

Students' clinical management decisions: use of a tool to increase awareness of cost

Katherine Travis¹, Amy Clithero-Eridon², Cameron Crandall³

¹BS, Medical student, University of New Mexico School of Medicine, Albuquerque, New Mexico, United States

²PhD, MBA, Principal Lecturer, University of New Mexico School of Medicine, Albuquerque, New Mexico, United States

³MD, Professor, Department of Emergency Medicine, University of New Mexico, Albuquerque, New Mexico, United States

Abstract

Background: The overuse of medical resources is a global issue, often resulting in more harm than good. Within the United States, almost one-third of medical spending is unnecessary, with physicians being responsible for an estimated 10% of this waste, primarily through lack of care coordination and overtreatment. Identifying opportunities for cost savings while delivering quality care is a core competency requirement for all medical specialties. We took a pragmatic approach to improve medical students' decision-making in different contexts to assist them in understanding contextual factors when ordering care. **Methods:** This study retrospectively reviewed 193 high-value care prescriptions. Prescriptions were completed by 4th-year medical students completing a rotation in an outpatient, inpatient, or emergency room setting during the 2020 and 2021 academic years. Indicators of interest included underlying reasons for testing, whether non-clinical effects of tests were considered, who the students discussed costs

with, and whether students believed the course changed the management of the patient. **Results:** A majority of students described downstream effects on the healthcare system and effects related to patients, such as cost, time, transportation, stress or anxiety, missed work, and childcare. The financial cost was one of the primary considerations for patients, yet it was not routinely discussed with patients. Most students felt that the prescription tool did not change the management of the current patient. However, they did feel that the tool changed their approach to future patients with the same problem, which was the goal of this project. **Conclusion:** There is a need to consider the value for patients and the cost to the health care system when ordering tests and procedures. More work must be done to encourage consideration and conversations about finances and social determinants of health amongst all team members, including patients.

Key words: Social determinants of health, Delivery of Healthcare, Medical Students, Cost Savings

Date submitted: 5-Mar-2024

Email: Katherine Travis (KTTravis@health.unm.edu)

Citation: Travis K, Clithero-Eridon A, Crandall C. Students' clinical management decisions: use of a tool to increase awareness of cost. *Educ Health* 2024;37:118-124

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-Non Commercial-Share Alike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

Online access: www.educationforhealthjournal.org

DOI: 10.62694/efh.2024.39

Background

The overuse of tests, procedures, and medications is found in both resource-rich and under-resourced countries.¹ Clinicians face increasingly compromising time constraints and a widening portfolio of administrative responsibilities. These expectations, combined with patient populations that remain under-informed regarding the costs and benefits of various treatment decisions, have led to an unsustainable amount of waste in the healthcare system.²⁻⁴ Almost one-third (30%) of medical spending in the United States is unnecessary, amounting to an estimated range of \$760 to 935 billion per year in wasted resources.² Physicians are responsible for an estimated 10% of this waste through unnecessary services, primarily through lack of care coordination and overtreatment.⁵

Identifying opportunities for cost savings while delivering quality care is a core competency requirement of the Accreditation Council for Graduate Medical Education for all medical specialties, specifically, "Identifies forces that impact the cost of health care, and advocates for, and practices cost-effective care."³ The American Medical Association advocates for incorporating cost and quality instruction as part of medical education, and many medical schools have risen to this challenge using a variety of educational methods, including lectures, student-led projects, courses on economics, and on-demand videos.^{6,7} To meet this mandate, all fourth-year medical students at the University of New Mexico School of Medicine (UNM SOM) complete a 4-week rotation that includes

Published by The Network: Towards Unity for Health

instruction for implementing high-value care based on suggested care delivery prompts.⁸ Students complete this high-value care prescription after completing a clinical case, completing the 12 online cost-value modules through Dell University, and viewing two videos depicting high-value care conversations with patients or preceptors.^{9,10} UNM SOM students use the prescription prompts while providing care in either inpatient, outpatient, or emergency settings. Students must then practice discussing costs with a relevant stakeholder (patient, preceptor, or consult team). The prescription form includes the original prompts and unique questions about social determinants of health (See Table 1: Prescription for Decision Making).

citations, and PubMed returned 13 article citations of the original Editorial. None of these citations included the implementation of the prompts in medical student education. We seek to categorize procedure and test ordering decision-making of 4th-year medical students to determine if the prescription tool assists their decision-making and if the tool might influence how they make future decisions. Cognitive learning theory guided the design of this project as students are given new information (costs and value), but they are grappling with it internally (questioning reasons why they order) and learning with it through this interaction (change in future approach).

Since 2012 when the prescription form prompts were published, Google Scholar recorded 51

Table 1: Prescription for Decision-Making

HIGH VALUE CARE EDUCATIONAL PRESCRIPTION
Adapted from the American College of Physicians©

Rotation: Medicine in NM IM Sub-I

Setting: Outpatient Inpatient Emergency Room Disease/Condition: _____

Test you are considering: _____

Did the patient have this test previously? Yes No Unknown N/A
If yes, what is the indication for repeating it?

Is the result of a repeated test likely to be substantively different from the last result? Yes No
 Unknown N/A

If it was done recently elsewhere, can you get the result instead of repeating the test? Yes No
 Unknown N/A

Will the test result change your care of the patient? Yes No

What are the potential harms? Consider effects to both the healthcare system and the patient
What are the probable and potential adverse consequences of a false-positive result?

Is the patient in potential danger over the short term if I do not perform this test? Yes No

Am I ordering the test primarily because the patient wants it or to reassure the patient? Yes No
If yes, have you discussed the issue with the patient? Yes No

Are there other strategies to reassure the patient? Yes No

Alternative test: _____

Alternative is no testing

What are the costs of the test and the alternative (actual cost AND downstream costs)?

Who did you discuss the cost (monetary and other) with? Patient Yes Preceptor Consultant

Clinical Choice made: _____

Did this exercise change management of this patient? Yes No
Did this exercise change your approach to future patients with the same
Problem? Yes No

Preceptor Name: _____

Preceptor Signature: _____

METHODS

Study Design

This study retrospectively reviewed decision-making assignments. The study population was 4th-year medical students who opted to explore the Healthcare System track within their required Medicine in New Mexico rotation at the UNM SOM. We analyzed 193 high-value care prescriptions completed during the 2020 and 2021 academic years by 193 students, each of whom submitted one prescription. We use the term “test” to indicate either a clinical test or procedure, as students could complete the prescription for either a test or procedure. Our focus is overall decision-making, not the type of care delivered. Indicators of interest include underlying reasons for ordering tests, whether non-clinical effects of tests were considered, who the students discussed costs with, and whether students believed the course changed the management of the patient or would affect the future management of similar patients. Students were given the link to the University’s Charge Master,¹¹ Fair Health Consumer,¹² and GoodRX¹³ to determine direct costs. A chargemaster lists line item charges for hospital care. Fair Health Consumer provides reasonable average charges based on zip codes. GoodRx provides pharmaceutical prices based on zip codes, store discounts, and coupons.

Ethics: The University of New Mexico Human Research and Review Committee exempted this study (HRRC# 18-272).

Setting: Students completed a rotation in an outpatient, inpatient, or emergency room (ER) setting. We incorporated ER settings into inpatient responses.

Data Collection: Data were collected from the prescription assignment. Students submitted the prescription to the instructor, A.C.E., at the end of the course. Assignments were stored on the instructor’s password-protected computer. After IRB approval was obtained, a research assistant entered de-identified data elements into the UNM RedCap database.

Data Elements: Data points to analyze student decision-making and determine if using a structured prescription form changes their original decision, include all the prompts on the prescription form. There are three main questions with branching options, which depend on how the main question is answered.

Main Question 1: Care Setting. Options of Emergency Department, Inpatient, Outpatient.

Main Question 2: Procedure or test decision-making prompts.

Branching Questions for Q2 were yes, no, or potential, except for a free text response on downstream harms and who they discussed the prescription form with.

Indicators of interest: Did a patient have a similar prior test? Would the result of a repeated test differ from the last result? If it was done recently elsewhere, can you get the result instead of repeating the test? Will the test result change your care of the patient?

Potential downstream harms and adverse consequences of a false-positive result? Is the patient in potential danger over the short term if the test is not ordered? Are you ordering the test primarily because the patient wants it or to reassure the patient? If yes, have you discussed the issue with the patient? Are there other strategies to reassure the patient? Who did you discuss the cost with?

Main Question 3: Form usefulness asked as a yes or no question: Did the exercise change the management of this patient? Did this exercise change your approach to future patients with the same problem?

Data Analysis: Statistical analyses using R studio. If the response was “possible,” we characterized it as a negative response. We used Fisher’s exact and Pearson’s Chi-Squared tests to determine significance beyond simple percentages between outpatient and inpatient settings. Alpha was set at 0.05, and two-sided p values were reported. For open-ended questions, we categorized responses into themes using Excel. Percentages are reported in the qualitative responses for descriptive purposes only. Analysis was done on the inpatient versus outpatient to determine if decision-making and care discussions differed by setting.

The one question regarding the downstream effects of tests was analyzed qualitatively. An experienced researcher, A.C.E., did the analysis. The responses were grouped into health system or patient effects.

Table 2 captures the underlying reasons for ordering a particular test or procedure on a patient. We did not include “unknown” responses and adjusted our N accordingly within the settings where tests were ordered.

RESULTS

Main Question 1: Care Setting

There were 193 completed prescriptions, 83% (n = 160) completed in the outpatient setting and 17% (n = 33) completed in the inpatient setting.

Table 2: Underlying reasons for decision making

n (%)	Total 193 (100)	Outpatient 160 (83)			Inpatient 33 (17)			p-value
		Yes	No	Potentially	Yes	No	Potentially	
Ordered a repeat test	85 (47)	71 (46)	83 (54)					
		14 (50)	14 (50)		0.7 ¹			
Ordered a repeat test even though the results were unlikely to be substantively different from the previous test	23 (41)	21 (36)	25 (43)	12 (21) ^a	2 (18)	8 (73)	1 (9) ^a	0.3 ²
If the test was done elsewhere, could, you get the result instead of repeating the test?	21 (44)	19 (44)	24 (56)		2 (40)	3 (60)		>0.9 ²
Believed the test/procedure ordered would change the management of the patient	58 (78)	52 (78)	11 (16)	4 (6) ^b	6 (43)	5 (36)	3 (21) ^b	0.020 ²
Is the patient in potential danger over the short term if I don't order this test/procedure?	71 (39)	53 (35)	--		18 (56)	--		0.028 ¹
Are you ordering the test primarily because the patient wants it or to reassure the patient?	46 (24)	43 (28)	--		3 (9)	--		0.025 ¹
If yes, did you discuss this with the patient?	44 (98)	41 (98)	--		3 (100)	--		>0.9 ²
Were there other strategies to reassure the patient other than ordering a test/procedure?	38 (88)	37 (93)	--		1 (33)	--		0.032 ²

Note: Values expressed as n (%). Differences between outpatient and inpatient by Pearson's Chi-squared test¹ or Fisher's exact test². The 'Potentially' column includes responses recorded as possible and maybe.

Main Question 2: Procedure or test decision-making prompts

Less than half of the students ordered a repeat test (47%, n=85). The most common reasons for repeat testing were to “assess, diagnose, screen, monitor, and follow clinical guidelines.” There were no significant differences between settings for repeating a test (p=0.7) and correlating responses of whether the test was likely to differ from the last test result (p=0.3).

If the test was recently done elsewhere, 21 students (44%) believed they could obtain the results instead

of repeating it. When the students were asked if the test they were considering would change the care of their patient, 58 (78%) responded that it would, with the outpatient setting (78%, n=52) significantly differing (p=0.020) from the inpatient (43%, n=6).

One hundred and sixty-nine students responded to the open-ended question regarding probable and potential harms resulting from a false-positive test, including downstream effects on the patient and healthcare system. Students could list as many effects as they wanted. For the downstream effects considered, more than three-fourths (86%, n=148) of students described effects on the healthcare

system, such as monetary costs and unnecessary use of resources (15%, $n=25$) or clinical effects of excess interventions, antibiotic resistance, or radiation exposure (71% $n=120$). Effects related to patients were mentioned in 75% of the responses ($n=127$) as a downstream effect, and primarily listed in the outpatient setting. These included financial costs to the patient (17%), time (14%), transportation (.04%), stress or anxiety (28%), missed work (22%), and childcare (.01%). Patient and provider relationship or trust issues were .02% of responses. Costs non-specific to the healthcare system or patient comprised 16% ($n=27$) of answers.

When asked if the patient was in potential short-term danger if the test was not performed, 39% ($n=71$) of students said yes, with the majority of the inpatient setting (56%, $n=18$, $p=0.028$) responding yes.

The inpatient and outpatient groups differed significantly for ordering a test to reassure their patients ($p=0.025$), with 28% ($n=43$) of outpatient and 9% ($n=3$) of inpatient ordering primarily to reassure the patient. Almost all students (98%, $n=44$) discussed with their patients when they ordered the test to reassure them. Compared to the inpatient (33%, $n=1$), most students in the outpatient group (93%, $n=37$) believed there were other strategies to reassure the patient aside from ordering a test or procedure ($p=0.032$).

Financial costs were the primary consideration for patients, yet they were not routinely discussed with patients. The majority of students (95%, $n=177$) discussed cost with their preceptor, and 29% ($n=54$) discussed cost with their patients (greater than 100% because some students discussed cost with both their patient and their preceptor).

Main Question 3: Form usefulness

When asked if the prescription tool changed the patient's management, 81% ($n=133$) said no. When asked if the prescription tool changed their approach to future patients with the same problem, 71% ($n=117$) said yes.

Limitations

Limitations include a small N for the inpatient setting, and we piloted the project with medical students who have limited agency in decision-making authority.

DISCUSSION

The American Medical Association advocates for the broad incorporation of Health System Sciences instruction in medical curricula as the 3rd pillar of education beyond clinical and basic science content; value in Health Care is one of the core components.¹⁴ Globally, however, there is a need to consider the value for patients and the cost to the healthcare system and patients when ordering tests and procedures. As this study shows, many tests were ordered even though the results were presumed by students to not likely change patient management or be different from previous results. Repeat testing contributes to excess monetary costs as well as potential excess interventions.¹⁵ Excess interventions such as over-screening, overprescribing, and interventions with harmful side effects all affect the healthcare system and individuals. There can even be psychological harm from now being labeled as "sick" or "diseased."

The prescription would not change more than 75% of student's decisions. As these are medical students, this may result from role-modeled behavior, a lack of autonomy in the final decision-making, and a desire to be thorough. Reasons resident physicians overorder include: (1) Duplicating role modeled behavior; (2) Desire to be complete; (3) Pre-emptive ordering/rushing an evaluation/unnecessary duplication of tests; (4) Discomfort with diagnostic uncertainty; (5) Curiosity; (6) Lack of knowledge of the costs and harms; (7) Defensive medicine; (8) Patient requests; (9) Faculty demand; (10) No training in weighing benefit relative to cost and harm; and (11) Ease of access to services when a patient is hospitalized.^{16,17} It is reasonable to assume that medical students role-model resident physicians' and attendings' behaviors, thus being driven by similar motivations. Our findings show repeat tests and procedures continue to be ordered even though results could definitely or potentially be obtained elsewhere. Additionally, we demonstrate that results would not likely change from previous results, would not change the management of the patient, and would not harm the patient if not ordered.

Improving value is a multifaceted endeavor. In this research, we focused on improving medical students' recognition of their reasoning and motivations for ordering specific tests or making specific clinical decisions. It is encouraging that almost 75% of all students would re-consider their decisions for similar patients in the future. We observed that much of their learning is self-directed

and informed by experience and interventional introspection, more so than formal instruction. This is supported by responses to the prompt questioning whether or not this prescription assignment will change their future decision-making. This research intervention focuses on the United States, but the prescription tool can be adapted to other contexts.

CONCLUSION

Despite the many observations from this exercise, there is room for improvement in considering the costs of social determinant effects on patients,

particularly in the inpatient department setting. UNM SOM students are learning from providers we know from our experience aren't having these conversations, or are uncomfortable questioning an attending's decisions. The prescription exercise is a start, but more work, whether utilizing these prescription forms or a different methodology, needs to be done in various contexts such as private practices, community-based clinics, and with advanced trainees, faculty, and non-MD healthcare providers to encourage considerations and conversations about patient finances and social determinants of health.

References

1. Brownlee S, Chalkidou K, Doust J, Elshaug AG, Glasziou P, Heath I, et al. Evidence for Overuse of Medical Services Around the World. *Lancet London England*. 2017 Jul 8;390(10090):156–68. [https://doi.org/10.1016/S0140-6736\(16\)32585-5](https://doi.org/10.1016/S0140-6736(16)32585-5).
2. Shrank WH, Rogstad TL, Parekh N. Waste in the US Health Care System: Estimated Costs and Potential for Savings. *The Journal of the American Medical Association*. 2019 Oct 15;322(15):1501–9. <https://doi.org/10.1001/jama.2019.13978>.
3. Schlesinger M, Grob R. Treating, Fast and Slow: Americans' Understanding of and Responses to Low-Value Care. *Milbank Quarterly*. 2017 Mar;95(1):70–116. <https://doi.org/10.1111/1468-0009.12246>.
4. Berwick DM, Hackbarth AD. Eliminating waste in US health care. *The Journal of the American Medical Association*. 2012 Apr 11;307(14):1513–6. <https://doi.org/10.1001/jama.2012.362>.
5. The Role Of Clinical Waste In Excess US Health Spending | Health Affairs Brief [Internet]. Retrieved 2023 Jan 24. Available from: <https://www.healthaffairs.org/doi/10.1377/hpb20220506.432025/full/>.
6. Gonzalo JD, Chang A, Dekhtyar M, Starr SR, Holmboe E, Wolpaw DR. Health Systems Science in Medical Education: Unifying the Components to Catalyze Transformation. *Academic Medicine*. 2020 Sep;95(9):1362–72. <https://doi.org/10.1097/ACM.0000000000003400>.
7. Erath A, Mitchell M, Salwi S, Liu Y, Sherry A. The Sooner the Better: High-Value Care Education in Medical School. *Acad Med*. 2019 Nov;94(11):1643–5. <https://doi.org/10.1097/ACM.0000000000002881>.
8. Laine C. High-Value Testing Begins With a Few Simple Questions. *Annals of Internal Medicine*. 2012 Jan 17;156(2):162–3. <https://doi.org/10.7326/0003-4819-156-2-201201170-00016>
9. | Dell Medical School | The University of Texas at Austin [Internet]. [Retrieved 2022 Apr 13]. | Dell Medical School | The University of Texas at Austin. Available from: <https://vbhc.dellmed.utexas.edu/>
10. Value Conversations Modules: First, Do No Financial Harm [Internet]. Costs of Care. Retrieved 2022 Oct 5. Available from: <https://costsofcare.org/?popupspress=value-conversations-modules>
11. UNMH and SRMC Standard Charges| Billing & Insurance | UNM Health System | Albuquerque, New Mexico [Internet]. Retrieved 2024 Mar 5. Available from: <https://unmhealth.org/patients-visitors/billing-insurance/charge-masters.html>
12. Welcome to FAIR Health [Internet]. [Retrieved 2024 Mar 5]. Available from: <http://www.fairhealthconsumer.org>

13. Prescription Prices, Coupons & Pharmacy Information - GoodRx [Internet]. Retrieved 2024 Mar 5. Available from: <https://www.goodrx.com>
14. Borkan JM, Hammoud MM, Nelson E, Oyler J, Lawson L, Starr SR, et al. Health systems science education: The new post-Flexner professionalism for the 21st century. *Medical Teacher*. 2021 Apr 8;43(sup2):S25–31. <https://doi.org/10.1080/0142159X.2021.1924366>
15. Gupta P, Gupta M, Koul N. Overdiagnosis and overtreatment; how to deal with too much medicine. *Journal of Family Medicine Primary Care*. 2020 Aug 25;9(8):3815–9. https://doi.org/10.4103/jfmpe.jfmpe_433_20
16. LMSW BSY MA. Why do residents order unnecessary labs? [Internet]. *Today's Hospitalist*. 2017 Retrieved 2022 Sep 13. Available from: <https://www.todayshospitalist.com/why-do-residents-order-unnecessary-labs/>
17. Sedrak MS, Patel MS, Ziemba JB, Murray D, Kim EJ, Dine CJ, et al. Residents' self-report on why they order perceived unnecessary inpatient laboratory tests. *Journal of Hospital Medicine*. 2016;11(12):869–72. <https://doi.org/10.1002/jhm.2645>