Sessions 1 - 10

Instructor:
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Course Description:
Welcome to MED INF 402 - Introduction to Clinical Thinking. This course provides an exposure to the clinical environment throughout the health center. It is designed for students not previously involved in clinical medicine as well as those trained in medicine outside the U.S. The course features problem-based learning and traditional medical informatics task domains. It will also cover medical terminology and basic pathophysiology. Topics include the clinical setting, eliciting information from patients, synthesizing the history and physical examination, establishing diagnosis, treatment planning, integrating evidence-based medicine, and using an intelligent medical record in a complex environment. This is an entry track course for students with little clinical experience and should be completed before attempting core course work beyond MED INF 403.

Text:
The primary text for the course will be Problem Solving in Clinical Medicine: From Data to Diagnosis (3rd Edition), by Paul Cutler, MD. Additional readings can be found on the course Web site.

Text Details:
Problem Solving in Clinical Medicine: From Data to Diagnosis
Paul Cutler, MD

Online Activities and Class Projects:
Students will form discussion groups for online interactions. Each week, a different student will be identified as the group facilitator and manage the online discussion. Results of the online discussions will be summarized and shared with the class.

A project that applies the concepts presented in the course to a challenging situation in healthcare will be required. Students will prepare a project proposal, final paper and in-class presentation of their project and be assessed on each stage of the project, both individually and as a group.

Student Goals:
The goals for this course are:

- Understand the clinical environment in which problem solving occurs
- Understand the process of acquiring both narrative and structured content and assimilating both into a medical record
- Understand the techniques used by clinicians to formulate clinical hypotheses when caring for patients
- Understand how precise use of an electronic medical record facilitates clinical thought and decision making
• Stimulate thought for how future technologies and care approaches may better utilize information management
• Use these new skills in practice scenarios

Learning Objectives:
By the end of this course, you will be able to:
• Understand the current clinical care environment
• Establish a clinical thinking perspective
• Appreciate the complexity of applying an EMR context to clinical care
• Know the how and why for narrative and structured content
• Apply specific clinical case examples
• Explore future EMR approaches

Evaluation Method:
Students will be evaluated using the following criteria:
• Group Presentation - 20%
• Participation and leadership during online discussions - 30%
• Homework - 25%
• Final exam - 25%

Online Synchronous Meetings are Mondays from 6-8:30 PM. Some weeks may not have a Sync Session; your Instructor will indicate the exact schedule during the first Sync Session. All readings from the text and articles listed online are to be prepared in advance.

Session 1 – The Clinical Encounter

Assigned Readings
Chapters 1 and 2 from Problem Solving in Clinical Medicine, by Paul Cutler, M.D.

PowerPoint slides: Session 1

Articles:
• Agenda Setting
• Health Information Technology: Can HIT Lower Costs and Improve Quality?

Optional Readings
Articles:
• Analysis of Healthcare Interventions That Change Patient Trajectories
• The State and Patter of Health Information Technology Adoption
• Extrapolating Evidence of Health Information Technology Savings and Costs

Access to Medline Plus, a medical dictionary
Access to Galter Health Sciences Library
Any additional books or articles on this subject matter; please share useful links with classmates via the Discussion Board

Assignments
Below is the assignment you must complete and submit for this topic.

• Small group discussions:
  Discuss one of the following questions with your group. Choose a scribe for each group,
who will present a summary of the discussion, and any conclusions reached, during the next synchronous session. The scribe should rotate each time we do this activity. Group Topics:

1. Ensuring patients’ questions are answered when they visit the doctor.
2. How can one efficiently obtain narrative while also recording structured content?
3. How can problem list maintenance be made easy for physicians?

- **Homework – Session 1** - Please answer the following essay questions:
  1. What is meant by a "chief complaint?"
  2. What are some of the issues related to capturing a chief complaint electronically within an emergency room environment?
  3. What is the difference between narrative and structured content and when should each be used in the context of physician documentation?
  4. When is it appropriate to use open-ended versus closed-ended questions?
  5. How might capture of chief complaints electronically assist with bioterrorism surveillance?
  6. How does the data gathering process of experienced clinicians differ from that of students or new resident physicians?
  7. What are some immediate observations a physician can make that help in the formulation of a differential diagnosis for a patient's chief complaint?
  8. Describe the hypothetico-deductive method for establishing a clinical diagnosis.
  9. Why is it important for an outpatient physician to negotiate an agenda during an outpatient visit? How might this occur?

**Synchronous Session:**
TBA

**Online Office Hours:**
Meet online with your Instructor to ask any questions about Session 1.

As office hours may change, ask your Instructor

**Session 2 - Using Medical References, New Technology, the Thought Process, and the Write-Up**

**Assigned Readings**
Chapters 9, 10, and 11 from *Problem Solving in Clinical Medicine*, by Paul Cutler, M.D.

PowerPoint slides: Searching for Clinical Information

**Articles:**
- A look at Google Scholar, PubMed, and Scirus: comparisons and recommendations
- Google Scholar: A source for clinicians?
- BMC Medical Informatics and Decision Making
- Users’ Guides to the Medical Literature
- An examination of PubMed’s ability to disambiguate subject queries and journal title queries

**PubMed Tutorial**

**Website:**
MeSH (Medical Subject Headings) browser

**Assignments**
Below is the assignment you must complete and submit for this topic.
Complete a **Peer Group Evaluation form**

**Homework – Session 2** - Please answer the following essay questions:

1. Using PubMed, start with the MeSH database to search for randomized controlled trials supporting the use of beta blockers in the treatment of congestive heart failure. To reveal your search strategy, find the "Details" section and copy and paste content your strategy below.

2. Using the reference Clinical Evidence found on the Galter Library Website, please determine the NNT (number of patients needed to treat) with beta blockers in order to prevent 1 death in 1 year in people with any severity of heart failure. Hint: After finding details on beta blockers, it turns out that 1/(absolute risk reduction) is the NNT. That is, if you know the percent by which an event can be is made less likely by a treatment, in this case death prevented by taking beta blockers, you can take the reciprocal of the absolute risk reduction to determine the number of people you need to treat with beta blockers in order to prevent one death over the stated time period. Presenting compelling information in this manner to physicians may increase compliance with recommendations over a simple link to a reference article or search summary."

**Synchronous Session:**
TBA

**Online Office Hours:**
Meet online with your instructor to review or ask any questions about Session 3.

As office hours may change, ask your instructor for the schedule.
Session 3 – Problem Solving Methods and Clues

Readings
Assigned Readings
Chapters 3 and 4 from Problem Solving in Clinical Medicine, by Paul Cutler, M.D.

PowerPoint Slides: Session 3

Articles:
- Clinical skills textbooks fail evidence-based examination
- Textbook descriptions of disease - where's the beef?

Optional Readings
Here are some medical informatics organizations for your reference:
- Amit X. Garg, MD; Neill K. J. Adhikari, MD; Heather McDonald, MSc; M. Patricia Rosas-Arellano, MD, PhD; P. J. Devereaux, MD; Joseph Beyene, PhD; Justina Sam, BHS; R. Brian Haynes, MD, PhD, JAMA. 2005;293:1223-1238.

Additional resources:
- Access to a medical dictionary
- Access to online resources used in clinical care

Please share any additional books or articles you find with your classmates via the Discussion Board

Assignments
Below is the assignment you must complete and submit for this topic.

- **Small group discussions:**
  Discuss one of the following questions with your group.
  Choose a new scribe for each group, who will present a summary of the discussion, and any conclusions reached, during the next synchronous session.
  Group Topics:
  1. Why might physicians be reluctant to use a diagnostic support tool?
  2. How can physicians learn how to optimally weight clues they discover leading to particular diagnoses? For example, a patient complains of slightly worsening migraines during a stressful work period and one episode of blood in the stool.
  3. How can physicians learn when to investigate asymptomatic clues? For example, a minor component of a blood test series is reported as abnormal.

- **Homework – Session 3** - Please answer the following essay questions:
  1. What is the definition of a disease? How does this definition relate to a problem list?
  2. What is meant by a "key clue" or "pivotal clue"?
  3. For the past 2 weeks a 45 yo female patient has abdominal bloating, joint pain, fever (low grade), pruritus (itching) and hyponatremia (low sodium). Use DXplain to look into some possibilities and submit a list of the top 5 findings. Then, try using the "focus" function on abdominal bloating to see what changes.

  Try the "narrow" search option. Then, discuss your impressions of this tool and
how it might be made more effective both in terms of how it functions, and how it might be effectively integrated into patient workflow.

4. What classes of items are appropriate to include in a patient's problem list? What are examples of each?

5. How and why should a problem list change during a patient’s hospitalization?

**Synchronous Session:**
TBA

**Online Office Hours:**
Meet online with your instructor to review or ask any questions about Session 3.

As office hours may change, ask your instructor for the schedule.
Session 4 – Basic Decision Making

Readings
Assigned Readings
Chapters 7 and 8 from Problem Solving in Clinical Medicine, by Paul Cutler, M.D.

PowerPoint slides:
Session 4

Articles:
• Management of Acute Pharyngitis in Adults
• Prediction of Pulmonary Embolism in the Emergency Department: The Revised Geneva Score
• Practice Corner: Using clinical prediction rules

Assignments
Below is the assignment you must complete and submit for this topic.

• Small group discussions:
  Discuss one of the following questions with your group. Choose a new scribe, who will present a summary of the discussion and any conclusions reached, during the next synchronous session.
  Group Topics:
  1. How may medication adherence by patients be improved?
  2. How may care be better standardized for common conditions?
  3. How might reference sources for physicians be optimally structured to facilitate answers to management questions?

Homework – Session 4
Please answer the following essay questions:
1) Case 1: Pharyngitis:
   A 32 year-old male with 3 days of symptoms, fever to 101, chills, sore throat, tender lymph nodes and a cough. Diagnosis of pharyngitis is clear.
   Are antibiotics in order?
   • See article on strep throat and the Med- Calc3000 McIsaac rule; advise on the next steps applying the concepts illustrated in class.
   • Comment on how this entire process might be facilitated by healthcare IT.
   • Using the Framingham LDL risk prediction equation from Med- Calc3000 (available via Galter Library), what is the 10 year risk for developing coronary disease in a 37 year-old female patient who smokes with an LDL of 162, HDL of 46, and blood pressure of 143/86?

2) Case 2:
   A 66 year-old female presents 1 day following a trip home from Europe with sudden onset of shortness of breath and chest pain that is worse when she takes a deep breath. Her heart rate is 96. She has no history of cancer. Her left leg is slightly swollen.
   • Use the article referenced for this session to estimate the patient's clinical probability of having pulmonary embolism.
   How might the next step of similar patients’ management be facilitated by healthcare IT?

Synchronous Session:
TBA

**Online Office Hours:**
Meet online with your instructor to review or ask any questions about Session 4.

As office hours may change, ask your instructor for the schedule.
Session 5 – Non-physician Decision Making

Readings:
Assigned Readings
PowerPoint slides: Clinical Thinking - A Nursing and Pharmacist Perspective

Articles:
- The Epidemiology of Prescribing Errors
- Background paper on decision support with e-prescribing

Optional Readings
- Evidence-based medicine resources from an established EBM site
- E-prescribing link: RXHUB
- E-prescribing link: SureScripts

Assignments:
Below is the assignment you must complete and submit for this topic.

- **Homework – Session 5** - Please answer the following essay questions:
  1. How does nursing decision making differ from that of physicians? How might information technology solutions to assist nurses differ from IT solutions focused on physicians?
  2. How does pharmacist decision making differ from that of physicians? How might information technology solutions to assist pharmacists differ from IT solutions focused on physicians?

What are some of the factors, as discussed on the slides and in class, that impair the ability of pharmacists, nurses, and physicians to make consistently prompt and evidence based decisions?

Synchronous Session:
TBA

Online Office Hours:
Meet online with your instructor to review or ask any questions about Session 5.

As office hours may change, ask your instructor for the schedule.
Session 6 – Data Resolution Skills

Readings
Assigned Readings
Chapters 5 and 6 from Problem Solving in Clinical Medicine, by Paul Cutler, M.D.

PowerPoint slides: Session 6

Articles:
- Clinical skills textbooks fail evidence-based examination
- FMEA Document

Group Presentation assignment: We will discuss the details during the synchronous portion of this session

Optional Readings
- For more information about applying FMEA to healthcare beyond the file, register here at the IHI.org website

Assignments
Below is the assignment you must complete and submit for this topic.

- **Small group discussions:**
  Discuss one of the following questions with your group. Choose a new scribe for each group, who will present a summary of the discussion, and any conclusions reached, during the next synchronous session.
  Group Topics:
  1. How might the concepts of sensitivity and specificity be incorporated into physician workflow?
  2. How best might the concept of diagnosis uncertainty, even after testing, be presented in an understandable fashion to patients?
  3. How might an FMEA process be applied to a doctor's response to test results?

- **Group presentations:**
  Nothing is due next session, but it’s a good idea to get together with your group and begin the project.

- **Homework – Session 6** - Please answer the following essay questions:
  1. Read the posted background material on FMEA. What are some of the benefits of this approach to improving patient safety? What are some of the drawbacks? What is meant by a “key clue” or “pivotal clue”?
  2. Using the Framingham LDL risk prediction equation from MedCalc3000 (available via Galter Library), what is the 10 year risk for developing coronary disease in a 37 year-old female patient who smokes with an LDL of 162, and HDL of 46, and blood pressure of 143/86?
  3. What if the woman were 57 years old?
  4. If the 57 year-old woman asks you (her physician) for a test to see if she has coronary disease, how do you answer her?
  5. You decide to perform a stress echocardiogram exam with a sensitivity of 85% and a specificity of 95% on the 57 year-old woman. Please draw a 2 x 2 chart demonstrating this scenario like the examples we reviewed in class. Use her Framingham risk score as her pre-test probability of disease.
  6. Using concepts of PPV and NPV, please answer the following questions:
     i. What is the probability your patient does not have CAD despite a positive test?
ii. What is the probability your patient still has CAD despite a negative test?

**Synchronous Session:**
TBA

**Online Office Hours:**
Meet online with your instructor to review or ask any questions about Session 6.

As office hours may change, ask your instructor for the schedule.
Session 7 – Designing Systems For Use By Physicians

Readings

Assigned Readings
Articles:
• Bar coding near miss
• Article: Fumbled Handoffs

Optional Readings
Articles:
• Cognitive Psychology of Missed Diagnoses
• Hospitalization from Hell
• Patient Safety and Medical Malpractice

Assignments:
Below is the assignment you must complete and submit for this topic.

Assignments are due 48 hours before the synchronous portion for Session 8.
• Read the Bar Coding Near Miss and Fumbled Handoffs articles. Note your comments on the Discussion Board.

• Complete a Peer Group Evaluation form

Synchronous Session:
TBA

Online Office Hours:
Meet online with your instructor to review or ask any questions about Session 7.

As office hours may change, ask your instructor for the schedule.
Session 8 – Group Presentations

Readings
Assigned Readings
Articles:
• The Wrong Patient
• Triage of Acute Chest Pain

Assignments
Some students will give their Group Presentations during this session; others will present during Session 9.

We will see several group presentations. For each presentation (including your own), complete a Presentations Evaluation form. Pay attention to the following areas:
• Organization
• Member participation
• Class concepts demonstrated
• Innovative ideas presented
• Overall rating
• Additional feedback

Synchronous Session:
TBA

Online Office Hours:
Meet online with your instructor to review or ask any questions about Group Presentations.

Session 9 - Group Presentations and Review

Assigned Readings
Chapter 14 from Problem Solving in Clinical Medicine, by Paul Cutler, M.D.

Assignments
The remaining groups will give their Group Presentations during this session.

• For each presentation (including your own), you will complete a Presentation Evaluation form. (See Session 8 above for details.)

Synchronous Session:
TBA

Online Office Hours:
Meet online with your instructor to review or ask any questions about Group Presentations.
Session 10 – Final Exam

Assignments
The final exam is the assignment this week. Details to come as the date gets closer.

Synchronous Session:
TBA

Online Office Hours:
Meet online with your instructor to review or ask any questions about Group Presentations.