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An initiative of the ABIM Foundation

American Society for Clinical Pathology

ASCP STRONGERTOGETHER

Thirty Five Things Physicians and Patients Should Question

1 Don't perform population based screening for 25-OH-Vitamin D deficiency.

Vitamin D deficiency is common in many populations, particularly in patients at higher latitudes, during winter months and in those with limited sun exposure. Over the counter Vitamin D supplements and increased summer sun exposure are sufficient for most otherwise healthy patients. Laboratory testing is appropriate in higher risk patients when results will be used to institute more aggressive therapy (e.g., osteoporosis, chronic kidney disease, malabsorption, some infections, obese individuals).

2 Don't perform low risk HPV testing.

National guidelines provide for HPV testing in patients with certain abnormal Pap smears and in other select clinical indications. The presence of high risk HPV leads to more frequent examination or more aggressive investigation (e.g., colposcopy and biopsy). There is no medical indication for low risk HPV testing (HPV types that cause genital warts or very minor cell changes on the cervix) because the infection is not associated with disease progression and there is no treatment or therapy change indicated when low risk HPV is identified.

3 Avoid routine preoperative testing for low risk surgeries without a clinical indication.

Most preoperative tests (typically a complete blood count, Prothrombin Time and Partial Prothomboplastin Time, basic metabolic panel and urinalysis) performed on elective surgical patients are normal. Findings influence management in under 3% of patients tested. In almost all cases, no adverse outcomes are observed when clinically stable patients undergo elective surgery, irrespective of whether an abnormal test is identified. Preoperative testing is appropriate in symptomatic patients and those with risks factors for which diagnostic testing can provide clarification of patient surgical risk.

4 Only order Methylated Septin 9 (SEPT9) to screen for colon cancer on patients for whom conventional diagnostics are not possible.

Methylated Septin 9 (SEPT9) is a plasma test to screen patients for colorectal cancer. Its sensitivity and specificity are similar to commonly ordered stool guaiac or fecal immune tests. It offers an advantage over no testing in patients that refuse these tests or who, despite aggressive counseling, decline to have recommended colonoscopy. The test should not be considered as an alternative to standard diagnostic procedures when those procedures are possible.

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

The bleeding time test is an older 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.

6 Don't order an erythrocyte sedimentation rate (ESR) to look for inflammation in patients with undiagnosed conditions. Order a C-reactive protein (CRP) to detect acute phase inflammation.

CRP is a more sensitive and specific reflection of the acute phase of inflammation than is the ESR. In the first 24 hours of a disease process, the CRP will be elevated, while the ESR may be normal. If the source of inflammation is removed, the CRP will return to normal within a day or so, while the ESR will remain elevated for several days until excess fibrinogen is removed from the serum.

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Don't test vitamin K levels unless the patient has an abnormal international normalized ratio (INR) and does not respond to vitamin K therapy.

Measurements of the level of vitamin K in the blood are rarely used to determine if a deficiency exists. Vitamin K deficiency is very rare, but when it does occur, a prolonged prothrombin time (PT) and elevated INR will result. A diagnosis is typically made by observing the PT correction following administration of vitamin K, plus the presence of clinical risk factors for vitamin K deficiency.

8

Don't prescribe testosterone therapy unless there is laboratory evidence of testosterone deficiency.

With the increased incidence of obesity and diabetes, there may be increasing numbers of older men with lower testosterone levels that do not fully meet diagnostic or symptomatic criteria for hypogonadism. Current clinical guidelines recommend making a diagnosis of androgen deficiency only in men with consistent symptoms and signs coupled with unequivocally low serum testosterone levels. Serum testosterone should only be ordered on patients exhibiting signs and symptoms of androgen deficiency.

9

Don't test for myoglobin or CK-MB in the diagnosis of acute myocardial infarction (AMI). Instead, use troponin I or T.

Unlike CK-MB and myoglobin, the release of troponin I or T is specific to cardiac injury.

Troponin is released before CK-MB and appears in the blood as early as, if not earlier than, myoglobin after AMI. Approximately 30% of patients experiencing chest discomfort at rest with a normal CK-MB will be diagnosed with AMI when evaluated using troponins. Single-point troponin measurements equate to infarct size for the determination of the AMI severity. Accordingly, there is much support for relying solely on troponin and discontinuing the use of CK-MB and other markers.

10

Don't order multiple tests in the initial evaluation of a patient with suspected non-neoplastic thyroid disease. Order thyroid-stimulating hormone (TSH), and if abnormal, follow up with additional evaluation or treatment depending on the findings.

The TSH test can detect subclinical thyroid disease in patients without symptoms of thyroid dysfunction. A TSH value within the reference interval excludes the majority of cases of primary overt thyroid disease. If the TSH is abnormal, confirm the diagnosis with free thyroxine (T4).

11

Do not routinely perform sentinel lymph node biopsy or other diagnostic tests for the evaluation of early, thin melanoma because these tests do not improve survival.

Sentinel lymph node biopsy (SLNB) is a minimally invasive staging procedure developed to identify patients with subclinical nodal metastases at higher risk of occurrence, who could be candidates for complete lymph node dissection or adjuvant systemic therapy. The National Comprehensive Cancer Network (NCCN) Melanoma Panel does not recommend SLNB for patients with in situ melanoma (stage 0). In general, the panel does not recommend SLNB for Stage 1A or 1B lesions that are very thin (0.75mm or less). In the rare event that a conventional high-risk feature is present, the decision about SLNB should be left to the patient and the treating physician.

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Do not routinely order expanded lipid panels (particle sizing, nuclear magnetic resonance) as screening tests for cardiovascular disease.

A standard lipid profile includes total cholesterol, low-density lipoprotein (LDL) cholesterol, high-density lipoprotein (HDL) cholesterol, and triglycerides. These lipids are carried within lipoprotein particles that are heterogeneous in size, density, charge, core lipid composition, specific apolipoproteins, and function. A variety of lipoprotein assays have been developed that subfractionate lipoprotein particles according to some of these properties such as size, density or charge. However, selection of these lipoprotein assays for improving assessment of risk of cardiovascular disease and guiding lipid-lowering therapies should be on an individualized basis for intermediate to high-risk patients only. They are not indicated for population based cardiovascular risk screening.

Research evaluating the frequency and correlates of repeat lipid testing in patients with CHD demonstrates that individuals with LDL-C levels of less than 100mg/dl had no additional benefit from the intensification of lipid-lowering therapies. Understanding the frequency and correlates of redundant lipid testing could identify areas for quality improvement initiatives aimed at improving the efficiency of cholesterol care in patients with coronary heart disease (CHD).

Millions of U.S. adults are at increased ASCVD risk—some because they have had an ASCVD event, others because of ASCVD risk factors. Adherence to healthy lifestyle behaviors, control of blood pressure and diabetes, and avoidance of smoking is recommended for all adults. Statin therapy should be used to reduce ASCVD risk in individuals likely to have a clear net benefit (those with clinical ASCVD) or in primary prevention for adults with LDL-C levels over 190 mg/dL, those aged 40 to 75 years with diabetes, and those with a 10-year ASCVD risk 7.5% without diabetes. A clinician–patient discussion that considers potential ASCVD risk reduction, adverse effects, and patient preferences is needed to decide whether to initiate statin therapy, especially in lower-risk primary prevention.

13

Do not test for amylase in cases of suspected acute pancreatitis. Instead, test for lipase.

Amylase and lipase are digestive enzymes normally released from the acinar cells of the exocrine pancreas into the duodenum. Following injury to the pancreas, these enzymes are released into the circulation. While amylase is cleared in the urine, lipase is reabsorbed back into the circulation. In cases of acute pancreatitis, serum activity for both enzymes is greatly increased.

Serum lipase is now the preferred test due to its improved sensitivity, particularly in alcohol-induced pancreatitis. Its prolonged elevation creates a wider diagnostic window than amylase. In acute pancreatitis, amylase can rise rapidly within 3–6 hours of the onset of symptoms and may remain elevated for up to five days. Lipase, however, usually peaks at 24 hours with serum concentrations remaining elevated for 8–14 days. This means it is far more useful than amylase when the clinical presentation or testing has been delayed for more than 24 hours.

Current guidelines and recommendations indicate that lipase should be preferred over total and pancreatic amylase for the initial diagnosis of acute pancreatitis and that the assessment should not be repeated over time to monitor disease prognosis. Repeat testing should be considered only when the patient has signs and symptoms of persisting pancreatic or peripancreatic inflammation, blockage of the pancreatic duct or development of a pseudocyst. Testing both amylase and lipase is generally discouraged because it increases costs while only marginally improving diagnostic efficiency compared to either marker alone.

14

Do not request serology for *H. pylori*. Use the stool antigen or breath tests instead.

Serologic evaluation of patients to determine the presence/absence of *Helicobacter pylori* (*H. pylori*) infection is no longer considered clinically useful. Alternative noninvasive testing methods (e.g., the urea breath test and stool antigen test) exist for detecting the presence of the bacteria and have demonstrated higher clinical utility, sensitivity, and specificity. Additionally, both the American College of Gastroenterology and the American Gastroenterology Association recommend either the breath or stool antigen tests as the preferred testing modalities for active *H. pylori* infection. Finally, several laboratories have dropped the serological test from their menus, and many insurance providers are no longer reimbursing patients for serologic testing.

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Do not perform fluorescence in situ hybridization (FISH) for myelodysplastic syndrome (MDS)-related abnormalities on bone marrow samples obtained for cytopenias when an adequate conventional karyotype is obtained.

The presence of certain clonal abnormalities in the bone marrow or blood of patients with cytopenia(s) establishes or strongly supports the diagnosis of MDS, in some cases even in the absence of diagnostic morphologic findings. MDS FISH panels typically employ probes for four or more genetic loci, making this an expensive test. Multiple studies have demonstrated the added value of MDS FISH on bone marrow is extremely low when a satisfactory karyotype is obtained (20 interpretable metaphases). MDS FISH can be performed post hoc in the event of an unsatisfactory karyotype.

16

Do not order a frozen section on a pathology specimen if the result will not affect immediate (i.e., intraoperative or perioperative) patient management.

Although the result of an intraoperative frozen section evaluation is often helpful to determine the treatment path of a patient during a surgical procedure, the frozen section analysis may be limited in regards to sampling and technical issues that can hinder interpretation and/or compromise the integrity of the specimen for the final diagnosis. If there is no therapeutic decision to be made for the patient on the day of the surgical procedure based on the results of the frozen section, it is preferable to submit the specimen for routine (or rush, if necessary) histologic processing and permanent section evaluation.

17

Do not repeat hemoglobin electrophoresis (or equivalent) in patients who have a prior result and who do not require therapeutic intervention or monitoring of hemoglobin variant levels.

Pre-conception and antenatal hemoglobin electrophoresis screening is recommended, especially in high prevalence areas for sickle cell disease or thalassemia, and has become routine practice in order to detect abnormalities of hemoglobins S, C, D-Punjab, E, O-Arab, Lepore, beta-thalassemia trait, delta/beta thalassemia trait, alpha thalassemia trait (2 chain deletion), and hereditary persistence of fetal hemoglobin (HPFH). Partner testing should be offered when there is a risk of a significant hemoglobinopathy in the infant. Repeat hemoglobin electrophoresis testing is required only to make a more specific diagnosis or monitor the results of interventional therapies in patients with known hemoglobinopathies. Providers should investigate prior results before requesting a repeat hemoglobin electrophoresis.

18

Do not test for Protein C, Protein S, or Antithrombin (ATIII) levels during an active clotting event to diagnose a hereditary deficiency because these tests are not analytically accurate during an active clotting event.

These assays may be useful to test for an acquired deficiency (i.e., disseminated intravascular coagulation) in consumptive coagulopathies. These tests are not analytically accurate during an active clotting event. Moreover they are not clinically actionable at the time of an acute clot, because the same therapeutic intervention (anticoagulation) is performed regardless of the results. Deferral to the outpatient/non-acute setting allows for the testing to be done at a time when the results would change patient management, i.e., ceasing or continuing anticoagulation. Because anticoagulation may also impact the determination of results (e.g., Protein C and Protein S decrease on warfarin, while ATIII is actually elevated), testing while on anticoagulants may also yield misleading results and should be avoided.

19

Do not order red blood cell folate levels at all. In adults, consider folate supplementation instead of serum folate testing in patients with macrocytic anemia.

Since 1998, when the U.S. and Canada mandated that foods with processed grains be fortified with folic acid, there has been a significant decline in the incidence of folate deficiency. For the rare patient suspected of having a folate deficiency, simply treating with folic acid is a more cost-effective approach than blood testing. While red blood cell folate levels have been used in the past as a surrogate for tissue folate levels or a marker for folate status over the lifetime of red blood cells, the result of this testing does not, in general, add to the clinical diagnosis or therapeutic plan.

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Do not use sputum cytology to evaluate patients with peripheral lung lesions.

Sputum cytology is not effective for evaluating peripheral lesions. For peripheral lesion evaluation, consider alternative diagnostic approaches (e.g., image guided needle aspiration).

21

Don't request just a serum creatinine to test adult patients with diabetes and/or hypertension for CKD; use the Kidney Profile (serum Creatinine with eGFR and urinary albumin-creatinine ratio.)

Use the National Kidney Foundation (NKF) updated evidence-based Kidney Profile test to evaluate patients for CKD with the following common tests to more effectively assess kidney function.

- "Spot" urine for albumin-creatinine ratio (ACR) to detect albuminuria
- Serum creatinine to estimate glomerular filtration rate (GFR) using the CKD EPI equation

22

Don't transfuse plasma to correct a laboratory value; treat the clinical status of the patient.

Plasma transfusion to a patient with an INR of <1.6 has minimal effect, and transfusion for INR values between 1.6 and 2 should be carefully considered. Since a mildly elevated INR is usually not associated with spontaneous hemorrhage and doesn't increase the risk of bleeding during routine invasive procedures, excessive transfusion of plasma is unnecessary and increases the risk of transfusion-associated circulatory overload (TACO), which is a leading cause of transfusion associated morbidity and mortality. Judicious use of vitamin K and/or prothrombin complex concentrate following evidence-based clinical practice guidelines should also be considered to avoid unnecessary transfusion.

23

Don't order IgM antibody serologic studies to assess for acute infection with infectious agents no longer endemic in the US, and in general avoid using IgM antibody serologies to test for acute infection in the absence of sufficient pre-test probability.

As the prevalence of a disease decreases, so does the positive predictive value for testing for acute infection with that disease. Although documentation of IgG antibodies to rare infectious agents is useful (for documentation of effective vaccination, for example), assessing acute infection by evaluation of IgM antibody status to these agents is fraught with false positives and low predictive value. For example, according to CDC, rubella is no longer endemic in the US. As such, nearly all positive rubella IgM antibody tests are false positives, resulting in unnecessary follow-up testing and unnecessary anxiety.

Even for diseases not yet eradicated and for which low level outbreaks still occur (such as measles), if overall prevalence remains low, then the predictive value of positive IgM serology will still be low. False positive measles IgM serology, for example, has been documented due to cross-reactivity to parvovirus and human herpes virus 6, among others.

If clinical evaluation yields legitimate pre-test suspicion for a rare infectious disease, then practitioners should report to and engage the help of their state public health department and/or the CDC in further evaluating for potential acute infection.

In common viral infections it is also most effective to limit IgM serology to those cases in which clinical assessment yields relatively high suspicion for acute infection, since there are well known causes for potential IgM antibody cross-reactivity (rheumatoid factor, cross reactivity with other viral antigens). The potential for false positive results will decrease (and positive predictive value will increase) with increasing pre-test probability for true acute infection.

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Do not perform peripheral blood flow cytometry to screen for hematological malignancy in the settings of mature neutrophilia, basophilia, erythrocytosis, thrombocytosis, isolated anemia, or isolated thrombocytopenia.

The role of peripheral blood flow cytometry for hematologic neoplasia is limited to settings in which either there are morphologically abnormal cells identified on a peripheral blood smear review (blasts, lymphoma cells) or there are clinical and/or laboratory findings that suggest a high pre-test probability for the presence of a disorder amenable to the immunophenotypic detection of neoplastic cells in the blood. The latter includes patients with neutropenia, absolute lymphocytosis, lymphadenopathy, or splenomegaly. The likelihood of flow cytometry of blood producing diagnostic results in the settings enumerated in the recommendation above is extremely low; bone marrow sampling with morphologic analysis (and appropriate ancillary diagnostic testing) may be indicated in those scenarios.

25

Don't perform Procalcitonin testing without an established, evidence-based protocol.

Procalcitonin is a biomarker that has been used successfully to identify patients with certain bacterial infections (e.g., sepsis). The appropriate use includes serial (usually daily) measurements of procalcitonin in select patient populations (e.g. patients with fever and presumed serious infection for which antibiotics were initiated).(1) Such uses may help to identify low-risk patients with respiratory infections who would not benefit from antibiotic therapy, and to differentiate blood culture contaminants (e.g., coagulase-negative staphylococci) from true infections.(2,3) When used appropriately there are significant opportunities to decrease unnecessary antimicrobial use. The overuse of antimicrobial agents is directly related to the increasing antimicrobial resistance, so judicious use of these agents is warranted.

Unfortunately, procalcitonin is often either misused (i.e. not used in the appropriate setting) or established algorithms are not followed. When the latter occurs, the procalcitonin result becomes simply another piece of laboratory data that adds costs, but does not benefit the patient. These scenarios often occur because there is not an evidence-based utilization plan established at an institution. Laboratory and intensive care unit leadership are encouraged to identify the major users of procalcitonin, to establish guidelines that are most appropriate for the local setting and to monitor use.

26

Do not routinely test for community gastrointestinal stool pathogens in hospitalized patients who develop diarrhea after day 3 of hospitalization.

A number of studies have indicated that stool culture and parasitological examination is usually not indicated when diarrhea develops more than 3 days after admission to the hospital, because these tests are designed to detect agents of community-acquired gastrointestinal infection (1-3). In contrast, testing for *C. difficile* should be considered in such patients. In contrast, testing for *C. difficile* should be considered in such patients, if they are over 2 years in age; patients <2 years in age commonly have asymptomatic *C. difficile* colonization.

NOTE: There are select patient populations, such as older adults and immunocompromised patients, in whom community-type pathogens may be detected after three days of hospitalization. Therefore, clinicians should be able to obtain stool cultures and/or stool parasitological examinations in these select populations after three days of hospitalization.

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Do not repeat Hepatitis C virus antibody testing in patients with a previous positive Hepatitis C virus (HCV) test. Instead, order Hepatitis C viral load testing for assessment of active versus resolved infection.

There are joint guidelines from the Infectious Diseases Society of America and the American Association for the Study of Liver Diseases, which are consistent with guidance from the Centers for Disease Control and Prevention regarding the testing, management and treatment of patients with HCV infection (1, 2). A positive HCV antibody test remains positive for life (3). Repeat HCV antibody testing, adds cost but no clinical benefit, so it should not be performed. A common reason for unnecessary repeat testing is the inclusion of this test in order sets (eg, hepatitis and/or opioid screening order sets), or a result of problematic follow-up of HCV positive patients in an outpatient setting.

A positive HCV serologic test (or a proven history of positive results) should be followed by an HCV viral load test, which distinguishes an active from resolved infection. The result of the HCV viral load establishes a baseline in patients with active disease by which the efficacy of therapy can be monitored. Patients with active infection (i.e. positive serology and HCV viral load) may often need an HCV genotyping assay to guide therapy.

Patients who have had a remote and resolved HCV infection who are suspected to have been reinfected, should be tested using the HCV viral load test, rather than the HCV antibody test, since this latter test remains positive for life. Viral load reflects the degree and severity of active infection and also acts as a useful component in monitoring antiviral therapy in medication-managed patients.

28

Do not perform a hypercoagulable workup in patients taking direct factor Xa or direct thrombin inhibitors.

Direct oral anticoagulants (DOACs) such as dabigatran etexilate, rivaroxaban, apixaban, edoxaban, and betrixaban often interfere with clot-based or chromogenic coagulation assays and may lead to inaccurate results or render the test uninterpretable. Affected tests include many commonly ordered tests on hypercoagulable workup panels: Lupus anticoagulant (LA) panels, activated protein C resistance, protein C and protein S activity, antithrombin activity, and specific factor activity levels. These tests should not be done in patients taking DOACS. If there is a compelling reason to perform these tests, great caution must be taken to avoid acting on a false result. For instance, specimens should be collected at the medication trough, and potential test interference should be considered prior to ordering. The potential for interference is dependent on test methodology, drug mechanism of action, and drug concentration. For patients suspected clinically to have antiphospholipid antibody syndrome, the lupus anticoagulant panel may be uninterpretable, but ELISA-based anticardiolipin and anti-beta2 GP1 antibody testing is unaffected. Genetic testing, such as PCR for factor V Leiden, is also unaffected.

29

Don't use plasma catecholamines to evaluate a patient for pheochromocytoma or paraganglioma; instead use plasma free metanephrines or urinary fractionated metanephrines.

Recommended first-line testing is either plasma free metanephrines or urinary fractionated metanephrines. If measuring plasma metanephrines, patients should have their blood drawn while in a supine position, and the values should be compared to reference intervals determined from the same collection position.

30

Do not routinely order broad respiratory pathogen panels unless the result will affect patient management.

In place of broad respiratory pathogen panels, use tests that provide immediate diagnosis and potentially expedite management decisions. Consider first using tests of commonly suspected pathogens, which may change according to the location/season. Examples include rapid molecular or point of care tests for RSV, Influenza A/B, or Group A pharyngitis. Rapid tests may be laboratory based or point of care, depending on operational needs. Broader testing for other respiratory pathogens may be done when the result will affect patient management; such as altering/discontinuing empiric antimicrobial therapy or changing infection control measures

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Do not generally use swabs to collect specimens for microbiology cultures on specimens from the operating room. For optimal recovery of microbes, tissue or fluid samples obtained in the operating room should be submitted, when available and adequate.

Microbiology laboratories recommend that operating room surgeons and staff collect tissue or fluid when submitting specimens, but many laboratories continue to receive swabs instead, even when tissue or fluid samples are available. In some cases, both (tissue and swabs) are submitted with requests to fully evaluate both. Swab specimens are not optimal for microbiology testing because in this setting alternative specimen types have greater specificity and are more likely to reflect the pathologic process being investigated: there is evidence that, in these settings, swabs do not offer benefit, testing increases costs and does not provide higher quality care. Eliminating swabs when possible and only submitting tissue or fluid addresses these issues and results in a more effective use of laboratory resources and personnel.

32

Avoid Thyroid Stimulating Hormone (TSH) screening in annual well-visits for asymptomatic adults, regardless of age.

TSH screening is a common ambulatory practice; however, no evidence finds routine screening improves patient care. Testing is appropriate when patients are considered at-risk or demonstrate subtle or direct signs of thyroid dysfunction upon physical evaluation.

33

Don't perform urine cytology for routine hematuria investigation.

Urine cytology has little value in the diagnosis of common causes of hematuria. Routine urine cytology is costly and of limited clinical value as a first line investigation for all patients with hematuria. Because this test has low sensitivity for diagnosing low-grade superficial urothelial malignancy, a negative test does not rule out malignancy. Although urine cytology has reasonable specificity when positive, it is impossible to localize a tumor based on urine cytology alone. A positive test would require further invasive investigation including upper urinary tract imaging and flexible cystoscopy.

34

Do not order a Type & Crossmatch for patients undergoing procedures that have minimal anticipated blood loss, historically low fraction of transfusion use, and a low transfusion index (ratio of transfused units to patients).

Appropriate use of blood component resources is critical to maintain adequate supply. For specific elective surgeries, the need for red blood cell transfusion may be anticipated, however, there is often over-ordering of RBCs and a lack of valid need. The Type & Crossmatch is labor and reagent intensive, resulting in increased workload costs and increased inventory wastage. Optimizing appropriate orders for a Type & Crossmatch can prevent these downstream detriments to effective, efficient care and stewardship of our blood supply. Development and implementation of an institutional-specific maximal surgical blood ordering schedule (MSBOS) can aid in this endeavor, along with over-arching education regarding transfusion best practices. Each hospital medical staff should have a MSBOS and it should be available to all members of the medical and hospital staff, on request.

35

Do not monitor anti-platelet agent inhibition of platelet activity using platelet function or genetic testing.

Available evidence does not support the use of these laboratory tests to guide the dose of aspirin or clopidogrel in patients with so-called aspirin or clopidogrel "resistance." Study results do not provide support for the concept of changing antiplatelet therapy based on the results of platelet function monitoring tests. Thus, high on-treatment platelet reactivity (higher than expected platelet reactivity seen in patients receiving antiplatelet therapy) may be a non-modifiable clinical risk factor in patients treated with anti-platelet agents. The American Heart Association has not recommended either platelet function testing or genetic testing at the present time.

How This List Was Created (1–5)

The American Society for Clinical Pathology (ASCP) list was developed under the leadership of the chair of ASCP's Institute Advisory Committee and Past President of ASCP. Subject matter and test utilization experts across the fields of pathology and laboratory medicine were included in this process for their expertise and guidance. The review panel examined hundreds of options based on both the practice of pathology and evidence available through an extensive review of the literature. The laboratory tests targeted in our recommendations were selected because they are tests that are performed frequently; there is evidence that the test either offers no benefit or is harmful; use of the test is costly and it does not provide higher quality care; and, eliminating it or changing to another test is within the control of the clinician. The final list is not exhaustive (many other tests/procedures were also identified and were also worthy of consideration), but the recommendations, if instituted, would result in higher quality care, lower costs, and more effective use of our laboratory resources and personnel.

How This List Was Created (6–15)

The American Society for Clinical Pathology (ASCP) list of recommendations was developed under the leadership of the ASCP Choosing Wisely Ad Hoc Committee. This committee is chaired by an ASCP Past President and comprises subject matter and test utilization experts across the fields of pathology and laboratory medicine. The committee considered an initial list of possible recommendations compiled as the result of a survey administered to Society members serving on ASCP's many commissions, committees, and councils. The laboratory tests targeted in our recommendations were selected because they are tests that are performed frequently; there is evidence that the test either offers no benefit or is harmful; use of the test is costly and it does not provide higher quality care; and eliminating it or changing to another test is within the control of the clinician. Implementation of these recommendations will result in higher quality care, lower costs, and a more effective use of our laboratory resources and personnel.

How This List Was Created (16–35)

The American Society for Clinical Pathology (ASCP) list of recommendations was developed under the leadership of the ASCP Effective Test Utilization Steering Committee. This committee is chaired by an ASCP Past President and is comprised of subject matter and test utilization experts across the fields of pathology and laboratory medicine. The committee considered a list of possible recommendations compiled as the result of a survey administered to Society members serving on ASCP's many commissions, committees and councils. In addition, an announcement was made to ASCP's newly formed Advisory Board seeking suggestions for possible recommendations to promote member involvement. The laboratory tests targeted in our recommendations were selected because they are tests that are performed frequently; there is evidence that the test either offers no benefit or is harmful; use of the test is costly and it does not provide higher quality care; and eliminating it or changing to another test is within the control of the clinician. Implementation of these recommendations will result in higher quality care, lower costs and a more effective use of our laboratory resources and personnel.

ASCP's disclosure and conflict of interest policy can be found at www.ascp.org.

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