Choosing Wisely in Adult Hospital Medicine: Co-creation of New Recommendations for Improved Healthcare Value by Clinicians and Patient Advocates

Hyung J. Cho, MD[1,2], Danielle Smith, MD[3], Anita Hart, MD[4], Rupesh Prasad, MD[5], Suchita Shah Sata, MD[6], Karen Clarke, MD[7], Olugbenga Arole, MD[8], John Beurlein, MD[9], Marina George, MD[10], Carlton Moore, MD[11], Anneliese M. Schleyer, MD MHA[12], Kathleene Wooldridge, MD[13], Talya Bordin Wosk, MD[14], Elham Yousef, MD[15], Jenna Goldstein, MA[16], April E. Fegley[16], Megan Malouk[16], and Mona Krouss, MD[17]

[1]New York City Health and Hospitals, 50 Water Street, New York, NY, USA; [2]New York University School of Medicine, New York, NY, USA; [3]Molina Healthcare, Long Beach, CA, USA; [4]University of Michigan, Ann Arbor, MI, USA; [5]Advocate Aurora Health, Milwaukee, WI, USA; [6]Duke University Hospital, Durham, NC, USA; [7]Emory University Hospital, Atlanta, GA, USA; [8]Griffin Hospital, Derby, CT, USA; [9]Ascension, St. Thomas Health, Nashville, TN, USA; [10]MD Anderson Cancer Center, Houston, TX, USA; [11]UNC School of Medicine, Raleigh, NC, USA; [12]Harborview Medical Center, University of Washington, Seattle, WA, USA; [13]Vanderbilt University Medical Center, Nashville, TN, USA; [14]UC San Diego, San Diego, CA, USA; [15]Cleveland Clinic Medical Center, Cleveland, OH, USA; [16]Society of Hospital Medicine, Philadelphia, PA, USA; [17]Icahn School of Medicine, New York, NY, USA.

BACKGROUND: The American Board of Internal Medicine Foundation's Choosing Wisely campaign has resulted in a vast number of recommendations to reduce low-value care. Implementation of these recommendations, in conjunction with patient input, remains challenging.

OBJECTIVE: To create updated Society of Hospital Medicine Adult Hospitalist Choosing Wisely recommendations that incorporate patient input from inception.

DESIGN AND PARTICIPANTS: This was a multi-phase study conducted by the Society of Hospital Medicine's High Value Care Committee from July 2017 to January 2020 involving clinicians and patient advocates.

APPROACH: Phase 1 involved gathering low-value care recommendations from patients and clinicians across the USA. Recommendations were reviewed by the committee in phase 2. Phase 3 involved a modified Delphi scoring in which 7 committee members and 7 patient advocates voted on recommendations based on strength of evidence, potential for patient harm, and relevance to either hospital medicine or patients. A patient-friendly script was developed to allow advocates to better understand the clinical recommendations.

KEY RESULTS: A total of 1265 recommendations were submitted by clinicians and patients. After accounting for similar suggestions, 283 recommendations were categorized. Recommendations with more than 10 mentions were advanced to phase 3, leaving 22 recommendations for the committee and patient advocates to vote upon. Utilizing a 1–5 Likert scale, the top combined recommendations were reducing use of opioids (4.57), improving sleep (4.52), minimizing overuse of oxygen (4.52), reducing CK-MB use (4.50), appropriate venous thromboembolism prophylaxis (4.43), and decreasing daily chest x-rays (4.43).

CONCLUSIONS: Specific voting categories, along with the use of patient-friendly language, allowed for the successful co-creation of recommendations.

All author affiliations are members of the Society of Hospital Medicine High Value Care Subcommittee.

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INTRODUCTION

The US healthcare system is fraught with low-value care, with up to $101 billion in estimated waste in costs annually.[1] Low-value care is defined as a healthcare service in which evidence shows little or no benefit for patients, and the potential of harm exceeds benefit.[2] As a part of the American Board of Internal Medicine Foundation's (ABIM-F) Choosing Wisely® (CW) campaign, more than 80 specialty societies have published over 500 recommendations of reducing low-value care since its launch in 2012.[3]

Although the campaign achieved significant clinician awareness since its inception (40%), the progress has plateaued in recent years.[4] Furthermore, large-scale implementation of CW recommendations remains a challenge, and additional interventions including patient-focused strategies have been suggested.[5] Surveys of physicians have included fear of malpractice and patient concern or request as the most common drivers of overuse.[4, 6] The public may be skeptical of top-down efforts to curb low-value care, perceiving them as rationing.[7] Thus, patient input is critical in reducing healthcare waste and an important next step for increasing uptake of CW recommendations among both clinicians and patients.[8, 9]

Past efforts at patient engagement in CW list development were predominantly aimed at translation and dissemination of recommendations created by clinician societies to patients.[8, 10] Patients have yet to play a pivotal role in defining value from its inception. In this study, we utilized a multi-institutional, co-creational approach that included patient advocates in conjunction with clinicians in CW list development for hospital medicine. Patient advocates were selected as they are familiar with healthcare operations and have the unique experience of hearing multiple patient perspectives, in addition to being patients themselves.

METHODS

The Society of Hospital Medicine (SHM) Hospital Quality and Patient Safety Committee convened the High Value Care Committee (HVCC) in July 2017. Monthly conference calls were held from July 2017 to January 2020. The group consisted of 19 members total, some of which did not serve the entire period. All members are considered to be experts in quality and safety and were self-selected to be a part of the HVCC.

Phase 1: Crowdsourcing and Brainstorming

An online questionnaire requesting examples of low-value care in adult hospital medicine was sent from October 5 to 31, 2017, to the SHM listserv, along with ABIM Foundation and affiliated social media outlets (Fig. 1). The target audience included both clinicians and non-clinicians. Upon receiving initial feedback that the questionnaire was unclear for some non-clinicians, a second patient-friendly questionnaire was created with the help of the patient advocates from the Right Care Alliance Community Engagement Council (Supplement 1). This is a grassroots organization including patients and community members whose vision focuses on a healthcare system that is universally accessible, equitable, and affordable.[11]

All examples of low-value care from the questionnaire were compiled, edited, counted, and categorized into 5 domains: laboratory, imaging, medication, diagnostics, and other. Duplicate or similar recommendations were also taken into account. Recommendations in the previous SHM CW Top 5 list were removed. All items with 10 or more mentions were taken into the next phase in an effort to capture the most prominent themes.

Phase 2: Literature Search and Developing Recommendations

All items brought into this phase were individually reviewed and discussed through an iterative process. Items were divided among HVCC members, and a literature search was performed in PubMed database. Focused recommendations were developed and presented to the committee for review. Edits were made according to feedback and citations were added to each recommendation. Items that were duplicative or had insufficient evidence to support the recommendation were removed, leaving 22 items. For the purposes of this step in the process, adequate evidence was defined as the presence of any existing peer-reviewed studies that validated the recommendation. These sources were referenced so that voting members could determine the strength of the evidence in the modified Delphi voting process.

Phase 3: Modified Delphi Voting

For the remaining recommendations, a Delphi scoring process was utilized to reach consensus among clinicians and patient advocates.[12] Online voting surveys (SurveyMonkey®) were developed. They included the semi-final recommendations, accompanied by evidence-based citations. To minimize bias, members of the HVCC who created the survey or were a part of the Right Care Alliance did not vote, which left a total of 7 HVCC members. To ensure an equal representation of the patient perspective, 7 patient advocates were identified by HVCC members from different institutions across the country representing both community and teaching hospitals in urban and non-urban settings. No other specific criteria were used to identify patient advocates.

For each recommendation on the voting survey, clinician respondents were asked to rate on a 1–5 Likert scale on three criteria: (1) strength of evidence, (2) potential for avoiding patient harm, and (3) relevance to *hospital medicine*.

For patient advocates, a patient-friendly version of the recommendations was created for the voting survey. Due to the clinical complexity of the items, a standardized patient-friendly script was created. The script consisted of an explanation of normal state, abnormal state, rationale for recommendation, and potential harms (Supplement 2). Two HVCC members who did not participate in the clinician voting process used the scripts during calls with patient advocates, lasting 1 hour each. Once each recommendation was explained, the patient partner completed the voting survey independently. They were asked to rate each recommendation based on the same Likert scale on slightly different criteria: (1) strength of evidence, (2) potential for avoiding patient harm, and (3) relevance to *patients*.

For each recommendation, a mean composite score was calculated by accounting for strength of evidence, patient harm, and relevance. This was calculated for patient advocate, clinicians, and combined. Data was presented numerically by absolute value and included a standard deviation.

RESULTS

The initial questionnaire was sent through SHM on October 12, 2017, to 28,906 individuals through an email with a subject heading “Provide Us Your Feedback.” Additionally, the questionnaire was disseminated via emails and social media feeds from the society, ABIM-F, and HVCC members.

There were 285 respondents that completed the questionnaire with1234 items (Supplement 3). The respondents included 194 (68%) hospitalists, 16 (6%) residents, 15 (5%) nurse practitioners, 14 (5%) patients, 8 (3%) nurses, 6 (2%) fellows,

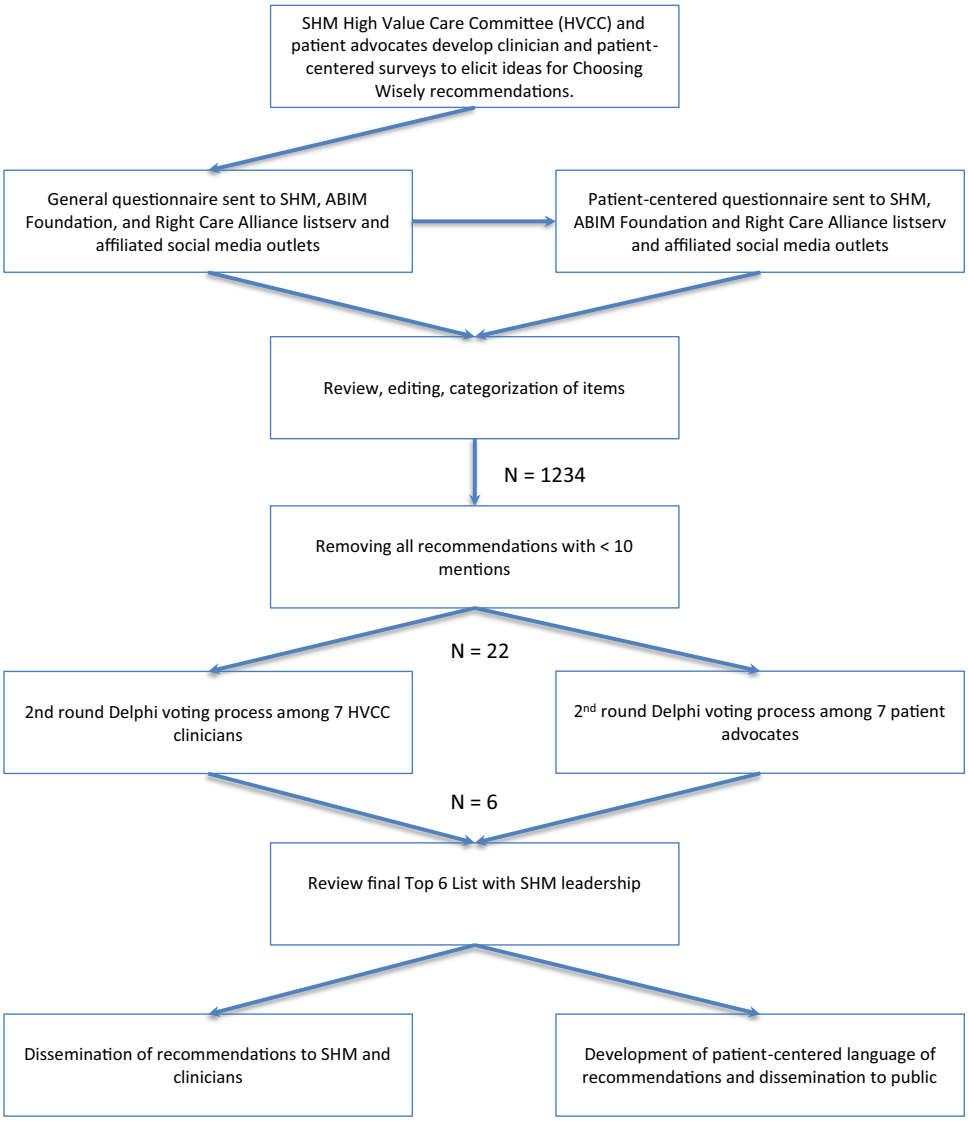

Fig. 1 Society of Hospital Medicine Adult Choosing Wisely List Development Process Map

6 (2%) medical students, 6 (2%) physician assistants, 3 (1%) patient advocates, and 17 (6%) others.

The second questionnaire was made in conjunction with patient advocates from the Right Care Alliance. It consisted of 4 questions assessing if any medical care was unnecessary. This resulted in 31 additional items for review.

A total of 1265 items were reviewed. After accounting for similar suggestions, there were 283 items, of which 73 were in medication domain, 65 in laboratory testing, 43 in imaging, 25 in diagnostic, and 77 in other domain. Twenty-seven of these recommendations had 10 or more mentions, and advanced into phase 2. The council reviewed these recommendations and eliminated 5 recommendations based on lack of evidence or inclusion in previous Choosing Wisely guidelines, leaving 22 items for review.

During phase 3, a total of 7 hospitalists and 7 patient partners completed the online survey. Results were tallied and the mean response scores based on the three categories were compiled for patient advocates, clinicians, and scores combined (Fig. 2). The aim was to have five recommendations; however, two recommendations received identical scores, leaving six total recommendations.

RECOMMENDATIONS

1. Avoid using opioids for treatment of mild, acute pain. For moderate to severe acute pain, if opioids are used, it should be in conjunction with non-opioid methods with the lowest effective dose for the shortest required duration.
2. Do not maintain a peripheral capillary oxygen saturation (SpO2) of higher than 96%, when using supplemental oxygen, unless treating for carbon monoxide poisoning, cluster headaches, sickle cell crisis, or pneumothorax.

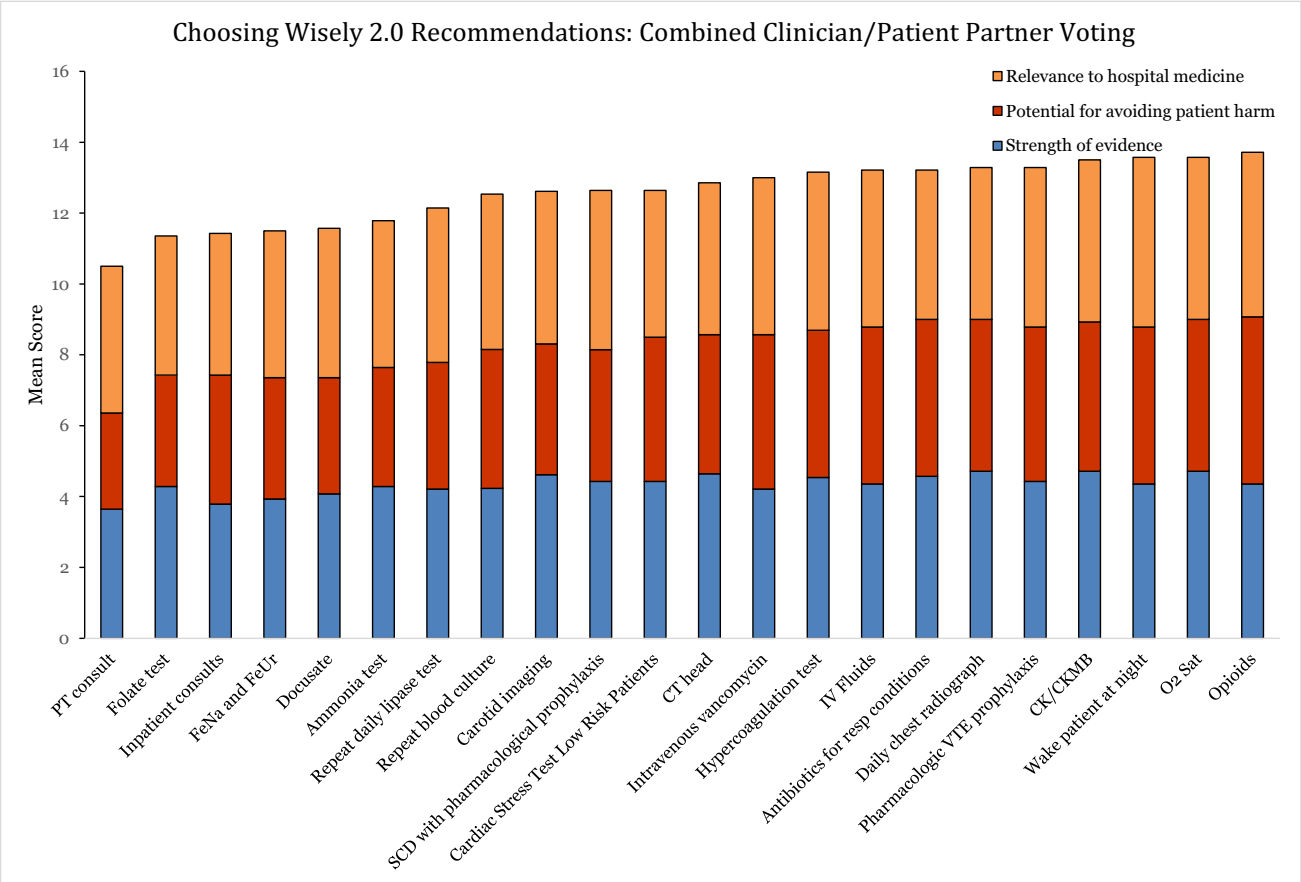

Fig. 2 Choosing Wisely 2.0 recommendations: combined clinician/patient partner voting

3. Do not wake patients at night for routine care; redesign workflow to promote sleep at night.
4. Do not order creatine kinase (CK) or creatine kinase-myocardial band (CK-MB) in suspected acute coronary syndrome or acute myocardial infarction.
5. Do not order daily chest radiographs in hospitalized patients unless there are specific clinical indications.
6. Do not routinely prescribe VTE prophylaxis to all hospitalized patients; use an evidence-based risk stratification system to determine whether a patient needs VTE prophylaxis. If they do warrant prophylaxis, use a bleeding risk assessment to determine if mechanical rather than pharmacologic prophylaxis is more appropriate.

Recommendation 1: Avoid using opioids for treatment of mild, acute pain. For moderate to severe acute pain, if opioids are used, it should be in conjunction with non-opioid methods with the lowest effective dose for the shortest required duration.

The use of opioids has serious risks including opioid use disorder and overdose. If opioid therapy is required, pain management with short acting opioids should be the lowest effective dose for the shortest required duration, often no more than 1 week [13]. A trial of non-opioid and non-pharmacological alternatives is recommended for opioid naïve patients. If opioids are used, they may be used in conjunction with non-opioid methods, when clinically appropriate [13].

For patients already on opioids for chronic pain, it is not recommended to abruptly stop or taper opioid therapy to avoid withdrawal, mental health crisis, and overdose [14]. Individualized treatment plans should be made with the patient, and outpatient clinicians, whenever possible. It is important for the clinician to assess potential biases that may affect treatment of pain [14].

Recommendation 2: Do not maintain a peripheral capillary oxygen saturation (SpO2) of higher than 96%, when using supplemental oxygen, unless treating for carbon monoxide poisoning, cluster headaches, sickle cell crisis, or pneumothorax.

Delivering oxygen to prevent hypoxemia must be balanced with the possible harms of over-oxygenation including cytokine production, decreased cardiac output, coronary vasoconstriction, and acute lung injury.[15] In a systematic review and meta-analysis of 25 studies and over 16,000 patients, liberal

oxygen saturation levels above 94–96% increased in-hospital mortality by 20%. The overuse of supplemental oxygen has been shown to increase mortality in numerous studies of patients with critical illness including cardiac arrest, stroke, trauma, and emergency surgery.[16] An important caveat exists to this recommendation as studies published after these guidelines were created demonstrate a higher incidence of occult hypoxemia, defined as an arterial oxygen saturation of less than 88% with a pulse oximetry measurement of 92 to 96%, in black patients compared to white patients[17].

Recommendation 3: Do not wake patients at night for routine care; redesign workflow to promote sleep at night.

Inadequate sleep in hospitalized patients has been associated with poor outcomes including high blood pressure, hyperglycemia, immune dysfunction, and delirium. Environmental factors (noise, light disruptions), care-related factors (blood draws, vital signs), and patient factors (illness, pain) all contribute to sleep disruption. It is recommended that non-pharmacologic interventions be the first line of prevention.[18] Although data is limited and the quality of evidence is low, multifaceted interventions targeting modifiable factors including nighttime interventions to decrease noise and light, relaxation techniques, and minimizing unnecessary patient contact may improve sleep quality and duration.[19] Non-pharmacologic sleep aids including earplugs and eye masks can be utilized and may provide some benefit.[20].

Recommendation 4: Do not order creatine kinase (CK) or creatine kinase-myocardial band (CK-MB) in suspected acute coronary syndrome or acute myocardial infarction.

The American College of Cardiology Foundation and American Heart Association's guidelines for management of myocardial infarction recommend using cardiac troponin as the lab test of choice to diagnose acute coronary syndrome or acute myocardial infarction. Troponin is highly sensitive for AMI and more specific than CK-MB.[21] Despite the superiority of troponin compared to CK-MB, many centers continue to use CK-MB. This is thought to be a result of clinicians mistakenly believing that CK-MB is more useful in certain clinical scenarios. CK-MB yields no incremental diagnostic value even in patients with chronic kidney disease. No study has shown that CK-MB is superior over troponin in detecting re-infarction.[22].

Recommendation 5: Do not order daily chest radiographs in hospitalized patients unless there are specific clinical indications.

Patients in the intensive care unit have historically had daily chest x-rays as part of routine management to detect complications with endotracheal tubes and central venous catheters. The use of daily chest x-rays leads to excessive test utilization, unwarranted exposure to radiation, and additional cost. A systematic review and meta-analysis of 9 studies with close to 40,000 chest x-rays showed no difference in mortality, ICU length of stay, or mechanical ventilation days when comparing a restrictive x-ray strategy with routine, daily chest x-rays.[23].

Recommendation 6: Do not routinely prescribe VTE prophylaxis to all hospitalized patients; use an evidence-based risk stratification system to determine whether a patient needs VTE prophylaxis. If they do warrant prophylaxis, use a bleeding risk assessment to determine if mechanical rather than pharmacologic prophylaxis is more appropriate.

Venous thromboembolism (VTE) is a major cause of morbidity and mortality in hospitals. Pharmacologic prophylaxis has been shown to reduce the risk of clinically significant VTE. While VTE prevention should be considered for every hospitalized patient, excess VTE prophylaxis—prophylaxis inappropriately administered either to patients at low risk of VTE or to high-risk patients with contraindications—may be harmful. The CHEST antithrombotic guidelines recommend objective risk stratification for VTE prevention in hospitalized medical patients.[24].

The top recommendations of clinicians were minimizing overuse of oxygen (4.52), opioids (4.43), improving sleep (4.38), reducing CT head in syncope (4.38), and reducing CK-MB use (4.29) (Table 1). The top recommendations from patient partners were decreasing daily CXR (4.76), reducing CKMB use (4.71), opioids (4.71), improving sleep (4.67), appropriate VTE ppx (4.62), and reducing unnecessary IV fluids (4.62).

Three common selections among patient advocates and clinicians were included in the final recommendations. After combining answers, the top recommendations were opioids (4.57), improving sleep (4.52), minimizing overuse of oxygen (4.52), reducing CK-MB use (4.50), appropriate VTE ppx (4.43), and decreasing daily CXR (4.43). The lowest-rated recommendations included reducing inappropriate physical therapy consults (3.50), folate (3.79), reducing inappropriate consults in general (3.81), reducing urine electrolyte usage (3.83), and decreasing docusate (3.86).

The top-rated recommendations that would reduce patient harm include reducing opioids (4.7), improving sleep (4.43), reducing antibiotic usage for viral infections (4.43), reducing unnecessary IV fluids (4.43), and reducing overuse of oxygen (4.29). Three of these recommendations were included in the final recommendations.

Table 1 Mean Response Scores with Mean Confidence Intervals for Recommendations for Patient Advocates, Clinicians, and Combined Scores. All Results Are Based on Responses from a 1-to-5 Likert Scale

Recommendation	Mean response scores (/5)		
	Combined	Patient Advocate	Clinician
Avoid using opioids for treatment of mild, acute pain. For moderate to severe acute pain, if opioids are used, it should be in conjunction with non-opioid methods with the lowest effective dose for the shortest required duration	4.57 ± 0.20	4.71 ± 0.20	4.43 ± 0.39
Do not maintain a peripheral capillary oxygen saturation (SpO2) of higher than 96%, when using supplemental oxygen, unless for carbon monoxide poisoning, cluster headaches, sickle cell crisis, or pneumothorax	4.52 ± 0.20	4.52 ± 0.39	4.52 ± 0.39
Do not wake patients at night for routine care; redesign workflow to promote sleep at night.	4.52 ± 0.20	4.67 ± 0.39	4.38 ± 0.39
Do not order creatine kinase (CK) or creatine kinase-myocardial band (CK-MB) in suspected acute coronary syndrome or acute myocardial infarction	4.50 ± 0.20	4.71 ± 0.20	4.29 ± 0.39
Do not order daily chest radiographs in hospitalized patients unless there are specific clinical indications.	4.43 ± 0.20	4.76 ± 0.20	4.10 ± 0.39
Do not routinely prescribe VTE prophylaxis to all hospitalized patients; use an evidence-based risk stratification system to determine whether a patient needs VTE prophylaxis. If they do warrant prophylaxis, use a bleeding risk assessment to determine if mechanical rather than pharmacologic prophylaxis is more appropriate.	4.43 ± 0.20	4.62 ± 0.20	4.24 ± 0.20
Do not administer "maintenance" intravenous fluids if the patient is clinically stable and able to tolerate oral fluids	4.40 ± 0.20	4.62 ± 0.20	4.19 ± 0.39
Avoid antibiotics for respiratory conditions that are likely viral in origin	4.40 ± 0.20	4.57 ± 0.20	4.24 ± 0.39
Avoid intravenous vancomycin for lower extremity cellulitis without evidence of purulence	4.33 ± 0.20	4.43 ± 0.39	4.24 ± 0.39
Do not order CT of the head for uncomplicated syncope with normal neurological exam and in the absence of significant head trauma	4.29 ± 0.20	4.19 ± 0.39	4.38 ± 0.39
Do not use sequential compression devices (SCD) in combination with pharmacological prophylaxis unless the patient is high risk for venous thromboembolism (VTE)	4.21 ± 0.20	4.29 ± 0.39	4.14 ± 0.39
Do not order advanced cardiac imaging for patients without using a guideline-based system to determine which patients will benefit from such testing	4.21 ± 0.20	4.43 ± 0.39	4.00 ± 0.39
Avoid inpatient testing for hypercoagulability as it is not clinically useful or reliable in the setting of acute venous thromboembolism (VTE)	4.07 ± 0.39	4.05 ± 0.78	4.10 ± 0.39
Do not test repeat daily lipase levels after initial diagnosis of acute pancreatitis as levels do not correlate with severity, course, or outcome	4.05 ± 0.39	4.29 ± 0.39	3.810.39
Do not order serum ammonia to diagnose or monitor treatment of hepatic encephalopathy	3.93 ± 0.39	4.05 ± 0.59	3.81 ± 0.39
Do not order carotid imaging for uncomplicated syncope without other neurological symptoms	3.90 ± 0.39	3.62 ± 0.78	4.19 ± 0.39
Avoid repeat blood cultures for persistent fever without new findings, or fever that can be accounted for by a non-infectious cause	3.88 ± 0.39	3.86 ± 0.78	3.90 ± 0.39
Do not use docusate for treatment or prevention of inpatient constipation	3.86 ± 0.20	4.24 ± 0.39	3.48 ± 0.39
Avoid ordering FeNa and FeUr in the diagnosis and management of acute kidney injury (AKI) unless for suspected hepatorenal syndrome or oliguria	3.83 ± 0.20	3.90 ± 0.39	3.76 ± 0.39
Avoid unnecessary inpatient consults and redesign system to prevent formal consults of other services without the approval and oversight of the primary inpatient team, unless emergent	3.81 ± 0.39	4.29 ± 0.39	3.33 ± 0.59
Do not test for folate deficiency. Consider folate supplementation instead of serum folate testing in suspected patients	3.79 ± 0.39	4.29 ± 0.39	3.29 ± 0.39
Avoid consulting physical therapists routinely to assess and ambulate patients without debility	3.50 ± 0.39	3.90 ± 0.59	3.10 ± 0.39

Top-rated recommendations for strength of evidence included reducing overuse of oxygen (4.71), ordering chest x-rays daily (4.71), reducing CK-MB use (4.71), CT for syncope (4.64), and use of carotid imaging for syncope (4.62). Again, three of these recommendations were included in the final recommendations.

CONCLUSION

Through a collaborative process with patient advocates, we successfully co-developed six CW recommendations to reduce low-value care in adult hospital medicine. We built upon CW campaign's principal aim of promoting conversation between clinicians and patients by integrating the concept of co-production in healthcare.[25] Many clinicians are more motivated by focusing on patient-centered concerns and patient safety, rather than cost alone. Through this approach, we hope to engage more clinicians in implementing the CW recommendations.[26] Moreover, the vast majority of published efforts in CW list development engaged patients *after* the lists were fully developed.[8, 27] For example, the CW partnerships with Consumer Reports in the US or Altroconsumo in Italy facilitated dissemination with public-friendly language. Models for

incorporating patient input *during* list development are lacking. Exceptions include the Canadian Rheumatology Association and Canadian Psychiatry CW lists that incorporated only one patient advocate into their working groups.[28] Additionally, the 28 perinatal organizations responsible for the CW Newborn Medicine list incorporated 15 family representatives (from 1047 total individuals) who responded to a survey for suggestions.[29].

Building upon the model from the Right Care Alliance's Hospital Medicine Council Top 10 list development, we formally integrated patient advocates into the Delphi voting process.[12, 30] Patient advocates were chosen rather than patients as they can represent a broader patient perspective being exposed to a variety of patient concerns. To overcome the known barriers in clinical knowledge that prevented full participation[30], we utilized a patient-friendly script. This allowed a standardized method of communication with patient partners to allow meaningful understanding and input into the CW list. We also selected equal number of patient advocates to clinicians to provide equity in the decision-making process. This represents a shift in paradigm from paternalistic medicine and simply finding better ways to explain recommendations developed from clinicians to patients. Integrating patients' views from inception to completion is critical for determining if these CW recommendations are truly "low-value," as the patient is ultimately the end-consumer. Interestingly, three of the final recommendations were shared among patients and clinicians, indicating common priorities.

We note a key limitation and learning point, which was the degree of public engagement. Through the first questionnaire outreach, we elicited only 3 responses from patient/patient advocates. Even with assistance from Right Care Alliance and ABIM foundation, through their email listservs, websites, and social media, as well as our HVCC members' efforts in reaching out to their contacts, we obtained only 48 total responses, albeit the highest number of patient engagement in CW list development. It should also be noted that one of the top recommendations of reducing nighttime awakenings was provided as an example on the patient-friendly survey for initial suggestions, which may have inadvertently promoted this recommendation. Harrison et al. outlined some barriers of patient partner engagement in research in their qualitative study, including researchers' lack of training in appropriate engagement.[31] Moreover, the main method of patient outreach in this study was through social media, which may not be representative of all patients cared for by hospitalists.

There were other limitations. We observed a small overall response to the 1st questionnaire. The main goal of this questionnaire was to reach a broad audience to promote brainstorming of ideas for CW. It was not intended as a survey in the classic research sense, where we would calculate and aim for a high response rate. In order for this to occur, we would need a denominator, which was not possible given that this questionnaire was posted on the ABIM-F website, sent over social media, and forwarded through many emails. Finally, this complete process took over 2 years to complete. The clinician and patient advocate voting surveys were administered approximately 1 year apart, and a greater 2 years from the initial questionnaire to the patient advocate voting survey. Research and media coverage on healthcare issues may have shifted during this time, including notably the US Health and Human Services (HHS) declaration of the opioid epidemic, and Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) survey change from pain management to pain communication questions. Chronological changes such as these may have skewed survey responses that otherwise may have been different had it been completed at the same time. This process may have been accelerated with financial support, incentives to complete the survey, and a broader outreach through partnering with other organizations. Additionally, a more extensive literature review utilizing the PRISMA guidelines was not conducted, which may have affected the strength of evidence section.

Utilizing focused categories of strength of evidence, patient harm, and relevance for voting results in recommendations that have large clinical impact and actionability. The clinical feasibility with a positive impact of several of these recommendations has already been demonstrated in several studies. [32–34] The breakdown of these categories, along with utilizing patient-friendly language allows patients to meaningfully contribute to these important recommendations. We hope that this will serve as a model for CW in the future.

Corresponding Author: *Hyung J. Cho, MD; New York City Health and Hospitals, 50 Water Street, New York, NY 10013, USA (e-mail: harryjcho@gmail.com).*

Supplementary Information *The online version contains supplementary material available at https://doi.org/10.1007/s11606-021-07269-4.*

Declarations:

Conflict of Interest: *The authors declare no competing interests.*

REFERENCES

1. **Shrank WH, Rogstad TL, Parekh N.** Waste in the US health care system: estimated costs and potential for savings. *JAMA*. 2019:https://doi.org/10.1001/jama.2019.13978.
2. **Elshaug AG, Rosenthal MB, Lavis JN, et al.** Levers for addressing medical underuse and overuse: achieving high-value health care. *Lancet*. 2017.
3. Choosing Wisely: Factors and Figures. Choosing Wisely website. http://www.choosingwisely.org/our-mission/facts-and-figures/. Published October 26, 2017. Accessed 20 July 2018.
4. **Colla CH, Mainor AJ.** Choosing Wisely campaign: valuable for providers who knew about it, but awareness remained constant, 2014-17. *Health affairs (Project Hope)*. 2017;36(11):2005-2011.
5. **Rosenberg A, Agiro A, Gottlieb M, et al.** Early trends among seven recommendations from the Choosing Wisely campaign. *JAMA internal medicine*. 2015;175(12):1913-1920.

6. **Lyu H, Xu T, Brotman D, et al.** Overtreatment in the United States. *PLOS ONE.* 2017;12(9):e0181970.
7. D. C. Doctors to withhold treatments in campaign against 'too much medicine'. *The Guardian.* 2015.
8. **Born KB, Coulter A, Han A, et al.** Engaging patients and the public in Choosing Wisely. *BMJ Qual Saf.* 2017;26(8):687-691.
9. **Pasik S, Korenstein D, Israilov S, Cho HJ.** Engagement in eliminating overuse: the argument for safety and beyond. *J Patient Saf.* 2018.
10. **Wolfson D, Santa J, Slass L.** Engaging physicians and consumers in conversations about treatment overuse and waste: a short history of the choosing wisely campaign. *Academic medicine : journal of the Association of American Medical Colleges.* 2014;89(7):990-995.
11. Alliance TRC. The Right Care Alliance vision. https://rightcarealliance.org/about/the-right-care-alliance-vision/. Accessed October 13, 2021.
12. **Fitch K.** The Rand/UCLA appropriateness method user's manual. Santa Monica, CA: Rand; 2001.
13. **Wood E, Simel DL, Klimas J.** Pain management with opioids in 2019–2020. [published online ahead of print, 2019 Oct 10]. JAMA. 2019;1–3.
14. Agnoli A, Guibo X, Tancredi DJ et al. Association of Dose Tapering With Overdose or Mental Health Crisis Among Patients Prescribed Long-term Opioids. JAMA. 2021;326(5):411-419.
15. **Siemieniuk RAC, Chu DK, Kim LH, et al.** Oxygen therapy for acutely ill medical patients: a clinical practice guideline. BMJ. 2018;363:k4169. Published 2018 Oct 24. https://doi.org/10.1136/bmj.k4169.
16. **Chu DK, Kim LHY, Young PJ, et al.** Mortality and morbidity in acutely ill adults treated with liberal versus conservative oxygen therapy (IOTA): a systematic review and meta-analysis. Lancet. 2018;391(10131):1693-1705.
17. **Sjoding MW, Dickson RP, Iwashyna TJ et al.** Racial bias in pulse oximetry measurement. N Engl J Med. 2020;383(25):2477-2478. doi:https://doi.org/10.1056/NEJMc2029240.
18. **Tamrat R, Min Phuong HL, Goyal M.** Non-pharmacologic interventions to improve the sleep of hospitalized patients: a systematic review. J Gen Intern Med. 2014;29(5):788–795.
19. **Miller MA, Renn BN, Chu F, Torrence N.** Sleepless in the hospital: a systematic review of non-pharmacological sleep interventions. Gen Hosp Psychiatry. 2019;59:58-66.
20. **Hu RF, Jiang XY, Chen J, et al.** Non-pharmacological interventions for sleep promotion in the intensive care unit. Cochrane Database Syst Rev. 2015;2015(10):CD008808.
21. **Anderson JL, Adams CD, Antman EM, et al.** 2012 ACCF/AHA focused update incorporated into the ACCF/AHA 2007 guidelines for the management of patients with unstable angina/non-ST-elevation myocardial infarction: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines [published correction appears in J Am Coll Cardiol. 2013 Sep 10;62(11):1040–1]. J Am Coll Cardiol. 2013;61(23):e179-e347.
22. **Alvin MD, Jaffe AS, Ziegelstein RC, Trost JC.** Eliminating creatine kinase-myocardial band testing in suspected acute coronary syndrome: a value-based quality improvement. [published correction appears in JAMA Intern Med. 2017 Oct 1;177(10):1544]. JAMA Intern Med. 2017;177(10):1508–1512.
23. **Ganapathy A, Adhikari NK, Spiegelman J, Scales DC.** Routine chest x-rays in intensive care units: a systematic review and meta-analysis. Crit Care. 2012;16(2):R68. Published 2012 Dec 12.
24. **Kahn SR, Lim W, Dunn AS, et al.** Prevention of VTE in nonsurgical patients: antithrombotic therapy and prevention of thrombosis, 9th ed: American College of Chest Physicians Evidence-Based Clinical Practice Guidelines. Chest. 2012;141(2 Suppl):e195S-e226S. https://doi.org/10.1378/chest.11-2296.
25. **Batalden M, Batalden P, Margolis P, et al.** Coproduction of healthcare service. *BMJ Qual Saf.* 2016;25(7):509-517.
26. **Gupta R, Moriates C.** Swimming Upstream: Creating a Culture of High-Value Care. Acad Med. 2017;92(5):598-601. https://doi.org/10.1097/ACM.0000000000001485
27. **DeCamp M, Tilburt JC.** Ethics and high-value care. *J Med Ethics.* 2017;43(5):307-309.
28. **Chow SL, Carter Thorne J, Bell MJ, et al.** Choosing wisely: the Canadian Rheumatology Association's list of 5 items physicians and patients should question. *The Journal of rheumatology.* 2015;42(4):682-689.
29. **Ho T, Dukhovny D, Zupancic JA, Goldmann DA, Horbar JD, Pursley DM.** Choosing Wisely in newborn medicine: five opportunities to increase value. *Pediatrics.* 2015;136(2):e482-489.
30. **Cho HJ, Wray CM, Maione S, et al.** Right care in hospital medicine: co-creation of ten opportunities in overuse and underuse for improving value in hospital medicine. *Journal of general internal medicine.* 2018;33(6):804-806.
31. **Harrison JD, Anderson WG, Fagan M, et al.** Patient and Family Advisory Councils (PFACs): Identifying challenges and solutions to support engagement in research. *The Patient - Patient-Centered Outcomes Research.* 2018.
32. **Le RD, Kosowsky JM, Landman AB et al.** Clinical and financial impact of removing creatine kinase-MB from the routine testing menu in the emergency setting. Am J Emerg Med. 2015;33(1):72-75. doi:https://doi.org/10.1016/j.ajem.2014.10.017.
33. **Tsega S, Hernandez-Meza G, DiRisio AC et al.** A multifaceted, student-led approach to improving the opioid prescribing practices of hospital medicine clinicians. Jt Comm J Qual Patient Saf. 2020;46(3):153–157. doi:https://doi.org/10.1016/j.jcjq.2019.11.006.
34. **Arora VM, Machado N, Anderson SL, et al.** Effectiveness of SIESTA on objective and subjective metrics of nighttime hospital sleep disruptors. J Hosp Med. 2019;14(1):38-41. doi:https://doi.org/10.12788/jhm.3091.