

Prospective Observational Study on High-Value Care Topics Discussed on Multidisciplinary Rounds

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ABSTRACT

OBJECTIVES: Establishing a high-value care (HVC) culture within an institution requires a multidisciplinary commitment and participation. Bedside rounds provide an ideal environment for role modeling and learning behaviors that promote an HVC culture. However, little is understood regarding the types of HVC discussions that take place at the bedside and who participates in those discussions.

METHODS: A prospective observational study at a tertiary-care, university-affiliated, free-standing children's hospital. The prevalence of HVC discussions was captured by using the HVC Rounding Tool, a previously developed instrument with established validity evidence. For each observed HVC discussion, raters recorded who initiated the discussion and a description of the topic.

RESULTS: Raters observed 660 patient encounters over 59 separate dates. Of all patient encounters, 29% (191 of 660; 95% confidence interval: 26%–33%) included at least 1 observed HVC discussion. The attending physician or fellow initiated 41% of all HVC discussions, followed by residents or medical students (31%), families (12%), and nurses (7%).

CONCLUSIONS: Despite a recent focus on improving health care value and educating trainees in the practice of HVC, our study demonstrated that bedside discussions of HVC are occurring with a limited frequency at our institution and that attending physicians initiate the majority of discussions. The capacity of the nonphysician team members to contribute to establishing and sustaining an HVC culture may be underused. Multi-institutional studies are necessary to determine if this is a national trend and whether discussions have an impact on patient outcomes and hospital costs.

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Although health care spending in the United States far outstrips that of other industrialized nations, Americans generally do not enjoy better health.^{1,2} Unnecessary tests and treatments contribute significantly to wasted expenditure.^{3,4} Accordingly, proponents, including consumer groups and specialty societies, have called on physicians and hospitals to respond by emphasizing high-value care (HVC) principles in medical decision-making.^{5,6} Following Kleinert's⁷ description, we define HVC as care that is focused on patient outcomes by using evidence-based medicine to deliver individualized care that is economically responsible.

Establishing an HVC culture within an institution, with a sustained effect on practice and behavior, requires multidisciplinary commitment and participation. Although physicians play a critical role in the rise of health care use,⁸ implementing and sustaining an HVC culture also requires multidisciplinary collaboration and education with role modeling of HVC practices.^{9,10} Pharmacists,^{11,12} nurses and nurse practitioners,¹³ trainees,^{14–17} and patients^{18,19} may all influence and model HVC practices.

Bedside rounds and discussion represent a crucial environment for learning clinical and communication skills that promote HVC practices²⁰ and provide an opportunity to role model the culture of patient centered care.²¹ Despite this, little is understood regarding the types of HVC discussions that take place at the bedside and, importantly, who participates in those discussions. Given that multidisciplinary collaboration and education are crucial to driving organizational change, understanding these discussions is critical to establishing this culture within an institution.

We previously developed a tool to capture HVC topics discussed during bedside rounds.²² For this study, our primary objective was to use this tool to quantify the prevalence of HVC discussions during bedside rounds. On the basis of trainee perceptions that HVC principles are rarely role modeled,^{23,24} we hypothesized that HVC discussions would be infrequently observed during bedside rounds. Our secondary

objectives were to identify who initiated the HVC discussion and describe the specific topics discussed. Historically, the attending physician directed patient care discussion and educational conversation during bedside rounds. As such, we hypothesized that most conversations around HVC would be initiated by the attending physician and that other members of the multidisciplinary team would not initiate a significant number of HVC discussions. Characterizing practice variation could inform future efforts to incorporate more HVC discussions during rounds.

METHODS

Site

From August 2016 to December 2016, we conducted a cross-sectional observational study of multidisciplinary bedside rounds at Seattle Children's Hospital (SCH), a tertiary-care, university-affiliated, free-standing children's hospital. Since 2010, SCH has developed and implemented >60 clinical standard work pathways for a range of conditions.²⁵ Clinical standard work uses a standardized approach to develop evidence-based, cost-effective clinical pathways. This approach is integrated into the workflow via tools such as electronic order sets, nursing documentation, respiratory therapy protocols, and treatment algorithms. Providers incorporate the pathways into clinical management, although they retain the ability for a nuanced approach in the context of individual patient care.

We observed 4 combined general pediatric medical and subspecialty teams during bedside rounds, excluding the pediatric units and NICUs. Each rounding team included a general medicine attending physician as well as 1 to 2 subspecialty attending physicians who each conducted rounds on their respective patients. The teams also included a senior resident (postgraduate year [PGY] 2 or PGY 3), at least 1 intern (PGY-1), one third-year medical student, and/or a fourth-year medical student. For the subspecialty services, a fellow would often join rounds and serve as the supervising physician. Rounds typically included bedside nurses, pharmacists, registered dietitians, nurse

case managers, and an interpreter, if necessary.

Family-centered rounds (FCR) are defined as interdisciplinary work rounds at the bedside in which the patient and family share control of the management plan as well as the evaluation of the process itself.²⁶ FCR are the standard model for inpatient general medicine and subspecialty rounds at SCH except on weekends. Accordingly, we observed rounds on weekdays to capture the maximum multidisciplinary interactions. Observations were conducted by 6 attending hospitalists. At the start of FCR, observers described the study to the patient, family, and all team members as an observational study of "bedside teaching during rounds" but did not reveal the focus on HVC topics to minimize the likelihood that participants would modify their typical behaviors.²⁷

All aspects of this study were approved by the Institutional Review Board at SCH. The study was exempt, and participation was voluntary.

HVC Rounding Tool

As members of a multidisciplinary research team, we previously used a modified Delphi approach to develop the HVC Rounding Tool, which is an instrument to measure the frequency and content of HVC discussions (Table 1). The development, piloting, and interrater reliability of the tool are described in McDaniel et al.²² Nineteen national HVC experts representing a spectrum of clinical experience years, regions of the country, and subspecialties agreed to participate in the modified Delphi process. A total of 10 topics were ultimately chosen by the panel and then classified into 3 domains (Quality, Cost, and Patient Values) representing critical areas for HVC role modeling and bedside discussion. Instrument piloting ultimately demonstrated weighted kappas for each of the 3 domains ranging from 0.96 to 1.0 and percent positive agreement measures ranging from 95.7% to 100%.

Observers used the HVC Rounding Tool to capture HVC discussions for each individual patient encounter. Raters recorded observed topics dichotomously as "discussed" or "not discussed." For each

TABLE 1 The HVC Rounding Tool and Frequency of Individual HVC Topics by Domain

	HVC Discussions Observed Among 660 Patient Encounters, <i>n</i>	Observation Percent (95% CI)
Quality topics discussed during rounds		
Offer anticipatory guidance to prevent a complication of a medical issue or unplanned readmission	13	2 (1–3)
Narrow down the chronic and/or home medication list or discharge medication list	15	2 (1–4)
Praised a team member for not doing an unnecessary test and/or treatment	7	1 (1–2)
How a test may or may not “change,” “impact,” or “affect” management	11	2 (1–3)
Balance between the clinical benefits of care and its harms	34	5 (4–7)
Cost topics discussed during rounds		
Care alternatives, including less expensive test and/or treatment (cost) and/or observation	17	3 (2–4)
Avoid or cancel a low-value test (daily CBC; ESR and CRP), therapy or monitoring (pulse oximeter), or consult	50	8 (6–10)
Discussion about whether the patient requires ongoing hospitalization	23	3 (2–5)
Patient-values topics discussed during rounds		
Customize care plan to incorporate patient and/or family values and/or goals	44	7 (5–9)
Discussion about what “worries” or “concerns” the patient and/or family in the context of a specific medical decision (also could include “goals” and “values”)	30	5 (3–6)

CBC, complete blood cell count; CRP, C-reactive protein; ESR, erythrocyte sedimentation rate.

HVC topic discussion, the user recorded who initiated the discussion and a description of the topic. On the basis of published descriptions of the factors that influence bedside discussions,²⁸ we collected the following information for each patient encounter: (1) Was the patient a new admission (admitted within the previous 24 hours) or an established patient? (2) Was a parent, guardian, and/or caretaker present during rounds? (3) Was an interpreter used? (4) Did rounds occur in the patient room (versus the hallway)? We also recorded the entire duration of rounds in minutes and the total number of patients observed, allowing for the calculation of average time spent per patient.

Data Collection

Observation dates were chosen on the basis of a convenience sample of the raters' schedules. The 6 raters were part of the

development of the HVC Rounding Tool and had previously participated in a 3-part rater training and instrument piloting.²² Some dates included observations by multiple raters, although each rater observed different teams. Individual raters were assigned to 1 of the 4 teams for observation by using a simple block randomization allocation stored in REDCap (research electronic data capture).

Data Analysis

Data were deidentified before analysis. We calculated the frequencies and proportions of patient encounters with at least 1 HVC discussion and 95% confidence intervals (CIs). Additionally, we analyzed the prevalence of HVC topics by domain, rounding team specialty, attending physician academic rank, and encounter characteristics (new versus established patient, parent and/or guardian present, interpreter used, and rounds in patient

room), reporting the frequency and percent of recorded HVC discussions on the basis of who initiated the discussion. We calculated descriptive summaries for observation time, including the median, range, and interquartile range (IQR) of individual rounding sessions and the length of time per patient (total session time divided by the number of patients). Given that this was a descriptive study at a single institution to determine initial prevalence estimates, we did not a priori conduct a power analysis.

RESULTS

Data were collected on 59 separate dates between August 2016 and December 2016. We requested permission to observe rounds of 72 attending physicians. Sixteen attending physicians requested to be observed on a different day with no refusals for participation. A total of 660 patient encounters were observed during 87 separate rounds. Fifteen attending physicians were observed >1 time. Total observation time by raters for the duration of rounds was recorded for 69 rounds, including 574 patient encounters (87%). The median duration of a single rounding session was 103 minutes (range: 16–171 minutes; IQR: 75–130 minutes). Time per individual patient was not recorded, but the calculated average time per patient (total rounding time divided by number of patients) had a median of 12 minutes (range: 8–24 minutes; IQR: 10–14 minutes). The median number of patients per rounding session observed by raters was 8 (range: 1–15 patients; IQR: 5–10 patients). Overall, 29% of all patient encounters (191 of 660; 95% CI: 26%–33%) included at least 1 observed HVC discussion from the 10 potential topics. A single topic was discussed in 161 encounters; multiple topics were discussed in 30 encounters. In total, we observed 242 HVC topics, and 16% (30 of 191) of the encounters had >1 HVC domain discussed during a single patient encounter. The frequency of HVC discussions was similar across the 3 HVC domains: 11% of encounters (95% CI: 8%–13%) included at least 1 Quality HVC discussion, 12% of encounters included at least 1 Cost HVC discussion (95% CI: 10%–15%), and 11% included at least 1 Patient Values HVC

discussion (95% CI: 9%–13%). We found no statistically significant difference in the prevalence of discussions by month of the year.

The frequencies of individual HVC topics are shown in Table 1. The most frequently observed topics were “avoid or cancel a low-value test (daily complete blood count; erythrocyte sedimentation rate and C-reactive protein) or therapy or monitoring (pulse oximeter)” and “customize care plan to incorporate patient and/or family values and/or goals.” These were recorded in 8% (95% CI: 6%–10%) and 7% (95% CI: 5%–9%) of all patient encounters, respectively.

Rounds were observed for 7 pediatric medical specialties: general medicine, endocrinology, neurology, rheumatology, gastroenterology, nephrology, and craniofacial. General medicine accounted for 61% (403 of 660) of patient encounters; the number of patient encounters in other specialties varied from a low of 2% (13 of 660, rheumatology) to a high of 13% (86 of 660, gastroenterology). The percentage of encounters with any HVC discussion by specialty is shown in Fig 1; small sample sizes are reflected in the wide CIs and limit any interpretation of differences across specialties. We found no statistically significant difference when comparing the percent of encounters with any HVC topic between general medicine (30% [95% CI: 25%–34%]) and all subspecialties combined (29% [95% CI: 23%–35%]).

The majority of patient encounters involved established patients (74%). Parents or guardians were present in 63% of encounters. Only 5% of encounters included an interpreter, and teams conducted rounds in a patient’s room for 52% of encounters. We observed 72 unique attending physicians, 13% with the rank of instructor of pediatrics, 46% with the rank of assistant professor, 26% with the rank of associate professor, and 15% with the rank of full professor. The location of rounds, use of an interpreter, or presence of a parent or guardian were not associated with HVC discussions (Fig 2). We observed a slightly higher percentage of HVC topics for established (31%) versus new patients (23%), although this was not statistically significant.

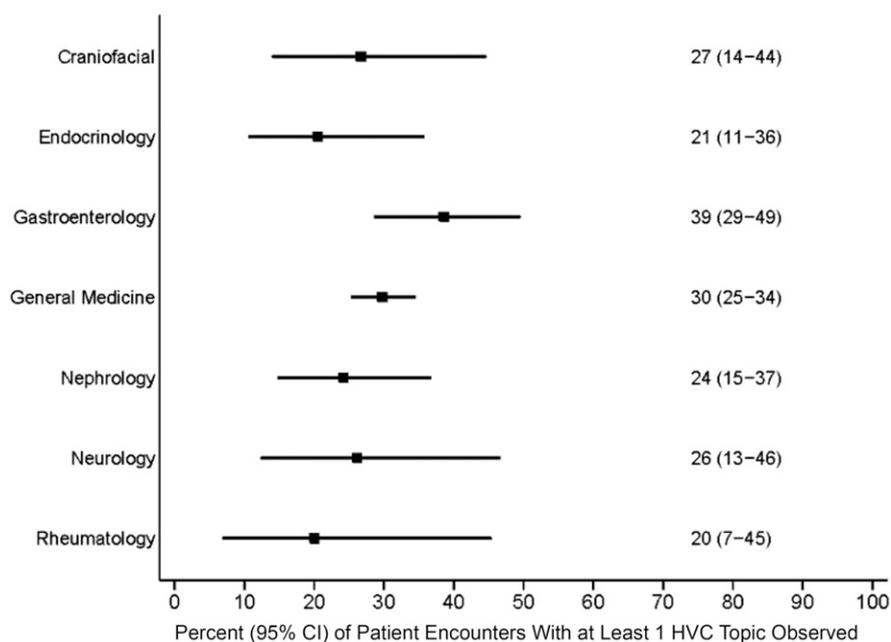


FIGURE 1 Percent of all patient encounters with at least 1 HVC topic discussed by subspecialty.

The attending physician or fellow initiated 41% of all HVC discussions followed by residents or medical students (31%) (Table 2). Whereas families initiated 12% of HVC topics, only 7% of HVC topics were raised by nurses and 6% by pharmacists. The majority of nurse-initiated discussions focused on topics in the Cost domain, such

as the discontinuation of isolation precautions or unnecessary monitors. Additionally, most pharmacist comments focused on topics in the Quality domain. Discussions by the attending and/or fellow and medical student and/or resident were distributed throughout all 3 domains.

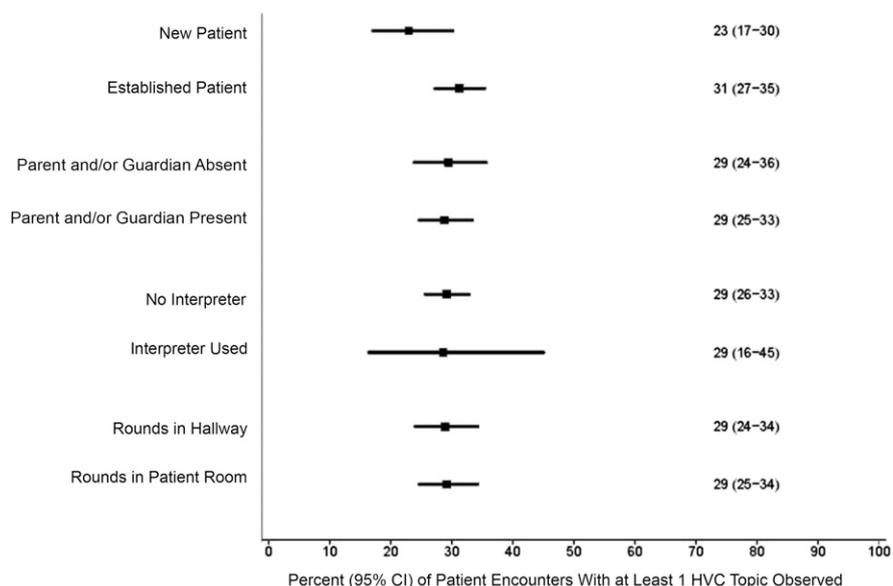


FIGURE 2 Percent of patient encounters with at least 1 HVC topic observed by 4 different characteristics.

TABLE 2 Number of HVC Topics Initiated During Patient Encounters by the Role of Participant

Role of the Person Initiating HVC Topic	No. HVC Topics Initiated (% of All Observations)	Quality Domain	Cost Domain	Patient Values Domain
Attending and/or fellow	101 (41)	44	36	21
Medical student and/or resident	75 (31)	18	33	24
Parent and/or family	30 (12)	3	3	24
Nurse	17 (7)	3	11	3
Pharmacist	15 (6)	10	5	0
Other (social worker, case manager)	4 (2)	1	1	2
Grand total	242	79	89	74

DISCUSSION

We present the first comprehensive description of HVC discussions held during multidisciplinary rounds. Despite recent national efforts to raise awareness of waste in health care and to educate trainees about HVC, the bedside discussion of HVC topics occurred in less than one-third of observed encounters. No individual HVC topic arose in >8% of conversations and only 29% of multidisciplinary bedside patient rounds had any form of value discussions. Attending physicians initiated the majority of HVC discussions.

Our results build on previous studies highlighting not only the importance of role modeling HVC decision-making and behaviors but that HVC discussions are happening infrequently. For example, conversations around test-ordering principles during bedside rounds occurred in only 20% of internal medicine bedside rounds,²³ whereas we observed ~14% during pediatric bedside rounds. Additionally, Patel et al²⁴ reported that residents felt that cost-conscious care was role modeled only 23% of the time. Furthermore, they found no significant difference in the training programs that have a formal HVC curriculum and those that do not, underscoring that HVC behaviors are learned indirectly and informally through other aspects of medical education and are not necessarily learned in a traditional classroom setting. Although we do not know the optimal prevalence of HVC discussions at the bedside to impact trainee behavior, there is a pressing need to

equip faculty with time-efficient HVC teaching strategies for role modeling at the bedside.

Many needs compete for time during rounds, including educational priorities, clinical responsibilities, and administrative duties, potentially contributing to the low prevalence of HVC discussions.²⁹⁻³¹ Despite these challenges, learning the complex principles of HVC may be most effective when accomplished in a clinical setting,³² and bedside rounds remain a central platform through which trainees are exposed to these concepts.^{9,33-35} With less than one-third of patient encounters including any form of value discussion at the bedside, it remains unclear whether this is enough role modeling of HVC practices to impact trainee behaviors.

Our work offers insight into the role of nonphysicians in the discussion of HVC topics. Most studies to date focus solely on the perspectives of attending physicians and trainees, although many other stakeholders participate in bedside rounding. Increasingly, the HVC conversation has revolved around promoting shared decision-making by involving patients and families in the discussion of value-based decisions.^{36,37} However, we found that families initiated only 12% of HVC discussions. Despite the call to empower patients to be more active participants in their care and to make patient centeredness a core aim of our health care system,³⁸ our results suggest that we have room to improve. A previous study reported that there is not a clearly defined role for

families and parents during bedside rounds.³⁹ Physicians may need to better introduce the concept of bedside rounds and use language that elicits patient and family goals and preferences on a routine basis.

Nurses and pharmacists also infrequently initiated HVC discussions. Nursing contributions focused primarily on the cost domain because they were often best equipped to identify areas of waste related to direct patient care, such as discontinuing unnecessary continuous pulse oximetry. Pharmacists initiated HVC discussions mostly in the quality domain, often times suggesting the discontinuation of medications given their unique insight into potential side effects. Possible reasons for the limited participation of nurses and pharmacists include the perceived hierarchy within medical teams⁴⁰ and the lack of clearly defined expectations of participation for nurses and pharmacists. We believe this represents an opportunity to change rounding roles and systems to facilitate sharing value perspectives with all team members, particularly nurses and pharmacists. Blackstone et al⁴¹ demonstrated that nurse participation in multidisciplinary, checklist-guided discussions in an ICU, including topics such as discontinuing standing orders or daily studies, lowered hospital charges. Outside of the ICU, organizing nonphysician ownership of targeted HVC practice through checklists could promote opportunities for collaborative HVC.

Lastly, we did not find variation in the prevalence of HVC topics related to the presence of a patient's family or the rounding location. We had hypothesized that some topics (such as discussing the cost of a test) may be less frequent because of provider discomfort or lack of knowledge of the cost of diagnostic studies,^{42,43} yet we did not find the presence of patients or families to be associated with the HVC topics discussed. It is possible that our study was not powered to detect this difference given the limited numbers of HVC discussions that we recorded.

Our study has several limitations. First, it was performed at a single, academic,

tertiary-care, children's hospital, limiting generalizability to adult and community institutions. However, our average rounding times and daily team census closely mirror those reported in other studies on bedside rounds.^{44,45} Second, our institution has a strong culture of standardized disease management using evidence-based, cost-conscious pathways to guide management. This environment may have impacted the type of discussions and management decisions discussed by teams. However, we cannot determine if pathway-based patients have more HVC discussions on rounds (given the hospital focus on clinical pathways) or fewer HVC discussions (given the standardized approach to care). Although this limits generalizability, we did not restrict observations to patients who were on or off a clinical pathway. Third, we did not record time per individual patient encounter and are unable to report if patients with HVC discussions had longer rounding times. We also did not collect data on patient complexity, ICU use, or length of stay that might characterize HVC opportunities at a patient level. Fourth, the raters did not track total speaking time per participant, limiting our ability to determine if variation among professions reflects their contributions to rounds in general or specifically around HVC topics. Because we did not capture the frequency of other, non-HVC topics discussed during rounds, we do not know how the inclusion of HVC discussions affects the prevalences of other topics discussed during rounds. Lastly, value discussions happen throughout the day. Although we did not capture the discussions that were had during other times of the day, our specific study aim was to look at those that were observed during bedside rounds. Additionally, we observed FCR on any given patient only once, and given the competing demands of rounds (patient needs and learner needs), it is possible that we underrepresented the prevalence of HVC discussions that may have taken place on other dates. However, the HVC Rounding Tool captures discussions held with patients and families regarding their personal values and preferences and whether those are incorporated into the decision-making for a patient. As such, we

believe an integrated approach with the incorporation of the family's goals of care and values should be more prevalent and explicit in most, if not all, patient interactions in which testing and/or treatment decisions are made.

Future studies are needed to confirm these findings in a multi-institution sample and identify potential barriers to and facilitators of effective HVC discussions during bedside rounds. As providing HVC increasingly becomes expected as the way to practice medicine, the call to action of a multidisciplinary approach becomes increasingly fundamental. Essential to this, the capacity of the nonphysician team members to sustain HVC culture remains underused, and empowering discussion from all participants in bedside rounds surrounding HVC is critical to increasing the prevalence of these topics at the bedside. This multidisciplinary, bedside approach to role modeling may be a key to affecting long-term HVC behaviors. It is also likely that faculty development programs that are designed to improve attending role modeling of HVC behaviors, education on leading HVC discussions involving multiple stakeholders, and engaging nonphysician participants may lead to HVC culture change.

CONCLUSIONS

Our study demonstrated that bedside discussions of HVC are occurring during a minority of rounds at our institution. Multi-institutional studies are necessary to determine if this is a representative finding. We plan to use these results to inform faculty development efforts, empower nonphysician team members and families to engage in HVC discussions at our institution, and measure whether these discussions have an impact on patient outcomes and hospital costs.

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REFERENCES

1. Freeman JD, Kadiyala S, Bell JF, Martin DP. The causal effect of health insurance

on utilization and outcomes in adults: a systematic review of US studies. *Med Care*. 2008;46(10):1023–1032

2. Woolf S, Aron L, eds. *US Health in International Perspective: Shorter Lives, Poorer Health*. Washington, DC: National Academies Press; 2013
3. Yong PL, Saunders RS, Olsen LA, eds; Institute of Medicine (US); Roundtable on Evidence-Based Medicine. *The Healthcare Imperative: Lowering Costs and Improving Outcomes: Workshop Series Summary*. Washington, DC: National Academies Press; 2010
4. Davis K, Stremikis K, Squires D, Schoen C; The Commonwealth Fund. *Mirror, mirror on the wall, 2014 update: how the U.S. health care system compares internationally*. 2014. Available at: www.commonwealthfund.org/publications/fund-reports/2014/jun/mirror-mirror. Accessed February 1, 2016
5. Weinberger SE. Providing high-value, cost-conscious care: a critical seventh general competency for physicians. *Ann Intern Med*. 2011;155(6):386–388
6. Levinson W, Kallewaard M, Bhatia RS, Wolfson D, Shortt S, Kerr EA; Choosing Wisely International Working Group. Choosing Wisely: a growing international campaign. *BMJ Qual Saf*. 2015;24(2):167–174
7. Kleinert S, Horton R. From universal health coverage to right care for health [published online ahead of print January 9, 2017]. *Lancet*. 2017;390(10090):101–102
8. Berwick DM, Hackbarth AD. Eliminating waste in US health care. *JAMA*. 2012;307(14):1513–1516
9. Stammen LA, Stalmeijer RE, Paternotte E, et al. Training physicians to provide high-value, cost-conscious care: a systematic review. *JAMA*. 2015;314(22):2384–2400
10. Gupta R, Moriates C, Harrison JD, et al. Development of a high-value care culture survey: a modified Delphi process and psychometric evaluation [published online ahead of print October 26, 2016]. *BMJ Qual Saf*. 2017;26(6):475–483

11. Elligsen M, Walker SA, Pinto R, et al. Audit and feedback to reduce broad-spectrum antibiotic use among intensive care unit patients: a controlled interrupted time series analysis. *Infect Control Hosp Epidemiol.* 2012;33(4):354–361
12. Larmour I, Pignataro S, Barned KL, Mantas S, Korman MG. A therapeutic equivalence program: evidence-based promotion of more efficient use of medicines. *Med J Aust.* 2011;194(12):631–634
13. Sucov A, Bazarian JJ, deLahunta EA, Spillane L. Test ordering guidelines can alter ordering patterns in an academic emergency department. *J Emerg Med.* 1999;17(3):391–397
14. Lee TC, Frenette C, Jayaraman D, Green L, Pilote L. Antibiotic self-stewardship: trainee-led structured antibiotic time-outs to improve antimicrobial use. *Ann Intern Med.* 2014;161(suppl10):S53–S58
15. Vidyarthi AR, Green AL, Rosenbluth G, Baron RB. Engaging residents and fellows to improve institution-wide quality: the first six years of a novel financial incentive program. *Acad Med.* 2014;89(3):460–468
16. Stinnett-Donnelly JM, Stevens PG, Hood VL. Developing a high-value care programme from the bottom up: a programme of faculty-resident improvement projects targeting harmful or unnecessary care [published online ahead of print December 23, 2015]. *BMJ Qual Saf.* 2016;25(11):901–908
17. Ashok A, Combs B. Teaching high-value care. *AMA J Ethics.* 2015;17(11):1040–1043
18. Gleason M. A family's perspective on family-centered rounds: progress and frustrations. *Hosp Pediatr.* 2016;6(7):437–438
19. Society for Participatory Medicine. Participatory medicine resources for professionals. Available at: <https://participatorymedicine.org/what-is-participatory-medicine/participatory-medicine-resources-for-professionals/>. Accessed April 11, 2017
20. Peters M, Ten Cate O. Bedside teaching in medical education: a literature review. *Perspect Med Educ.* 2014;3(2):76–88
21. Gonzalo JD, Heist BS, Duffy BL, et al. The value of bedside rounds: a multicenter qualitative study. *Teach Learn Med.* 2013;25(4):326–333
22. McDaniel CE, White AA, Bradford MC, et al. The high-value care rounding tool: development and validity evidence [published online ahead of print August 29, 2017]. *Acad Med.* doi:10.1097/ACM.0000000000001873
23. Pierce C, Keniston A, Stickrath C. Frequency of attending physician-led discussion of test-ordering principles during teaching rounds. *JAMA Intern Med.* 2016;176(2):261–262
24. Patel MS, Reed DA, Smith C, Arora VM. Role-modeling cost-conscious care—a national evaluation of perceptions of faculty at teaching hospitals in the United States. *J Gen Intern Med.* 2015;30(9):1294–1298
25. Seattle Children's Hospital. Clinical standard work pathways and tools. 2017. Available at: www.seattlechildrens.org/healthcare-professionals/gateway/pathways/. Accessed March 1, 2017
26. Sisterhen LL, Blaszak RT, Woods MB, Smith CE. Defining family-centered rounds. *Teach Learn Med.* 2007;19(3):319–322
27. Paradis E, Sutkin G. Beyond a good story: from Hawthorne effect to reactivity in health professions education research. *Med Educ.* 2017;51(1):31–39
28. Priest JR, Bereknyei S, Hooper K, Braddock CH III. Relationships of the location and content of rounds to specialty, institution, patient-census, and team size. *PLoS One.* 2010;5(6):e11246
29. Satterfield JM, Bereknyei S, Hilton JF, et al. The prevalence of social and behavioral topics and related educational opportunities during attending rounds. *Acad Med.* 2014;89(11):1548–1557
30. Stickrath C, Noble M, Prochazka A, et al. Attending rounds in the current era: what is and is not happening. *JAMA Intern Med.* 2013;173(12):1084–1089
31. Beck J, Meyer R, Kind T, Bhansali P. The importance of situational awareness: a qualitative study of family members' and nurses' perspectives on teaching during family-centered rounds. *Acad Med.* 2015;90(10):1401–1407
32. Korenstein D, Smith CD. Celebrating minimalism in residency training. *JAMA Intern Med.* 2014;174(10):1649–1650
33. Patel MS, Davis MM, Lypson ML. The VALUE Framework: training residents to provide value-based care for their patients. *J Gen Intern Med.* 2012;27(9):1210–1214
34. Sedrak MS, Patel MS, Ziemba JB, et al. Residents' self-report on why they order perceived unnecessary inpatient laboratory tests. *J Hosp Med.* 2016;11(12):869–872
35. Khan KS, Coomarasamy A. A hierarchy of effective teaching and learning to acquire competence in evidenced-based medicine. *BMC Med Educ.* 2006;6:59
36. Baicker K, Rosenthal M. Shared savings, shared decisions, and incentives for high-value medical care. *JAMA Intern Med.* 2014;174(12):2014–2015
37. Boss EF, Mehta N, Nagarajan N, et al. Shared decision-making and choice for elective surgical care: a systematic review. *Otolaryngol Head Neck Surg.* 2016;154(3):405–420
38. Institute of Medicine. *Crossing the Quality Chasm: A New Health System for the 21st Century.* Washington, DC: National Academy Press; 2001
39. Fletcher KE, Rankey DS, Stern DT. Bedside interactions from the other side of the bedrail. *J Gen Intern Med.* 2005;20(1):58–61
40. Tartaglia KM, Kman N, Ledford C. Medical student perceptions of cost-conscious care in an internal medicine clerkship: a thematic analysis. *J Gen Intern Med.* 2015;30(10):1491–1496
41. Blackstone ME, Miller RS, Hodgson AJ, Cooper SS, Blackhurst DW, Stein MA. Lowering hospital charges in the trauma intensive care unit while maintaining quality of care by increasing resident and attending physician awareness. *J Trauma.* 1995;39(6):1041–1044

42. Graham JD, Potyk D, Raimi E. Hospitalists' awareness of patient charges associated with inpatient care. *J Hosp Med.* 2010;5(5):295–297
43. Rock TA, Xiao R, Fieldston E. General pediatric attending physicians' and residents' knowledge of inpatient hospital finances. *Pediatrics.* 2013; 131(6):1072–1080
44. Rappaport DI, Ketterer TA, Nilforoshan V, Sharif I. Family-centered rounds: views of families, nurses, trainees, and attending physicians. *Clin Pediatr (Phila).* 2012;51(3):260–266
45. Gonzalo JD, Chuang CH, Huang G, Smith C. The return of bedside rounds: an educational intervention. *J Gen Intern Med.* 2010;25(8):792–798

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