Original Research Article

SAGE Open Medicine

What strategies are used by clinician champions to reduce low-value care?

SAGE Open Medicine
Volume 10: 1–9

DOI: 10.1177/20503121211069855
journals.sagepub.com/home/smo
SAGE

Michael L Parchman[1], Lorella G Palazzo[1], Jessica M Mogk[1], Janna C Webbon[1], Lauren Demosthenes[2], Elizabeth Vossenkemper[3], George Hoke[4], Joshua Moskovitz[5,6], Leslie Dunlap[7] and Roberto Diaz del Carpio[8]

Abstract

Background: Clinician champions are front-line clinicians who advocate for and influence practice change in their local context. The strategies they use when leading efforts to reduce the use of low-value care have not been well described. The purpose of this study is to identify and describe strategies used by six clinician champions who led a low-value care initiative in their clinical setting.

Methods: Qualitative data collected during an overuse reduction initiative led by clinician champions were used to identify strategies, guided by the Expert Recommendations for Implementing Change compilation of strategies. Clinician champions were asked to rank the importance of these activities and indicate which one of the six most important activities they would be willing to discuss in an interview. A 30-min semi-structured interview was conducted with each clinician about the activity they selected and thematically analyzed.

Results: Twelve Expert Recommendations for Implementing Change strategies were identified. The top six strategies discussed during interviews were: build a coalition, conduct a local needs assessment, develop a formal implementation blueprint, conduct educational meetings, use facilitation, and develop clinical reminders. Common themes that emerged across all interviews were the use of data to engage clinicians in conversations, including the patient's perspective in designing the interventions, and investing the time upfront to plan and launch the initiative because of the inherent challenges of relinquishing a service.

Conclusions: Clinician champions identified multiple strategies as important when de-implementing a low-value service. Many were used to engage in conversations with stakeholders, including leadership, providers, and patients, to increase buy-in and support, challenge beliefs, promote behavior change, and gather insights about next steps in their effort. Future work is needed to better understand how prepare clinicians for this role and to understand the mechanisms through which these strategies might be effective.

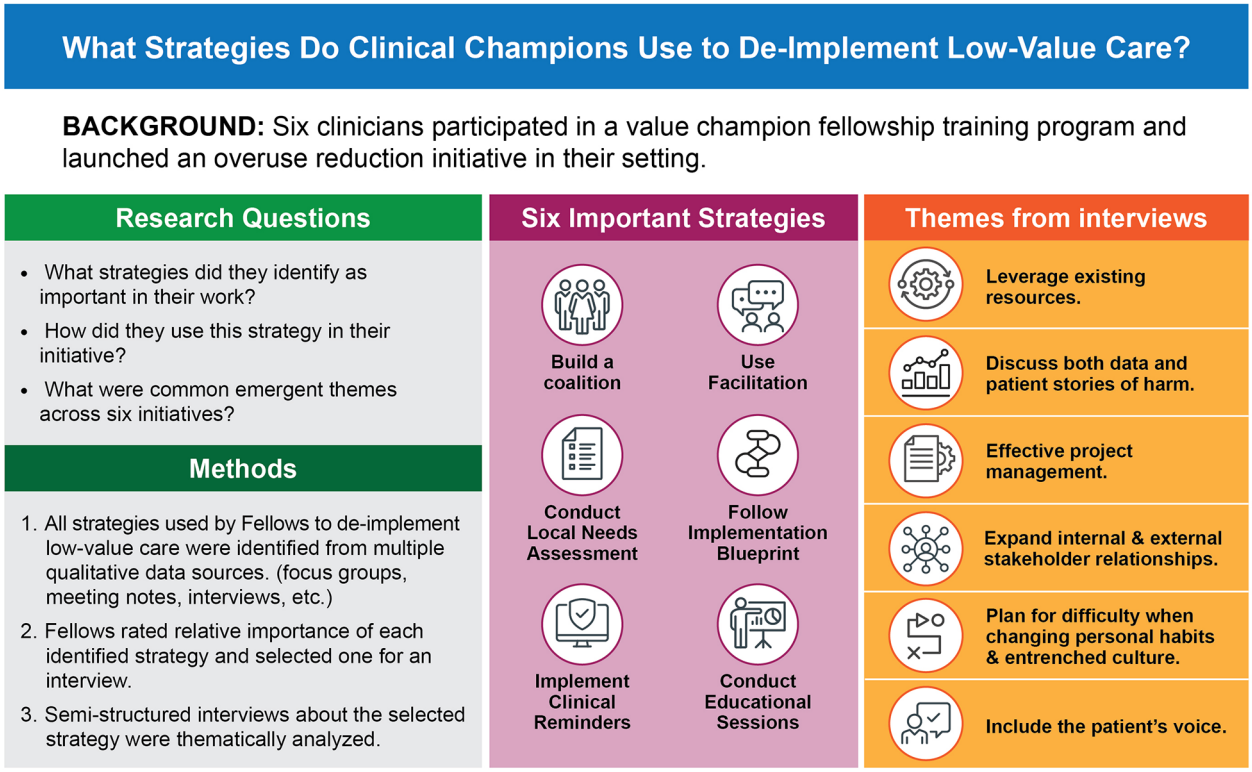
Keywords

Low value, clinician champion, de-implementation, de-adoption, overtreatment, overuse, implementation science, medical reversal, harmful

Date received: 8 September 2021; accepted: 10 December 2021

[1]Kaiser Permanente Washington Health Research Institute, Seattle, WA, USA
[2]University of South Carolina School of Medicine Greenville, Greenville, SC, USA
[3]Tri-Cities Community Health, Pasco, WA, USA
[4]University of Virginia School of Medicine, Charlottesville, VA, USA
[5]Department of Emergency Medicine, Albert Einstein College of Medicine, New York, NY, USA
[6]Department of Public Health, Hofstra School of Health and Human Services, New York, NY, USA
[7]University of New Mexico Hospital, Albuquerque, NM, USA
[8]CareMore Health, Cerritos, CA, USA

Corresponding author:
Michael L Parchman, Kaiser Permanente of Washington Health Research Institute, 1730 Minor Ave., Ste. 1600, Seattle, WA 98101, USA.
Email: michael.x.parchman@kp.org



Introduction

Although there is a growing body of knowledge about strategies to improve the implementation of underused, evidence-based practices,[1] less is known about how effectively engage clinicians in efforts to reduce the use of low-value care.[2–4] Also known as overused, inappropriate, or unnecessary care, these are services for which the potential for patient harm is greater than the benefit.[5–7] Spurred by a growing body of evidence about both the volume of unnecessary health care services and the harm they inflict on patients, interest is growing in identifying effective strategies and approaches to reduce the use of these services.[8–11] It is commonly recognized that factors affecting successful de-implementation are often multi-level, complex, context specific, and interact in ways that are uniquely different from implementation of an evidence-based service.[12] In addition, individual health care organizations have distinct patterns of overuse that persist over time, suggesting the need for interventions embedded within the organization to address the culture of how care is delivered.[13–15] One such intervention found in some studies to reduce low-value care is that of the clinician champion.[16–20]

Clinician champions are front-line clinicians who advocate for and influence practice change in their local context. They facilitate adoption of evidence-based practice and can be effective at overcoming organizational and contextual barriers.[21–23] Observed clinician champion activities during efforts to implement underused evidence-based care include: educating colleagues, advocacy, relationship building, problem-solving, implementing new care pathways, monitoring progress, and standardizing processes across service lines, and use of a participative leadership style.[22,24,25]

Although others have described the potential of a clinician champion in de-implementing low-value care services,[26] little or no work has focused on what strategies clinician champions use when leading efforts to reduce the use of a low-value care service and how they use such strategies. A recent systematic review on the impact of Choosing Wisely interventions concluded that multi-component interventions that target clinicians are most effective.[27] Clinician champions, someone who could advocate for change among their colleagues, were identified as a clinician-focused intervention in some of the studies reviewed.

The purpose of this study is to identify and describe strategies employed by clinician champions who led an initiative to reduce the delivery of a low-value service across a diversity of care settings. Three questions guided our study:

1. What strategies do clinician champions use when leading an initiative to de-implement an overused service?
2. How do clinician champions employ that strategy to support de-implementation efforts in their project?
3. When discussing these strategies, what additional insights about how a clinical champion can be effective are common across the six initiatives?

Table 1. Clinician champions, their projects, and important strategies.

Clinician	Setting	Project	Important strategy
1. Primary care general internist	Academic residency program faculty	Overprescribing of opioids for chronic pain	Clinical reminders
2. Emergency department physician	Urban/inner city emergency department	Imaging for low back pain	Facilitation
3. Obstetrician/gynecologist	Academic health center	Postnatal visits for hypertensive disorder of pregnancy	Building a coalition
4. Inpatient podiatry physician assistant	University hospital	Antibiotic stewardship for diabetic foot sores	Local needs assessment
5. Internal medicine hospitalist	University hospital	Multiple lumens peripherally inserted central catheters	Educational meetings
6. Pediatric advanced nurse practitioner	Federally qualified health center	Cough/cold medicine for infants/children	Implementation blueprint

Methods

Study design

An observational study of six clinicians who led an overuse reduction projects to address a low-value care service in their clinical setting.

Subjects and setting

Six clinicians from safety net settings across the United States were recruited to participate in a 16-month program from April 2019 to July 2020 address overused services in their setting. We prioritized safety net settings, which serve populations that are uninsured or covered by Medicaid or other vulnerable populations because of the interest of the funder, the Robert Wood Johnson Foundation, in health equity. Clinicians were asked to submit an application that included a description of their setting and their targeted low-value care service. In addition, we required evidence of leadership support and endorsement of each individual as a champion by providing a letter of support. Descriptions of the selected clinicians, their clinical setting, and the overuse topic they selected for their project are given in Table 1. Clinicians met monthly with a mentor and participated in a monthly meeting to share progress on their overuse reduction project. After 12 months, each clinician presented the results of their project during a Capstone meeting to an invited national audience.

Data collection and analysis

All data were collected as part of a planned formative and summative evaluation of their learning experiences for the purpose of developing a more formal program for future cohorts of clinician champions. An overview of the steps taken to collect and analyze the data to answer the three questions is shown in Figure 1. Here, we describe the specific methods used for each question.

Question 1. What are the most important strategies used by the value champions?

Figure 1. Data collection and analysis.

Data collection. Qualitative evaluation data were collected from eight sources during the project (see Supplemental Appendix 1). We used template analysis to analyze source documents from these eight data sources employing a code list drafted by LP and iteratively refined and agreed upon by the project team.[28] Five coding memos focused on central aspects of the clinicians' projects and experience were developed: (1) project implementation strategies, (2) sequencing of project steps, (3) training needs and gaps, (4) lessons learned, and (5) insights into preparing new clinician value champions.

Analysis. Guided by the Expert Recommendations for Implementing Change (ERIC) compilation of intervention strategies, two team members (MP and LP) reviewed the five coding memos to identify strategies used by the clinicians during their projects.[1] Strategies from the coding memos that appeared to match items in the ERIC taxonomy formed an initial list that MP and LP revised and finalized through discussion. Twelve of the 73 ERIC strategies were found to be represented across the clinicians' projects: audit and provide feedback, build a coalition, conduct educational meetings, conduct educational outreach visits, conduct local consensus discussions, conduct a local needs assessment, develop a formal implementation blueprint, provide facilitation, inform local opinion leaders, intervene with patients/consumers to enhance uptake and adherence, involve patients/consumers and family members, and use clinical reminders. Clinicians were then asked to rate the 12 strategies by relevance for the success of the projects (with 1 = most

Table 2. "How important were each of these strategies in your project" (1 = most important to 6 = least important).

Strategy	Mean score	Number of clinicians who rated as "1" or "2"
Build a coalition[a]	1.17	6
Conduct local needs assessment[a]	1.67	6
Develop a formal implementation blueprint[a]	2.00	5
Conduct educational meetings[a]	2.66	3
Facilitation[a]	2.66	3
Remind clinicians[a]	3.00	2
Inform local opinion leaders	3.00	2
Audit and provide feedback	3.17	3
Conduct local consensus discussions	3.17	2
Intervene with patients/consumers to enhance uptake and adherence	3.50	2
Involve patients/consumers and family members	3.67	2
Conduct educational outreach visits	4.00	1

[a]Identified by at least one clinician as a strategy they could describe in an interview.

important and 6 = least important). In addition, we asked them to select one strategy from the top 6 strategies they would be willing to discuss during an interview.

> *Questions 2 and 3*. How did they employ their strategy? What strategies/approaches were common across the projects?

Data collection. Three team members (MP, JM, and JW) conducted 30-min phone interviews with each clinician about the strategy they selected for their interview. Two interviewers attended each interview. All interviews were conducted using a set of common prompts: (1) Tell me about your strategy and how you used it, (2) I want to hear about your thinking as you planned to use this strategy, (3) Was this strategy used earlier or later in your project and why? (4) How did this strategy work with other strategies or pieces of your project? and (5) Did you encounter any barriers and how did you approach them? Interviews were recorded with consent and transcribed.

Analysis. Interview transcripts were reviewed and coded by three team members (JM, JW, and MP) using Atlas.ti software. Transcripts were first coded using a simple/high-level process that created a code as a comment for each "unit of meaning," defined as a section of text that all fell into a common theme. Units of meaning could overlap or have multiple codes applied to them. Two individuals coded each transcript independently using this process and then met to review their codes and develop/refine a final list of codes.

Before completing a second round of coding, LP, JW, and MP iteratively refined the code list, when possible aligning codes with strategy descriptions in ERIC and renaming code groups accordingly. With the code list finalized, the interview transcripts were recoded. LP applied thematic analysis to the coded transcripts and drafted a coding memo collecting themes surfaced across interviews, along with illustrative quotes. The project team reviewed and refined the memo, which was shared with the clinicians for feedback. The Kaiser Permanente of Washington Institutional Review Board completed an administrative review and issued a non-research determination.

Results

The six clinicians were diverse in their clinical training and in their settings, and the overuse topics they chose to address in their project (Table 1). They represented in- and outpatient settings, rural and inner-city urban clinics, and included an advanced nurse practitioner, a physician assistant, and four physicians.

The ranking of the relative importance of all 12 identified strategies is shown in Table 2. The six most important strategies selected by the clinicians for their interview along with illustrative quotes are shown in Table 3. The strategies were: build a coalition, conduct a local needs assessment, develop a formal implementation blueprint, conduct educational meetings, use facilitation, and develop clinical reminders.

Building a coalition involved recruiting supporters both outside and inside the local clinical setting to enhance buy-in and support from colleagues. For example, to decrease imaging for low back pain in the emergency department, it was important to recruit supporters in the department of radiology. To reduce use of peripherally inserted triple lumen intravenous catheters at the time of hospital discharge, engaging home health nurses was critical. The value champions commented on the need for such a coalition, which served as a support system to counter resistance to relinquishing an established medical practice, help survive leadership turnover, and overcome setbacks during the initiative.

The local needs assessment was important in both informing the selection of a low-value care service to address and identifying supportive stakeholders and resources. For example, the needs assessment often incorporated opinions

Table 3. Description of most important strategies selected by champions for interviews.

Strategy	ERIC definition	Illustrative quote
Build a coalition	Recruit and cultivate partners in the implementation effort	"I knew there were some leaders in my system that were supportive, so I got them on board early. And then if I could get a resident involved that would garner really strong support. Then I could go to the team of workers who it would involve and even if they weren't supportive, they were like, well, yeah, you know we'll do it." (Clinician #4)
Use facilitation	A process of interactive problem solving and support that occurs in a context of a recognized need for improvement and a supportive interpersonal relationship	"I think in any culture shift you really have to be smart about the engagement, and I think facilitation is one of the most useful ways to do that." (Clinician #2) "To say . . .'Why in practice are we doing something?'. . . and then kind of debunking the myths from there and facilitating the conversation to make them realize the importance." (Clinician #2)
Conduct a local needs assessment	Collect and analyze data related to the need for the innovation	"Essentially . . . we were able to just kind of crunch a few numbers and see: Is this really an issue here? Is this a local problem in our facility?" (Clinician #5) "Just getting their opinions . . . you know it was meeting people throughout the process and finding out where their views were on this as well." (Clinician #4)
Develop an implementation blueprint	Develop a formal implementation blueprint that includes all goals and strategies. Use and update this plan to guide the implementation effort over time	"It [project charter] was really a communication device . . . to quickly and effectively communicate what was happening . . . especially at meetings where I was giving a little bit of a shorter presentation on . . . what I was doing." (Clinician #6) "I'd refer back to that charter and be, OK, does this all align with what we're trying to measure at the end?" (Clinician #6)
Develop clinical reminders	Develop reminder systems to recall information and/or prompt them to use the clinical innovation	"People need a reminder, something that helps them to make their life easier." (Clinician #1) "Each of them helped me to create their own reminder. . .I think that help a lot because they felt that actually they did it." (Clinician #1)
Conduct educational meetings	Hold meetings targeted toward different stakeholder groups to teach them about the clinical innovation	"What we did then was design a brief session that described alternatives to [low-value care service], what factors made it more or less risky, and the evidence behind those things." (Clinician #5) "Even doctors who claim to be data driven like to tell stories. So, I did tell a couple of stories of bad things that happen to patients that might have been avoidable." (Fellow #5)

ERIC: Expert Recommendations for Implementing Change.

of providers and patients about relinquishing a specific low-value service before committing to that low-value care service for their project. The assessment conducted prior to launching an effort to reduce the use of intravenous antibiotics for diabetic foot ulcers revealed a larger institutional antibiotic stewardship campaign with resources that were useful for the value champion's project. As a result, the needs assessment also informed the [de-]implementation blueprint developed by the clinicians.

The formal [de-]implementation blueprint was a quality improvement (QI) project charter.[29] A QI charter is a living document that clearly states the aims of the project, provides a brief rationale for why it is important, describes expected outcomes, defines what is in scope and out of scope, specifies measures and data needs, and provides a proposed schedule of activities along with who is on the improvement team. Value champions used the QI charter to both to obtain and continuously engage leadership support in the face of competing organizational priorities and leadership turnover, and as a communication tool to improve buy-in from colleagues and key stakeholders across their organization. It was also valuable to champions as they managed their project and helped them keep track of next steps.

Educational meetings attended by clinicians were used to present evidence about the overused service to enhance buy-in and support. These meetings often included a story of patient harm from the targeted service in their clinical setting. They occasionally invited a local specialty opinion leader who presented additional evidence and the rationale behind reducing the use of the service.

Value champions also focused on facilitating conversations to engage colleagues either in one-on-one discussions or in group meetings about the overuse reduction initiative. These conversations were often used to address concerns about relinquishing a service, and perceived barriers to doing so. They were frequently unplanned and sometimes included recent provider-specific data about rates of overuse of the low-value service.

They worked to enhance engagement across the health care team by engaging with individual team members to develop reminders tailored to their role and workflow that supported relinquishing the overused service. These were

Table 4. Common approaches across the six projects.

Strategy	Illustrative quote
Leverage existing resources	"We did interviews with the clinical pharmacist residents and because they have to do a research project and we thought it would be great to find some more manpower." (Clinician #4)
Strategically use evidence/data	"I think talking to people and explaining to them the value and having a little bit of data to back you up, whether it's clear or not, it's been helpful to kind of continue conversations." (Clinician #2) "I think people see the value in it once they see kind of the data and they see the support." (Clinician #2)
Use project organization/ management	"Being able just take small pieces and then take them and say OK each one of these small bullet points on this two-page document is an entire process that I have to now branch out and pull out." (Clinician #6)
Rely on internal and external relationships	"It's just having an informal conversation with my colleagues . . . instead of telling them what to do, I need to learn what are their perspectives. How are they seeing this overall problem?" (Clinician #1) "I work inpatient and outpatient, so I have friends in the emergency department and talk to them about it." (Clinician #4)
Listen to the patient voice	"One of the major pushbacks here was that the patients will not be satisfied with using remote monitoring that they prefer in person visits. . .so we just went into the rooms of all the patients who would be eligible for this and asked. . .you know it was almost universal that they wanted to do it." (Clinician #3)
Recognize the difficulty of changing personal habits and entrenched cultural attitudes	"De-implementation is hard because it's a safety blanket you're used to. Whether that's right or not, it's your practice pattern." (Clinician #2) "The hardest part was just changing the culture of environment with 'Look, it's been done this way. We're not going to change.' " (Clinician #4) "[the time invested] is not lost work. You know it may be that your system is just not ready for this particular project, and so you might need to backtrack and build up toward it." (Clinician #2)

not just clinical prompts for the ordering physician, they also included prompts for care team members or checklists that would enhance the support clinicians need with patients. The champion then assisted them with implementation, either as a clinical reminder in the electronic health record or as staff member checklists.

Common themes across all six interviews are given in Table 4 with illustrative quotes. Champions described how they used data strategically in conversations and presentations to their peers to engage them in behavior change and create a safe learning environment for further discussions about the overuse topic in the future. Champions not only engaged in conversations with peers within their own clinical setting, but also found value in connecting with other colleagues in departments across their organization to form partnerships. These connections fostered an understanding of the potential impact of de-implementing the targeted service in those settings, and planning for future potential de-implementation projects. Incorporating the perspective of the patient was also a common strategy. Champions found this useful not only when addressing concerns among their clinician peers that relinquishing the service would not be acceptable to patients, but also to inform the design of their interventions to include patient engagement in the effort.

Finally, clinicians frequently mentioned the difficulty of changing existing behaviors and challenging an entrenched culture of overuse, compared to the effort required to implement an evidence-based service. Recognition of this difficulty motivated their efforts to form a strong coalition of partners across their organization, incorporate the patient perspective to counter resistance by providers, and include patient stories of harm during educational meetings. Clinician champions reported that these stories were an effective means of engaging colleagues during educational opportunities and were complimentary to sharing data.

Discussion

Clinician champions identified multiple strategies as important in their work to de-implement a low-value service. Many, if not most of the important strategies were helpful in their effort to engage in conversations with stakeholders, including leadership, providers, and patients. The purpose of these conversations was to increase buy-in and support, challenge beliefs, promote behavior change, and gather insights about next steps and strategies for their work as a clinician champion. Even the implementation blueprint, which was a QI charter, was used by clinicians as a communication tool when meeting with colleagues and stakeholders to discuss the de-implementation project. This multi-strategy focus is consistent with previously published de-implementation frameworks and theories of behavior change that show how conversations can influence people to relinquish an established routine or behavior.[10,27,30–33]

Our findings support the three potential mechanisms through which a clinician champion might be successful in promoting high-value care with their colleagues as described by Stammen et al.[26]: (1) effective transmission of knowledge

about benefits and harms, (2) facilitation of reflective practice, and (3) creation of a supportive environment. As an example of effective knowledge transmission, one champion mentioned the importance of a story about patient harm in their efforts to engage their colleagues during educational meetings. Reframing overuse as a patient harm has been previously described as an effective intrinsic motivator for change.[5,34,35] Another champion described the strategic use of data in reflective conversations with colleagues about unnecessary care in their clinical setting. It is important to note that it was not just the provision of data to clinicians that champions found important, rather it was the discussion with a peer about the data that champions reported as important. This approach is consistent with prior published literature about the value of using social norms when providing clinician feedback.[36] Finally, implementing clinical reminders and conducting a local needs assessment to identify and leverage existing resources were examples of how champions worked to create a supportive environment. These strategies and their descriptions by the champions are similar to the phases of work within the recently published Choosing Wisely De-Implementation Framework.[3]

It was difficult for clinicians to discuss the one strategy they thought was the most important during their interview without mentioning other strategies they used to engage individuals across multiple levels of their organization. This finding is consistent with suggestions that similar to implementation, multi-component interventions across multiple levels of an organization will be required when reducing the use of a low-value care service.[4,12] It is also consistent with the finding that clinician champions were never used alone, only in combination with other interventions in a recent systematic review of Choosing Wisely interventions.[27] Commonly used co-interventions included clinician education, clinician feedback, and clinical decision support, similar to the strategies used by the clinician champions in this study.

Especially, noteworthy was the recognition by champions of how difficult it was to ask individuals to relinquish delivery of a service, and the need to address a culture of overuse within their organization (see Table 4). This recognition might explain why the champions invested several months to identify existing resources, develop a strong coalition of supporters within their organization, gather data on overuse of their targeted service, and understand the perspectives of both patients and multiple other stakeholders within their clinical setting before moving forward with interventions to decrease the use of a service. The importance of engaging with patients is evident as it was one of the six common themes that emerged across all interviews with the champions, consistent with current literature.[37] In spite of these challenges, four of the six clinician champions reported success at reducing the use of their targeted low-value care service.

One limitation of this study is the small sample of clinician champions working to reduce low-value care. Thus, it is possible that a greatly expanded sample of clinician champions that would allow for saturation to be reached when collecting the qualitative data might reveal additional strategies. However, prior studies examining the work of clinician champions, including reviews across several studies, only describe their role and approach when implementing a new program or intervention, rather than reducing the use of a service.[21] In addition, de-implementation studies using clinician champions only address one low-value care service in one type of clinical setting, and do not provide in-depth analysis of the strategies or approaches used by the champion. In contrast, the diversity of settings and types of low-value care services addressed in this study suggests that these findings may be robust and generalizable about strategies used by clinician champions when reducing the use of a low-value service. Another limitation is the focus in the analysis on a predefined list of implementation strategies in the literature is a limitation. Our attempt to narrow the list of applicable ERIC strategies to those mentioned in the eight existing data sources may have unnecessarily restricted the choices of "important" strategies for the clinicians to choose from in our survey. However, the additional themes surfaced across all six interviews may suggest new approaches not previously identified.

Conclusion

The strategies identified by clinician champions as important to the success of their low-value care project were used to increase buy-in and engage diverse stakeholders across their organization in including leaders, managers, as well as front-line clinician and staff. Future research is needed to identify the specific competencies needed to train clinician value champions in the use of these strategies, evaluate their effectiveness in de-implementing other low-value services across a broader diversity of clinical settings, and further our understanding of the underlying mechanisms behind the effectiveness of a clinician champion to reduce low-value care delivery.

Abbreviations

ERIC: Expert Recommendations for Implementing Change; QI: quality improvement.

Acknowledgements

The authors would like to thank Chris Tachibana for editing assistance with the manuscript. They would also like to thank the individuals who served as faculty for the value champions training program for input and guidance with the manuscript: John Mafi, Kelly Rand, Robert Fogerty, Reshma Gupta, Kathy Reims, Josh Liao, and Scott Cook. A pre-print version of this manuscript was posted on June 1, 2021 on Research Square: https://www.research-square.com/article/rs-559651/v1

Author's contributions

MLP and LP conceived the study, developed, and implemented the study design. JM and JW contributed to data collection and analysis of the data. LD, EV, GH, JM, LD, and RDC participated in data

interpretation and contributed to writing the results and discussion. Drs Parchman and Palazzo had full access to all of the data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis.

Declaration of conflicting interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: Supported by the Robert Wood Johnson Foundation, Grant # 75607.

Ethics approval

The Kaiser Permanente—Washington Region IRB determined that no IRB review for the data collected was required and provided a waiver from IRB review/ethics review. The waiver number is 1316272-1.

Informed consent

Informed consent was not sought for the present study because these data were collected to evaluate an educational program for purposes of improving future programs to develop clinician champions and a waiver from IRB review was obtained. That said, all clinician participants were given the option of participating in this evaluation.

ORCID iDs

Michael L Parchman https://orcid.org/0000-0001-7129-2889
Jessica M Mogk https://orcid.org/0000-0003-4102-7309
Joshua Moskovitz https://orcid.org/0000-0001-5840-8664
Leslie Dunlap https://orcid.org/0000-0001-6034-5084

Supplemental material

Supplemental material for this article is available online.

References

1. Powell BJ, Waltz TJ, Chinman MJ, et al. A refined compilation of implementation strategies: results from the Expert Recommendations for Implementing Change (ERIC) project. *Implement Sci* 2015; 10: 21.
2. Ellen ME, Wilson MG, Vélez M, et al. Addressing overuse of health services in health systems: a critical interpretive synthesis. *Health Res Policy Syst* 2018; 16(1): 48.
3. Grimshaw JM, Patey AM, Kirkham KR, et al. De-implementing wisely: developing the evidence base to reduce low-value care. *BMJ Qual Saf* 2020; 29(5): 409–417.
4. Colla CH, Mainor AJ, Hargreaves C, et al. Interventions aimed at reducing use of low-value health services: a systematic review. *Med Care Res Rev* 2017; 74(5): 507–550.
5. Korenstein D, Chimonas S, Barrow B, et al. Development of a conceptual map of negative consequences for patients of overuse of medical tests and treatments. *JAMA Intern Med* 2018; 178(10): 1401–1407.
6. Bouck Z, Calzavara AJ, Ivers NM, et al. Association of low-value testing with subsequent health care use and clinical outcomes among low-risk primary care outpatients undergoing an annual health examination. *JAMA Intern Med* 2020; 180(7): 973–983.
7. Ganguli I, Simpkin AL, Lupo C, et al. Cascades of care after incidental findings in a US national survey of physicians. *JAMA Netw Open* 2019; 2(10): e1913325.
8. Berwick DM and Hackbarth AD. Eliminating waste in US health care. *JAMA* 2012; 307(14): 1513–1516.
9. Levinson W, Born K and Wolfson D. Choosing Wisely campaigns: a work in progress. *JAMA* 2018; 319(19): 1975–1976.
10. Parchman ML, Henrikson NB, Blasi PR, et al. Taking action on overuse: creating the culture for change. *Healthc (Amst)* 2017; 5(4): 199–203.
11. Prusaczyk B, Swindle T and Curran G. Defining and conceptualizing outcomes for de-implementation: key distinctions from implementation outcomes. *Implement Sci Commun* 2020; 1: 43.
12. Norton WE and Chambers DA. Unpacking the complexities of de-implementing inappropriate health interventions. *Implement Sci* 2020; 15(1): 2.
13. Oakes AH and Radomski TR. Reducing low-value care and improving health care value. *JAMA* 2021; 325(17): 1715–1716.
14. Nilsen P, Ingvarsson S, Hasson H, et al. Theories, models, and frameworks for de-implementation of low-value care: a scoping review of the literature. *Implement Res Pract*. Epub ahead of print September 2020. DOI: 10.1177/2633489520953762.
15. Berlin NL, Yost ML, Cheng B, et al. Patterns and determinants of low-value preoperative testing in Michigan. *JAMA Intern Med* 2021; 181: 1115–1118.
16. Trumbo SP, Iams WT, Limper HM, et al. Deimplementation of routine chest x-rays in adult intensive care units. *J Hosp Med* 2019; 14(2): 83–89.
17. Stinnett-Donnelly JM, Stevens PG and Hood VL. Developing a high value care programme from the bottom up: a programme of faculty-resident improvement projects targeting harmful or unnecessary care. *BMJ Qual Saf* 2016; 25(11): 901–908.
18. Oliver L, Gibson J, Kapu A, et al. Choosing Wisely: an APN-led initiative to reduce unnecessary chest x-rays in the cardiovascular ICU. *Crit Care Med* 2016; 44(12): 132.
19. Mafi J, Godoy-Travieso P, Wei E, et al. Evaluation of a Choosing Wisely™ intervention to reduce low value preoperative care for patients undergoing cataract surgery at a safety net health system. In: *December 4–7, 2017 10th Annual Conference on the Science of Dissemination & Implementation*, Arlington, VA.
20. Coronel E, Bassi N, Donahue-Rolfe S, et al. Evaluation of a trainee-led project to reduce inappropriate proton pump inhibitor infusion in patients with upper gastrointestinal bleeding: skip the drips. *JAMA Intern Med* 2017; 177(11): 1687–1689.
21. Miech EJ, Rattray NA, Flanagan ME, et al. Inside help: an integrative review of champions in healthcare-related implementation. *SAGE Open Med* 2018; 6(1): 1–11.
22. Flanagan ME, Plue L, Miller KK, et al. A qualitative study of clinical champions in context: clinical champions across three levels of acute care. *SAGE Open Med* 2018; 6(1): 1–8.
23. Damschroder LJ, Banaszak-Holl J, Kowalski CP, et al. The role of the champion in infection prevention: results from a multisite qualitative study. *Qual Saf Health Care* 2009; 18(6): 434–440.
24. Soo S, Berta W and Baker GR. Role of champions in the implementation of patient safety practice change. *Healthc Q* 2009; 12: 123–128.

25. Bonawitz K, Wetmore M, Heisler M, et al. Champions in context: which attributes matter for change efforts in healthcare? *Implement Sci* 2020; 15(1): 62.
26. 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.
27. Cliff BQ, Avancena ALV, Hirth RA, et al. The impact of Choosing Wisely interventions on low-value medical services: a systematic review. *Milbank Q*. Epub ahead of print August 2021. DOI: 10.1111/1468-0009.12531.
28. Brooks J, McCluskey S, Turley E, et al. The utility of template analysis in qualitative psychology research. *Qual Res Psychol* 2015; 12(2): 202–222.
29. Langley G, Nolan K, Nolan T, et al. *The improvement guide: a practical approach to enhancing organizational performance*. San Francisco, CA: John Wiley & Sons, 1996.
30. Jordan ME, Lanham HJ, Crabtree BF, et al. The role of conversation in health care interventions: enabling sensemaking and learning. *Implement Sci* 2009; 4: 15.
31. Morgan DJ, Leppin AL, Smith CD, et al. A practical framework for understanding and reducing medical overuse: conceptualizing overuse through the patient-clinician interaction. *J Hosp Med* 2017; 12(5): 346–351.
32. Norton WE, Chambers DA and Kramer BS. Conceptualizing de-implementation in cancer care delivery. *J Clin Oncol* 2019; 37(2): 93–96.
33. Helfrich CD, Rose AJ, Hartmann CW, et al. How the dual process model of human cognition can inform efforts to de-implement ineffective and harmful clinical practices: a preliminary model of unlearning and substitution. *J Eval Clin Pract* 2018; 24(1): 198–205.
34. Liao JM, Schapira MS, Navathe AS, et al. The effect of emphasizing patient, societal, and institutional harms of inappropriate antibiotic prescribing on physician support of financial penalties: a randomized trial. *Ann Intern Med* 2017; 167(3): 215–216.
35. Hicks LK. Reframing overuse in health care: time to focus on the harms. *J Oncol Pract* 2015; 11(3): 168–170.
36. Liao JM, Fleisher LA and Navathe AS. Increasing the value of social comparisons of physician performance using norms. *JAMA* 2016; 316(11): 1151–1152.
37. Born KB, Coulter A, Han A, et al. Engaging patients and the public in Choosing Wisely. *BMJ Qual Saf* 2017; 26(8): 687–691.