

AAIM Perspectives

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SOAP to SOAP-V: A New Paradigm for Teaching Students High Value Care



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INTRODUCTION

Despite multiple calls to improve training in high value, cost-conscious care,¹⁻⁶ medical schools have not traditionally emphasized instruction in this area.^{7,8} Training impacts future high value care (HVC) behaviors,^{9,10} yet medical students witness over-testing and unnecessary treatment behaviors in their clinical encounters,^{11,12} and residents report that only 54% of their faculty consistently role model cost-conscious care.¹³ Several medical schools have developed HVC curricula focused on delivering content knowledge.^{14,15} We created a point-of-care tool, SOAP-V, to empower students to integrate HVC into their medical decision making during oral presentations and note writing.

The SOAP-V framework modifies the traditional SOAP format (Subjective–Objective–Assessment–Plan) to include value (V). The framework prompts students to consider 3 aspects of HVC: evidence of value,

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patient preferences, and consideration of cost (**Figure**). We conceptualized SOAP-V during the Millennium Conference 2013 on Teaching High Value Care¹⁶ and subsequently refined the tool. Details of the development of SOAP-V have been described previously.¹⁷

SOAP-V serves as a cognitive forcing tool¹⁸ embedded into the normal workflow to remind team members to consider HVC. We taught students about SOAP-V and encouraged them to use this framework to bring up value concepts with attending physicians and residents during medical decision making. We envisioned SOAP-V as a tool to provide students with authentic, repeated practice opportunities to transfer HVC principles into their medical decision making and team discussions, optimize student learning,^{19,20} and increase student change agency²¹ in practicing HVC. Using Bandura's definition of self-efficacy, namely the confidence in the ability to exert control over one's own motivation, behavior, and social environment,¹⁸ this study examines the impact of SOAP-V on student self-efficacy in applying HVC principles.

PROGRAM DESCRIPTION

We launched a 1-year, institutional review board–approved study for academic year 2014-2015 to

implement SOAP-V at Pennsylvania State University College of Medicine (PSUCOM), Harvard Medical School (HMS), and Case Western Reserve University School of Medicine (CWRU). Participants were third-year medical students during their internal medicine clerkships. This study received exempt status and approval from the institutional review boards of Penn State College of Medicine (March 20, 2014, STUDY00000265), Harvard Medical School (April 3, 2014, IRB14-0708), Beth Israel Deaconess Medical Center (March 14, 2014, 2014P-000079), Louis Stokes Cleveland Veterans Administration Medical Center (March 28, 2014, CY14-036), and Case Western Reserve University (May 29, 2014, IRB-2014-830).

We conducted a non-randomized controlled trial, with half of the third-year students at each institution in the control arm and half in the intervention arm. Before the clerkship both control and intervention students attended a 1-hour lecture on general principles of HVC. Students in the intervention group received an additional 1-hour

SOAP-V training session, which included background on overuse and pressures faced by students on rounds to order unnecessary tests; introduction to the SOAP-V framework; a video of a student using SOAP-V on rounds; and role-play opportunities using SOAP-V in their presentations. They received a pocket card (Figure), which referenced Healthcarebluebook.com, a website that displays health care costs by US geographic region.²² We asked students to use the SOAP-V framework during inpatient rounds and informed faculty and residents that students might incorporate elements of HVC into their discussions. We did not provide SOAP-V instruction to faculty, residents, or control-arm students.

PERSPECTIVES VIEWPOINTS

- Medical students are well positioned to bring value discussions into patient care activities.
- Students at 3 medical schools used the SOAP-V framework during team presentations to apply high value care in their medical decision making.
- The intervention group reported higher self-efficacy toward addressing the economic health care crisis, initiating team discussions on unnecessary tests or treatments, and considering potential costs to patient and system; these changes were not present in the control group.

PROGRAM EVALUATION

Data Collection

To evaluate the impact of SOAP-V, we surveyed all students on their self-efficacy in applying HVC, queried students in the intervention group

about the types of value conversations held on rounds, and conducted 3 end-of-year student focus groups.

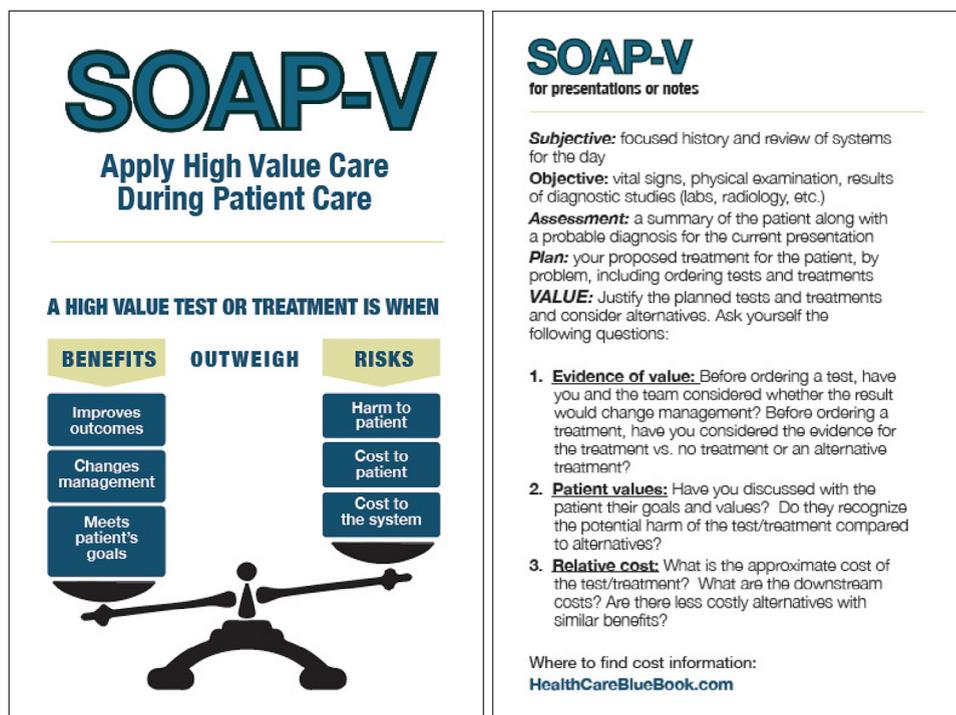


Figure SOAP-V Framework.

Students provided the last 4 digits of their cell phone numbers as nonidentifying codes for linking pre- and postintervention data. We conducted focus groups at the end of the academic year at PSUCOM and HMS on the value of SOAP-V, using volunteers from the intervention group, facilitated by faculty not involved in clerkship evaluation. Audio recordings were collected and transcribed without identifying data.

Data Analysis

We tabulated student results and dichotomized responses on 5-point scales as “strongly agree” or “agree” versus all other responses. We analyzed student survey results using McNemar’s test to compare results by individuals. We compared pre- with postintervention surveys and pre- with end-of-year surveys, by intervention and control groups. We tabulated the value self-audit results. All inferential analyses were conducted using Stata 13 (StataCorp, College Station, Tex).

We performed a thematic analysis of the focus group data. Two investigators (SBF, SAG) independently reviewed the transcripts and came to consensus on themes. We performed member checks by sending summaries to participants to ensure that their opinions were accurately represented.

RESULTS

A total of 265 medical students participated (PSUCOM, 137; CWRU, 80; HMS, 48) ([Appendix A](#), available online). The cohorts were similar across study sites except for HMS, where a higher proportion of students had received training in cost-consciousness in medical school. The overall student response rates to the survey were 100% before intervention (paper-based), 51% after intervention (electronic), and 51% at the end of the year (electronic). The response rates at each site did not vary significantly in postintervention measures (CWRU, 45%; HMS, 65%; PSUCOM, 49%; $P = .086$) but did by end of year (CWRU, 18%; HMS, 42%; PSUCOM, 74%; $P < .001$).

In the intervention group, paired analyses showed statistically significant increases from before to after intervention in the following self-efficacy statements: “I have the power to address the economic health care crisis” ($P = .005$), “I would be comfortable initiating a discussion about unnecessary tests or treatments with my team” ($P = .035$), “In my clinical decisions, I consider the potential costs to the patient” ($P = .003$), and “In my clinical decisions, I consider the potential costs to the health care system” ($P < .001$) ([Table](#)). By year end, positive responses toward the statement, “In my clinical decisions, I consider the potential costs to the health care system” ($P = .013$) persisted, and “I have the resources/means to make cost-conscious decisions” ($P = .020$) increased.

In the control group, paired analyses in the self-efficacy statements showed no change after clerkship but did show a decreased frequency of agreement with the statement, “I have the resources/means to make cost-conscious decisions” ($P = .050$) at end of year.

Value self-audits across sites differed from each other, with the highest proportion of value presentations at PSUCOM ($P = .014$), with similar types of value discussions across sites ([Appendix B](#), available online).

Several themes emerged from focus group discussions. Students articulated that one benefit of SOAP-V was that it embedded the concept of value into their thinking and empowered them to apply the framework in both inpatient and outpatient experiences, as well as in other clerkships. They reported becoming more cost-conscious and more comfortable with risk/benefit discussions. Many students remarked that SOAP-V training helped them find resources about relative costs that were often “invisible” to members of the team. Barriers to SOAP-V implementation included lack of cultural “buy-in” by residents and faculty and limited time. A table with themes and representative comments is available in [Appendix C](#) (available online).

DISCUSSION

We found that teaching third-year medical students in their medicine clerkships to use the SOAP-V framework positively impacted their self-efficacy to apply several HVC principles. At the end of clerkship, the intervention group students felt more comfortable in initiating a discussion about unnecessary tests or treatments with their team and were more likely to consider potential costs for the patient and the health care system compared with control group students. They felt more equipped to make cost-conscious medical decisions. Students did report an uptake of value discussions into teaching rounds. Interestingly, intervention and control students did not feel more comfortable specifically bringing up cost issues during rounds and indicated a lack of buy-in as a reason. Additionally, we suspect that specific discussions of costs may be fraught with anxiety and uncertainty for students who are attempting to fit in with the free-spending health care culture.

Our findings were consistent with the guiding principles of our tool. SOAP-V combines the well-established concepts of evidence-based medicine and patient-centered care with the less common consideration of cost into a memorable and intuitive framework. The training session elevated their awareness about value; Healthcare Bluebook gave them access to cost data; and SOAP-V provided them with a framework to integrate value discussions into rounds. These factors may have been synergistic in influencing student self-efficacy.

Our quantitative and qualitative results showed that some concepts from our SOAP-V training persisted to the end of the academic year. The SOAP format is not

Table Comparison of Student Intervention and Control Groups, Paired Analyses

Study Group	Pre-intervention Agreement*	Post-intervention Agreement	P Value†	End-of-Year Agreement	P Value‡
Intervention group					
I have the power to address the economic health care crisis.	12 (28)	23 (53)	.005§	21 (54)	.78
I have the resources/means to make cost-conscious decisions.	16 (37)	24 (56)	.10	27 (69)	.02§
I would be comfortable initiating a discussion about unnecessary tests or treatments with my team.	19 (44)	36 (84)	.000§	30 (77)	.20
I would be comfortable bringing up cost considerations in discussing patients with my team.	26 (60)	28 (65)	.59	25 (64)	.80
I make sure I elicit my patients' goals and preferences when I interact with them.	37 (86)	38 (88)	.74	34 (87)	.41
I incorporate my patients' goals and preferences when I make clinical decisions.	38 (88)	40 (93)	.48	36 (92)	1.00
In my clinical decisions, I consider the potential costs to the patient.	20 (47)	33 (77)	.003§	32 (82)	.21
In my clinical decisions, I consider the potential costs to the health care system.	10 (23)	29 (67)	.000§	24 (63)	.01§
Control group					
I have the power to address the economic health care crisis.	25 (42)	29 (48)	.37	26 (48)	.65
I have the resources/means to make cost-conscious decisions.	35 (57)	30 (49)	.35	28 (52)	.05§
I would be comfortable initiating a discussion about unnecessary tests or treatments with my team.	28 (47)	31 (52)	.53	30 (57)	.68
I would be comfortable bringing up cost considerations in discussing patients with my team.	37 (62)	30 (50)	.13	29 (55)	.06
I make sure I elicit my patients' goals and preferences when I interact with them.	54 (89)	54 (89)	1.00	46 (85)	.16
I incorporate my patients' goals and preferences when I make clinical decisions.	52 (87)	56 (93)	.25	47 (89)	.53
In my clinical decisions, I consider the potential costs to the patient.	46 (77)	47 (78)	.81	41 (77)	.81
In my clinical decisions, I consider the potential costs to the health care system.	33 (55)	41 (68)	.10	30 (57)	1.00

Values are number (percentage).

*Agreement indicates "somewhat agree" or "completely agree".

†Post- compared with preintervention.

‡End of year compared with preintervention.

§Statistically significant.

limited to internal medicine; it is a universal format for progress notes and presentations in all clerkship settings. As such, SOAP-V can be intimately linked to the daily activities of medical students, consistent with educational theories in which "educational innovation embedded in process change" can play a transformative role in learning.²³

One secondary finding was that whereas the students in the control group had a significant decline in their perception that they have the resources and means to make cost-conscious decisions, the students in the intervention group had an upward trend at the end of clerkship and a significant increase by year end. Although this difference may be due to chance, it is possible that

empowering students with tools to make HVC decisions may help to minimize the erosion of idealism and perceived self-efficacy, at least in the HVC domain, during a time in which stress, uncertainty, and intense acculturation contribute to the loss of optimism.²⁴⁻²⁷

Single-institution studies have revealed similar opportunities and challenges in teaching HVC to learners. The principle of using grassroots efforts²⁸⁻³⁰ is evidenced in Muntz's project, in which students are deputized as change agents in enforcing Choosing Wisely practices.¹⁴ Tartaglia's analysis of student experiences with cost-conscious care resonates with ours in that it highlighted "speaking up during rounds" as a primary strategy to incorporate value into decision making and identified time,

effort, and ingrained practices as barriers.¹¹ We propose that this “bottom-up” approach, using medical students and residents to transform the culture by gradual diffusion, represents a promising model for long-term change in physician HVC behaviors.

Limitations to our study include using institutions invested in HVC. Our outcomes centered on student self-efficacy rather than on objective measurement of behaviors or clinical outcomes. Students ranked site preferences, so groups were not randomized. Although differences between groups were modest, there may be unmeasured differences that could impact changes in HVC attitudes. Although all students were exposed to academic practices, unexplored site-specific differences in practice patterns and other hidden curricula might have influenced student attitudes. We experienced significant subject attrition in our measurements for several reasons: online surveys resulted in lower response rates compared with in-person paper-based surveys; repeat measurements resulted in lower response rates; and students did not always report identifier codes. Secular trends in institutions to focus on HVC may have magnified our results. Finally, our focus group participants were nonrandomized, which may have caused selection bias.

CONCLUSION AND IMPLICATIONS

SOAP-V is an effective and practical framework for teaching HVC. It creates a mindset of value in medical students. To test the generalizability of this framework for residents, we are currently studying the implementation of SOAP-V in 2 internal medicine residencies. Our hope is that once SOAP-V is embedded into presentations, every conversation, every case discussion, and every decision can focus appropriately on value that leads to improved outcomes for patients.

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Prior presentations: Report of 6-month interim analysis of quantitative data presented at Costs of Care Competition in Internal Medicine, Boston, Mass, April

30, 2015 and Northeastern Group on Educational Affairs Annual Retreat, Worcester, Conn, April 17, 2015.

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SUPPLEMENTARY DATA

Supplementary Tables accompanying this article can be found in the online version at [doi:10.1016/j.amjmed.2017.07.014](https://doi.org/10.1016/j.amjmed.2017.07.014).

APPENDIX A SUBJECT CHARACTERISTICS

Characteristic	CWRU	HMS	PSCOM	Total
Total	80	48	137	265
Age (y)				
25 or less	55 (69)	27 (56)	90 (66)	172 (65)
26-30	24 (30)	21 (44)	42 (31)	87 (33)
>30	1 (1)	0 (0)	5 (4)	6 (2)
Gender				
Female	41 (51)	23 (48)	67 (49)	131 (49)
Male	39 (49)	25 (52)	68 (50)	132 (50)
Unknown	0 (0)	0 (0)	2 (1)	2 (1)
Masters degree				
None	76 (95)	41 (85)	133 (97)	250 (94)
MPH	2 (3)	3 (6)	3 (2)	8 (3)
Other	2 (3)	4 (8)	1 (1)	7 (3)
Previous cost-conscious education*				
First 2 y	28 (35)	33 (69)	20 (15)	81 (31)
Other	11 (14)	11 (23)	15 (11)	37 (14)
Never	47 (59)	12 (25)	102 (74)	161 (61)
Primary care as a career				
No [†]	44 (55)	26 (54)	89 (65)	159 (60)
Yes [‡]	36 (45)	22 (46)	48 (35)	106 (40)

Values are number (percentage).

CWRU = Case Western Reserve University School of Medicine; HMS = Harvard Medical School; MPH = Master of Public Health; PSUCOM = Pennsylvania State University College of Medicine.

*Column totals may be greater than 100% because of rounding or because multiple responses were possible.

[†]Neutral, somewhat unlikely, or very unlikely.

[‡]Somewhat or very likely.

APPENDIX B VALUE SELF-AUDITS, BY STUDY SITE

Parameter	CWRU	HMS	PSCOM	Total
Incorporated value into rounds presentation				
Yes	47 (49)	29 (59)	40 (71)	116 (58)
No	46 (48)	15 (31)	14 (25)	75 (37)
No presentation at rounds	3 (3)	5 (10)	2 (4)	10 (5)
Form of discussion*				
Benefits of test/treatment	27 (57)	17 (59)	23 (58)	67 (58)
Risks of test/treatment	10 (21)	7 (24)	10 (25)	27 (23)
Effect of test on management	30 (64)	19 (66)	18 (45)	67 (58)
Patient preferences for test/treatment	10 (21)	6 (21)	7 (18)	23 (20)
Relative cost of test/treatment	22 (47)	8 (28)	20 (50)	50 (43)

Values are number (percentage).

CWRU = Case Western Reserve University School of Medicine; HMS = Harvard Medical School; MPH = Master of Public Health; PSUCOM = Pennsylvania State University College of Medicine.

*Column totals may be greater than 100% because multiple responses were possible.

APPENDIX C RESULTS OF THEMATIC ANALYSIS OF FOCUS GROUPS

SOAP-V served as a generalizable tool across clinical experiences	<p>"I had medicine first and I had it on my mind the rest of the year. When the discussions came up I had that added context."</p> <p>"If we can start having the health systems conversation talk much earlier on in our training, then you kind of switch your mindset and say, 'Okay, this is something important.'"</p> <p>"It definitely influenced me in the outpatient setting. I started to be more conscious of it and I would take into account not only guidelines, but would it change our management?"</p>
SOAP-V emphasized topics like cost and patient harm that were usually avoided	<p>"I just didn't think we did a good enough job of informing the patients about why we were doing the tests we were. Most of the discussions that we had about value were in the hallway, not in the patient's room."</p> <p>"(The system) lacks a finite idea of what this cost is. It's almost like having a credit card with an unlimited amount of money. You never know how much you're spending because you don't have a definitive statement of what's going on.</p>
SOAP-V facilitated value conversations	<p>"[A value-based question] would prompt either the intern or the resident to ask the same question."</p>
