

## **Course Title: High-Value Care 101: From Health Systems to the Bedside**

**Prerequisites:** None

### **Course Description**

This two-week course aims to introduce medical students to an integrative, comprehensive model of high-value care applicable to future clinical practice. Combining online modules, clinical cases, and textbook instruction with a team-based innovation project, this course spans the breadth of high-value care: a 30,000 foot view of value-based healthcare policy, the role of health systems science, and the bedside clinician's practice of high-value decision-making. On days with assigned articles to read, we will have optional Journal Club like debrief and discussion sessions.

Students will complete an innovative project. They will create a 1-2 page proposal in the mold of "Shark Tank" that formulates and demonstrates a method to decrease overutilization of a non-beneficial service to improve the value of healthcare in the United States. Depending on enrollment numbers, students have the option of forming groups and having final projects judged by a panel of experts in the form of a "Shark Tank" episode using zoom with a visual aid. The proposal(s) will be judged on the following criteria: background to the problem summarized including pertinent references, intervention (is it creative? is it feasible?), outcome well delineated, clarity of presentation.

**Course Faculty and Staff:** Heather Harrell, Grant Harrell

**Meeting Place and Time:** TBD, no in person meetings are required

### **Course Materials**

Clinical cases are provided by Aquifer and the American Medical Association (AMA). Aquifer High-Value Care consists of innovative, cross-discipline, case-based modules that begin teaching the fundamentals of value in healthcare. The modules include short interactive virtual patient cases, brief instructional videos, key teaching points, and embedded links so that students can apply principles from the high-value care modules to other cases. The AMA modules aim to provide medical students with a clear understanding of how healthcare is delivered, how healthcare professionals work together to deliver that care, and how the health system can improve patient care and healthcare delivery. Students receive a certificate following completion of each AMA module and can generate a personalized student report to prove completion of all Aquifer High-Value Care modules.

Required textbook: "Understanding Value-Based Healthcare" by C Moriates, V Arora, and N Shah, 2015. Available free of charge through the UF Health Sciences Library.

**Classes Offered:** Periods 1 and 2, 2 weeks for 2 credits (unlimited enrollment)

## **Evaluated Competencies**

### **#1 Professionalism:**

Educational Objectives:

Meet course deadlines

Participate in project

Method of Evaluation:

Completion of course materials on time and if working in a group, make constructive contributions to the group proposal

### **#2 Patient Care: N/A**

Educational Objectives:

Method of Evaluation:

### **#3 Medical Knowledge:**

Educational Objectives:

There are specific educational objectives related to gaining knowledge of health system science, value-based health care, patient safety, basics of costs and payment models, value of prevention, and costs of medications (see appendix)

Method of Evaluation:

Completion of AMA Clinical Cases and Aquifer High Value Care course.

### **#4 Practice-Based Learning:**

Educational Objectives:

Apply statistical measures to provide HVC

Identify general strategies and specific actions for bringing value into the care of adult patients (things to do and things to stop doing)

Method of Evaluation:

Completion of AMA Clinical Cases and Aquifer High Value Care course.

## #5 Interpersonal and Communication Skills:

### Educational Objectives:

Incorporate patients' goals into decision making and apply strategies to counsel patients to make positive, high value change.

Present a proposal for change succinctly and with clarity.

### Method of Evaluation:

Project proposal presentation and small group discussion

## #6 Systems-Based Practice:

### Educational Objectives:

Propose a solution to decrease the overuse of a non-beneficial health care service

Identify barriers to implementation of HVC

### Method of Evaluation:

The proposal(s) will be judged on the following criteria: background to the problem summarized including pertinent references, intervention (is it creative? is it feasible?), outcome well delineated, clarity of presentation.

## Appendix: Full Course Syllabus

### From Health Systems to the Bedside: High-Value Care 101

#### Background

Approximately one in three healthcare dollars are wasted, primarily in the form of physician-ordered unnecessary diagnostic tests and treatments that offer limited to no net benefit to the patient and translate into inefficient care delivery<sup>1</sup>. The traditional model of American medical education has likely played a central role in the creation of this problem by promoting thoroughness over appropriateness, a practice that is then perpetuated by physicians in their practice<sup>2</sup>. Alexandra E et al. recently published “The Sooner the Better...” calling for more consistent high-value care training in medical school, including a detailed explanation of the unique benefits associated with early introduction of high-value care concepts<sup>3</sup>.

This two-week course aims to introduce medical students to an integrative, comprehensive model of high-value care applicable to future clinical practice. Combining online modules, clinical cases, and textbook instruction with a team-based innovation project, this course spans the breadth of high-value care: a 30,000 foot view of value-based healthcare policy, the role of health systems science, and the bedside clinician’s practice of high-value decision-making. On days with assigned articles to read, we will have optional Journal Club like debrief and discussion sessions.

Clinical cases are provided by Aquifer and the American Medical Association (AMA). Aquifer High-Value Care consists of innovative, cross-discipline, case-based modules that begin teaching the fundamentals of value in healthcare. The modules include short interactive virtual patient cases, brief instructional videos, key teaching points, and embedded links so that students can apply principles from the high-value care modules to other cases. The AMA modules aim to provide medical students with a clear understanding of how healthcare is delivered, how healthcare professionals work together to deliver that care, and how the health system can improve patient care and healthcare delivery. Students receive a certificate following completion of each AMA module and can generate a personalized student report to prove completion of all Aquifer High-Value Care modules.

Required textbook: “Understanding Value-Based Healthcare” by C Moriates, V Arora, and N Shah, 2015. Available free of charge through the UF Health Sciences Library.

Students will complete an innovative project. Each group will create a 1-2 page proposal in the mold of “Shark Tank.” In other words, you will formulate and demonstrate a method to decrease overutilization of a non-beneficial service to improve the value of healthcare in the United States. Groups should meet throughout the week using an online platform to complete the proposal. All group members must participate and all group members names should be placed at the top of the proposal. The proposals will be judged by an expert panel on the following criteria: background to the problem summarized including pertinent references, intervention (is it creative? is it feasible?), outcome well delineated, information presented clearly, all members spoke (for Zoom presentations only). The top four

submissions will be presented via Zoom on the final day of the course to an expert panel of judges including your peers. Presenting groups should have a visual aid (such as powerpoint or similar).

## References

1. Institute of Medicine. Best Care at Lower Cost: The Path to Continuously Learning Healthcare in America. 2012.
2. Tartaglia KM, Kman N, Ledford C. Medical Student Perceptions of Cost-Conscious Care in an Internal Medicine Clerkship: A Thematic Analysis. J Gen Intern Med. 2015 Oct; 30(10):1491-6.
3. Alexandra E, Mitchell M, Salwi, S, et al. The Sooner the Better: High-Value Care Education in Medical School. Acad Med. 2019 Nov; 94(11):1643-1645

## Evaluation and Grading

1. AMA Completion Certificates (25%)
2. Aquifer Student Report (25%)
3. Shark Tank Proposal (25%)
4. Discussion participation (25%)

## Instructions to Access AMA Ed Hub:

Login to AMA Ed Hub (<https://edhub.ama-assn.org/>) and create an account. Once an account is created click the link for each module embedded in below Assignments.

## Instructions to Access Understanding Value Based Healthcare E Textbook:

Login to UF Health Science library website:

<https://library.health.ufl.edu/find/ebooks/>

## Instructions to Access Aquifer Case Material

Login to Aquifer website and sign up for free account to access cases:

[https://free.meduapp.com/users/sign\\_up](https://free.meduapp.com/users/sign_up)

To Access High Value Care Case Series:

Under Student Learning Resources, scroll and click on Aquifer High Value Care Case Series or Aquifer Diagnostic Excellence Case Series

## Information for Zoom meeting participants

Establish your "UVA Academic Zoom Pro Account" here (<https://in.virginia.edu/zoomaccount>)

From the download center - <https://virginia.zoom.us/download> , get the "Zoom Client for Meetings" for your computer (laptop/desktop). Optionally download & install the "Zoom Cloud Meetings" app from

the appropriate mobile store.

Web conferencing with Zoom is relatively straight forward once you get the hang of it. Here are a couple of resources that might be helpful as they address common issues in Zoom:

Join a test call - <https://support.zoom.us/hc/en-us/articles/115002262083>

Attendee controls in Zoom - <https://support.zoom.us/hc/en-us/articles/200941109-Attendee-Controls-in-a-Meeting>

Testing computer or device audio - <https://support.zoom.us/hc/en-us/articles/201362283-Testing-computer-or-device-audio>

Recommend that you use a headset or earbuds with a microphone if you have them.

## **Two-week schedule**

### **Day 1: Health Systems Science (estimated time 4 hours)**

Learning Objectives:

1. Describe why health systems science is an important component of health professional training, critical for successful functioning in the healthcare system;
2. Identify the domains of health systems science;
3. Describe how health systems science synergizes, complements and intersects with the basic and clinical sciences;
4. Explain how the integration of health systems science with basic and clinical sciences can maximize health for patients and society;
5. Identify the objectives, structures, processes, and outcomes of current healthcare systems in the United States;
6. Describe the ideal outcomes of healthcare systems;
7. Recognize how current healthcare systems are influenced by payment models and how this impacts patient care and the Triple Aim of better outcomes, improved patient experience, and lower costs and the Quadruple Aim that also works to ensure healthcare provider wellness and prevent burnout;
8. Examine how improvement strategies, population management, and data analytics can close gaps in healthcare systems regarding the Triple and Quadruple Aims.
9. Define systems thinking;
10. Explain the importance of systems thinking in clinical care;
11. Identify how a health system fits the definition of a complex system;
12. List the habits of systems-thinking health professionals and how they can be applied to improve clinical care.

Assignment:

- AMA Module What is health systems science?  
<https://edhub.ama-assn.org/health-systems-science/interactive/18206554>

- AMA Module What to know about healthcare delivery systems?  
<https://edhub.ama-assn.org/health-systems-science/interactive/17498797>
- AMA Module How systems thinking applies to healthcare?  
<https://edhub.ama-assn.org/health-systems-science/interactive/17498786>
- Please upload the pdf of your “Activities by Year” to BOX by the end of the day. This will include three certificates of completion for the AMA modules above.

## **Day 2 : Value-Based Healthcare (estimated time 5 hours)**

### Learning Objectives:

1. Explain the concept of value and how it applies to healthcare;
2. Summarize the current state of value in U.S. health care;
3. Describe the essential components of an ideal high-value healthcare system;
4. Identify the key barriers to patient-centered, high-value healthcare;
5. List strategies physicians can use to promote high-value care;

### Assignment:

- Shrank WH, Rogstad TL, Parekh N. Waste in the US Health Care System: Estimated Costs and Potential for Savings. *JAMA*. 2019;322(15):1501–1509.  
<https://jamanetwork.com/journals/jama/article-abstract/2752664>
- Understanding Value-Based Healthcare. CHAPTER 1: The Current State of Healthcare Costs and Waste in the United States (19 pages)
- Understanding Value-Based Healthcare. CHAPTER 2: Paying for Healthcare in the United States (21 pages)
- AMA Module What are the components of value-based care?  
<https://edhub.ama-assn.org/health-systems-science/interactive/18028223>
- Group meeting: Meet by Zoom or other online platform to discuss and formulate your proposal with your fellow FCM group members (meeting time arranged and agreed upon amongst FCM group members).
- Please upload the pdf of your “Activities by Year” to BOX by the end of the day. This will include a certificate of completion for the AMA module above.

### Optional:

- 1 pm student led Zoom Journal Club. We will informally discuss your impressions from the day’s assignment with particular focus on the assigned article by Shrank et al. See email for Zoom link.

### **Day 3: Quality and Safety (estimated time 3 hours)**

#### Learning Objectives:

1. Identify the basic principles of patient safety;
2. Explain how medical errors are classified;
3. Describe the elements of full disclosure and apology when addressing those affected by medical errors;
4. Recognize how human factors, systems thinking, and “Just Culture” can improve patient safety;
5. Describe how to connect quality and safety into the healthcare cost equation;

#### Assignment:

- Understanding Value-Based Healthcare. CHAPTER 4: Defining Value: Connecting Quality and Safety to Costs of Care (21 pages)
- AMA Module Recognizing a Physician’s Role in Patient Safety.  
<https://edhub.ama-assn.org/health-systems-science/interactive/17498789>
- Please upload the pdf of your “Activities by Year” to BOX by the end of the day. This will include a certificate of completion for the AMA module above.

### **Day 4: Paying for Value. What is the cost? (estimated time 5 hours)**

#### Learning Objectives:

1. Describe the basics of health insurance and coverage;
2. Describe the difference between cost, charges, reimbursement, and cost to the patient;
3. Recognize out-of-pocket costs vary greatly depending on insurance status;
4. Compare how cost varies across settings of care (office, emergency department, hospital);
5. Identify comparative costs of medications (generic versus non-generic and therapeutic substitutions);
6. Describe the basics of health insurance and coverage.
7. Describe the difference between cost, charges, reimbursement and cost to the patient.
8. Recognize out-of-pocket costs vary greatly depending on insurance status.
9. Explore several health provider reimbursement models and how this may affect test ordering.
10. Acknowledge that one's insurance affects the ability to adhere to treatment recommendations.
11. Identify resources to assist patients with medication costs and adherence.

#### Assignment:

- Understanding Value-Based Healthcare. CHAPTER 3: The Challenges of Understanding Healthcare Pricing (23 pages)
- Aquifer Module High Value Care 06: 65-year-old male - Paying for value: Insurance Part 1
- Aquifer Module High Value Care 12: 17-year-old female - Paying for value: Insurance Part 2



- Group meeting: Meet by Zoom or other online platform to discuss and formulate your proposal.

### **Day 5: Waste (estimated time 5 hours)**

Learning Objectives:

1. Acknowledge the importance of balancing the benefits and harms of testing;
2. Incorporate guidelines and evidence-based medicine into clinical care;
3. Describe the factors contributing to the problem of healthcare waste, including the role that students, residents, attendings, and practice venues play in the problem and the solution;
4. Describe how variation in resource utilization drives waste;
5. Identify known barriers to implementing high-value care solutions;

Assignment:

- Review recent Value Improvement Projects: cardiac biomarkers, repetitive lab testing, transfusions, and treatment of asymptomatic bacteriuria. <https://hvpaa.org/blueprints/>
- Understanding Value-Based Healthcare. CHAPTER 7: The Importance of Zip Codes and Genetic Codes: Variation in Resource Utilization (16 pages)
- Understanding Value-Based Healthcare. CHAPTER 10: Barriers to Providing High-Value Care (14 pages)
- Aquifer Module High Value Care 07: 7-year-old female - Rooting out waste

Optional:

- Student led Zoom Journal Club. We will informally discuss your impressions from the day's assignment with particular focus on the assigned HVPAA blueprint articles. See email for Zoom link.

### **Day 6: Taking it to the bedside: Clinical reasoning (estimated time 5 hours)**

Learning Objectives:

1. Describe how high-value, cost-conscious care is important for individual patients, the healthcare system, and society;
2. Explain the difference between value versus cost in healthcare;
3. Identify general strategies and specific actions for bringing value into the care of adult patients (things to do and things to stop doing);
4. Acknowledge the marginal benefit of some tests and studies that are frequently performed;
5. Recognize that many screening and diagnostic tests are associated with immediate and downstream harms;
6. Acknowledge the importance of balancing the benefits and harms of testing;
7. Consider whether the results of a test will alter the patient's management;
8. Acknowledge the importance of incorporating patients' individual goals into decision making;

9. Define overdiagnosis;
10. Distinguish overdiagnosis from other types of diagnostic error;
11. Analyze a case of diagnostic error to ascertain physical, emotional, and financial harms resulting from the error(s);
12. Discuss how diagnostic error(s) lead to system-level cost and waste;
13. Define the "second victim" effect that results from diagnostic error;
14. Determine what psychological forces/processes may lead to excessive testing or treatment;
15. Define eight common cognitive biases (Visceral bias, anchoring bias, availability heuristic, premature closure, confirmation bias, base-rate neglect, blind obedience, framing bias);
16. Discuss three methods to calibrate lifelong learning in response to a diagnostic error in order to avoid minimization and overreaction.
17. Discuss the role of metacognition in preventing error.
18. Understand the calibration process in response to a diagnostic error.
19. Define analytic and nonanalytic decision-making processes.
20. Discuss how both analytic and nonanalytic decision-making processes may lead to diagnostic error.

Assignment:

- David P Johnson, MD, Vivian Lee, MD, Anand Gourishankar, MD, MRCP, Prabi Rajbhandari, MD, Matthew Schefft, DO, Marquita Genies, MD, MPH, Things We Do For No Reason: Routine Blood Culture Acquisition for Children Hospitalized with Community-Acquired Pneumonia. *J. Hosp. Med* 2020;2;107-11
- Aquifer Module [High Value Care 01: 45-year-old male - The importance of clinical reasoning](#)
- Aquifer Module [Diagnostic Excellence 01: Two females with iron-deficiency anemia](#)
- Aquifer Module [Diagnostic Excellence 02: 35-year-old male with abdominal pain](#)
- Aquifer Module [Diagnostic Excellence 03: 16-year-old female with pelvic pain](#)

Optional:

- Student led Zoom Journal Club. We will informally discuss your impressions from the day's assignment with particular focus on the assigned article.

**Day 7: Diagnostic Testing (estimated time 4 hours)**

Learning Objectives:

1. Apply statistical measures to make effective and efficient decisions about diagnosis and treatment;
2. Identify general strategies and specific actions for bringing value into the care of adult patients (things to do and things to stop doing);
3. Identify comparative costs of medications (generic vs. non-generic and therapeutic substitutions);

4. Acknowledge the importance of incorporating patients' individual goals into decision-making;
5. Acknowledge that one's insurance affects the ability to adhere to treatment recommendations;

Assignment:

- Amit K Pahwa, MD, FAAP, Imran Qureshi, Pharm D, BCPP, Ethan Cumbler, MD, FACP, FHM, Things We Do For No Reason: Use of Antipsychotic Medications in Patients with Delirium. *J. Hosp. Med* 2019;9;565-567
- Aquifer Module High Value Care 02: 25-year-old female - Making diagnostic testing count
- Aquifer Module High Value Care 10: 16-year-old female - Statistics and clinical decision making
- Aquifer Module High Value Care 05: 78-year-old female - High value care in the inpatient setting

Optional:

- Student led Zoom Journal Club. We will informally discuss your impressions from the day's assignment with particular focus on the assigned article. We will be joined by students and faculty from Johns Hopkins School of Medicine who are taking the same course. See email for Zoom link.

**Day 8: Prevention and Reproductive Health (estimated time 5 hours)**

Learning Objectives:

1. Explain that one purpose of screening is to prevent consequences or complications of disease, not solely to detect potential disease earlier than it otherwise would be detected;
2. Identify high quality evidence based tools for promoting preventive care;
3. Customize a preventive care plan that incorporates the patient's values and addresses his or her concerns;
4. Apply strategies to counsel patients to make positive change;
5. Identify opportunities to address the problem of waste in the care of patients;
6. Acknowledge the importance of incorporating patients' individual goals into decision-making;

Assignment:

- Tapper EB, Herzig SJ. Things We Do For No Reason: Nondirected testing for inpatients with severe liver injury. *J. Hosp. Med* 2017;3;184-187. doi: 10.12788/jhm.270
- Understanding Value-Based Healthcare. CHAPTER 14: Screening and Prevention: Balancing Benefits with Harms and Costs (26 pages)

- Aquifer Module High Value Care 03: 65-year-old female - Adult preventive care and value
- Aquifer Module High Value Care 08: 5-month-old female and 4-year old male - Value of vaccines
- Aquifer Module High Value Care 11: 17-year-old female - High value care reproductive health care

Optional:

- Student led Zoom Journal Club. We will informally discuss your impressions from the day's assignment with particular focus on the assigned article. We will be joined by students and faculty from Johns Hopkins School of Medicine who are taking the same course. See email for Zoom link.

### **Day 9: Medications and End-of-Life Care (estimated time 4 hours)**

Learning Objectives:

1. Identify medication cost as an important barrier to adherence;
2. Identify comparative costs of medications (generic vs. non-generic and therapeutic substitutions);
3. Acknowledge the importance of incorporating patients' individual goals into decision-making;

Assignment:

- Breu AC, Axon RN. Things We Do For No Reason: Acute Treatment of Hypertensive Urgency. *J. Hosp. Med* 2018;12;860-862
- Understanding Value-Based Healthcare. CHAPTER 13: High-Value Medication Prescribing (24 pages)
- Aquifer Module High Value Care 04: 80-year-old female - Medications and value
- Aquifer Module High Value Care 09: 66-year-old female - Redefining value at end of life

Optional:

- Student led Zoom Journal Club. We will informally discuss your impressions from the day's assignment with particular focus on the assigned article. We will be joined by students and faculty from Johns Hopkins School of Medicine who are taking the same course. See email for Zoom link.

### **Day 10: Virtual Shark Tank (optional, depending on enrollment estimated time 2 hours)**

Learning Objective:

1. Propose a solution to decrease the overuse of a non-beneficial health care service

## Assignment:

- Submissions from each class will be presented via Zoom to an expert panel of judges including your peers. Presenting groups should create a visual aid (Powerpoint or similar) for their presentation. There will be three judges and your student peers will serve as the fourth judge. Judges will score based on the following criteria: background to the problem summarized including pertinent references, intervention (is it creative? is it feasible?), outcome well delineated, information presented clearly, all members spoke. A Qualtrics survey will be sent for official scoring.
- Shark Tank Judge Panel: TBD
- Alternate to Virtual Shark tank is recorded presentation (voice over PowerPoint) submitted for evaluation.
- Upload your personalized student report showing completion of all Aquifer High-Value Care Modules by the end of the day. <https://aquifer.org/resources-tools/reporting-for-students/>

## High-Value Care Optional Resources and Self-Directed Reading List

### Online Resources

1. Choosing Wisely. An Initiative of the ABIM Foundation.  
<http://www.choosingwisely.org/>.
2. Wolfson D. Teaching Choosing Wisely® in Medical Education and Training: The Story of a Pioneer. *The Medical Professionalism Blog*.  
<http://blog.abimfoundation.org/teaching-choosing-wisely-in-meded/>.
3. High Value Practice Academic Alliance. Education Modules and Brief Videos.  
<https://hvpaa.org/maven/>
4. American College of Radiology. ACR Appropriateness Criteria Overview.  
<http://www.acr.org/Quality-Safety/Appropriateness-Criteria>.
5. American College of Physicians. ACP High-Value Care Curriculum.  
[http://hvc.acponline.org.proxy01.its.virginia.edu/curriculum\\_list.html](http://hvc.acponline.org.proxy01.its.virginia.edu/curriculum_list.html).
6. Costs of Care, ABIM Foundation. Teaching Value Project.  
<http://www.teachingvalue.org/>
7. Communication Modules. Choosing Wisely.  
<http://www.choosingwisely.org/resources/modules/>

8. Consumer Health Choices. Consumer Reports Health.  
<http://consumerhealthchoices.org/>.
9. Healthcare Bluebook. Promoting Price Transparency. <https://www.healthcarebluebook.com>
10. Right Care Alliance. A grassroots organization promoting patients over profits.  
<https://rightcarealliance.org>
11. Society to Improve Diagnosis in Medicine.  
<https://www.improvediagnosis.org>

### Recommended Reading by Domain

#### Health Systems Science

1. Rosenbaum L. The whole ball game—overcoming the blind spots in health care reform. *N Engl J Med*. 2013;368(10):959–962.
2. Berwick DM, Nolan TW, Whittington J. The triple aim: care, health, and cost. *Health Aff*. 2008;27(3):759–769.
3. Lee TH. Improving value is improving health care, not rationing. *JAMA Intern Med*. 2014;174(6):847–848.
4. Barry MJ, Edgman-Levitan S. Shared decision making—pinnacle of patient-centered care. *N Engl J Med*. 2012;366(9):780–781.

#### Value-Based Healthcare

1. Porter ME. What is value in health care? *N Engl J Med*. 2010;363(26):2477–2481.
2. Curfman GD, Morrissey S, Drazen JM. High-value health care—a sustainable proposition. *N Engl J Med*. 2013;369(12):1163–1164.
3. Lee TH. Putting the value framework to work. *N Engl J Med*. 2010;363(26):2481–2483.
4. Volpp KG, Loewenstein G, Asch DA. Assessing value in health care programs. *JAMA*. 2012;307(20):2153–2154.
5. Weinberger SE. Providing high-value, cost-conscious care: a critical seventh general competency for physicians. *Ann Intern Med*. 2011;155(6):386–388.
6. Moriates C, Shah N. Creating an effective campaign for change: strategies for teaching value. *JAMA Intern Med*. 2014;174(10):1693–1695

#### Quality and Safety

1. Institute of Medicine. *To Err Is Human: Building a Safer Health System*. Washington, DC: National Academies Press; 1999.
2. Institute of Medicine. *Best Care at Lower Cost: The Path to Continuously Learning Health Care in America*. Washington, DC: National Academies Press; 2012.
3. McGlynn EA, Asch SM, Adams J, et al. The quality of health care delivered to adults in the United States. *N Engl J Med*. 2003;348(26):2635–2645.

4. Rauh SS, Wadsworth EB, Weeks WB, Weinstein JN. The savings illusion—why clinical quality improvement fails to deliver bottom-line results. *N Engl J Med*. 2011;365(26):e48.
5. Institute of Medicine. *Crossing the Quality Chasm: A New Health System for the 21st Century*. Washington, DC: National Academy Press; 2001. <http://www.iom.edu/Reports/2001/Crossing-the-Quality-Chasm-A-New-Health-System-for-the-21st-Century.aspx>.

#### Healthcare Waste

1. Fuchs VR. The gross domestic product and health care spending. *N Engl J Med*. 2013;369(2):107–109.
2. OECD. Health expenditure per capita. In: *Health at a Glance 2011*. Paris, France: OECD Publishing; 2011. [http://www.oecd-ilibrary.org.proxy01.its.virginia.edu/social-issues-migration-health/health-at-a-glance-2011/health-expenditure-per-capita\\_health\\_glance-2011-60-en](http://www.oecd-ilibrary.org.proxy01.its.virginia.edu/social-issues-migration-health/health-at-a-glance-2011/health-expenditure-per-capita_health_glance-2011-60-en).
3. Moriates C, Shah NT, Arora VM. First, do no (financial) harm. *JAMA*. 2013;310(6):577–578.
4. Berwick DM, Hackbarth AD. Eliminating waste in US health care. *JAMA*. 2012;307(14):1513.
5. Covinsky KE. The problem of overuse. *JAMA Intern Med*. 2013;173(15):1446.
6. Tilburt JC, Wynia MK, Sheeler RD, et al. Views of us physicians about controlling health care costs. *JAMA*. 2013;310(4):380–388.
7. Journal of Hospital Medicine. *Things We Do For No Reason*. Series of articles. <https://www.journalofhospitalmedicine.com/jhospmed/choosing-wisely-things-we-do-no-reason>
8. JAMA Internal Medicine. *Teachable Moments*. Series of articles. <https://jamanetwork.com/collections/44067/teachable-moment>

#### Clinical Reasoning

1. McGlynn EA, Asch SM, Adams J, et al. The quality of health care delivered to adults in the United States. *N Engl J Med*. 2003;348(26):2635–2645.
2. Patel MS, Davis MM, Lypson ML. The VALUE Framework: training residents to provide value-based care for their patients. *J Gen Intern Med*. 2012;27(9):1210–1214.

#### Diagnostic Testing

1. Wong ET, McCarron MM, Shaw ST Jr. Ordering of laboratory tests in a teaching hospital: can it be improved? *JAMA*. 1983;249(22):3076–3080.
2. Eaton KP, Levy K, Soong C, et al. Evidence-Based Guidelines to Eliminate Repetitive Laboratory Testing. *JAMA Intern Med*. 2017;177(12):1833–1839.
3. Alvin MD, Jaffe AS, Ziegelstein RC, Trost JC. Eliminating Creatine Kinase–Myocardial Band Testing in Suspected Acute Coronary Syndrome: A Value-Based Quality Improvement. *JAMA Intern Med*. 2017;177(10):1508–1512.
4. Sadana D, Pratzler A, Scher LJ, et al. Promoting High-Value Practice by Reducing Unnecessary Transfusions With a Patient Blood Management Program. *JAMA Intern Med*. 2018;178(1):116–122.
5. Daniel M, Keller S, Mozafarihashjin M, Pahwa A, Soong C. An Implementation Guide to Reducing Overtreatment of Asymptomatic Bacteriuria. *JAMA Intern Med*. 2018;178(2):271–276.

6. Yeow RY, Strohbehn GW, Kagan CM, et al. Eliminating Inappropriate Telemetry Monitoring: An Evidence-Based Implementation Guide. *JAMA Intern Med.* 2018;178(7):971–978.
7. Soong C, Burry L, Cho HJ, et al. An Implementation Guide to Promote Sleep and Reduce Sedative-Hypnotic Initiation for Noncritically Ill Inpatients. *JAMA Intern Med.* 2019;179(7):965–972.
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