The Fritsma Factor
YOUR INTERACTIVE HEMOSTASIS RESOURCE

Medical Laboratory Scientists Choose Wisely

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The ASCLS Choosing Wisely Task Force
The Fritsma Factor, Your Interactive Hemostasis Resource
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1

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American Board of Internal Medicine Foundation and *Consumer Reports*

Beginning in 2012, national organizations representing medical specialists have asked members to identify tests or procedures commonly used in their field whose necessity should be questioned and discussed. This call to action has resulted in specialty-specific lists of "Things Providers and Patients Should Question."

Example, ASCP, 2/21/13: "Avoid routine preoperative testing for low risk surgeries without a clinical indication."

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American Board of Internal Medicine Foundation and *Consumer Reports*

Choosing Wisely promotes conversations among clinicians and patients by helping patients choose care that is…

- Not duplicative of other tests or procedures already received
- Supported by evidence
- Truly necessary
- Free from harm

Medicine's Ethical Responsibility for Health Care Reform — The Top Five List: Howard Brody, NEJM 2010

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ASCLS Choosing Wisely Task Force

- **Dana Bostic**, U of Kansas MC; BB, Health Care Simulation
- **Lisa Cremeans**, MLS, MMDS, U. No. Carolina, Molecular Diagnostics
- **Josephine Ebomoyi**, Northern Illinois U; Microbiology
- **Muneeza Esani**, U of Texas Med Branch, Galveston, Clin Chem
- **George Fritsma**, Birmingham; Hematology, Hemostasis
- **Deborah Josko**, Rutgers U; Immunology
- **Brianna Miller**, U of Alabama at Bham, Hematology, Hemostasis, BB
- **Rick Panning**, Health Partners, Minnesota, Lab Management
- **Claude Rector**, U of Arkansas, Microbiology
- **Dawn Rudnick**, U of Michigan Hlth Svc; Micro, Lab Mgt, General
- **Eddie Salazar**, U of Texas Med Branch, Galveston, Clin Chem, UA
- **John P. Smith**, Kansas; Micro, Hlth Care Utilization

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The Duke Bleeding Time

- In 1910, WW Duke established that platelets came from bone marrow megakaryocytes, that they are needed in blood clotting, and that low platelet counts were associated with bruising.
- Duke developed the bleeding time test…
  1. Puncture the earlobe with a surgical blade.
  2. Start a timer.
  3. Dab the wound with filter paper every 30s until bleeding stops.
  4. Stop the timer. Normal is 1–9 minutes.
- Prolongation signals aspirin, thrombocytopenia, PLT functional abnormality, VWD, or afibrinogenemia.

Brinkhous KM. W. W. Duke and his bleeding time test. A commentary on platelet function. JAMA. 1983;250:1210–14.

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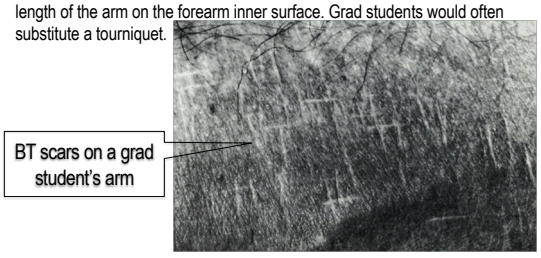
Ivy Bleeding Time, 1935

AC Ivy further standardized the BT by placing a blood pressure cuff on the (upper) arm, inflating to 40 mm Hg, and making an incision parallel to the length of the arm on the forearm inner surface. Grad students would often substitute a tourniquet.



BT scars on a grad student's arm

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Tonsillectomy

BTs were used as screens to predict surgical bleeding. People with prolonged BTs were taken off the surgery schedule.

1% risk of postoperative hemorrhage

7

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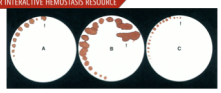
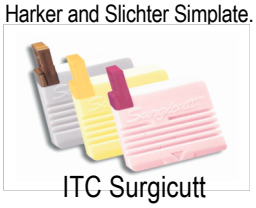
Mielke Template Bleeding Time



In 1969, CH Mielke, Jr. developed a template that further standardized the incision to 1–2 mm deep by 10 mm long. This was replaced by the 1972 Harker and Slichter Simplate.

Simplate
Blades remained exposed



ITC Surgicutt
Blade sweeps, disappears

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Bleeding Time, a Screening Test

- A screen is a test on an "unselected" population.
  - Sensitive: test sacrifices specificity for sensitivity
  - High *false positive* rate, low *false negative* rate
- A positive screen requires a confirmatory test
  - Specific: high *false negative* rate, low *false positive* rate
  - Safe to use subsequent to a positive screen

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False Positive, False Negative

- *True positive*: assay result correctly identifies those with a disease or condition
- *False positive*: assay result incorrectly identifies disease where none is present (false alarm)
- *True negative*: laboratory assay correctly identifies those without a disease or condition
- *False negative*: assay result incorrectly rules out disease where it is present (miss)

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Prevalence Effect on the True and False Positive Rates

Total Sample: 10,000	Sample Prevalence	With Disease	Without Disease	TP	FP	FP/TP Ratio
Selected sample	10%	1000	9000	1000	180	0.18
Unselected/common	1%	100	9900	100	198	1.98
Unselected/rare	0.01%	1	9999	1	200	200.0

- False positive rate is 2.0%; The assay classifies a constant 2% of subjects without disease as positive for the disease. 98% of subjects with disease are correctly classified.
- At a prevalence of 1/10,000, an assay with a 2% false positive rate identifies 200 false positive results for every true positive result

11

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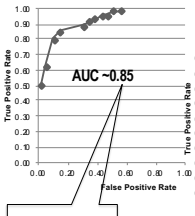
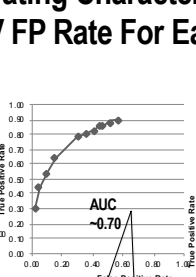
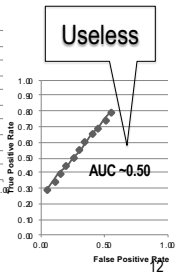
Receiver-Operating Characteristic Curve (ROC): TP V FP Rate For Each Limit



Good



Mediocre



Useless

12

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Bleeding Time Efficacy

- Standardization did not enhance the BT PPV or NPV.
- The BT is not a specific indicator of platelet function.
- The BT does not predict the risk of hemorrhage in invasive. procedures or anticoagulant therapy.
- BT doesn't prolong ahead of actual bleeding.
- BT does not measure therapeutic efficacy.

Ironically, Channing-Rodgers developed the Surgicutt in 1990

Channing-Rodgers RP, Levin J. A critical reappraisal of the bleeding time. Sem Thromb Hemostasis 1990;16:1–19.

13

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Choosing Wisely Recommendation

Don't use the bleeding time test to guide patient care.

The bleeding time test is an old assay that has been replaced by alternative coagulation tests. The relationship between the bleeding time test and the risk of a patient's actually bleeding has not been established. Further, the test leaves a scar on the forearm. There are other reliable tests of coagulation available to evaluate the risks of bleeding in appropriate patient populations (2013).

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Inherited Thrombosis Risk Factors ("Hypercoagulability," Thrombophilia)

- Antithrombin (antithrombin III, AT, ATIII) 1965 (Egeberg)
- Protein C (PC, 1984) and protein S (PS): 1986 (Comp)
- Activated protein C resistance (APCR), 1993 (Dahlbach)
  - Factor V Leiden (FVL) mutation: 1994 (Bertina)
- Prothrombin G20210A mutation: 1996 (Poort)
- Factor VIII, homocysteinemia, MTHFR polymorphisms

15

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The Dupont ACA—1983

Colorado COAGULATION
LabCorp Specialty Testing Group

16

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Prevalence of Inherited Risk Factors in Unselected Populations and in Thrombotic Disease

Factor	Random	Thrombosis*
APCR (FVL)	3–8%**	20–25%
Prothrombin G20210A	2–3%**	4–8%
AT deficiency	0.02–0.05%	1–1.8%
Protein C deficiency	1 in 300	2.5–5%
Protein S deficiency	1%	2.8–5%
Homocysteinemia (MTHFR 667 mutation)	11%	13.1–26.7%

* Subjects with at least one thrombotic event

** Caucasians, Arabs, Hispanics, absent from Africans and Asians

17

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Thrombophilia Testing Limitations

- Antithrombin
  - Acute phase reactant rises in acute inflammation
- Proteins C and S
  - Activity of both falls in acute inflammation following a clotting episode
  - Vitamin K dependent, activity of both falls in Coumadin therapy
- All three: high false positive rate
  - Reference interval is 60–140% of the mean
  - False positives are low values in apparently healthy people or during inflammation or Coumadin therapy

18

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Appropriate Thrombophilia Testing Profile Indications

Retrospective observational study of consecutive unselected patients undergoing thrombophilia testing in 2009

- Pregnancy morbidity: pre-eclampsia, intrauterine growth retardation
- Recurrent pregnancy loss, three or more instances
- Unprovoked arterial thrombosis
- Unprovoked venous thrombosis

- Department of Pathology, University of Texas Southwestern Medical Center, Dallas, TX,
- Shen YM, Tsai J, Taiwo E, et al. Analysis of thrombophilia test ordering practices at an academic center: a proposal for appropriate testing to reduce harm and cost. Plos ONE 11: e0155326. doi:10.1371/journal.pone.0155326

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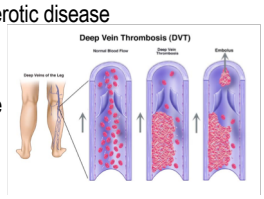
Thrombophilia Testing Non-Indications

- One or two pregnancy losses
- *Provoked* venous thrombosis: immobilization, surgery, trauma, and malignancy prior to or at the time of the event
- *Provoked* arterial thrombosis: hypertension, dyslipidemia, diabetes mellitus, atherosclerotic disease
- Testing without a prior thrombotic event or adverse pregnancy outcome



20

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University of Texas Southwestern Medical Center Patient Results

- 69% had suffered a current thrombotic event or preg loss.
- 29% had testing performed without a documented thrombotic event or pregnancy morbidity.
  - 80% of these had connective tissue or autoimmune disorders.
- 34% possessed an appropriate indication, but...
  - 146 patients had incomplete workups
  - 136 patients had no follow-up tests
  - 59 patients were on anticoagulant
- Altogether, 85% of thrombosis risk orders were inappropriate

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The Dallas Intervention

- Lab advisory committee (LAC), "do not perform thrombophilia testing of patients admitted with an acute VTE, arterial thrombosis, or patients diagnosed with a thrombotic event during their hospital stay,"
- Investigate as outpatients if they met the criteria (young age, unprovoked event) ≥2 weeks following D/C of anticoagulation.
- Hemostasis service communicated with clinicians to cancel testing that was deemed inappropriate.
- Intervention reduced total orders from 87/m to 5/m.
  - Reduced inpatient orders by 90%

22

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Choosing Wisely Recommendation

Don't test for thrombophilia in adult patients with venous thromboembolism (VTE) occurring in the setting of major transient risk factors (surgery, trauma or prolonged immobility).

Thrombophilia testing is costly and can result in harm to patients if the duration of anticoagulation is inappropriately prolonged or if patients are incorrectly labeled as thrombophilic. Thrombophilia testing does not change the management of VTEs occurring in the setting of major transient VTE risk factors. When VTE occurs in the setting of pregnancy or hormonal therapy, or when there is a strong family history plus a major transient risk factor, the role of thrombophilia testing is complex and patients and clinicians are advised to seek guidance from an expert in VTE.

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Choosing Wisely Recommendation

Do not test for PS, PC, or AT during an active clotting event to diagnose a hereditary deficiency; these tests are not analytically accurate during an active clotting event.

Assays may be useful to test for an acquired deficiency in DIC. Tests are inaccurate during an active clotting event. Moreover they are not clinically actionable at the time of an acute clot because the same anticoagulation is used regardless of results. Deferral to the outpatient/non-acute setting allows for the testing to be done when the results would change patient management such as continuing anticoagulation. Because PC and PS decrease on warfarin, while AT is elevated, testing while on anticoagulants also yields misleading results and should be avoided.

Marlar, RA. Gusman, JN. Laboratory testing issues for protein C, protein S, and antithrombin. 2014. [cited 7-17]. Available from http://onlinelibrary.wiley.com/doi/10.1111/jilh.12219/full

24

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Electronic Best Practice Alert: Stanford

- In 2016, every thrombophilia order generated an *interruptive BPA* highlighting the CW thrombophilia recommendations.
- 12m pre-BPA versus 7m post-BPA orders, *no hard stop*
- Outpatients
  - Pre-BPA: 471.5 tests/m; post-BPA: 471.6 test/m, p = 1.0
  - "Orders could be legitimate."
- Inpatient
  - Pre-BPA: 101.1 tests/m; post-BPA: 73.3 tests/m, p = 0.03

Jun T, Kwang H, You E, et al. Using electronic best practice alerts to improve thrombophilia testing based on ASH choosing wisely guidelines. ASH Poster, Atlanta, 12-10-17, 6–8 PM

25

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Blood Usage Recommendation

Don't transfuse more units of blood than absolutely necessary

Each unit of blood carries risks. A restrictive threshold (7.0-8.0 g/dL) should be used for the vast majority of hospitalized, stable patients without evidence of inadequate tissue oxygenation (evidence supports a threshold of 8.0 g/dL in patients with pre-existing cardiovascular disease). Transfusion decisions should be influenced by symptoms and hemoglobin concentration. Single unit red cell transfusions should be the standard for non-bleeding, hospitalized patients. Additional units should only be prescribed after re-assessment of the patient and their hemoglobin value.

26

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July, 2018

SABM
SOCIETY FOR THE ADVANCEMENT OF BLOOD MANAGEMENT

- Don't proceed with elective surgery in patients with properly diagnosed and correctable anemia until the anemia has been appropriately treated.
- Don't perform laboratory blood testing unless clinically indicated or necessary for diagnosis or management in order to avoid iatrogenic anemia.
- Don't transfuse plasma in the absence of active bleeding or significant laboratory evidence of coagulopathy.
- Avoid transfusion when antifibrinolytic drugs are available to minimize surgical bleeding.
- Avoid transfusion, outside of emergencies, when alternative strategies are available as part of informed consent; make discussion of alternatives part of the informed consent process.

27

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Choosing Wisely Champions Program

The Choosing Wisely Champions program recognizes clinicians who are leading efforts to reduce overuse and waste in medicine. The program was created to acknowledge the work of those dedicated to providing appropriate care and encourage others to follow their lead.

Champions are selected by participating societies and include clinicians or teams of clinicians whose work in their respective specialties represents significant contributions to advancing the goals of the campaign. Such contributions can include:

- Creation of an intervention to implement *Choosing Wisely* in their clinical practice;
- Designing local initiatives to educate colleagues; or…
- Playing a leadership role in developing society recommendations.

28

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Choosing Wisely Champion Ravi Sarode

"Ravi Sarode, MD, UT Southwestern Medical Center discovered that approximately 85 percent of thrombophilia tests at UT Southwestern's two teaching hospitals were ordered incorrectly or incompletely. Thrombophilia tests are frequently ordered for patients with acute thrombotic events, often while on anticoagulation therapy; however, these additional variables cause these standard tests to return false positive results. These abnormal results are not always checked for reproducibility or accuracy, causing some patients to be inappropriately placed on long-term anticoagulation therapy. To promote appropriate use of testing, Dr. Sarode's team developed local guidelines and implemented them in the EHR via a series of cascading questions that providers must answer before ordering. After implementation of the intervention and an associated education campaign, UT Southwestern has reduced testing for inpatients by more than 90 percent." (2016)

29

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Choosing Wisely Champions Nominated by ASCP, 2017

- **Jack Jordan, MLS, MA**—As Director of Performance Excellence and Quality at Henry Ford Health System, he has worked to make the utilization of laboratory services evidence-based, safer and compliant with *Choosing Wisely* recommendations.
- **Meghan Kapp, MD**—Dr. Kapp served as a founding member and co-chair of Vanderbilt UMC's *Choosing Wisely* steering committee, educating house staff and faculty about the potential harm of daily labs, encouraging discussions of lab results and the need for future labs during rounds and providing data feedback with peer comparisons.
- **Christopher Polage, MD**—Dr. Polage published research that contributed to the Infectious Diseases Society of America's (IDSA) *Choosing Wisely* recommendation for clinicians to avoid testing for *Clostridium difficile* in certain situations.

30

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Choosing Wisely Champions Nominated by ASCP, 2018

- **Ila Singh, MD, PhD** created the CLSI document on test utilization, and was a member on the committee on Lab Test Utilization and Stewardship that co-authored a consensus document on the subject.
- **Curtis A. Hanson, MD** led the incorporation of laboratory utilization rules into Mayo's inpatient hospital practice and clinical decision support tool.
- **Diane George, DO** led a group at Henry Ford Medical Group in Detroit, MI to establish a baseline of ordering volume and developed an analytics tool to monitor total volume, as well as highlight low and high utilizers. Within the first year of implementation, the number of vitamin D orders decreased from 685 per month to 150 per month, and the number continues to decrease at an annual rate of 23 percent.

31

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Choosing Wisely Grant Program

- In 2013, RWJF provided funding to support 21 projects led by state medical societies, specialty societies and regional health collaboratives to educate physicians about the recommendations and build skills to have conversations with patients about the care they need.
- In spring 2015, the ABIM Foundation—with continued funding from RWJF—awarded seven grants to organizations that promote the goals of the Choosing Wisely campaign. These new grants support seven initiatives focused on reducing utilization of inappropriate tests and treatments. Each initiative includes delivery systems, hospitals and/or medical groups collaborating with multi-stakeholder community-based groups and physician-led organizations.

32

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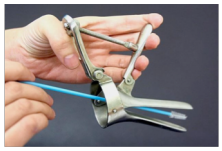
Summary of 2015 Grant Goals

Reduce…

- Antibiotic use in viral infections—bronchitis, URI.
- Imaging for headache and lower back pain.
- Repeated lab testing on inpatients.
- Blood transfusions for inpatients.
- Pap smears for women 30–65.



33

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Consumer Reports

A *Consumer Reports* Vitamin D Recommendation

- **Many people don't have enough vitamin D in their bodies**. Low vitamin D increases the risk of broken bones. It may also contribute to other health problems. That's why doctors often order a blood test to measure vitamin D. But many people do not need the test. Here's why:
- **A test usually does not improve treatment.** Many people have low levels of vitamin D, but few have seriously low levels. Most of us don't need a vitamin D test. We just need to make simple changes so we get enough D. We need to get a little more sun, eat foods rich in vitamin D, or take a supplement.

34

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Consumer Reports

A Consumer Reports Vitamin D Recommendation (Continued)

- **Extra tests lead to extra treatments and costs.** Getting tests that you don't need often leads to treatments you don't need, or treatments that can even be harmful. For example, if you take too much vitamin D, it can damage your kidneys and other organs.
- One blood test for vitamin D does not cost much. But doctors are ordering tests six times as often as in 2008. All these tests add up. In 2011, Medicare spent $224 million on vitamin D tests for seniors.
- Talk to your doctor about your risks. Here are some conditions where you might need a vitamin D test:
  - If you have osteoporosis. This disease makes your bones weak, so that they are more likely to break.

35

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Consumer Reports

A Consumer Reports Vitamin D Recommendation (Continued)

  - If you have a disease that damages your body's ability to use vitamin D. These are usually serious and ongoing diseases of the digestive system, such as inflammatory bowel disease, celiac disease, kidney disease, liver disease, pancreatitis and others.
- If your doctor suggests getting a vitamin D test, ask about your risks. If your risk is high, you should get the test. If your risk is low, ask if you can avoid the test. Ask if you can boost your vitamin D with sunlight and food, and possibly supplements.
- If your doctor does need to keep track of your vitamin D, make sure the same test is used each time. Ask your doctor which tests are best.
- *This report is for you to use when talking with your health-care provider. It is not a substitute for medical advice and treatment. Use of this report is at your own risk.*

36

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Perceived CW Barriers in 2014

Is it Working?

- 2014 survey: 2000 US PCPs, 2500 VA PCPs
- Response: 603 PCPs (34%) and 1173 VA PCPs (48%)
  - Low response may indicate lack of interest or knowledge of CW
- PCPs rated 12 CW recommendations for ease to implement, ease to convince patients, and potential barriers

Zikmund-Fisher BJ Kullgren JT, Fagerlin A, et al. Perceived barriers to implementing individual choosing wisely recommendations in two national surveys of primary care providers. J Gen Intern Med 2016; 32:210–7.

37

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Easy to Implement (80%)

- Avoid repeat colorectal cancer screening within 5 years if a prior colonoscopy found and removed only 1–2 adenomatous polyps without high-grade dysplasia
- Avoid conducting any form of colorectal cancer screening for 10 years if the patient had a negative colonoscopy
- Avoid performing cardiovascular testing for patients undergoing low-risk surgery
- Don't screen for carotid artery stenosis (CAS) in asymptomatic adult patients

38

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Moderate Difficulty (>20%)

- Avoid imaging for suspected pulmonary embolism
- Avoid the use of medications to achieve hemoglobin A1c <7.5 % in adults age 65 and older
- Avoid DEXA screening (bone density) among younger patients with no risk factors (VA PCPs considered this easy to implement)

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Considerable Difficulty (85%)

- Limit use of antibiotics for sinusitis
- Avoid imaging for low back pain within the first 6 weeks
- Don't use benzodiazepines (Xanax) and other sedative-hypnotics as first choice treatments for insomnia, agitation, or delirium in older adults
- Avoid brain imaging studies (CT of MRI) in evaluation of simple syncope
- Avoid antimicrobials to treat bacteriuria in older adults unless specific symptoms were present

40

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Why Not Implement?

- Can't ignore patient requests for tests and treatments
- Tests and treatments are recommended by specialists
- Lack of time for shared decision making with the patient
- Avoid malpractice suits (VA not so much)

41

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2017: Choosing Wisely Turns Five With Mixed Results

Is it Working?

Overall savings could be $200,000,000/year, reduce backlogs.

UCLA example…

- Cataract surgery uses local anesthesia, protected site, 15" procedure
- In 2015, UCLA recommended no EKG, no chest X-ray, no lab profiles
- Test ordering dropped by 80%, mean wait time shortened from 245 to 64 days, resulting in good vision six months earlier, no adverse effects

42

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2017: Choosing Wisely Turns Five With Mixed Results

Is it Working?

- 10-25-17: One in four US physicians knows about CW (21% in 2014)
- The increase in US physicians with difficulty having patient conversations about avoiding low-value services was from 42% in 2014 to 46% in 2017.
- No data support patient demands for low-value services.
- What next? Greater Detroit Area Health Consortium president Kate Kohn-Parrott say, "you have to hear it seven ways from seven sources."

Kerr, EA, Kullgren JT, Saini SD Choosing Wisely: how To fulfill the promise In the next 5 years. Health Affairs 2017;36:11 doi.org/10.1377/hlthaff.2017.0953

43

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33% of Accountable Care Organizations Attempt to Adopt CW Recommendations 2017

- What worked? ACOs with commercial risk-based provider contracts who have prior experience reduce "low-value" care.
- Uninsured, Medicaid, and privately insured patients, indigents and minorities, receive ever-increasing percentage of low value care
  - Associated with lack of high-value care
  - Poorer health upon presentation
- What didn't work? Education, CMS quality measures, shared decision-making with clinical decision support, audits, performance feedback, pay for performance

Haverkamp MH, Peiris D, Mainor AJ, et al. ACOs with risk-bearing experience are likely taking steps to reduce low-value medical services. Am J Manag Care. 2018;24:e216–e21.

44

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If Your Society Wants to Partner

- Submit at least five recommendations for consideration.
- Recommendations begin with the term "Don't" or "Avoid."
- Recommendations are evidence-based with current citations.
- Recommendations address frequent diagnostic or therapeutic choices.
- Recommendations are developed within the contributing society using internal society processes.
- Contributing societies may send recommendations that overlap with existing recommendations.
- Conversely, contributing societies should avoid redundancy, CW advocates for new recommendations.

45

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If Your Society Wants to Partner

- Recommendations are developed with transparency; the method is summarized with the recommendation.
- Recommendations are accompanied by description of the contributing society.
- ABIM sends each recommendation to two independent reviewers for comments and approval.
- ABIM then sends recommendations to all partners to ensure there is no conflict with existing recommendations.
- When published, recommendation copyrights belong to the contributing society.

Our ASCLS process: present to respective Scientific Assemblies➔ ASCLS fall 2018 BOD ➔ ABIM

46

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ASCLS Choosing Wisely Task Force "Primacy:" Educational Modules

- **Brianna Miller**, UAB, Hematology, Hemostasis, BB
- **Muneeza Esani**, U of Texas Med Branch, Galveston, Clin Chem
- **Josephine Ebomoyi**, Northern Illinois U; Micro
- **Dana Bostic**, U of Kansas MC; BB, Health Care Simulation
- **Lisa Cremeans**, MLS, MMDS, U. No. Carolina, Molecular
- **Deborah Josko**, Rutgers U; Immunology
- **Dawn Rudnick**, U of Michigan Hlth Svc; Micro, Lab Mgt, General

47

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Fourth-Year Med Students Text or Video Case Studies of Low-Value Procedures

Prospective randomized control trial with crossover assessed 93 fourth-year med students

- Repeated video (intervention) or text (control) cases
- Pre-test mean: 28.5 ± 13.5%
- Exit test *video*: 74.3 ± 17.4; *text*: 67.8 ± 18.5%; p = 0.026
- Retention (9 mo) video mean: 69.2 ± 20.2%, text mean: 66.4 ± 20.3%; p = 0.108 (NS)

Retention test revealed many errors

- Thrombolytic treatment without confirmation of a diagnosis of pulmonary embolism (17.7%)
- Oxygen supplementation for CO poisoning (16.9%)
- Rapid sodium supplementation for chronic hyponatremia (11.0%) and more

Ludwig S, Schuelper N, Brown J, et al. How can we teach medical students to choose wisely? A randomised controlled cross-over study of video- versus text-based case scenarios. BMC Med. 2018;16:107. doi: 10.1186/s12916-018-1090-y.

48

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Our Recommendations

- **Josephine & Llsa**: "Do not order rapid multiplex molecular assays for microbial infections unless the assays will impact patient management decisions."
- **George & Brianna**: "Avoid routine prothrombin time (PT) and partial thromboplastin time (PTT, APTT) pre-operative screens on unselected patients."
- **Brianna & George**: "Avoid routine blood typing and screening for low risk surgeries without a clinical indication."
- **Muneeza**: "Avoid using HGB to screen for iron deficiency. Instead use ferritin."
- **Dana**: "Do not transfuse red blood cells for expansion of circulatory volume unless necessary for patient cases with severe hemorrhage."
- **Suggestions from CLEC and ASCLS**: Reduce influenza testing, identify based on symptoms and treatment response; eliminate erythrocyte sedimentation rates, recommend C-reactive protein; reduce frequency of hemoglobin A1C assays; reduce testing for hemoglobin variants; review panel charging practices, use targeted assays; do not order testosterone on men >90 YO

49

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2019 Recommendations

- **Dawn Rudnik**: "Avoid antibody screening for asymptomatic Herpes simplex type II."
- **Muneeza Esani**: "Reduce frequency of hemoglobin A1C assays."
- **Deborah Josko**: "Reduce influenza testing, and identify based on symptoms and treatment response."
- **George Fritsma**: "Avoid ordering an initial factor V Leiden, first perform the activated protein C resistance."
- **Dana Bostic**: "Review profile charging practices, use targeted assays."

50

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Your Recommendations?

51