and Doctor/nurse/Physical therapist/Occupational Therapist/Social Worker communication/teamwork
- 3) Medico-legal issues
- 4) Safety
- 5) Ethics
- 6) Basic Intern skills (geared to specialty)
- 7) Review of new science since beginning Medical School
Conclusion

- Emory’s new curriculum will develop physicians who:
  - Are professionals
  - Are superb clinicians and can apply medical knowledge
  - Can develop new knowledge
  - Can critically analyze new information
  - Can effectively communicate
  - Are personally aware
  - Are lifelong learners
  - Have good moral reasoning and ethics
Thanks

- J. William Eley MD Executive Associate Dean for Students
- Jonas Shulman MD consultant and previous Senior Executive Associate Dean for Students
Questions?