INTRODUCTION TO HIGH VALUE CARE: ELIMINATING HEALTHCARE WASTE

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Learning Objectives

• Understand some of the current problems with health care spending

• Recognize the role that residents, faculty and teaching hospitals play in the problem

• Introduce the five step model for delivering high value, cost conscious care

• Articulate strategies for bringing high value care into daily practice
Why Worry About Cost Now?

Health Care Costs in the US in Billions of Dollars

*30% of these costs are wasted care (around $765 billion in 2009)
What is the problem?¹

• Since 1970, healthcare spending is rising 2.4% faster than GDP.

• Estimated $765 billion of “healthcare waste” annually.

• Physicians responsible for 87% of wasteful spending.

• Definition of Waste in healthcare:
  • “Healthcare spending that can be eliminated without reducing the quality of care.”
Estimated Sources of Excess Costs in Health Care

Unnecessary Services
$210 Billion

Excessive Administration Costs
$190 Billion

Prices That Are Too High
$105 Billion

Fraud
$75 Billion

Inefficient Service Delivery
$130 Billion

Missed Prevention
$55 Billion

IOM 2010
Ordering more services...

- **Two areas of greatest expenditures and most rapid growth:** imaging and tests
Reasons Residents Over-Order Tests

1. Duplicating role modeled behavior
2. Desire to be complete
3. Pre-emptive ordering/rushing an evaluation/unnecessary duplication of tests
4. Discomfort with Diagnostic Uncertainty
5. Curiosity
6. Lack of knowledge of the costs and harms
7. Defensive medicine
8. Patient requests
9. Faculty demand
10. No training in weighing benefit relative to cost and harm
11. Ease of access to services when patient is hospitalized
The Cost of a Long Life

The graph shows a comparison of average life expectancy and per capita spending (in international dollars) for various countries. The countries are listed along the x-axis, with Japan, San Marino, and Switzerland on the left, and Portugal on the right. The y-axis represents average life expectancy, ranging from 74.0 to 82.0. The United States has the highest per capita spending, which is an outlier in the graph.
What is High Value, Cost Conscious Care?

Providing the best possible care to our patients

and

Simultaneously reducing unnecessary costs to the healthcare system
Appropriate Use of Screening and Diagnostic Tests to Foster High-Value, Cost-Conscious Care

Amir Qaseem, MD, PhD, MHA; Patrick Alguire, MD; Paul Dallas, MD; Lawrence E. Feinberg, MD; Faith T. Fitzgerald, MD; Carrie Horwitz, MD, MPH; Linda Humphrey, MD, MPH; Richard LeBlond, MD; Darilyn Moyer, MD; Jeffrey G. Wiese, MD; and Steven Weinberger, MD

Unsustainable rising health care costs in the United States have made reducing costs while maintaining high-quality health care a national priority. The overuse of some screening and diagnostic tests is an important component of unnecessary health care costs. More judicious use of such tests will improve quality and reflect responsible awareness of costs. Efforts to control expenditures should focus not only on benefits, harms, and costs but on the value of diagnostic tests—meaning an assessment of whether a test provides health benefits that are worth its costs or harms. To begin to identify ways that practicing clinicians can contribute to the delivery of high-value, cost-conscious health care, the American College of Physicians convened a workgroup of physicians to identify, using a consensus-based process, common clinical situations in which screening and diagnostic tests are used in ways that do not reflect high-value care. The intent of this exercise is to promote thoughtful discussions about these tests and other health care interventions to promote high-value, cost-conscious care.

Ann Intern Med. 2012;156:147-149. For author affiliations, see end of text.

Health care costs in the United States are increasing unsustainably: from $253 billion in 1980, to $714 billion in 1990, to more than $2.2 trillion in 2008 (1). In 2008, U.S. health care spending accounted for 16.2% of the nation’s gross domestic product (GDP) and was approximately $7681 per person (1). Employee contributions to health care premiums have increased by nearly 150% in the past 10 years (2). The increase in costs has placed great strain on family, employer, and government budgets.

Although many factors have contributed to the increase in health care costs (3), new drugs, devices, procedures, and tests are the primary drivers of increased health care spending. However, because biomedical innovations are also often key factors in improved patient outcomes (4), it is critical that we use testing and medical technology judiciously and assess whether potential benefits justify the costs.

For organized medicine to identify a list of "top 5" tests or treatments that are commonly overused (6). The American College of Physicians convened an ad hoc workgroup of experienced internal medicine physicians with the goal of identifying common screening and diagnostic tests relevant to internal medicine that they believe are commonly overused. Workgroup members represented a variety of internal medicine specialties, an array of practice environments, and different patient populations from across the country. In light of increasing health care costs as well as overuse and misuse of tests and treatments, some have called for organized medicine to identify a list of "top 5" tests or treatments that are commonly overused (6). The American College of Physicians convened an ad hoc workgroup of experienced internal medicine physicians with the goal of identifying common screening and diagnostic tests relevant to internal medicine that they believe are commonly overused. Workgroup members represented a variety of internal medicine specialties, an array of practice environments, and different patient populations from across the country.
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<thead>
<tr>
<th><strong>Table. Clinical Situations in Which a Test Does Not Reflect High-Value Care</strong>*</th>
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<tbody>
<tr>
<td>1. Repeating screening ultrasonography for abdominal aortic aneurysm following a negative study</td>
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<tr>
<td>2. Performing coronary angiography in patients with chronic stable angina with well-controlled symptoms on medical therapy or who lack specific high-risk criteria on exercise testing</td>
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<tr>
<td>3. Performing echocardiography in asymptomatic patients with innocent-sounding heart murmurs, most typically grade I-II/VVI short systolic, midpeaking murmurs that are audible along the left sternal border</td>
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<tr>
<td>4. Performing routine periodic echocardiography in asymptomatic patients with mild aortic stenosis more frequently than every 3-5 y</td>
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<tr>
<td>5. Routinely repeating echocardiography in asymptomatic patients with mild mitral regurgitation and normal left ventricular size and function</td>
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<tr>
<td>6. Obtaining electrocardiograms to screen for cardiac disease in patients at low to average risk for coronary artery disease</td>
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<tr>
<td>7. Obtaining exercise electrocardiogram for screening in low-risk asymptomatic adults</td>
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<tr>
<td>8. Performing an imaging stress test (echocardiographic or nuclear) as the initial diagnostic test in patients with known or suspected coronary artery disease who are able to exercise and have no resting electrocardiographic abnormalities that may interfere with interpretation of test results</td>
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<tr>
<td>9. Measuring brain natriuretic peptide in the initial evaluation of patients with typical findings of heart failure</td>
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<tr>
<td>10. Annual lipid screening for patients not receiving lipid-lowering drug or diet therapy in the absence of reasons for changing lipid profiles</td>
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<td>11. Using MRI rather than mammography as the breast cancer screening test of choice for average-risk women</td>
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<tr>
<td>12. In asymptomatic women with previously treated breast cancer, performing follow-up complete blood counts, blood chemistry studies, tumor marker studies, chest radiography, or imaging studies other than appropriate breast imaging</td>
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<tr>
<td>13. Performing dual-energy x-ray absorptiometry screening for osteoporosis in women younger than 65 y in the absence of risk factors</td>
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<tr>
<td>14. Screening low-risk individuals for hepatitis B virus infection</td>
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<tr>
<td>15. Screening for cervical cancer in low-risk women aged 65 y or older and in women who have had a total hysterectomy (uterus and cervix) for benign disease</td>
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<td>16. Screening for colorectal cancer in adults older than 75 y or in adults with a life expectancy of less than 10 y</td>
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<td>17. Repeating colonoscopy within 5 y of an index colonoscopy in asymptomatic patients found to have low-risk adenomas</td>
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<td>18. Screening for prostate cancer in men older than 75 y or with a life expectancy of less than 10 y</td>
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<tr>
<td>19. Using CA-125 antigen levels to screen women for ovarian cancer in the absence of increased risk</td>
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<tr>
<td>20. Performing imaging studies in patients with nonspecific low back pain</td>
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<tr>
<td>21. Performing preoperative chest radiography in the absence of a clinical suspicion for intrathoracic pathology</td>
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<tr>
<td>22. Ordering routine preoperative laboratory tests, including complete blood count, liver chemistry tests, and metabolic profiles, in otherwise healthy patients undergoing elective surgery</td>
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<td>23. Performing preoperative coagulation studies in patients without risk factors or predisposing conditions for bleeding and with a negative history of abnormal bleeding</td>
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<td>24. Performing serologic testing for suspected early Lyme disease</td>
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<td>25. Performing serologic testing for Lyme disease in patients with chronic nonspecific symptoms and no clinical evidence of disseminated Lyme disease</td>
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<td>26. Performing sinus imaging studies for patients with acute sinusitis in the absence of predisposing factors for atypical microbial causes</td>
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<td>27. Performing imaging studies in patients with recurrent, classic migraine headache and normal findings on neurologic examination</td>
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<tr>
<td>28. Performing brain imaging studies (CT or MRI) to evaluate simple syncope in patients with normal findings on neurologic examination</td>
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<td>29. Routinely performing echocardiography in the evaluation of syncope, unless the history, physical examination, and electrocardiogram do not provide a diagnosis or underlying heart disease is suspected</td>
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<td>30. Performing predisharge chest radiography for hospitalized patients with community-acquired pneumonia who are making a satisfactory clinical recovery</td>
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<td>31. Obtaining CT scans in a patient with pneumonia that is confirmed by chest radiography in the absence of complicating clinical or radiographic features</td>
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<td>32. Performing imaging studies, rather than a high-sensitivity d-dimer measurement, as the initial diagnostic test in patients with low pretest probability of venous thromboembolism</td>
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<td>33. Measuring d-dimer rather than performing appropriate diagnostic imaging (extremity ultrasonography, CT angiography, or ventilation-perfusion scintigraphy), in patients with intermediate or high probability of venous thromboembolism</td>
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<td>34. Performing follow-up imaging studies for incidentally discovered pulmonary nodules ≤4 mm in low-risk individuals</td>
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<td>35. Monitoring patients with asthma or chronic obstructive pulmonary disease by using full pulmonary function testing that includes lung volumes and diffusing capacity, rather than spirometry alone (or peak expiratory flow rate monitoring in asthma)</td>
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<tr>
<td>36. Performing an antinuclear antibody test in patients with nonspecific symptoms, such as fatigue and myalgia, or in patients with fibromyalgia</td>
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<tr>
<td>37. Screening for chronic obstructive pulmonary disease with spirometry in individuals without respiratory symptoms</td>
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Steps Toward High Value, Cost Conscious Care

Five-Step Framework: High-Value, Cost-Conscious Care

• **Step 1** Understand the benefits, harms, and relative costs of the interventions that you are considering

• **Step 2** Decrease or eliminate the use of interventions that provide no benefit and/or may be harmful

• **Step 3** Choose interventions and care settings that maximize benefits, minimize harms, and reduce costs (using comparative-effectiveness and cost-effectiveness data)

• **Step 4** Customize a care plan with the patient that incorporates their values and addresses their concerns

• **Step 5** Identify system-level opportunities to improve outcomes, minimize harms, and reduce health care waste
Case #1

- Ms. B is 57 year-old woman presenting to the ED with chest pain.
- She has a history of recurrent UTIs; she denies dysuria or urinary frequency.
- Afebrile
- WBC count 5.5

Should she have a routine urinalysis and urine culture?
Case #1

• How would you manage this patient?
  • Additional testing?
  • Treatment?
  • Do your recommendations change if she has an indwelling Foley catheter?
Step 1: Understand the benefits, harms, and costs of diagnostic testing

How much do you think the following cost:
- Urinalysis?
- Urine culture?
- 7 days of oral ciprofloxacin?

What are the potential downstream “costs”? 
Case #1: Follow Up

- Urinalysis: cloudy, 11-50 WBC, 11-50 RBC, 2+ bacteria
- Urine culture: >100,000 *E. coli*
- Ms. B was discharged to complete 7 days of oral ciprofloxacin.

- She returned 10 days later with fever, abdominal pain and diarrhea.
- Stool *Clostridium difficile* assay was positive.
## Case #1: Approximate Charges

### Initial episode of care:
- Urinalysis: $94
- Urine culture: $94
- Ciprofloxacin 500 mg po bid x 7 days: $23

*(UCIMC: Urinalysis w/ microscopy = $128!)*

### Downstream:
- C. difficile PCR assay: $38
- Metronidazole x 10 days: $36
- Vancomycin po x 10 days: $2,284

- Illness and lost days of work due to C. difficile colitis
Steps Toward High Value, Cost-Conscious Care

- **Step one**: Understand the benefits, harms, and relative costs of the interventions that you are considering.

- **Step two**: Decrease or eliminate the use of interventions that provide no benefits and/or may be harmful.

- **Step three**: Choose interventions and care settings that maximize benefits, minimize harms, and reduce costs (using comparative-effectiveness and cost-effectiveness data).

- **Step four**: Customize a care plan with the patient that incorporates their values and addresses their concerns.

- **Step five**: Identify system level opportunities to improve outcomes, minimize harms, and reduce healthcare waste.
Step 2: Decrease or eliminate care that provides no benefit and/or may be harmful.

<table>
<thead>
<tr>
<th>Society</th>
<th>Recommendation</th>
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<tr>
<td>Infectious Diseases Society of America</td>
<td>Avoid prophylactic antibiotics for the treatment of mitral valve prolapse.</td>
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<tr>
<td>Infectious Diseases Society of America</td>
<td>Avoid testing for a Clostridium difficile infection in the absence of diarrhea.</td>
</tr>
<tr>
<td>Infectious Diseases Society of America</td>
<td>Don’t use antibiotic therapy for stasis dermatitis of lower extremities.</td>
</tr>
<tr>
<td>Infectious Diseases Society of America</td>
<td>Avoid prescribing antibiotics for upper respiratory infections.</td>
</tr>
<tr>
<td>Infectious Diseases Society of America</td>
<td>Don’t treat asymptomatic bacteruria with antibiotics.</td>
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</table>

Choosing Wisely
An initiative of the ABIM Foundation
Step 2: Decrease or eliminate care that provides no benefit and/or may be harmful.

American Urological Association

View all recommendations from this society

June 11, 2015

Don’t prescribe antimicrobials to patients using indwelling or intermittent catheterization of the bladder unless there are signs and symptoms of urinary tract infection.

Antibiotics in the absence of signs and symptoms (which may include fever; altered mental status or malaise with no other cause; flank or pelvic pain; flank or suprapubic tenderness; hematuria; dysuria, urinary urgency or frequency; and, in spinal cord injury patients, increased spasticity, autonomic dysreflexia or sense of unease) is not efficacious and risks inducing resistance to antimicrobials. This applies to both indwelling and intermittent catheterization of the bladder. The major exception is patients needing periprocedural antimicrobials. Additionally, initial placement of a suprapubic tube requires a skin puncture or incision and therefore antibiotics should be considered.
Case #2

- Mr. M is a 75 year-old man with OA presenting with acute-on-chronic right hip pain. He slipped out of bed this morning and is now unable to bear weight on his right leg.

- Exam is notable only for moderate tenderness over the right hip.

- Hip and pelvis x-rays were negative for fracture.

Should he have further imaging? Which type?
Clinical Decision Support Tools

- American College of Radiology: Appropriateness Criteria
ACR Appropriateness Criteria: Acute Hip Pain – Suspected Fracture

<table>
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<tr>
<th>Radiologic Procedure</th>
<th>Rating</th>
<th>Comments</th>
<th>RRL*</th>
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<tr>
<td>MRI pelvis and affected hip without contrast</td>
<td>9</td>
<td></td>
<td>O</td>
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<tr>
<td>CT pelvis and hips without contrast</td>
<td>6</td>
<td></td>
<td>3</td>
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<tr>
<td>MRI pelvis and affected hip without and with contrast</td>
<td>4</td>
<td>See statement regarding contrast in text under “Anticipated Exceptions.”</td>
<td>O</td>
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<tr>
<td>Tc-99m bone scan hip</td>
<td>4</td>
<td>Consider using single-photon emission CT (SPECT) or SPECT/CT.</td>
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<tr>
<td>CT pelvis and hips with contrast</td>
<td>1</td>
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<tr>
<td>US hip</td>
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Rating Scale: 1,2,3 Usually not appropriate; 4,5,6 May be appropriate; 7,8,9 Usually appropriate

*Relative Radiation Level
Case #2: Follow Up

- CT pelvis was performed and was non-diagnostic.

- Pain persisted and he remained unable to bear weight.

- MRI was obtained and revealed a nondisplaced femoral fracture in the setting of severe osteoarthritis.

- Patient underwent nonemergent repair of the fracture.
Case #2: Approximate Charges

This hospitalization:

• Femur x-ray: $700
• Pelvis x-ray: $800
• CT hip/pelvis: $3000
• MRI hip: $4000
• 4 nights in the hospital: $12,000
• Femur fracture repair: $12,415

Downstream:

• Delay in therapy, leading to increased morbidity/mortality
• Radiation exposure
Cost ≠ Value

Cost ≠ Cost of Test

- Cost includes cost of test and downstream costs, benefits and harms

- High-cost interventions may provide good value because they are highly beneficial

- Low-cost interventions may have little or no value if they provide little benefit or increase downstream costs
Clinical Case #3: Syncope

- Mr. P., a 42 year-old man with hypertension treated with HCTZ, presents to the emergency department after passing out. He was outside working in his garden on a hot afternoon when he started to feel ill and then suddenly lost consciousness. His wife witnessed the event and noticed that he fell to the ground and was unresponsive for about 10 seconds. He did not hit his head. He then woke up and returned to his baseline mental status.

- T 37.5°C BP 110/70, HR 95, RR 12, O₂ sat 98% on ambient air

- Exam notable for: dry mucus membranes, no cardiac murmurs, normal neurologic exam
Step 1: Benefits, harms, costs
Evaluation and Management of Syncope

• What is your workup for a patient with syncope?
• Which labs or initial studies do you want to order?
• What are the benefits, harms, and costs of each test or intervention?
Mr. P. was admitted for 2 days during which time:

- ECG was normal; TTE was also obtained and revealed mild LVH
- Head CT revealed no abnormalities.
- Carotid duplex ultrasound revealed 10-50% stenosis, bilaterally.
- Lab evaluation with CBC, BMP, troponin were all within normal limits.
- He was monitored on telemetry, which revealed occasional PVCs.
- He was given 1 liter of normal saline and discharged on hospital day 2.
Case #3: Approximate Charges*

- One night on telemetry $7,000
- Electrolyte panel: $175
- CBC: $170
- CXR: $500
- Head CT: $3,000
- TTE: $3,000
- Carotid ultrasound: $1900
- IV fluid bolus: $150

*Charges from CA Chargemaster website and patient bills; actual charges vary by institution (http://www.oshpd.ca.gov/chargemaster/)
Approximate Cost?

- What is the total charge for this patient’s 2-day admission?

  Approximately $19,000

- In addition to financial costs, what are some harms and potential downstream costs of this patient’s management?

  Examples: Repeated phlebotomy, IV catheter-related phlebitis or infection, days of work lost, etc.
Discussion

• When does a patient with syncope require a limited workup versus an extensive evaluation?

• When does a patient with syncope require inpatient admission?

**Key:** *When managing a patient with syncope, risk stratify your patient to assist in the decision to admit or treat as an outpatient.*
Step 2: Decrease or eliminate care that provides no benefit and/or may be harmful.

American College of Emergency Physicians

Avoid CT of the head in asymptomatic adult patients in the emergency department with syncope, insignificant trauma and a normal neurological evaluation.

October 27, 2014

Syncope (passing out or fainting) or near syncope (lightheadedness or almost passing out) is a common reason for visiting an emergency department and most episodes are not serious. Many tests may be ordered to identify the cause of such episodes. However, diagnostic tests for syncope should not be routinely ordered, and the decision to order any tests should be guided by information obtained from the patient’s history or physical examination. CT scans of the brain are frequently ordered for this problem to look for bleeding or strokes, but published research has confirmed that abnormalities are rarely found. CT scans are expensive, and may unnecessarily expose patients to radiation. If a head injury is associated with a syncopal episode (fainting spell), then a CT scan of the brain may be indicated. In addition, if there were symptoms of a stroke (i.e., headache, garbled speech, weakness in one arm or leg, trouble walking or confusion) before or after a syncopeal episode, a CT scan may be indicated. However, in the absence of head injury or signs of a stroke, a CT scan of the brain should not be routinely ordered.
Step 2: Decrease or eliminate care that provides no benefit and/or may be harmful.

American Academy of Neurology

View all recommendations from this society

Released February 21, 2013

Don't perform imaging of the carotid arteries for simple syncope without other neurologic symptoms.

Occlusive carotid artery disease does not cause fainting but rather causes focal neurologic deficits such as unilateral weakness. Thus, carotid imaging will not identify the cause of the fainting and increases cost. Fainting is a frequent complaint, affecting 40% of people during their lifetime.
Case Presentation

• 70 y/o female POD#3 from laparoscopic cholecystectomy

• Patient recovering well with plan for discharge

• While ambulating became acutely SOB with tachycardia

• Complained of right shoulder and chest pain associated with diaphoresis
Step 1: Benefits, Harms, Costs

- What is your work-up?
- What factors lead us to make these orders or recommendations?
- How much does this cost?
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<th>Benefit</th>
<th>Harm</th>
<th>Costs</th>
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## Benefits, Harm, Costs

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<tr>
<td>D-dimer</td>
<td>Easy to obtain, helpful in ruling out PE if negative</td>
<td>Low specificity</td>
<td>$65.88</td>
</tr>
<tr>
<td>BNP</td>
<td></td>
<td></td>
<td>$18.75</td>
</tr>
<tr>
<td>Troponin (serial)</td>
<td></td>
<td>Repeated phlebotomy</td>
<td>$26.01 (x 1)</td>
</tr>
<tr>
<td>ABG</td>
<td></td>
<td>Arterial Stick</td>
<td>$35.94</td>
</tr>
<tr>
<td>LE U/S Doppler</td>
<td>no contrast, non-invasive</td>
<td></td>
<td>$125.23</td>
</tr>
<tr>
<td>Hypercoagulable work up</td>
<td></td>
<td>Low yield in patient with clear risk factor for PE</td>
<td>$79.18</td>
</tr>
</tbody>
</table>
Step 2: Decrease or eliminate care that provides no benefit and/or may be harmful

Which tests had the potential to change management?

- CT Angio
- D-dimer
- Fibrinogen
- BNP
- Serial Troponin
- Hypercoagulable panel
- TTE
- LE Ultrasound
- ABG
Step 2: Decrease or eliminate care that provides no benefit and/or may be harmful

1. **Don't do imaging for uncomplicated headache.**
   - Imaging headache patients absent specific risk factors for structural disease is not likely to change management or improve outcome. Those patients with a significant likelihood of structural disease requiring immediate attention are detected by clinical screens that have been validated in many settings. Many studies and clinical practice guidelines concur. Also, incidental findings lead to additional medical procedures and expense that do not improve patient well-being.

2. **Don't image for suspected pulmonary embolism (PE) without moderate or high pre-test probability.**
   - While deep vein thrombosis (DVT) and PE are relatively common clinically, they are rare in the absence of elevated blood D-Dimer levels and certain specific risk factors. Imaging, particularly computed tomography (CT) pulmonary angiography, is a rapid, accurate and widely available test, but has limited value in patients who are very unlikely, based on serum and clinical criteria, to have significant value. Imaging is helpful to confirm or exclude PE only for such patients, not for patients with low pre-test probability of PE.

3. **Avoid admission or preoperative chest x-rays for ambulatory patients with unremarkable history and physical exam.**
   - Performing routine admission or preoperative chest x-rays is not recommended for ambulatory patients without specific reasons suggested by the history and/or physical examination findings. Only 2 percent of such images lead to a change in management. Obtaining a chest radiograph is reasonable if acute cardiopulmonary disease is suspected or if there is a history of chronic stable cardiopulmonary disease in a patient older than age 70 who has not had chest radiography within six months.
Step 3: Choose interventions and care settings that maximize benefits, minimize harms, and reduce costs

- Use comparative-effectiveness and cost-effectiveness data

- In this case: Well’s or Geneva Score to determine pre test probability
# Wells’ Score

<table>
<thead>
<tr>
<th>Clinical symptom</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinical symptoms of DVT (leg swelling, pain with palpation)</td>
<td>3.0</td>
</tr>
<tr>
<td>Other diagnosis less likely than pulmonary embolism</td>
<td>3.0</td>
</tr>
<tr>
<td>Heart rate &gt;100</td>
<td>1.5</td>
</tr>
<tr>
<td>Immobilization (≥3 days) or surgery in the previous four weeks</td>
<td>1.5</td>
</tr>
<tr>
<td>Previous DVT/PE</td>
<td>1.5</td>
</tr>
<tr>
<td>Hemoptysis</td>
<td>1.0</td>
</tr>
<tr>
<td>Malignancy</td>
<td>1.0</td>
</tr>
</tbody>
</table>

### Traditional clinical probability assessment (Wells criteria)

<table>
<thead>
<tr>
<th>Probability Level</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>&gt;6.0</td>
</tr>
<tr>
<td>Moderate</td>
<td>2.0 to 6.0</td>
</tr>
<tr>
<td>Low</td>
<td>&lt;2.0</td>
</tr>
</tbody>
</table>

### Simplified clinical probability assessment (Modified Wells criteria)

<table>
<thead>
<tr>
<th>Probability Level</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>PE likely</td>
<td>&gt;4.0</td>
</tr>
<tr>
<td>PE unlikely</td>
<td>≤4.0</td>
</tr>
</tbody>
</table>
## Simplified Geneva Score

<table>
<thead>
<tr>
<th>Variable</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age $&gt;$65</td>
<td>1</td>
</tr>
<tr>
<td>Previous DVT or PE</td>
<td>1</td>
</tr>
<tr>
<td>Surgery or fracture within 1 month</td>
<td>1</td>
</tr>
<tr>
<td>Active malignancy</td>
<td>1</td>
</tr>
<tr>
<td>Unilateral lower limb pain</td>
<td>1</td>
</tr>
<tr>
<td>Hemoptysis</td>
<td>1</td>
</tr>
<tr>
<td>Pain on deep vein palpation of lower limb and unilateral edema</td>
<td>1</td>
</tr>
<tr>
<td>Heart rate 75 to 94 bpm</td>
<td>1</td>
</tr>
<tr>
<td>Heart rate greater than 94 bpm</td>
<td>2</td>
</tr>
</tbody>
</table>

Score of less than 2 is low probability for PE, score of less than 2 plus a negative D-dimer results in a likelihood of PE of 3%
Diagnostic Algorithm

1. Determine if "PE unlikely" or "PE likely"
   - PE unlikely
     - D-dimer assay
       - <500 ng/mL
         - PE excluded
       - >500 ng/mL
         - Spiral CT pulmonary angiogram (CT-PA)
           - Negative
             - PE excluded
           - Positive
             - PE confirmed
   - PE likely
     - Spiral CT pulmonary angiogram (CT-PA)
       - Negative
         - PE excluded
       - Positive
         - PE confirmed
Start with the H+P!

The first step is to perform a good history and physical examination

- Cost = $0
- Risk = Zero
- Yield = Priceless
SPECIAL REPORT

WHY MEDICAL BILLS ARE KILLING US

BY STEVEN BRILL

MARCH 4, 2013
Cost of an ED Visit

- Community hospital in Southern California
- Patient fell, seen in ED for evaluation
- Clinically stable
Quiz: What is the patient charged?

One bag of normal saline given IV:

Actual bill: $158.55
Quiz: What does is the patient charged?

A comprehensive metabolic panel:

Actual bill: $1,212.00

(UCIMC Outpatient Charge: $115)
Quiz: What is the patient charged?

One set of blood cultures:

Actual bill: $510 (remember, we usually order 2 sets)
Quiz: What is the patient charged?

Electrocardiogram:

Actual bill: $706
What is the patient charged?

Troponin (x 1):

Actual bill: $402 (remember, we usually order x 3)
Quiz: What is the patient charged?

CT Head w/o contrast:

Actual bill: $2930

(At UCIMC: $3,939)
ED Bill

- Community hospital in Southern California
- Patient fell, seen in ED for evaluation
- Clinically stable
- Discharged from ED
- Total cost billed to patient (not including physician fees): $10,122.75
Disclaimer

• Cost of test and charge to patient is complex and involves many factors, and is not just monetary

• Clinical reasoning and individualized care are very important

• Cost-conscious care is *not* about discouraging appropriate care, nor denying beneficial services
Steps Toward High Value, Cost Conscious Care

Five-Step Framework: High-Value, Cost-Conscious Care

• **Step 1** Understand the benefits, harms, and relative costs of the interventions that you are considering

• **Step 2** Decrease or eliminate the use of interventions that provide no benefit and/or may be harmful

• **Step 3** Choose interventions and care settings that maximize benefits, minimize harms, and reduce costs (using comparative-effectiveness and cost-effectiveness data)

• **Step 4** Customize a care plan with the patient that incorporates their values and addresses their concerns

• **Step 5** Identify system-level opportunities to improve outcomes, minimize harms, and reduce health care waste
Questions to Ask Before Ordering a Test

• Did the patient have this test previously?

• Will the result of this test change the care of the patient?

• What are the probability and potential adverse consequences of a false positive result?

• Is the patient in potential danger in the short term if I do not perform this test?

• Am I ordering the test primarily because the patient wants it or to reassure the patient?
HVC Recommendations

About High-Value Care

The American College of Physicians, in collaboration with multiple other organizations, is embarking on a national initiative to promote awareness about the importance of stewardship of health care resources. The goals are to improve health care outcomes by providing care of proven benefit and reducing costs by avoiding unnecessary and even harmful interventions. The initiative comprises several programs that integrate the important concept of health care value (balancing clinical benefit with costs and harms) for a given intervention into various educational materials to address the needs of trainees, practicing physicians, and patients.

To integrate discussion of high-value, cost-conscious care into MKSAP 16, we have created recommendations based on the medical knowledge content that we feel meet the below definition of high-value care and bring us closer to our goal of improving patient outcomes while conserving finite resources.

What is a High-Value Care Recommendation? A recommendation to choose diagnostic and management strategies for patients in specific clinical situations that balance clinical benefit with cost and harms with the goal of improving patient outcomes.

Below are the High-Value Care Recommendations in MKSAP 16.

- Cardiovascular Medicine Recommendations
- Dermatology Recommendations
- Endocrinology and Metabolism Recommendations
- Gastroenterology and Hepatology Recommendations
- General Internal Medicine Recommendations
- Hematology and Oncology Recommendations
- Infectious Disease Recommendations
- Nephrology Recommendations
- Neurology Recommendations
- Pulmonary and Critical Care Medicine Recommendations
- Rheumatology Recommendations
Summary

START:
• Using validated clinical tools and follow diagnostic algorithms to avoid overuse of tests

• Asking yourself before you order the test if the results will change what you do for the patient

STOP:
• Routinely obtaining studies if results will not alter your management
References