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ORIGINAL RESEARCH

Choosing Wisely in Adult Hospital Medicine: Five Opportunities for Improved Healthcare Value

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BACKGROUND: In an effort to lead physicians in addressing the problem of overuse of medical tests and treatments, the American Board of Internal Medicine Foundation developed the Choosing Wisely campaign. The Society of Hospital Medicine (SHM) joined the initiative to highlight the need to critically appraise resource utilization in hospitals.

METHODS: The SHM employed a staged methodology to develop the adult Choosing Wisely list. This included surveys of the organization's leaders and general membership, a review of the literature, and Delphi panel voting.

RESULTS: The 5 recommendations that were subsequently approved by the SHM Board are: (1) Do not place, or leave in place, urinary catheters for incontinence or convenience or monitoring of output for non–critically ill patients (acceptable indications: critical illness, obstruction, hospice, perioperatively for <2 days for urologic procedures; use weights instead to monitor diuresis). (2) Do not prescribe medications for stress ulcer prophylaxis to medical inpatients unless at high risk for gastrointestinal complications. (3) Avoid transfusions of red blood cells for arbitrary hemoglobin or hematocrit thresholds and in the absence of symptoms or active coronary disease, heart failure, or stroke. (4) Do not order continuous telemetry monitoring outside of the intensive care unit without using a protocol that governs continuation. (5) Do not perform repetitive complete blood count and chemistry testing in the face of clinical and lab stability.

CONCLUSIONS: Hospitalists have many opportunities to impact overutilization of care. The adult hospital medicine Choosing Wisely recommendations offer an explicit starting point for eliminating waste in the hospital. *Journal of Hospital Medicine* 2013;8:486–492. © 2013 Society of Hospital Medicine

The overuse of medical tests and treatments is a growing concern. A recent survey revealed that 2 in 5 primary care physicians perceive that patients in their own practice are receiving too much care.[1] Twenty-eight percent of the physicians indicated they provide more care than they should. When queried about reasons for the aggressiveness of care, responses included fear of malpractice litigation, adherence to clinical performance measures that require following protocols, and inadequacy of time spent with patients. Overutilization of healthcare resources is a complex issue promulgated not only by the factors cited by the physicians but also a culture in the United States habituated to believe "more care is better care."[2–4] In 2010, $2.6 trillion was spent on healthcare, an increase of $1.3 trillion between 2000 and 2010.[5] As much as 30% of healthcare spending may be wasted.[6] Because physicians influence approximately 80% of healthcare expenditures, including ordering tests and treatments, it is imperative that physicians take a leadership role in reversing this trend.[7]

In response to this need, several physician-led projects have emerged.[8–10] One such initiative is the American Board of Internal Medicine Foundation's (ABIM-F's) *Choosing Wisely*® campaign.[11] The ABIM-F contacted a variety of specialty societies and asked each to identify the 5 top tests or treatments relevant to their specialty that may frequently be overused. Phase 1 of the Choosing Wisely campaign was launched in April 2012 with 9 specialty societies participating. The second phase was unveiled in February 2013 and comprised of 16 additional groups including the Society of Hospital Medicine (SHM). The SHM represents 35,000 hospitalists in the United States whose primary focus is the general medical care of hospitalized patients. This is especially important because almost one-third of total US healthcare expenditures are on hospital care,[12] and hospitalists care for an increasing number of hospitalized patients.[13] In this article, we describe the used to derive the adult hospital medicine Choosing processes Wisely list, review the tests and treatments that the

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SHM's Choosing Wisely Subcommittee chose, and discuss potential next steps in implementation of the adult hospital medicine recommendations.

METHODOLOGY

Upon invitation to participate in the Choosing Wisely campaign, SHM's Hospital Quality and Patient Safety (HQPS) Committee formally convened the Choosing Wisely Subcommittee. The subcommittee identified and executed a methodology (see Supporting Figure 1 and Supporting Table 1 in the online version of this article) to create the list of 5 tests and treatments that the SHM submitted to the ABIM-F. All subcommittee members participated fully in the voting and refinement process. The Choosing Wisely Subcommittee worked closely with the SHM's Pediatrics Choosing Wisely Subcommittee to develop both adult and pediatric lists.

Convening the Choosing Wisely Subcommittee

The HQPS Committee convened a subcommittee consisting of 9 members. The subcommittee represented a diverse group of hospitalists reflecting different institution types, geographic regions, and experience. All Choosing Wisely Subcommittee members signed conflict of interest statements and reported no conflict related to the conclusions, implications, or opinions stated. The subcommittee did not consult other external stakeholders in the development of recommendations.

Identification and Refinement of Potential Wasteful Practices

To generate an initial list of potential recommendations, members of all of the SHM committees were surveyed and asked to submit 5 tests and treatments that are inappropriately used or overused. SHM staff removed duplicates and categorized submissions by topic, highlighting overlapping recommendations. Tests and treatments that are used infrequently and items included in phase 1 society lists were also excluded. Subcommittee members then ranked the resultant list using a 5-point Likert scale. All SHM members were then given the opportunity to rank their agreement with the tests and treatments on the list, as refined at the time based upon their own experience and consideration of the following criteria: tests and procedures within the control and purview of hospital medicine, the frequency with which the tests or procedures occur, and the significance of associated costs. This was accomplished via electronic survey.

Establishing an Evidence Base

SHM staff conducted a literature review of the list of tests and treatments that was further refined by the SHM membership's ranking using a standard template. Two reviewers (W.N. and J.G.) conducted an independent literature review of the remaining tests and treatments using PubMed, MEDLINE, and Cochrane Library. The reviewers also conducted generic Internet searches. The literature review included all literature published through 2012 as well as non–English language publications. The reviewers included clinical research guidelines and primary and secondary research studies. Studies included in the review were based upon common criteria including whether the article discussed an evaluation of efficacy and/or utility of treatment, reviewed the harm associated with the administration of a test or treatment, and explored the cost associated with the test or treatment as well as the overall strength of evidence. Additionally, the reference lists included in articles were reviewed to identify supplementary literature sources. The reviewers read and analyzed the articles identified in the initial search for relevant subject matter and summarized the findings in a table.

Delphi Panels

A Delphi scoring process was utilized to complete list refinement.[14] Subcommittee members anonymously voted via email for the strength of the test and treatment recommendation based upon specific criteria. To assist with this process, they received a copy of the completed literature review and an evidence summary of the literature. The following categories were used to guide the scoring: validity/evidence base to support, feasibility of implementation, frequency of occurrence, cost of occurrence, yield/impact, harm, and potential to improve. Results were aggregated and shared with the Choosing Wisely Subcommittee. The subcommittee conferred a final time, editing the recommendations for clarification and improved wording. A second anonymous vote was then conducted for the remaining tests and treatments through a revised scoring spreadsheet. The penultimate list was presented to the SHM's Board. Upon the Board's approval, the final list was submitted to the ABIM-F.

RESULTS

The results of each stage of the list development process are shown in the online supporting information (see Supporting Figure 1 and Supporting Table 1 in the online version of this article). The initial survey of SHM committee members garnered in excess of 150 tests and treatments from approximately 40 SHM committee members. The subsequent list refinement by SHM staff narrowed this list to 65 items, which were then further reduced to 15 items after ranking by members of the subcommittee (see Supporting Figure 1 and Supporting Table 1 in the online version of this article). Voting by members of the general SHM membership further reduced the list to 11 tests and treatments.

The final list of 5 tests and treatments submitted to the ABIM-F were:

- Do not place, or leave in place, urinary catheters for incontinence or convenience or monitoring of output for non–critically ill patients (acceptable indications: critical illness, obstruction, hospice, perioperatively

for <2 days for urologic procedures; use weights instead to monitor diuresis).
- Do not prescribe medications for stress ulcer prophylaxis to medical inpatients unless at high risk for gastrointestinal (GI) complications.
- Avoid transfusions of red blood cells for arbitrary hemoglobin or hematocrit thresholds and in the absence of symptoms or active coronary disease, heart failure, or stroke.
- Do not order continuous telemetry monitoring outside of the intensive care unit (ICU) without using a protocol that governs continuation.
- Do not perform repetitive complete blood count (CBC) and chemistry testing in the face of clinical and lab stability (Table 1).

RECOMMENDATIONS

> Do not place, or leave in place, urinary catheters for incontinence or convenience or monitoring of output for non–critically ill patients (acceptable indications: critical illness, obstruction, hospice, perioperatively for <2 days for urologic procedures; use weights instead to monitor diuresis).

Despite guidelines identifying appropriate indications for the placement of urinary catheters, urinary tract infections due to catheter use remain the most frequent type of infection in acute care settings. Nearly 1 in every 5 patients in the hospital receives an indwelling catheter, and up to half are placed inappropriately.[15] Twenty-six percent of patients who have indwelling catheters for 2 to 10 days will develop bacteriuria; subsequently, 24% of those patients will develop a catheter-associated urinary tract infection (CAUTI).[15] More than 13,000 deaths due to CAUTI occur annually.[16] In addition to urinary tract infections and their complications, additional adverse outcomes related to indwelling catheters include formation of encrustations and restrictions to flow, prolonged hospital stay, and exposure to multi–drug resistant organisms due to increased use of antibiotics. Evidence suggests that infections due to catheters are frequently preventable.[17,18]

TABLE 1. Society of Hospital Medicine Choosing Wisely Recommendations

Test/Treatment Recommendations
Do not place, or leave in place, urinary catheters for incontinence or convenience, or monitoring of output for non–critically ill patients (acceptable indications: critical illness, obstruction, hospice, perioperatively for <2 days or urologic procedures; use weights instead to monitor diuresis).[21,50]
Do not prescribe GI prophylaxis to medical inpatients without clear-cut indication or high risk for GI complication.[24]
Avoid transfusing red blood cells just because hemoglobin levels are below arbitrary thresholds such as 10, 9, or even 8 mg/dL in the absence of symptoms.[29,51]
Avoid overuse/unnecessary use of telemetry monitoring in the hospital, particularly for patients at low risk for adverse cardiac outcomes.[35,43,52,53]
Do not perform repetitive CBC and chemistry testing in the face of clinical and lab stability.[44,54,55]

NOTE: **Abbreviations:** CBC, complete blood count; GI, gastrointestinal.

The economic burden associated with indwelling catheter complications is also substantial. Each episode of symptomatic urinary tract infection adds $676 in incremental costs, and catheter-related bacteremia costs at least $2836.[15] According to Scott, nearly 450,000 CAUTIs were estimated to have occurred in 2007, resulting in direct medical costs of between $340 to $370 million.[19]

Several organizations simultaneously released guidelines to provide a roadmap for appropriate catheter use and prevention of CAUTIs.[20,21] Despite explicit guidelines, the Centers for Disease Control and Prevention recently reported that there was no improvement in CAUTIs between 2010 and 2011.[22] Implementing these strategies for CAUTI reduction include establishing a multidisciplinary team that applies a clear protocol, with daily reminders about catheters and stop orders for catheter discontinuation.

> Do not prescribe medications for stress ulcer prophylaxis to medical inpatients unless at high risk for GI complications.

Stress ulcer prophylaxis in the hospital with proton pump inhibitors (PPIs) or histamine-2 antagonists are common. As many as 71% of patients admitted to the hospital receive some form of prophylaxis without appropriate indication.[23] Guidelines exist for appropriate use; however, therapy is commonly used in the inpatient setting for indications not investigated or supported by the literature.[24]

Inappropriate prescribing practices have been associated with multiple adverse events, including drug interactions, hospital-acquired infections, and increased costs of care. Although consensus among physicians regarding whether GI prophylaxis causes harm is lacking, studies demonstrate a strong correlation between use of PPIs and common adverse events such as pneumonia and *Clostridium difficile* infection.[25,26] For instance, inpatients receiving PPIs were 3.6 times more likely to develop *C. difficile*-associated diarrhea than inpatients not exposed to PPIs.[27]

The American Society of Health-System Pharmacists Therapeutic Guidelines on Stress Ulcer Prophylaxis provide guidance regarding the optimal indication for administration of acid-suppression medication for patients in the hospital setting. The clinical guidelines specify that stress ulcer prophylaxis is not recommended for adult patients in non-ICU settings. The recommendations are applicable to general medical and surgical patients with fewer than 2 risk factors for clinically important bleeding. Indications for use of stress ulcer prophylaxis in the ICU include coagulopathy and mechanical ventilation.[24]

> Avoid transfusions of red blood cells for arbitrary hemoglobin or hematocrit thresholds and in the absence of symptoms or active coronary disease, heart failure, or stroke.

Anemia is a frequent comorbid condition in hospitalized patients. Correcting anemia by means of allogeneic blood transfusions with the goal of maximizing oxygen delivery is common practice in many hospitals. Varied threshold levels of hemoglobin and hematocrit are used, which is unsupported by evidence.[28,29]

Acute anemia with normovolemic hemodilution has been proven safe in patients with coronary artery disease, heart valve disease, and the elderly. A restrictive transfusion approach with hemoglobin cutoff of 7 g/dL, as opposed to higher thresholds, has shown improved outcomes (lower mortality and lower rate of rebleeding) in adult and pediatric critical care as well as surgical patients.[30] Large studies in patients with acute myocardial infarction demonstrated that restrictive transfusional strategies are associated with decreased in-hospital mortality, rate of reinfarction, and worsening heart failure, as well as 30-day mortality.[31] A randomized trial in patients with active GI bleeding showed that a restrictive strategy of hemoglobin threshold of 7 g/dL was associated with improved outcomes (less mortality, less rate of rebleeding), compared with a strategy to transfuse patients with hemoglobin less than 9 g/dL.[32] In addition, increased awareness of the high cost of blood (~$700–$900 per unit) associated with the blood banking process as well as risk of potential infectious and noninfectious adverse reactions (eg, human immunodeficiency virus, hepatitis C virus, transfusion-related lung injury, transfusion-related circulatory overload) must be considered in the risk/benefit equation.[28]

Based on current available evidence, the American Association of Blood Banks recommends adhering to a restrictive transfusion strategy (7 g/dL) in hospitalized stable patients, and this threshold is raised to 8 g/dL in patients with preexisting cardiovascular disease or with active symptoms.[28] This should be combined with techniques such as preoperative anemia optimization by hematinics replacement (eg, iron, vitamin B12, folate, erythropoietin), intraoperative strategies (eg, antifibrinolytics, hypotension, normovolemic hemodilution, etc.), and postoperative strategies (eg, intraoperative cell salvage). These strategies have been shown to result in parsimonious red blood cell utilization as well as in substantial healthcare cost savings.[33]

> Do not order continuous telemetry monitoring outside of the ICU without using a protocol that governs continuation.

Telemetry use in the hospital is common and clearly has a role for patients with certain cardiac conditions and those at risk for cardiac events. Telemetry is resource intensive, requiring dedicated multidisciplinary staff with specialized training. Many hospitals lack the ability to maintain and staff telemetry beds.[34] Physicians may overestimate the role of telemetry in guiding patient management.[35] One study concluded that only 12.6% of patients on a non-ICU cardiac telemetry unit required telemetric monitoring, and only 7% received modified management as a result of telemetry findings.[36]

Inappropriate utilization of telemetry can be linked to increased length of stay or boarding in the emergency department, reduced hospital throughput, increased ambulance diversion, and increased operational costs.[37] In addition, the use of telemetry can lead to a false sense of security and alarm fatigue.[38] Telemetry artifacts may result in unnecessary testing and procedures for patients.[39] Furthermore, to accommodate the need for telemetry, frequent room changes may occur that may lead to decreased patient satisfaction. Low-risk chest pain patients (hemodynamically stable with negative biomarkers, no electrocardiogram changes, and no indication for invasive procedure) do not require telemetry monitoring, because it rarely affects direct care of these patients.[36,40] A 2009 study concluded that telemetry monitoring does not affect the care or the outcome of low-risk patients.[41] Patients with other diagnoses, such as chronic obstructive pulmonary disease exacerbation or hemodynamically stable pulmonary embolism, and those requiring blood transfusions, are often placed in monitored beds without evidence that this will impact their care.[37]

The American Heart Association has published guidelines on the use of cardiac telemetry.[35] Patients are risk stratified into 3 categories, with class III patients being those who are low risk and do not require telemetry. Seventy percent of patients with the top 10 diagnoses that were admitted from the emergency department may clinically warrant telemetry.[37] Implementing a systematic evidence-based approach to telemetry use can decrease unnecessary telemetry days,[42] reduce costs, and avoid unnecessary testing for rhythm artifacts.[39,43]

> Do not perform repetitive complete blood count (CBC) and chemistry testing in the face of clinical and lab stability.

Although unnecessary laboratory testing is widely perceived as ineffective and wasteful, no national guideline or consensus statement exists regarding the utility or timing of repetitive laboratory testing. Multiple studies showed no difference in readmission rates, transfers to ICUs, lengths of stay, rates of adverse events, or mortality when the frequency of laboratory testing was reduced. Charges for daily laboratory testing were estimated to be $150/patient/day.[44] In a study at a university-associated teaching hospital, an intervention to reduce the frequency of laboratory testing was associated with a total decrease of nearly 98,000 tests over a 3-year period.[45] The cost savings in this study was estimated to be almost $2 million over the same time period. A second study at a teaching hospital, involving a computerized physician order

entry (CPOE)-based intervention, showed a reduction of almost 72,000 tests over a 1-year period, which reduced the total number of inpatient phlebotomies by approximately 21%.[46]

The cost of routine, daily laboratory testing for a given patient or health system is not insignificant. When healthcare providers are made aware of the cost of daily laboratory testing, this might reduce the number of laboratory tests ordered and result in significant savings for a health system, as well as improve the patient experience.[44]

Developing guidelines or strategies to reduce repetitive laboratory testing in the face of clinical or laboratory stability would likely produce significant cost savings for both the individual patient as well as the health system, and could possibly would likely improve the hospital experience for many patients. Widespread adoption of CPOE by the US healthcare system has the potential to facilitate decision support that can change laboratory ordering practices.

DISCUSSION

Eliminating waste in healthcare is a priority for physicians,[6–10] and the ABIM-F's Choosing Wisely campaign is a key component of this effort.[11] The SHM chose 5 tests and treatments relevant to the specialty of hospital medicine that occur at a high frequency, have significant cost and affect to patients, and that can feasibly be impacted. Given that a high percentage of healthcare costs occur in the hospital[5] and hospitalists care for an increasing number of these patients,[13] successful implementation of the SHM's adult hospital medicine Choosing Wisely list has great potential to decrease waste in the hospital, reduce harm, and improve patient outcomes.

The methodology chosen to develop the adult Choosing Wisely recommendations was intended to be both pragmatic and evidence based. A broad range of opinions was solicited, including from the SHM's general membership. The final refinement included a literature review and a Delphi process.

Review of cost and utilization data to determine the scope of the problem was used for decision-making by subcommittee members to formulate the SHM's recommendations. For some recommendations, there were significant data, whereas for others, this information was sparse. As has been noted, we were unable to identify the total number of patients in the United States who receive telemetry on an annual basis, and thus were unable to make an estimate about the total population that would be impacted by improved utilization. However, several studies do indicate inappropriate use in significant patient populations and widespread use of the resource. Similarly, we were able to identify the costs associated with a CBC, but were unable to calculate the total number of CBCs administered annually. In the absence of these data, subcommittee members utilized other criteria, including frequency of test or treatment, patient harm or benefit, and utility for making treatment/management decisions.

In general, the tests and treatments contained in the adult hospital medicine *Choosing Wisely*® list are not requested by patients. As such, physicians' choices play a greater role, potentially magnifying the impact hospitalists could make. Overuse of medical tests is multifactorial, and culture plays a significant role in the United States.[2–4] Although each of the tests and treatments identified by the SHM is within the purview of hospitalists, ensuring that guidelines are reliably followed will require interdisciplinary process changes. Ample opportunity exists to partner with nurses (urinary catheters and telemetry), pharmacists (stress ulcer prophylaxis), blood banks, and laboratories (transfusions and lab testing), as well as other healthcare providers and physicians in multiple specialties.

Successful implementation of each guideline will require improvement of systems within hospitals to drive reliability.[47] Provider education, training programs, protocols and reminders may prove to be significant catalysts in overcoming misinformation or no information about specific guidelines. More importantly, interdisciplinary teams will need to assess the current practice patterns within their hospitals prior to implementing solutions that standardize and automate the ordering processes for these tests and treatments.[48] Additionally, the culture within individual patient care units will need to be modified.[49] The challenge of changing the behavior of multiple stakeholders and hardwiring systems changes represent significant potential barriers to success.

There are several potential concerns with the recommendations. Concepts such as high risk and clinical stability exist in several of the recommendations. In most cases, specific guidelines exist that explicitly define the appropriate use of the test or treatment. Where they do not, implementers will need to define the operational definitions, such as the number of normal CBCs that define stability. Although the recommendations are based on the best evidence available, consensus still plays a role. As has been noted, the risk of malpractice litigation influences physicians' decisions.[1] Although evidence-based recommendations such as these help shape the standard of care and mitigate risk, they may not completely eliminate this concern. Providers should always weigh the risks and benefits of any test or treatment. Finally, the approach taken to establish the list was both pragmatic and evidence based. Published evidence was not reviewed until the list was honed to 11. When the evidence was reviewed, the strength of the evidence was judged in a subjective manner by members of the committee as part of the Delphi panel voting.

CONCLUSION

As healthcare providers enter an era of more cost conscious decision-making about provision of care based upon necessity, hospitalists have an excellent opportunity to impact overutilization. The 5 recommendations

comprising the adult hospital medicine Choosing Wisely list offer an explicit starting point. The SHM hopes to lead this process during the coming months and years and to offer additional recommendations, providing a foundation for hospitalists to decrease unnecessary tests and treatments and improve healthcare value.

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