DIME: Diagnostic Integrity and Medical Efficiency Resources and Cases

A case-based resident conference series designed to guide learners through understanding and applying high-value, patient-centered care.

Name	Description	For Educators
ACP High Value Care https://hvc.acponline.org	Website with a variety of clinician and patient resources as well as guidelines focused on providing the best possible care while simultaneously reducing unnecessary cost	Free online or printable curriculum addressing: 1) Eliminating waste 2) Healthcare payment models 3) Diagnostic testing 4) Hospitalizations 5) Barriers to High Value 6) Quality Improvement
Choosing Wisely http://www.choosingwisely.org/	ABIM website focusing on avoiding healthcare waste (tests, treatments, and procedures). Database of medical society lists on ways to avoid healthcare waste	Free Physician Communication Modules developed by Drexel College of Medicine that incorporate shared decision making about recommendations from the Choosing Wisely Lists
Ottawa Research Institute – Patient Decision Aids https://decisionaid.ohri.ca/	Searchable database of patient decision aids to help with shared decision making (SDM) communication. Outlines a strategy to implement and perform SDM in the clinical setting.	Online tutorials to help practitioners develop knowledge in SDM and decision support. Requires free log-in.
Healthcare Blue Book https://healthcarebluebook.com	Website devoted to increasing fairness and transparency in healthcare. Searchable geographic-specific consumer database of provider reimbursements fee for medical treatments	
AGS 2015 Beers Criteria http://www.americangeriatrics.org/files/documents/beers/BeersCriteriaPublicTranslation.pdf	Review of how the Beers Criteria List is used in clinical practice to reduce adverse drug events in the elderly. Beers Criteria List organized by medication category	

Decreasing Excessive Testing

Background: Excessive investigational tests for patients are common including for diagnoses that have a low pretest probability. Excessive tests increase likelihood of false positive, errors, information overload and missing of relevant results, failure to follow-up send out tests, and costs.

Learning Objectives: Examine the concept of pretest probability in relation to diagnostic testing. Apply pre-test probability concepts to a case presentation to decrease unnecessary testing.

What you need: Two cases where multiple labs and test results have been completed

The Conference

1) Identify two cases for a 45-60 minute morning report or noon conference. Cases should ideally be recent admissions.
2) Introduce the case
3) Print out summary of the case, and all the tests.
4) Divide the audience into groups and ask each group:
    - To discuss each test ordered - what diagnosis are they trying to identify, is the pretest probability high enough to warrant sending the test.
    - Are there any other relevant tests - what is your pretest probability for the test
5) Debrief and discuss each teams' assessment of the need for each test.
6) If available, present false positive and false negative rates for certain tests.
7) Repeat with second case
8) Wrap-up: Discuss the importance of DIME, and the specific consequences of excessive testing. Highlight the significance of identifying the probability of a diagnosis before ordering a collection of tests that require follow-up. Discuss the concept of false positives and false negatives and how they may lead to incorrect diagnosis or errors.

Example Case

History of presenting illness:
47 yo male presents with:

- 8 days of symptoms
- Fevers, malaise, sore throat, cough with yellow sputum, rash, myalgias
- Right sided pleuric chest pain; no dyspnea
- No hemoptysis, recent travel, or immobilization.
- No medications
- Visited urgent care 6 days ago – CBC, CMP wnl, given acetaminophen and discharged

Past medical history:
Muscukuloskeletal pains
Hypertension
Hyperlipidemia

Medications:
Hydrochlorothiazide 25mg
Atorvastatin 40mg

Social history:
Lives in Boston
From the UK
Non-smoker
No EtOH
No recreational drugs

Examination:

Vital signs:	100.2 F; HR 92; BP 112/75; RR 20; Sats 97%
General:	Appears uncomfortable.
HEENT:	Tonsils diffusely erythematous and enlarged with sparse white exudate Tender, mobile, soft LN, left submandibular area
Skin	Rash – innumerable macules affecting trunk, face, extremities
Cardiac:	Normal rate and rhythm.
Respiration:	Clear to auscultation and percussion.
Abdomen:	Soft non-tender, non-distended

White cell count: 4.5 Hemoglobin 10.5 Platelets 162	Na^+ 136 K^+ 4.2 Cl- 104	CO_2 24 Blood Urea Nitrogen 16 Creatinine 0.7

Chest roentgenography: Reported normal
Electrocardiograph: Sinus rhythm with ischemic changes.

Example Group Breakout Handout

47 year old male:
Presents with 8 days of symptoms
Fevers, malaise, sore throat, cough with yellow sputum, rash, myalgias
Right sided pleuritic chest pain; no dyspnea
No hemoptysis, recent travel, or immobilization.
No medications
Visited urgent care 6 days ago – CBC, CMP wnl, given acetaminophen and discharged

VS: 100.2 F; HR 92; BP 112/75; RR 20; Sats 97%	
GEN	Appears uncomfortable.
HEENT:	Tonsils diffusely erythematous and enlarged with sparse white exudate Tender, mobile, soft LN, left submandibular area
Skin	Rash – innumerable macules affecting trunk, face, extremities
CARDS RESP	Wnl
ABDO:	SNT. ND

Chest x-ray normal
Electrocardiogram: Normal sinus rhythm without ischemic changes.

All the following tests have been ordered.
1) Review your pretest probability for each diagnosis and if to continue to order each.
2) Review if any other further tests should be considered

- D-dimer
- ESR and CRP
- Toxoplasma IgM and IgG
- Parvovirus B19 IgM and IgG
- RPR
- Heterophile antibody
- Influenza A and B
- ANA and Anti-dsDNA
- Immunoglobulins
- Blood, sputum and urine cultures
- CT chest and abdomen
- US abdomen (ordered by another provider)

Diagnosis: Acute HIV

Patient Centered Care

Background: Multiple decisions must go into providing patient-centered care for any individual. Factors influencing care decision-making include patient preferences, values, cost and logistical factors.

Learning Objectives: Understand the complexity of patient-centered care. Create a treatment plan for a case patient incorporating patient values, logistical factors, and cost.

What you need: An illustrative case where multiple correct pathways and modalities exist for care. 2-4 envelopes (one per breakout group) with one page patient scenario handouts: include treatment decision, patient history, values and logistical factors.

The Conference

1) Present case beginning with HPI, past medical history, and medication list
   2) Introduce the use of the Healthcare Bluebook (https://healthcarebluebook.com/ a tool for appreciating the costs of care)
3) Come to a key treatment decision point in the case
4) Divide the audience into 2-4 groups
   - Pass out envelopes with specific patient scenarios that effect treatment decision
   - Ask the following questions of each group:
     a. What kind of treatment will you use?
     b. What data supports this?
     c. How much will it cost? (using Healthcare Bluebook consumer search)
5) Debrief and discuss each teams' answers.
6) Wrap-up: Discuss the importance of DIME, and how specific patient factors effect treatment decisions. Highlight the importance of tailoring care to a specific patient's needs.

Example Case

History of presenting illness:
42 yo female presents with:

- One month ago had **foley** placed for chronic urinary retention with overflow incontinence
- Had recurrent UTIs and kidney stones prior to foley placement
- Now with severe L leg pain limiting her walking
- Came from Eritrea to be with family in the U.S.

Past medical history:
Recurrent UTIs

Medications:

- Alfluzosin
- Meloxicam

Social history:
Three children
Non-smoker
No EtOH

Examination:

Vital signs:	98.2 F; HR 92; BP 122/75; RR 20; Sats 98%
General:	Appears uncomfortable
Skin	No rashes or lesions
Cardiac:	Normal rate and rhythm
Respiration:	Clear to auscultation and percussion
Abdomen:	Soft, mild suprapubic tenderness
Extremities:	LLE 5/5, RLE 4/5 strength, sensation intact. Bilateral 2+ lower extremity edema

White cell count: 6.6	Na^+ 141	CO_2 24
Hemoglobin 12.1	K^+ 4.2	Blood Urea Nitrogen 16
Platelets 211	Cl- 109	Creatinine 0.83

CT chest/abdomen/pelvis: 1) Mass along the posterior inferior wall of the urinary bladder with hydronephrosis 2) Large lytic lesions in the pelvis 3) Acute pulmonary artery embolism

Treatment Decision: The patient has been diagnosed with a new tumor, as well as a new pulmonary embolism. She requires immediate anticoagulation for this new pulmonary embolism, recommended for at least a week before she undergoes urologic surgery for diagnosis of her mass.

She would like to go home and you need to decide which medication to use to anti-coagulate her. You look at her insurance and realize she is “Self Pay,” meaning she will be paying out of pocket for whichever regimen you choose.

Group Breakout Handout

Group 1: The patient needs anticoagulation for her newly diagnosed DVT and PE. She has a daughter who is a nurse who would be comfortable giving injections at home. She has normal renal function.

—1) What kind of anticoagulation will you use?

—2) What data supports this?

—3) How much will it cost?

USE your smartphones/books.

Group 2: The patient needs anticoagulation for her newly diagnosed DVT and PE. The patient adamantly refuses injections of medication.

—1) What kind of treatment will you use?

—2) What data supports this?

—3) How much will it cost?

USE your smartphones/books.

Group 3: The patient requires treatment of her DVT/PE. The patient has worsening hematuria with anemia (hgb 13 -> 8) requiring a total of 4 units RBC transfusion.

—1) What kind of treatment will you use?

—2) What data supports this?

—3) How much will it cost?

USE your smartphones/books.

Shared Decision Making and High Value Care

Background: A critical element of cost-conscious and patient-centered care involves the engagement of patients in their diagnostic and therapeutic plans, taking into account their expectations and preferences. This model of shared decision-making provides for reduction in often-unnecessary and ineffective interventions but is difficult to teach.

Learning Objectives: Identify opportunities for shared decision making in clinical care through case presentations. Examine patient specific expectations, preferences, and unique factors that play a role in decision making.

What you need: Two short case vignettes where the proposed management strategies have a degree of equipoise (afib management, colonoscopy screening in the elderly, initiation of dialysis, low back pain management, lung cancer screening). Briefly review the guidelines for treatment of the specific diseases present in the cases. Access to patient/clinical resources through the internet.

The Conference

1) Define high value care: Optimal patient outcomes along with cost-conscious care
2) Define shared decision making and decision aids and how they can lead to reduced cost and better patient outcomes (Stacey D. et al. Cochraine Database Syst Rev. 2011 Oct 5;(10):CD001431)
3) List examples of opportunities for shared decision making (low back pain, prostate cancer screening etc.)
4) Case 1
    - As a group, discuss the steps for shared decision making in this specific scenario:
        a. Identify a shared decision making opportunity
        b. Identify patient expectations, preferences, and unique factors that will play into decision making
        c. Examine the data behind different approaches to diagnosis/treatment
            i. Okay to use electronic resources including guidelines, UpToDate, etc.
        d. Discuss how to share the information on different approaches with the patient (discuss the evidence and utility of patient aids and resources to find them)
        e. Discuss how to come to a consensus with the patient
    - Debrief
5) Case 2
    - Break into groups of 2-3
    - Repeat above steps
    - Debrief
6) Wrap-up: Discuss the importance of DIME, and how shared decision making can improve patient-centered outcomes and lead to more cost-effective care. Remind residents of where to find practical resources on patient aids and how to incorporate evidence-based guidelines into shared decision making.

Example Cases

Vignette #1:
51 y/o homeless male w/ hx of COPD, HTN and BPH presents for routine visit. Generally doing well and mainly here for prescription refills. You notice he has not had a colonoscopy yet. When you approach the subject, patient is very hesitant on getting screened.

Steps of shared decision making:

1) **Identify a shared decision making opportunity (SDO):** colonoscopy versus FOBT versus no screening
2) **Understand patient expectations, preferences and unique factors that will play into decision making:** lack of housing, unpredictable access to restroom may make prep difficult, potential difficulty with regular follow-up after procedure
3) **Know the data behind different approaches to diagnosis:** USPTF guidelines, UpToDate cards
4) **Share the information on different approaches with patient:** present examples of patient aids and patient aid databanks – Ottawa Hospital Research Institute, Mayo Clinic Knowledge and Evaluation Unit, Healthwise.org, Optiongrid.org
5) **Consensus with patient** – review actual (if known) or potential solution/consensus. For this case, FOBT might be most reasonable for this patient given difficulty with prep as well as cost

Vignette #2:
56 y/o male w/ hx of CAD, HTN, HLD presents to your clinic for a follow-up. He notes that he has been having chest pain with exertion for the past 8-9 months, unchanged in intensity. He has been intermittently compliant with his medications (including metoprolol) due to side effects. You send him for a stress test. An exercise echocardiogram shows mild reversible ischemia in inferior wall. He is worried about dying from a heart attack and asks you about cardiac catheterization.

Steps of shared decision making:

1) **Identify a shared decision making opportunity (SDO):** Medical management or PCI for treatment of stable angina
2) **Understand patient expectations, preferences and unique factors that will play into decision making:** Patient has problems with medication compliance and has an expectation that he will have a mortality benefit from a PCI
3) **Know the data behind different approaches to diagnosis:** AHA guidelines/COURAGE Trial
4) **Share the information on different approaches with patient:** present examples of patient aids and patient aid databanks as above
5) **Consensus with patient** – review actual (if known) or potential solution/consensus. For this case, patient decided to forgo PCI given lack of mortality benefit and discussed with physician barriers to medication compliance and ways to address overcome barriers

Polypharmacy and Adverse Drug Events in the Elderly

Background: Polypharmacy, defined as 9 or more medications for one patient has a high prevalence in the elderly and is associated with increased adverse drug events (ADEs), increased cost, and potentially more hospitalization and ED visits. Decreasing unnecessary medication use and safe prescribing in the elderly to minimize ADEs represent high value care. This session helps residents develops practical skills for reducing medication overuse.

Learning Objectives: Identify contributors to polypharmacy and ADEs and recognize the impact of these on the cost of healthcare. Examine and apply a strategies to reduce polypharmacy in the elderly. Self-reflect on the use of polypharmacy within a resident's own patient census and develop a transition of care plan to decrease unnecessary or harmful medications at hospital discharge.

What you need: Brief review of the definitions of adverse drug events, polypharmacy and the effects of these on clinical outcomes. Short clinical vignette where an adverse drug event occurred. Access to a drug interaction database and a list of medications potentially inappropriate for the elderly (Beers Criteria, STOPP Criteria, or FORTA Criteria).

The Conference

1) Vignette presentation to setup clinical context of bad outcomes associated with medications
2) Provide background and definitions regarding polypharmacy and ADEs including information on how these entities are associated with patient outcomes. Ask residents for their experiences with medication-related in the elderly
3) Review EBM strategies of decreasing polypharmacy in the elderly
    - Kojima G. et al. J Am Med Dir Assoc. 2012;13(9):818.e11-818.e15 (Beer's List and Epocrates)
    - Garfinkel D. et al. Isr Med Assoc J. 2007;9(6):430-434. (Good Palliative-Geriatric Practice algorithm)
4) Apply strategies
    - Residents individually review medication lists of patients over the age of 65 on their inpatient census using either of the two EBM strategies
    - Residents share findings to the group and facilitator leads brainstorm discussions about ways to minimize drug interactions or reduce polypharmacy in specific patients including the importance of inpatient and outpatient provider communication and discharge medication reconciliation
    - Residents develop and buy-into individual plans to decrease polypharmacy and/or minimize ADE in at least one of their patients
5) Wrap-up: Discuss the importance of DIME, and how reducing polypharmacy and minimizing ADEs in the elderly leads to high-value and patient-centered care. Encourage residents to communicate directly with outpatient providers about medication and treatment changes for all patients, but especially elderly patients with polypharmacy.

Stewardship of Healthcare Resources

Background: The ethics manual of the American College of Physicians states that physicians have an obligation to promote their patients' welfare in an increasingly complex health care system. This entails forthrightly helping patients to understand clinical recommendations and make informed choices among all appropriate care options. Further, it states that physicians have an obligation to be stewards of finite health care resources so that as many health care needs as possible can be met. Residents are in need of training that helps them understand medical stewardship and apply concepts of appropriate resource utilization in daily practice.

Learning Objectives: Discuss the role of stewardship in primary care. Review stewardship guidelines including the Choosing Wisely Campaign and the American College of Radiology (ACR) Appropriateness Criteria. Practice patient-provider discussions of high-value care and how to say "no".

What you need: 4-5 hypothetical clinical cases where a patient asked for a test or treatment that is not recommended by guidelines for medical stewardship. Access to medical stewardship guidelines (most are available online for free).

The Conference

1) Define medical stewardship and introduce High-Value Care. Review the increasing costs of healthcare nationwide.
2) Review the Choosing Wisely Campaign recommendations for a specific area to be discussed in the cases (i.e. when to perform imaging for headache)
3) Case #1
   - Present clinical vignette
   - What is management plan?
   - Review stewardship guidelines for case
4) Repeat process for cases #2-4
5) Discuss how to say "no" to a patient asking for an unnecessary testing
   - Open up to group discussion about strategies that have worked for individuals
   - Present strategies to assist with saying "no"
   - Using 5th clinical vignette, break into groups of 3 for role-play session (provider, patient, observer) to practice discussions regarding appropriate resource utilization.
6) Wrap-up: Discuss the importance of DIME and how medical stewardship has an important role in reducing cost. Highlight that medical stewardship does not equal ordering less tests, but instead means working up a patient with the appropriate test.

Example Cases

Vignette #1:
34 y/o woman with a history of headaches. She gets them every three to four weeks for the last six months. They are preceded by "seeing spots" and are accompanied by nausea. They are R-sided and pounding lasting 4-8 hours. She has no history of head trauma. Management questions: Does she need imaging? What is your management plan?

Migraine with Aura: Diagnosis made clinically. No imaging needed in young patient with no alarm features. Review treatment options and associated costs: Generic ibuprofen less expensive than Excedrin® Migraine which is less expensive than sumatriptan succinate prescription.

Vignette #2:
19 y/o man who is a linebacker in his college football team. He had a concussion during play and lost consciousness. He can't remember exactly what happened. Now he says he feels fine except for a mild headache. Management questions: Does he need imaging? What is your management plan? When can he return to play?

Concussion: review the Canadian CT Head Injury/Trauma Rule to see if patient needs brain imaging. In this patient, imaging is not indicated. Discuss the management of concussion with a focus on when or if this patient can return to his sport.

Vignette #3:
45 y/o man with no past medical or family history who presents complaining of increased frequency of his headaches. He notes tingling and numbness in his hands bilaterally, and he is worried that he may have a brain cancer. Management questions: Does he need imaging? What is your management plan?

Chronic headache with new features: review the ACR Appropriateness Criteria for head imaging with headache. In this patient, MRI imaging is indicated because of his new symptoms. Discuss the likelihood of incidentalomas versus cancer and the potential implications of each of these diagnoses for this patient who is specifically worried about cancer.

Vignette #4:
88 y/o woman who has been followed in primary care clinic for many years presents with a new throbbing unilateral headache. She is concerned that she may need new glasses because her vision is worsening. She also reports that her jaw has been hurting when she eats, which she thinks is from her dentures not fitting well. Management questions: Does he need imaging? What is your management plan?

New headache in the elderly (temporal arteritis): review the ACR Appropriateness Criteria for head imaging with headache and discuss red flag symptoms. In this patient, MRI imaging is indicated and she should also undergo temporal artery biopsy. Discuss empiric glucocorticoids.

Group Breakout Role Play Handout

Case #1:

Provider: You are Ms. John's longtime primary care physician. She is a 40 y/o woman who is very familiar to you as she is a rather anxious patient, but you have a good relationship with her and have worked with her to manage her diabetes, hypothyroidism, and anxiety in the past. The Medical Assistant has written that the reason for the visit is "headaches". You have treated Ms. J for her occasional headaches in the past with ibuprofen and are curious to see what she has to say.

Patient: You made an appointment with your doctor because recently you have been having worse headaches than usual. You used to have headaches occasionally, but now you seem to be having them more often. They are all over your head, throbbing, and you feel you can't see well because the light bothers your eyes. They now occur several times a week. Despite taking ibuprofen, advil, and Tylenol, they just don't seem to be getting better. You've never had headaches bother you like this before and you are concerned there's something wrong like a brain tumor. You have three kids ranging in age from 10-17 and it's eating you up inside to think that you might not be around for them. You love Dr. X, and you're sure the good doctor will understand why you need to have an MRI.

Observer: Did the physician elicit the patient's concerns? Did the physician respond to emotional cues? What reasons were given for or against testing? Was a test ultimately ordered?

Case #2:

Provider: You're working the urgent care shift at work and this is your last scheduled patient of the day. In previewing the chart you see this is a 28 y/o man with no prior medical history. The Medical Assistant lists the reason for the visit as "headache".

Patient: Four days ago you were coming home from a late shift and got into a car accident. Your car has been totaled and what's worse, you still feel pretty awful! You fell asleep at the wheel and a car hit you from the side when you ran through a red light. Luckily, you were wearing your seatbelt, but your head hit the door of the car hard and you saw stars. You never went to the ED because you were stressed about dealing with your car and the police. Besides you didn't really feel the pain till you calmed down. You had a big goose egg on the side of your head which has come down now after lots of ice packs. Today you have back pain and a headache which still hasn't gone away. You wonder if you need medical imaging to document the effects of the accident for your insurance since you were the one that was hit and you're worried the insurance company is not going to cover the cost of your car. Concussion: review the Canadian CT Head Injury/Trauma Rule to see if patient needs brain imaging. In this patient, imaging is not indicated. Discuss the management of concussion with a focus on when or if this patient can return to his sport.

Observer: Did the physician elicit the patient's concerns? Did the physician respond to emotional cues? What reasons were given for or against testing? Was a test ultimately ordered?

The Patient Experience

Background: Residents and attendings alike have less and less time to spend at patient's bedside. As the practice of medicine evolves, we need to ensure that trainees are exposed to the "patient's voice" to help us understand patient specific factors that change outcomes and management decisions.

Learning Objectives: Examine the patient-specific factors that influence patient decisions, compliance, values, and satisfaction with medical care.

What you need: A hospitalized patient who is stable and can and is willing to answer questions about the index hospitalization for learning purposed. This conference works best when the patient is able to leave their room, and can discuss their thoughts on either an adverse event or a shared decision-making opportunity.

The Conference

1) Introduce the patient and summarize the patient's clinical course
2) Interview patient
    - In your own terms, can you tell us about why you are hospitalized?
    - What questions have you had about your treatment plan so far?
    - Have there been times where you think doctors have been unclear in their recommendations or communication with you?
    - Do you feel that you are your medical team is involving you in the decision making process for your care?
    - Do you have any concerns about your care so far?
    - In a perfect world, what would have been an ideal course for your care so far?
    - How do you want your medical team to communicate with you?
    - How much do you want to know about your medical care?
    - What factors are important to you in your daily life when you leave the hospital?
    - If you had to take medications and go to the doctor regularly after you leave the hospital, what potential problems do you foresee with this plan?
3) Wrap-up: Discuss the importance of DIME and how understanding a patient's background, social and clinical context helps to improve patient-physician communication and can lead to improved outcomes with shared decision making.