SESSION 1
7:45am – 8:45am
High Value Care: Informed Decisions that Reduce Waste and Improve Health Outcomes

SPEAKER
Cynthia Smith, MD

✔ Making Informed Decisions
✔ Reducing Waste
✔ Improving Outcomes

What is the problem?
• We spend too much on healthcare – 17% of U.S. GDP
• Healthcare spending is the largest driver of budget deficits and leaves less money for investment in roads, schools and public safety
• Despite spending twice as much on healthcare as other developed nations, we have lower life expectancy

Presenter Disclosure Information
The following relationships exist related to this presentation:
► Cynthia Smith, MD, reports that her spouse holds ownership interest (e.g., stocks, stock options, etc.) in Merck & Co., Inc.

Off-Label/Investigational Discussion
► In accordance with pmiCME policy, faculty have been asked to disclose discussion of unlabeled or unapproved use(s) of drugs or devices during the course of their presentations.

High Value Care Definition
Care that balances clinical benefit with cost and harms with the goal of improving patient outcomes

High Value Care Timeline
2010: ACP introduced the HVC Initiative
2012: AAIM/ACP FREE HVC Curriculum for Internal Medicine Residents
2013: ACP launched new HVC website http://hvc.acponline.org/index.html
2014: ACP launched online HVC cases

http://hvc.acponline.org/index.html
**Topic 1: Avoid Unnecessary Testing**

- Use validated decision support tools for efficient and accurate diagnostic testing
- Estimate harms and costs associated with common tests
- Balance benefits with harms and costs of testing

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**Michelle Barrow**

59-yo woman 3 days s/p laparoscopic cholecystectomy has acute shoulder pain, shortness of breath, and small amount of hemoptysis

On exam:
- Afebrile, BP 110/78 mm Hg, P 115/min, RR 20/min, O2 sat 82% on room air
- Appearance: Diaphoretic
- Lungs: crackles at bases that clear with cough
- Cardiac: tachycardic, no m/r/g
- Abdomen: nontender, incision clean/dry/intact
- Extremities: no edema
- Portable CXR: shows atelectasis

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**Michelle Barrow**

You think that she might have had a pulmonary embolism (PE)

**Clinical Decision Support Tool: Wells Criteria**

van Belle, A, et al. JAMA 2006; 295:172

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**Wells Criteria: Diagnose PE**

<table>
<thead>
<tr>
<th>Clinical symptoms of DVT</th>
<th>3 points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other diagnosis less likely than pulmonary embolism</td>
<td>3 points</td>
</tr>
<tr>
<td>Heart rate &gt;100</td>
<td>1.5 points</td>
</tr>
<tr>
<td>Immobilization (&gt;3 days) or surgery in the previous four weeks</td>
<td>1.5 points</td>
</tr>
<tr>
<td>Previous DVT/PE</td>
<td>1.5 points</td>
</tr>
<tr>
<td>Hemoptysis</td>
<td>1 point</td>
</tr>
<tr>
<td>Malignancy</td>
<td>1 point</td>
</tr>
</tbody>
</table>

**Clinical probability assessment**

- **High**: >6 points
- **Moderate**: 2-6 points
- **Low**: ≤ 2 points

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**Pretest Probability of PE**

- Ms. Barrow’s Wells score is 7
- She has a high probability (16-20%) of having a pulmonary embolism

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**Key Point**

In patients with high pretest probability of pulmonary embolism like Ms. Barrow, pulmonary CT angiogram is the most cost-effective diagnostic test
Use Validated Risk Scores to Guide Testing

- The Wells score helps streamline diagnostic testing and prevent unnecessary testing.
- High pretest probability
  - D-dimer unnecessary as a positive result does not confirm and a negative result does not exclude the diagnosis.
  - Combination of high pretest probability and a normal D-dimer still have a 19-28% chance of having an acute PE
- D-dimer testing is most useful for excluding disease in patients at low or intermediate risk

“Value” ≠ Cost of the Test

- Lower extremity US and V/Q scan are not first line choices in this patient
  - Results can be indeterminate, leading to further testing
- High Value Care is not always choosing the least expensive test
- High Value Care is making the correct diagnosis as efficiently as possible and avoiding unnecessary testing and delaying treatment

Michelle Barrow cont…

- Ms. Barrow is stabilized and transferred to the intensive care unit
- Pulmonary CT angiography confirms the diagnosis of pulmonary embolism
- She is given intravenous heparin. Her subsequent course is uncomplicated

Ms. Barrow’s Hospital Bill

<table>
<thead>
<tr>
<th>Test</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>BNP</td>
<td>$234</td>
</tr>
<tr>
<td>PT x 4 (34.35)</td>
<td>$137</td>
</tr>
<tr>
<td>PTT x 13 ($54.02)</td>
<td>$702</td>
</tr>
<tr>
<td>D-Dimer</td>
<td>$84</td>
</tr>
<tr>
<td>CBC with diff x 5</td>
<td>$168</td>
</tr>
<tr>
<td>ABG</td>
<td>$310</td>
</tr>
<tr>
<td>Troponin x 3</td>
<td>$550</td>
</tr>
<tr>
<td>BMP x 5 ($60.35)</td>
<td>$302</td>
</tr>
<tr>
<td>Hepatic function</td>
<td>$69</td>
</tr>
<tr>
<td>Hypercoag panel</td>
<td>$2553</td>
</tr>
<tr>
<td>ABO</td>
<td>$26</td>
</tr>
<tr>
<td>ECG</td>
<td>$206</td>
</tr>
<tr>
<td>APAP ($0.10)</td>
<td>$2</td>
</tr>
<tr>
<td>Warfarin ($0.14)</td>
<td>$1</td>
</tr>
<tr>
<td>IV Heparin ($20.25)</td>
<td>$243</td>
</tr>
<tr>
<td>Portable CXR</td>
<td>$410</td>
</tr>
<tr>
<td>CT Chest w/contrast</td>
<td>$1463</td>
</tr>
<tr>
<td>USS Duplex L Ext Bilat</td>
<td>$1089</td>
</tr>
<tr>
<td>Echocardiogram</td>
<td>$2600</td>
</tr>
<tr>
<td>Physician x 5 days ($200)</td>
<td>$1000</td>
</tr>
<tr>
<td>PT Evaluation</td>
<td>$319</td>
</tr>
<tr>
<td>Bed x 5 d ($3250)</td>
<td>$16,250</td>
</tr>
</tbody>
</table>

Total > $28,000

Key Point

Diagnostic testing should be tailored to the individual patient and focused on making an accurate diagnosis as efficiently as safely possible

$6,000 in Unnecessary Testing!

- Unnecessary imaging studies and laboratory testing contributed the most to Ms. Barrow’s hospital charges
- She had a straightforward PE diagnosis that was identified and treated quickly
- Despite this, she underwent an extensive work-up that were unlikely to change her management plan
- Studies should be selected based on the information needed to diagnose and treat the patient effectively, not based on habit or routine
- High value care is customized, prioritized care—not one-size-fits-all medicine
Javier Cruz

62-yo man with known small-vessel ischemic dilated cardiomyopathy who presents with increasing dyspnea and orthopnea in the setting of dietary and medication non-adherence. He does not have chest pain

On exam:
- Afebrile, BP 130/70 mm Hg, P 110/min, RR 22/min. O₂ sat 91% on room air
- Lungs: crackles bilaterally
- Cardiac: regular rhythm, +S3, JVP at 15cm
- Extremities: pitting edema

Javier Cruz cont…

- Labs: Creatinine 1.1 mg/dL; electrolytes & CBC are normal
- CXR: consistent with heart failure
- EKG: sinus tachycardia without ischemic changes
- Echocardiogram (2 months ago): left ventricular ejection fraction of 35%
- ED treatment: oxygen and intravenous furosemide. Symptoms improve
- He is admitted to the hospital and placed on telemetry

Key Point

Testing should be based on clinical impression and whether the results of a particular test will influence management

Trust Your Clinical Diagnosis

History and physical examination are powerful diagnostic tools
- Mr. Cruz’ H&P are consistent with acute decompensated left sided heart failure due to dietary and medication non-adherence

Avoid testing unlikely to change management
- B-type natriuretic peptide added little value but was ordered twice
  - most useful in patients with atypical presentations or who have dyspnea of unclear etiology


Javier Cruz cont…

- Rules out for a myocardial infarction
- Cardiology consultant recommends a stress test prior to discharge.
- The stress test is equivocal, and coronary angiography is recommended
- Mr. Cruz is worried about having the test and asks for your recommendation. When he underwent coronary angiography last year, he was told that were no blockages that could be opened with the balloon or operated on

Key Point

A patient’s underlying risk factors and comorbidities may increase the potential harms associated with an intervention
Let's review his hospital bill and think aloud about which tests may be of low value and could possibly be avoided.

Mr. Cruz’ Hospital Bill

<table>
<thead>
<tr>
<th>Service</th>
<th>Frequency</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital bed</td>
<td>3</td>
<td>$4,200</td>
</tr>
<tr>
<td>Physician billing</td>
<td>3</td>
<td>$600</td>
</tr>
<tr>
<td>Consultant billing</td>
<td>3</td>
<td>$900</td>
</tr>
<tr>
<td>Electrolyte panel</td>
<td>3</td>
<td>$150</td>
</tr>
<tr>
<td>CBC</td>
<td>3</td>
<td>$150</td>
</tr>
<tr>
<td>Troponin</td>
<td>3</td>
<td>$225</td>
</tr>
<tr>
<td>BNP</td>
<td>2</td>
<td>$150</td>
</tr>
<tr>
<td>EKG</td>
<td>2</td>
<td>$120</td>
</tr>
<tr>
<td>CXR</td>
<td>2</td>
<td>$200</td>
</tr>
<tr>
<td>Echo/nuclear stress test</td>
<td></td>
<td>$2,000</td>
</tr>
<tr>
<td>Transthoracic echo</td>
<td></td>
<td>$1,000</td>
</tr>
<tr>
<td>Electrolyte panel</td>
<td>3</td>
<td>$150</td>
</tr>
<tr>
<td>CBC</td>
<td>3</td>
<td>$150</td>
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</tr>
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<td>EKG</td>
<td>2</td>
<td>$120</td>
</tr>
<tr>
<td>CXR</td>
<td>2</td>
<td>$200</td>
</tr>
</tbody>
</table>

Total $17,695

High Value Care

• Balancing clinical benefits with risk and cost
• A repeat cardiac catheterization is unlikely to benefit Mr. Cruz and may cause harm.

Pamela Johnson

Ms. Johnson is a 42 yo woman with asthma who comes to the ED with dyspnea and a dry cough but no chest pain. She has no other significant past medical history. She lost her health insurance and cannot afford to follow up with a primary care clinician.

On exam:
• Mild respiratory distress
• Afebrile, P 86/min, RR 21/min
• Lungs: expiratory wheezing bilaterally
• The remainder of PE is normal

Pamela Johnson’s ED Bill

<table>
<thead>
<tr>
<th>Service</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nebulizer treatment</td>
<td>$150</td>
</tr>
<tr>
<td>IV methylprednisolone</td>
<td>$140</td>
</tr>
<tr>
<td>Electrocardiogram</td>
<td>$150</td>
</tr>
<tr>
<td>D-Dimer</td>
<td>$60</td>
</tr>
<tr>
<td>Creatine kinase</td>
<td>$100</td>
</tr>
<tr>
<td>Troponin</td>
<td>$60</td>
</tr>
<tr>
<td>Pulmonary CT angiography</td>
<td>$3750</td>
</tr>
<tr>
<td>PA/lateral chest radiograph</td>
<td>$250</td>
</tr>
<tr>
<td>ED physician—level 5</td>
<td>$1750</td>
</tr>
</tbody>
</table>

Total $6410

• CXR, pulmonary CT angiography, ECG, and troponin and D-dimer are all normal
• Ms. Johnson receives intravenous methylprednisolone and one nebulized albuterol treatment
• Follow-up 1 hour later, she feels much better and her wheezing is improved
• Oxygen saturation is 96% on room air
Emergency department visits generate high charges because both the number of services and the cost per service are increased in this setting.

Unnecessary testing for patients with straightforward diagnoses often occurs in the emergency department.

Tonya Dixon

- 35-yr-old woman with right-sided, pulsatile, headaches lasting 4-8 hours
- Associated with nausea and preceded by “seeing spots.” Occur every 3 to 4 weeks for the past 6 months. Cannot identify any triggers. Mild relief with acetaminophen. No headache today
- No fever, visual loss, focal weakness, paresthesias, neck pain in relation to the headaches, recent head trauma.
- No other relevant medical history or family history
- Not sexually active or using contraceptives

On exam:
- Well-appearing
- Vital signs, including blood pressure, are normal
- Funduscopic exam is normal
- No temporal artery tenderness, no bruits, and no focal neurologic findings

Key Points

- Based on her history and physical exam, Ms. Dixon has uncomplicated migraine headaches, and an NSAID would be the most appropriate initial treatment
- Patients with typical migraine features and no red flags do not require neuroimaging

High Diagnostic Yield for History

The POUND mnemonic is useful for the diagnosis of migraine:
- Pulsatile
- One-day duration (episodes lasting 4-72 hours if untreated)
- Unilateral
- Nausea/vomiting
- Disabling

The likelihood ratio (LR) for migraine by the number of POUND criteria:

- 4 of 5 criteria: LR(+) = 24
- 3 of 5 criteria: LR(+) = 3.5
- 2 or fewer criteria: LR(–) = 0.41

Low Diagnostic Yield for Imaging

Brain imaging has a less than 1% chance of identifying the cause of a patient's headache.

Why NSAIDs?

Good efficacy in randomized, placebo-controlled trials of migraine therapy including:
- aspirin (650 to 1000 mg)
- ibuprofen (400 to 1200 mg)
- naproxen (750 to 1250 mg)
- diclofenac (50 to 100 mg)

NSAIDs are relatively inexpensive, with most treatments costing less than a dollar per headache.

Why Not Try a Triptan?

- Triptans are efficacious for migraine headaches with or without aura.
- Triptan side effects include dizziness, dry mouth, and upset stomach.
- Triptans should be used with caution in patients with known vascular disease.
- The cost per headache for triptans is in the $20 to $30 range per headache.
- For this reason, it would be prudent to try NSAID therapy before prescribing a triptan in most instances.

Where to Find Estimated Costs

- Medical costs are complex and extremely variable.
- All that is typically necessary in a conversation with your patients is an estimate of relative cost.
- There are several websites available that can help you with this process:
  - [www.healthcarebluebook.com](http://www.healthcarebluebook.com)
  - [www.clearhealthcosts.com](http://www.clearhealthcosts.com)
  - [www.goodrx.com](http://www.goodrx.com)
  - [www.cms.gov/Medicare/Medicare-Fee-for-Service Payment/ClinicalLabFeeSched/Index.html](http://www.cms.gov/Medicare/Medicare-Fee-for-Service Payment/ClinicalLabFeeSched/Index.html)

Key Point

Incidental findings are common and lead to additional medical procedures and expense without improving patient outcomes or well-being.

Tonya Dixon cont...

- She has a noncontrast CT of the brain to exclude a mass or bleed as a potential cause of her headaches.
- A small 1.5 cm peripheral mass in the left parietal region that cannot be well categorized.
- Contrast-enhanced CT or MRI is recommended.

Incidental findings are common and lead to additional medical procedures and expense without improving patient outcomes or well-being.
Incidentalomas

- Brain CT rates are 20% to 30%
- Brain MRI rates are 10% to 12%
- Abdominal CT scans have the highest rates of incidental findings: more than 50% of studies have an incidental finding
- Incidental findings often lead to additional medical procedures and expense that do not improve patient well-being


Jason Stone

Chief complaint: “I need an MRI for my back”

- 45-year-old male presents with 2 weeks unremitting low back pain that is affecting his productivity at work. He denies radiation to the legs, weakness, numbness, bowel or bladder incontinence, or any other neurological symptoms or fever
- PMH: Unremarkable
- Medication: Acetaminophen as needed with some relief
- Social/Family Hx: banker, occasional ETOH, denies illicit drug use. No family history of cancer
- PE: (including neurologic exam): Normal


ACP Guidelines

- Recommendation: Clinicians should not routinely obtain imaging or other diagnostic tests in patients with nonspecific low back pain
- Recommendation: Perform diagnostic imaging and testing for patients with low back pain when severe or progressive neurologic deficits are present or when serious underlying conditions are suspected.


What do physicians actually do?

- About 40% of family practice and 13% of internal medicine physicians reported ordering routine diagnostic imaging for acute low back pain
- In the absence of any worrisome features:
  - 22% of physicians would obtain lumbar spine radiography for acute low back pain without sciatica
  - 62% would do so for low back pain with sciatica


What are the potential barriers to high value use of diagnostic tests?

- Lack of guidelines
- Poor familiarity with guidelines
- Lack of knowledge of costs, including the impact of setting on cost
- Defensive medicine (i.e. fear of litigation)
- Explaining to patients why tests/treatments are not indicated takes time
- Discomfort with diagnostic uncertainty
- Local standards of care
- Time pressure (emphasis on shorter LOS and productivity)
- Misaligned financial incentives
- Lack of appreciation of harms
- Patient expectations
- Lack of centrally available information on prior tests

Potential Barrier: Defensive Medicine

Defensive medicine occurs when doctors order tests, procedures, or visits... primarily to reduce their exposure to malpractice liability.” (Congressional OTA 1994)

Raise your hand if you have ever practiced defensive medicine or seen it practiced

Studdert DM et al. JAMA. 2005 Jun 1;293(21):2609-17

Defensive medicine is very common: 93% of physicians in Pennsylvania report practicing defensive medicine

Studdert DM et al. JAMA. 2005 Jun 1;293(21):2609-17
Defensive medicine does NOT protect against malpractice

- Malpractice claims can be arbitrary and hard to prevent: 40% of malpractice claims do not involve medical errors
- More care is not better care as tests and treatments have harms associated with them that may lead to malpractice
- Lack of follow up of abnormal test results often leads to malpractice litigation—don’t order the test if you don’t plan on following it up and acting on the results
- Tips to avoid malpractice: listen to your patients and carefully document decision-making, including discussion of side effects and risks of all tests and treatments

Potential Barrier: Patient Expectations

- Patients often think that more testing is better
- Physicians have legitimate concerns about patient satisfaction, which may be tied to reimbursement

Patient expectations in low back pain:

- Patients often want imaging
- They also want a clear diagnosis, shared decision-making, and acknowledgment that their symptoms are real
- Effective communication may contribute more to satisfaction than the specific management plan

In Summary

- Use validated decision support tools for streamlined testing
- Estimate the harms and costs associated with common tests
- Balance benefits with harms and costs of testing
- Go to https://hvc.acponline.org/cases to complete the remaining 4 topics for FREE CME and ABIM MOC credit (including patient safety)!

References

- Detaks ME, et al. Does this patient with headache have a migraine or need neuroimaging? JAMA. 2006; 296:1274-1283.

Talking to patients about NOT doing things

Principles of patient-centered discussions

- Find out where the patient is coming from
  - “What are you afraid we will find?”
  - “What do you think is going on and what are you worried about?”
- Explain your reasons
  - “The good news is that you don’t have any worrisome symptoms”
- Make it clear that you are on the patient’s side
  - “I wish more testing would help you, but it could actually make things worse”
- Contract for a clear follow-up plan and review red flag signs and symptoms
  - “I want to see you in 2 weeks, but call sooner if you have leg weakness”

References

- Detaks ME, et al. Does this patient with headache have a migraine or need neuroimaging? JAMA. 2006; 296:1274-1283.
References

- Case slides by Krishan Soni, MD (UCSF)