The Undergraduate Medical Education Program

Myths, facts, and where Pediatrics fits in…

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Objectives

- To describe the UME program
- To correct some common misperceptions
- To discuss how Pediatrics fits into the overall program
- To describe outcome measures currently in use
- To provide support for next steps in curriculum development

The Program

- 3 years
  - Pre-clerkship
    - Courses 1-7
    - Medical Skills
    - Healthy Populations (year 1), AEBM (year 2)
    - Summer Elective
    - Integrative Course, Introduction to Clerkship Course
    - (Clinical Correlation)
  - Clerkship
    - Mandatory Rotations
    - Electives
What are Courses 1-7?

- Course 1
- Course 2
- Course 3
- Course 4
- Course 5
- Course 6
- Course 7
- GI/Blood
- Musculoskeletal/Skin
- Cardiovascular/Respiratory
- Renal/Endocrine
- Neurosciences/Aging
- Human Development/Repro
- Mind/Family

What is the Medical Skills Course?

- Physical Examination
- Communication
- Ethics
- Global Health
- Physicianship
- Procedural Skills

What is Med 440?

- Applied Evidence Based Medicine
- 3 options
  - Clinical
  - Research
  - Directed Study
- 80 hours
Clerkship Rotations (Class of 2011)

- 54 weeks
  - Anesthesia (2)
  - Emergency Medicine (2)
  - Family Medicine (6)
  - Internal Medicine (10)
  - O/G (6)
  - Pediatrics (6)
  - Psychiatry (6)
  - Surgery (6)
  - Electives (10)

- 54 weeks
  - Rural (32)
  - Electives (10)
  - Pediatrics (4)
  - Internal Medicine (4)
  - Selectives (4)

Goals/Objectives/Philosophy

- 6 goals
- 10 objectives
- 11 operating philosophy statements

Available at UME website
http://www.ucalgary.ca/mdprogram/
Selected items

- Goal #3
- "Facilitate the acquisition of clinical problem solving skills through the use of clinical presentations as the foundation of its curriculum, early contact with patients and integration of basic and clinical sciences."

Selected items (2)

- Operating Philosophy #1
- "The program will support the goals and objectives of the Undergraduate Medical Education Program and will be characterized by an innovative 3-year program with clinical presentations as the foundation of the curriculum. The curriculum provides:
  - An approach to the solution of the clinical presentation
  - Knowledge pertinent to this clinical presentation
  - Exposure to a balance of clinical settings with clinical presentations in ambulatory, emergency, long term and acute health care delivery situations.

What are Clinical Presentations?

- Ways patients present to physicians
  - Historical points – chest pain
  - Physical examination – hypertension
  - Laboratory abnormalities – elevated lipids
  - 125 ± 5
Problems in our discipline with the CP list

- Many overlap with adult CP’s but use different decision points
  - Eg. Jaundice
- List from MCC
- Gaps and emphasis problems
- Therefore – not widely embraced

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**Why we teach how we teach**

(Thanks to Dr. Sylvain Coderre)

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Definitions

- **Transfer:**
  - Applying a concept learned in one context to solve a problem in another context
- **Integration:**
  - the organization of teaching matter to inter-relate or unify subjects usually taught in separate academic courses or departments
Definitions

- Horizontal integration (overlap): relationship of a topic in one discipline to the same topic in another discipline
- Vertical integration (outcomes): relationship (or relevance) to the ultimate training goal, in this case a practicing general physician

Cognitive load theory

- CLT:
  - Instructional design should explicitly consider the human cognitive architecture and its limitations in order to be effective
  - Working memory:
    - 7 chunks when just holding information
    - 2-3 when processing information
  - Long-term memory:
    - Infinite, just have to get it there

Curricular history

- 1765: Apprenticeship Model
  - College of Philadelphia
  - Founded by Benjamin Franklin
  - Basic Sciences downplayed
  - Teaching largely based on ‘clinical role models’
Curricular history

- 1871: Discipline-based Model
  - Two uninterrupted years of basic science prior to clinical knowledge
  - Supported by 1908 Flexner report:
    - Preliminary scientific phase
    - Medical sciences phase
    - Art of medicine phase
  - Increasing emphasis on basic sciences
  - Leads to ‘departmentalization’ of curriculum

- 1952: Western Reserve School of Medicine. Organ systems-based curriculum
  - Traditional curriculum, problems with integration
  - Integration of basic and clinic sciences within framework of organ system, not department
  - Two major flaws:
    - Learners do not necessarily interdigitate knowledge across systems (horizontal integration)
    - Still lacked emphasis on integration with ultimate task of problem-solving of real clinical cases (vertical integration)

- 1969 PBL
  - Three major innovations
    - Emphasized the role of “setting an appropriate context” for learning
    - Enhanced emphasis on the importance of meaning (i.e. cases) in promoting knowledge structuring, for both basic and clinical sciences
    - Emphasis on ‘intrinsic motivation’
Curricular history

- 1969 PBL
  - Two major flaws
    - Predicated on the notion that the PBL experience could teach the 'one and only' problem-solving method that experts use
    - Such a generic problem-solving method does not exist
    - Problem-solving predicated primarily on specific knowledge pertaining to the problem or case
    - Fosters 'backward' reasoning, or hypothetico-deductive reasoning, as had previous curricular models

- 1991 Clinical Presentation Curriculum
  - Problem-solving requires:
    - Relevant knowledge
    - Task-specific reasoning process
    - The 'task': 120+/-5 ways patients present to physicians, i.e. the Clinical Presentations
    - 120+/- CPs easier to tackle than 3262 diagnoses
    - The 'reasoning process': schemes, aka diagnostic classification pathways, 'algorithms'

Clinical Presentations

- Advantages:
  - Expands on the two major driving forces of PBL, the 'context' and 'meaning' (cases)
  - Expands 'meaning' and vertical integration, via organizing curriculum in way patients presents to physicians
  - Provides a basis for knowledge structuring
    - Decreases cognitive load
  - Enhanced integration of basic and clinical sciences
Course sequencing: pedagogical concerns

- There is no literature on how to specifically sequence courses/knowledge
- Pedagogically, the linkages are an attempt to:
  - Improve horizontal integration
  - Enhance the unique features of the curriculum
    - Clinical presentation model
    - Schemes as learning tools

What is a scheme?

Scheme Definition
- the term 'scheme” used in our curriculum, is intended as:
  - the anglicized form of “schemata”
    - data schemata: used for data storage
    - process schemata: used in active info. processing
  - our “schemes” attempt to recreate on paper the cognitive processes involved in:
    - information bundling (data schemata)
    - diagnostic chunking (process schemata)
Schemes: Background

- Schemes:
  - important for two key functions:
    - organization of knowledge into memory
    - solving of clinical problems
  - Organization of knowledge is a key function of these schemes in undergraduate education

Non-medical experiments:

- 1973: Chase/Simon
  - Studied experts and non-expert chess players
  - Found differences in knowledge structuring between the groups
  - Novices remembered the pieces singly (hence could recall only 5-6 pieces on the board)
  - Experts remembered 5-6 chunks of 5-6 pieces, hence total of 25-30 pieces
- Evidence for such differences in knowledge structuring (chunking) also found in domains of algebra, physics

Why we teach how we teach

- Summary:
  - knowledge is structured into semantic networks (organization of knowledge)
  - learning is improved when prior knowledge is activated (knowledge storage)
  - elaboration of study material/context specificity (knowledge retrieval)
  - intrinsic motivation improves achievement
Jaundice

PRE-HEPATIC (Unconjugated Hyperbilirubinemia)

- Decreased Hepatic Uptake
- Decreased Biliurbin Conjugation
- Intrahepatic Cholestasis
- Hemolysis
- Bacterial infection

Cirrhosis

Drugs

INTRAHEPATIC (Conjugated Hyperbilirubinemia)

- Increased Hepatic Cellular Conjugation
- Extravascular Hemolysis
- Shock

POST-HEPATIC (Extrahepatic Cholestasis)

- Compression of Biliary Duct
- Intraductal Obstruction

JAUNDICE

Hemolysis
Sepsis
Gilbert

ANEMIA

MACROCYTIC

- B12/Folate defi.
- Alcohol abuse
- Chemotherapy

DECREASED PRODUCTION (<2% retics)
- Bone Marrow Dis.

MICROCYTIC

- Iron def.
- Sideroblastic

INCREASED DESTRUCTION (>2% retics)
- Auto-antibodies
- RBC abnormalities

BLOOD LOSS

- Visible
- Occult

NORMOCYTIC


Hypertension

HYPERTENSION

PRIMARY

Secondary

S.P. =
C.O. (volume dependent)
E.D.
SVR (vaso-controlled)

Secondary:
- Renal Parenchymal disease
- Neoplasm
- Angiotensin II excess
- Thrombotic occlusion
- TTP/HUS

Secondary:
- Basketball Cameroon
- Thrombosis
- Hypertensive disease
- Drug related

Primary:
- Vascular/Neural
- Malignancy
- Idiopathic
- Coarctation

Hypertension

Hypertension
What do Drs. Doan Le, Amonpreet Sandhu, Estee Grant, and Hani Hadi have in common?

They are Master Teachers!
What are Master Teachers?

- Physicians from various disciplines
- Demonstrated excellence in education
- Completed Teaching Scholars Certificate Program
- Contribute across UME Program

True or false?

- Standards for admission have fallen because of increased class sizes.

True or False?

- Students are not taught basic sciences at the University of Calgary.
True or false?

- Our students do badly on MCC exams.

Outcome Measures

- Student feedback
- Canadian graduate questionnaire
- Alumni survey
- Postgraduate directors
- Student performance

(thanks to Dr. Wayne Woloschuk)

Department of Pediatrics

Where do we contribute?
Administrative Roles

- Course Chairs
  - Kelly Millar – Course 6
  - Leanna McKenzie – Integrative Course

- Unit Chairs (Medical Skills Course)
  - Katherine Smart – Global Health
  - Ian Mitchell – Ethics
  - Vince Grant – Physical Examination

- Clerkship Director
  - Sue Illmar

- Evaluation Coordinators
  - Julian Middle – Clerkship
  - Jorge Pinto – Course 6

Teachers

- Course 6
- Clerkship
- Electives
- Medicine 440
- Medical Skills
- Healthy Populations
- Integrative Course
- Introduction to Clerkship
- Master Teachers

January – October
What's next?

- Overall plan from pediatric perspective
  - Content
  - Timing
- Clinical Presentations
  - Revision needed in pediatric topics
  - Emphasis on generalism
- Clinical Correlation

Thank you on behalf of UME for your contributions!

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http://www.ucalgary.ca/mdprogram/