



Published in final edited form as:

Ann Surg Oncol. 2020 August ; 27(8): 2653–2663. doi:10.1245/s10434-020-08285-0.

Barriers and Facilitators to De-Implementation of the Choosing Wisely® Guidelines for Low-Value Breast Cancer Surgery

Margaret E. Smith, MD, MS^{1,2}, C. Ann Vitous, MA, MPH², Tasha Hughes, MD, MPH^{1,2}, Sarah P. Shubeck, MD, MS¹, Reshma Jagsi, MD, DPHl³, Lesly A. Dossett, MD, MPH^{1,2}

¹Department of Surgery, University of Michigan, Ann Arbor, MI

²Center for Healthcare Outcomes and Policy, University of Michigan, Ann Arbor, MI

³Department of Radiation Oncology, University of Michigan, Ann Arbor, MI

Abstract

Background: To address overuse of unnecessary practices, several surgical organizations have participated in the Choosing Wisely® campaign and identified four breast cancer surgical procedures as unnecessary. Despite evidence demonstrating no survival benefit for all four, evidence suggests only two have been substantially de-implemented. Our objective was to understand why surgeons stop performing certain unnecessary cancer operations but not others, and how best to de-implement entrenched and emerging unnecessary procedures.

Methods: We sampled surgeons who treat breast cancer in a variety of practice types and geographic regions in the United States. Using a semi-structured guide, we conducted telephone interviews (n=18) to elicit attitudes and understand practices relating to the four identified breast cancer procedures in the Choosing Wisely® campaign. Interviews were recorded, transcribed and anonymized. Transcripts were analyzed using inductive and deductive thematic analysis.

Results: For the two procedures successfully de-implemented, surgeons described a high level of confidence in the data supporting the recommendations. In contrast, surgeons frequently described a lack of familiarity or skepticism toward the recommendation to avoid sentinel node biopsy in women 70 years of age, and the influence of other collaborating oncology providers as justification for continued use. Regarding contralateral prophylactic mastectomy, surgeons consistently agreed with the recommendation that this was unnecessary yet reported continued utilization due value placed on patient autonomy and preference.

Conclusions: With a growing focus on the elimination of ineffective, unproven or low value practices, it is imperative that the behavioral determinants are understood and targeted with specific interventions to rapidly decrease utilization.

Corresponding Author: Lesly A Dossett MD MPH, Assistant Professor of Surgery, University of Michigan Institute for Health Policy and Innovation, 1500 E Medical Center Drive, Ann Arbor, MI 48109, Phone: 615-943-2543, ldossett@umich.edu.

Conflicts of Interest

The authors have no conflicts of interest.

Introduction

Use of ineffective, unproven, or low-value practices in cancer care leads to patient harms without improving overall survival.^{1–3} To address overuse of unnecessary practices, several major surgical organizations recently participated in the Choosing Wisely® campaign^{4–8} and identified four breast cancer surgical procedures as unnecessary. These include (1) avoiding re-excision for close but negative lumpectomy margins for invasive cancer, (i.e. the “no tumor on ink” guideline), (2) avoiding completion axillary lymph node dissection (ALND) in women with limited metastatic disease in the lymph nodes (i.e. the ACOSOG Z0011 trial^{9,10}), (3) avoiding sentinel lymph node biopsy (SLNB) in women 70 years of age with hormone receptor-positive breast cancer, and (4) avoiding contralateral prophylactic mastectomy (CPM) in women without hereditary breast cancer syndromes.

After a randomized controlled trial demonstrated no survival benefit for complete ALND in women with only a few involved lymph nodes,⁹ single center rates decreased substantially.^{11–19} Similarly, after leading oncology groups issued a consensus statement on adequate lumpectomy margins for invasive cancer, rates of unnecessary re-excision substantially decreased within 18 months.^{20–25} In contrast, despite evidence demonstrating no survival benefit for patients, CPM rates continue to increase^{26–31} and the use of sentinel node biopsy in women 70 years of age with hormone receptor-positive cancer has not significantly changed.^{32–35} This differential de-implementation raises questions as to how and why surgeons stopped doing some unnecessary cancer procedures but not others, and which factors act as barriers or facilitators to de-implementing entrenched or emerging unnecessary practices.

To assess whether and why surgeons have de-implemented low-value, unnecessary breast surgical practices, we performed a qualitative descriptive study with practicing surgeons across the United States. Our specific research questions were: (1) What are surgeons’ current practice patterns regarding the four Choosing Wisely recommendations addressing unnecessary? (2) What barriers and facilitators exist in de-implementing each of these practices?

Methods

Study Sample and Recruitment

Utilizing a combination of professional contacts, publicly available information via center websites and purposive and snowball sampling³⁶, participants were recruited via email or at in-person national meetings. Eligibility criteria included being a general surgeon, breast surgeon or surgical oncologist in the US treating at least 12 breast cancer patients per year. We sampled surgeons to include a variety of practice types (free-standing cancer center, university-based practice, community-based practice) and geographic regions. Preliminary analyses were performed iteratively with data collection to reassess sample size for sufficient information power for cross-case comparison.³⁷ Interview participants were reimbursed \$50 for participation. This study deemed exempt from review by the University of Michigan Institutional Review Board.

Theoretical Framework

The Theoretical Domains Framework is a validated framework based on rigorous review of the literature and expert consensus. It comprises 84 major constructs across 14 domains consolidated from implementation frameworks to systematically assess contextual factors influencing practice change.³⁸ Based on our prior work, we selected constructs we believed were most likely to be potential barriers and facilitators of de-implementation. The semi-structured interview guide was designed to elicit and further explore these constructs as well as elicit beliefs and attitudes not captured in these constructs .

Data Collection

A semi-structured interview guide was developed by members of the research team (MS, SS, LD) and included a series of open-ended questions designed to elicit barriers and facilitators to de-implementation of each of the unnecessary procedures identified by the Choosing Wisely® campaign. After pilot testing the interview guide was with three breast surgeons to confirm validity wording of certain questions was modified to enhance clarity. The interview guide was further revised through the data collection period, as necessary, in keeping with standard qualitative methods. All interviews were conducted over the phone by MS. Interviews lasted 25 – 40 minutes and were completed between September 2018 and March 2019.

Data Analysis

Interviews were recorded, transcribed and anonymized. Each transcript was analyzed using both inductive and deductive thematic analysis.³⁹ Initially, two investigators (MS, AV) reviewed all transcripts to familiarize themselves with the data. The two investigators then independently identified and developed initial codes. The initial codes were collated into themes and domains, which were iteratively developed throughout the analytic phase until saturation was achieved. Thematic saturation was reached when new themes were infrequently identified, and eligible subjects were recruited and interviewed until this was achieved.⁴⁰ Each transcript was independently coded for all domains by two researchers and coding disagreements were resolved through discussion until consensus was reached. The research team then created a descriptive matrix to identify patterns and themes between and across the four surgical procedures. The identified themes for each procedure were then mapped to the TDF behavior domains and constructs. The qualitative research software NVivo 12 (QSR International, Doncaster, VIC, Australia) was used to assist with storage, coding, and searching of the data.

Results

We sampled and interviewed eligible practicing breast surgeons between September 2018 and March 2019 until saturation of themes was achieved (n = 18). Eight subjects completed a breast surgery fellowship, 7 completed a surgical oncology fellowship, and three received no fellowship training. Years of experience in breast surgery ranged from 0.5 – 30 years, with an average of 11.5 years in practice (median 11 years). The surgeons performed an average of 240 breast cancer operations annually (median 250 cases, range 100 – 350 cases), and 9 of the subjects practiced in a community setting.

General Knowledge Regarding the Choosing Wisely® Guidelines

Approximately half of the subjects were familiar with the Choosing Wisely® campaign and its aim to reduce unnecessary tests and procedures. None of the subjects accurately identified all four breast surgery practices targeted for de-implementation by the campaign. Dominant themes identified from the interviews were classified within eight domains: knowledge, skills, beliefs about consequences, social influences, goals, beliefs about capabilities, emotion, and professional role and identity. Key themes varied substantially between the four surgical procedures, and the directionality of the domain (barrier versus facilitator of guideline concordant care) differed between practices. Below, we provide explanations of the identified determinants of de-implementation for each surgical practice.

Choosing Wisely Guideline #1: Don't routinely re-operate on women with invasive breast cancer if the cancer is close to the edge of the excised lumpectomy tissue.

—Women undergoing lumpectomy for invasive cancer benefit from re-operation to excise more tissue if microscopic review indicates cancer cells at the tissue edge. However, if cancer cells are only close to the edge, then re-operation is unnecessary serving only to remove normal breast tissue.⁴¹

The participating surgeons uniformly described avoiding re-excision for management of a patient with invasive breast cancer and a close but negative margin after lumpectomy. A frequent facilitator of de-implementation was the strong evidence base (Knowledge - Scientific Rationale). Several surgeons emphasized that this facilitated straightforward conversations with patients (Skills - Interpersonal Skills).

Nearly half of participants offered comments regarding their decisions to perform the procedure in *specific* cases. One surgeon stated, “there are still patients with close margins who may benefit from re-excision” (Beliefs about Consequences - Outcome Expectancies). Common scenarios for considering re-excision included young patients, patients with multiple close margins, or patient wishing to avoid recommended adjuvant therapy. Many surgeons expressed that if a patient were to request a re-excision for peace-of-mind or other psychological factors, they would perform this procedure in order to preserve patient autonomy and avoid paternalism, despite acknowledging this was a low-value practice (Social Influence - Power; Goals - Goal Priority). (Table 1)

Choosing Wisely Guideline #2. Don't routinely excise all the lymph nodes beneath the arm (axillary lymph node dissection) in women with only a few involved lymph nodes.

—In the past, women found to have cancer in any lymph node underwent extra surgery to remove all the nodes—a complete axillary lymph node dissection. Recent randomized controlled trial evidence confirms the complete dissection is unnecessary in women with cancer in fewer than three lymph nodes if the patient receives other recommended cancer treatments.^{9,10}

All surgeons reported avoiding completion ALND in women meeting the criteria of the ACOSOG Z0011 trial.⁹ Some surgeons reported managing patients this way prior to results of clinical trials, while the majority described rapidly de-implementing this procedure following publication trial result (Knowledge - Scientific Rationale). Surgeons were

consistent in their treatment decisions and, in contrast to other procedures, no patient or clinical factors were described as creating an exception to following the guideline. The majority of surgeons attributed patients' concerns for developing debilitating lymphedema after an ALND as the key driver for why patients never requested this procedure be performed. Notably, over half of the participants described that this fear often resulted in patients refusing ALND in situations where it was clinically indicated. Finally, some surgeons described what they perceived as widespread de-implementation of completion ALND, stating it would be inappropriate for any provider to continue to perform this operation (Social Influence – Group Norms). (Table 1)

Choosing Wisely Guideline #3. Don't routinely use sentinel node biopsy in women 70 years of age with hormone receptor-positive breast cancer.—

Hormonal therapy is standard for all women with hormone receptor-positive cancer. The omission of sentinel node biopsy in women 70 years of age treated with hormonal therapy does not result in increased rates of recurrence and does not impact breast cancer mortality.^{42,43}

SLNB in women 70 years of age with hormone receptor-positive cancer continues to be frequently performed by the majority of surgeons interviewed. Multiple subjects were unaware of the SSO Choosing Wisely recommendation or clear evidence supporting this guideline. Subjects frequently expressed significant skepticism over the evidence-base and the generalizability of the age threshold to their patients (Knowledge –Scientific Rationale). Nearly all subjects described making treatment decisions based on a patients' functional status rather than chronological age. Surgeons stated that if a patient "appeared healthy" and they anticipated the patient would live for at least five additional years then they would offer, and often recommend, a SLNB on patients over age 70.

Unique to this particular Choosing Wisely® recommendation, the influence of other collaborating multidisciplinary medical providers significantly impacted decision-making. Specifically, surgeons believed information obtained from SLNB impacted adjuvant therapy, and not pursuing this procedure was disadvantageous for patients in terms of their subsequent adjuvant therapy options (Beliefs about Consequences –Outcome Expectancies). Additionally, if medical or radiation oncologists indicated they might use information from a SLNB to guide adjuvant treatment (i.e. would administer chemotherapy to a patient aged 70 or older) then nearly all surgeons reported they would perform the procedure (Social Influences – Social Pressures). Many subjects justified performing a SLNB in patients aged 70 or over with hormone receptor-positive tumors by emphasizing their belief that a SLNB is a very low-risk procedure that adds minimal additional time to an operation (Beliefs about Consequences – Outcome Expectancies; Beliefs about Capabilities – Professional Confidence).

Even in clinical scenarios where the results of a SLNB would not inform or alter treatment, nearly all surgeons agreed they would perform a SLNB if it was requested by the patient. If a patient could tolerate general anesthesia, the majority of surgeons stated they would perform a SLNB to satisfy patients' preferences and autonomy, even if they acknowledged

this was of low-value to the patient (Social Influence – Power; Goals – Goal Priority). (Table 2)

Choosing Wisely Guideline #4. *Don't routinely perform a double mastectomy in women with unilateral breast cancer.*—

After a diagnosis of breast cancer in a single breast, some women desire removal of the uninvolved, normal other breast (contralateral prophylactic mastectomy, CPM), believing their cancer cure rate will be improved with double mastectomy. Multiple meta-analyses confirm CPM does not improve survival and is unnecessary in women with unilateral mastectomy and no hereditary breast cancer syndrome.^{44–47}

Nearly all surgeons reported frequently performing CPM in women without hereditary breast cancer syndromes. A minority of subjects expressed outright disagreement with the guideline, often emphasizing their belief that CPM offers significant psychological benefits and that patients have complete autonomy over their breasts. On the other hand, the majority of surgeons agreed that CPM offered no survival benefit and that surgeons should be offering and performing this operation substantially less often (Knowledge – Scientific Rationale). Nearly all subjects intentionally avoided initiating conversations about CPM with patients, however, the surgeons repeatedly followed this by mentioning that often patients initiated the conversation, leading to frustration for the surgeons (Emotion - Stress).

Despite the majority of subjects' preference to avoid CPM in patients without a hereditary breast cancer syndrome, all but one surgeon stated that they would perform CPM at the patient's request. Possible psychological benefits for patients and avoidance of patient regret were often used as justification for continuing to perform this operation (Beliefs about Consequences – Outcome Expectancies; Anticipated Regret). Some surgeons expressed a belief that if they did not agree to perform a CPM, they would face consequences such as patients seeking care elsewhere, decreased referrals, or diminished trust in their abilities. Most surgeons expressed the belief that patients had unequivocal autonomy in this decision (Social Influences – Power). In contrast to the three other procedures where surgeons communicated clear recommendations to the patient, when discussing CPM, many surgeons described that their role was to offer all possible treatment options and follow the patient preferences, regardless of their own knowledge or beliefs (Professional Role and Identity – Professional Role).

A significant barrier to decreasing utilization of CPM was the influence of external sources and patients' misunderstanding of their personal risk. Surgeons routinely indicated that patients presented with strongly held misconceptions and overestimations of their risk of developing a second malignancy. Patients' feared the "cancer spreading to the other breast", with often limited understanding of the difference between an ipsilateral or distant recurrence and a second primary malignancy (Emotion - Fear). Additionally, surgeons stated that friends' and family members' personal stories and recommendations strongly influenced patients' preferences. Coupled with the notoriety of celebrities' treatment decisions (e.g. the Angelina Jolie effect), the influence of information from non-medical sources resulted in patients having strong treatment preferences, requesting a CPM, and providers simply accommodating these preferences (Social Influences – Social Support,

Modeling). No surgeons mentioned plastic surgeons as an external source of information that influenced patients to request a CPM. (Table 3)

Discussion

In this qualitative study of breast surgeons, we identified barriers and facilitators influencing de-implementation of low-value, unnecessary breast cancer surgical practices targeted by the Choosing Wisely® campaign. For the two procedures that most data suggest have been successfully de-implemented (re-excision after close but negative margins and completion ALND), providers' high level of confidence in the strength of the evidence facilitated rapid de-implementation. In contrast, provider's lack of familiarity and skepticism with evidence supporting avoiding SLNB in women age 70 years and older and the influence of other collaborating multidisciplinary providers emerged as key factors driving surgeons' continued use of SLNB in this population. Regarding CPM, while surgeons agreed that the procedure is often unnecessary and confers no survival benefit, patient autonomy and preference emerged as key barriers to de-implementation. Understanding the key determinants driving this differential de-implementation can help to inform the development of future interventions targeting the specific deficits in provider capability, opportunity, and motivation.

While the science and behavioral theories of implementing new practices are fairly extensive,^{48–51} the best strategies to promote de-implementation of entrenched practices are limited.^{52,53} Successful de-implementation efforts in health care often target practices that are subject to ordering restrictions or replacement,^{54–56} and attempts to de-implement unnecessary practices through purely educational efforts and guideline dissemination have had variable success.^{57–60} The role of the Choosing Wisely® guidelines and identification of unnecessary surgical practices in the care of patients with breast cancer is particularly unclear as our results demonstrate that surgeons inconsistently prioritize evidence, patient autonomy, and personal preferences. We found that surgeons' confidence in the strength of evidence driving the guidelines to avoid re-excision and completion ALND facilitated rapid de-implementation and was the primary justification for this practice change. Conversely, despite robust and well-accepted data supporting the recommendation to avoid CPM^{44–46}, providers disregarded their confidence in this evidence in favor of patient autonomy. This highlights the inconsistent impact of data, confirming that for some practices disseminated evidence is not enough to alter provider behavior.

For surgical procedures where the impact of evidence was minimal, patient autonomy was often emphasized. However, for other unnecessary and low-value practices, patient preference is not prioritized. For example, providers consistently make decisions that directly challenge patients' requests when they refuse to prescribe antibiotics for viral upper respiratory infections or order an MRI for back pain without red-flag symptoms. However, when considering CPM, providers frequently described deferring to patient preference and specifically avoiding making strong recommendations. This suggests that surgeons identify some inherent value in CPM that is not reflected in the guidelines and highlights that guidelines are likely ineffective at changing behavior when value is differentially defined between stakeholders.

Given that the weight of the determinants varied substantially across surgical practices and providers, the question of how to define unnecessary or low-value practices arises. Many practice recommendations are grounded primarily on clinical outcomes, such as recurrence rates and overall survival, but overlook psychological outcomes and patient preferences. In health policy, value is commonly defined as “outcomes divided by cost”.⁶¹ However, none of the surgeons interviewed mentioned cost as a determinant in defining procedural value. The Choosing Wisely® breast cancer surgical practices were established by prominent surgical societies including the American College of Surgeons, Society of Surgical Oncologists and the American Society of Breast Surgeons. We found that the surgeons in the study, many of whom are members of these societies, are not in agreement with all of the guidelines, questioning the buy-in of practicing surgeons. Additionally, the position of societies to identify low-value care is muddled as these judgements may be influenced by specialty self-preservation and viewed through a very narrow lens of maximizing clinical benefit without considering spending, access, and fixed resources. Ultimately, while organizational and behavioral theory-based strategies targeting specific determinants for each practice may improve de-implementation, the surgical community may benefit from first establishing agreement regarding how to define low-value breast cancer care.

This study has several limitations. First, our sample included surgeons performing a high volume of breast cancer surgery; it is possible that lower volume surgeons may face other barriers to de-implementation. For example, in a survey of breast surgeons regarding adequate margins after a lumpectomy, low volume surgeons were less likely to report a close margin as adequate (85% versus 55%, $p < 0.001$)²¹. Second, the surgeons interviewed frequently described patient factors and patient beliefs that influenced surgical management decisions. We did not include patients in this analysis, and additional determinants may be identified by inclusion of patients. Third, surgeons' responses were based on beliefs regarding their clinical practice and previous patients, leading to possible recall bias. Future studies comparing subjects' responses to their objective practice patterns may identify additional factors influence decision-making. Finally, identification of themes does not confirm a true influence on practice patterns. However, qualitative methods are well-suited to explore barriers and facilitators of providers' practice and given near-uniform identification of barriers to de-implementation, it is unlikely that these factors are unrelated to de-implementation.

Conclusion

Overtreatment and use of low-value, unnecessary procedures results in patient harm without a survival benefit. Surgical societies participating in the Choosing Wisely® campaign identified four low-value practices and these procedures have had varying rates of de-implementation. We identified several factors influencing both successful and incomplete de-implementation. These determinants and associated behaviors may be modified by developing behavioral interventions targeting the essential drivers. However, as incomplete de-implementation appeared to often be driven by differences in how value was determined, efforts to create common definitions of value may be most effective. As healthcare continues to focus on improving the value of care and recommending de-implementation of previously well-established practices, it is necessary that the characterization of value is commonly

endorsed among stakeholders and that determinants of de-implementation are understood to develop future interventions.

Acknowledgments

Sources of Funding Research Support

Dr. Dossett is supported by a grant from the Agency for Healthcare Research and Quality (AHRQ; 5 K08 HS026030–02).

References

1. Institute of Medicine. 2013 Best care at lower cost: the path to continuously learning health care in America. Washington, DC: The National Academies Press 10.17226/13444.
2. Katz SJ, Jagsi R, Morrow M. Reducing overtreatment of cancer with precision medicine: just what the doctor ordered. *JAMA* 2018;319:1091–2. [PubMed: 29470568]
3. Sullivan R, Peppercorn J, Sikora K, et al. Delivering affordable cancer care in high-income countries. *Lancet Oncol* 2011;12:933–80. [PubMed: 21958503]
4. Levinson W, Kallewaard M, Bhatia RS, et al. 'Choosing Wisely': a growing international campaign. *BMJ Qual Saf* 2015;24:167–74.
5. Bhatia RS, Kerr EA. Implementation of Choosing Wisely: Promise and Pitfalls. *Jt Comm J Qual Patient Saf* 2018;44:697–8. [PubMed: 30447759]
6. Bhatia RS, Levinson W, Shortt S, et al. Measuring the effect of Choosing Wisely: an integrated framework to assess campaign impact on low-value care. *BMJ Qual Saf* 2015;24:523–31.
7. Cassel CK, Guest JA. Choosing wisely: helping physicians and patients make smart decisions about their care. *JAMA* 2012;307:1801–2. [PubMed: 22492759]
8. Kerr EA, Kullgren JT, Saini SD. Choosing Wisely: how to fulfill the promise in the next 5 years. *Health Aff (Millwood)* 2017;36:2012–8. [PubMed: 29137505]
9. Giuliano AE, Hunt KK, Ballman KV, et al. Axillary dissection vs no axillary dissection in women with invasive breast cancer and sentinel node metastasis: a randomized clinical trial. *JAMA* 2011;305:569–75. [PubMed: 21304082]
10. Galimberti V, Cole BF, Zurrada S, et al. Axillary dissection versus no axillary dissection in patients with sentinel-node micrometastases (IBCSG 23–01): a phase 3 randomised controlled trial. *Lancet Oncol* 2013;14:297–305. [PubMed: 23491275]
11. Weiss A, Mittendorf E, DeSnyder S, et al. ACOSOG Z0011: impact after 5 years. *Ann Surg Oncol* 2017;24:168–9.
12. Hodgson N, Cornacchi SD, Simunovic M, et al. ACOSOG Z0011 trial results: Led to marked changes in surgical treatment of the axilla among patients with breast cancer: A population-based study. *Ann Surg Oncol* 2014;21:17–8.
13. Berger ER, Yao K, Liederbach E, Winchester DP, Bilimoria KY. Are the ACOSOG Z011 findings being incorporated into practice nationally? An initial assessment of practice patterns in the US since publication of the trial results. *J Am Coll Surg* 2015;221:S18.
14. Caudle AS, Hunt KK, Tucker SL, et al. American College of Surgeons Oncology Group (ACOSOG) Z0011: impact on surgeon practice patterns. *Ann Surg Oncol* 2012;19:3144–51. [PubMed: 22847123]
15. Fillion MM, Glass KE, Hayek J, et al. Healthcare costs reduced after incorporating the results of the American College of Surgeons Oncology Group Z0011 trial into clinical practice. *Breast J* 2017;23:275–81. [PubMed: 27900818]
16. Howard DH, Soulos PR, Chagpar AB, Mougalian S, Killelea B, Gross CP. Contrary to conventional wisdom, physicians abandoned breast cancer treatment after a trial concluded it was ineffective. *Health Aff (Millwood)* 2016;35:1309–15. [PubMed: 27385249]
17. Jorns JM, Kidwell KM. Sentinel lymph node frozen-section utilization declines after publication of American College of Surgeons Oncology Group Z0011 trial results with no change in subsequent

- surgery for axillary lymph node dissection. *Am J Clin Pathol* 2016;146:57–66. [PubMed: 27373347]
18. Le VH, Brant KN, Blackhurst DW, et al. The impact of the American College of Surgeons Oncology Group (ACOSOG) Z0011 trial: An institutional review. *Breast* 2016;29:117–9. [PubMed: 27479042]
 19. Nocera NF, Pyfer BJ, De La Cruz LM, Chatterjee A, Thiruchelvam PT, Fisher CS. NSQIP analysis of axillary lymph node dissection rates for breast cancer: implications for resident and fellow participation. *J Surg Educ* 2018;75:1281–6. [PubMed: 29605705]
 20. Schulman AM, Mirrieles JA, Levenson G, Landercasper J, Greenberg C, Wilke LG. Reexcision surgery for breast cancer: an analysis of the American Society of Breast Surgeons (ASBrS) mastery(SM) database following the SSO-ASTRO “no ink on tumor” guidelines. *Ann Surg Oncol* 2017;24:52–8. [PubMed: 27581607]
 21. Morrow M, Abrahamse P, Hofer TP, et al. Trends in reoperation after initial lumpectomy for breast cancer: addressing overtreatment in surgical management. *JAMA Oncol* 2017;3:1352–7. [PubMed: 28586788]
 22. Havel L, Landercasper J. ASO author reflections: rapid uptake of the SSO ASTRO margin guideline and decreased reoperations after lumpectomy: a success story. *Ann Surg Oncol* 2019;08:08.
 23. Bhutiani N, Mercer MK, Bachman KC, et al. Evaluating the effect of margin consensus guideline publication on operative patterns and financial impact of breast cancer operation. *J Am Coll Surg* 2018;227:6–11. [PubMed: 29428232]
 24. Havel L, Naik H, Ramirez L, Morrow M, Landercasper J. Impact of the SSO-ASTRO margin guideline on rates of re-excision after lumpectomy for breast cancer: ameta-analysis. *Ann Surg Oncol* 2019;26:1238–44. [PubMed: 30790112]
 25. Kaczmariski K, Wang P, Gilmore R, et al. Surgeon re-excision rates after breast-conserving surgery: a measure of low-value care. *J Am Coll Surg* 2019;228:504–12 e2. [PubMed: 30703538]
 26. King TA, Sakr R, Patil S, et al. Clinical management factors contribute to the decision for contralateral prophylactic mastectomy. *J Clin Oncol* 2011;29:2158–64. [PubMed: 21464413]
 27. Arrington AK, Jarosek SL, Virnig BA, Habermann EB, Tuttle TM. Patient and surgeon characteristics associated with increased use of contralateral prophylactic mastectomy in patients with breast cancer. *Ann Surg Oncol* 2009;16:2697–704. [PubMed: 19653045]
 28. Tuttle TM, Jarosek S, Habermann EB, et al. Increasing rates of contralateral prophylactic mastectomy among patients with ductal carcinoma in situ. *J Clin Oncol* 2009;27:1362–7. [PubMed: 19224844]
 29. Jones NB, Wilson J, Kotur L, Stephens J, Farrar WB, Agnese DM. Contralateral prophylactic mastectomy for unilateral breast cancer: an increasing trend at a single institution. *Ann Surg Oncol* 2009;16:2691–6.
 30. Jagsi R, Jiang J, Momoh AO, et al. Trends and variation in use of breast reconstruction in patients with breast cancer undergoing mastectomy in the United States. *J Clin Oncol* 2014;32:919–26. [PubMed: 24550418]
 31. Soran A, Kamali Polat A, Johnson R, McGuire KP. Increasing trend of contralateral prophylactic mastectomy: what are the factors behind this phenomenon? *Surgeon* 2014;12:316–22. [PubMed: 24685410]
 32. Albornoz CR, Matros E, Lee CN, et al. Bilateral mastectomy versus breast-conserving surgery for early-stage breast cancer: the role of breast reconstruction. *Plast Reconstr Surg* 2015;135:1518–26. [PubMed: 26017588]
 33. Dominici LS, Sineshaw HM, Jemal A, Lin CC, King TA, Freedman RA. Patterns of axillary evaluation in older patients with breast cancer and associations with adjuvant therapy receipt. *Breast Cancer Res Treat* 2018;167:555–66. [PubMed: 28990127]
 34. Kantor O, Pesce C, Liedebach E, Wang CH, Winchester DJ, Yao K. Surgery and hormone therapy trends in octogenarians with invasive breast cancer. *Am J Surg* 2016;211:541–5. [PubMed: 26768954]

35. Mamtani A, Gonzalez JJ, Neo D, et al. Early-stage breast cancer in the octogenarian: tumor characteristics, treatment choices, and clinical outcomes. *Ann Surg Oncol* 2016;23:3371–8. [PubMed: 27364507]
36. Heckathorn DD. Snowball Versus Respondent-Driven Sampling. *Sociol Methodol* 2011;41:355–66. [PubMed: 22228916]
37. Malterud K, Siersma VD, Guassora AD. Sample size in qualitative interview studies: guided by information power. *Qual Health Res* 2016;26:1753–60. [PubMed: 26613970]
38. Atkins L, Francis J, Islam R, et al. A guide to using the Theoretical Domains Framework of behaviour change to investigate implementation problems. *Implement Sci* 2017;12:77. [PubMed: 28637486]
39. Braun V, Clarke V. Using thematic analysis in psychology. *Qual Res Psychol* 2006;3:77–101.
40. Guest GBA, Johnson L. How many interviews are enough?: an experiment with data saturation and variability. *Field Methods* 2006;18(1):59–82.
41. Moran MS, Schnitt SJ, Giuliano AE, et al. Society of Surgical Oncology-American Society for Radiation Oncology consensus guideline on margins for breast-conserving surgery with whole-breast irradiation in stages I and II invasive breast cancer. *Int J Radiat Oncol Biol Phys* 2014;88:553–64. [PubMed: 24521674]
42. Hughes KS, Schnaper LA, Bellon JR, et al. Lumpectomy plus tamoxifen with or without irradiation in women age 70 years or older with early breast cancer: long-term follow-up of CALGB 9343. *J Clin Oncol* 2013;31:2382–7. [PubMed: 23690420]
43. Martelli G, Miceli R, Daidone MG, et al. Axillary dissection versus no axillary dissection in elderly patients with breast cancer and no palpable axillary nodes: results after 15 years of follow-up. *Ann Surg Oncol* 2011;18:125–33. [PubMed: 20652755]
44. Giuliano AE, Boolbol S, Degnim A, Kuerer H, Leitch AM, Morrow M. Society of Surgical Oncology: position statement on prophylactic mastectomy. approved by the Society of Surgical Oncology Executive Council, March 2007. *Ann Surg Oncol* 2007;14:2425–7. [PubMed: 17597344]
45. Fayanju OM, Stoll CR, Fowler S, Colditz GA, Margenthaler JA. Contralateral prophylactic mastectomy after unilateral breast cancer: a systematic review and meta-analysis. *Ann Surg* 2014;260:1000–10. [PubMed: 24950272]
46. Portschi PR, Abbott AM, Burke EE, et al. Perceptions of contralateral breast cancer risk: a prospective, longitudinal study. *Ann Surg Oncol* 2015;22:3846–52. [PubMed: 25762480]
47. Portschi PR, Kuntz KM, Tuttle TM. Survival outcomes after contralateral prophylactic mastectomy: a decision analysis. *J Natl Cancer Inst* 2014;106.
48. Damschroder LJ, Aron DC, Keith RE, Kirsh SR, Alexander JA, Lowery JC. Fostering implementation of health services research findings into practice: a consolidated framework for advancing implementation science. *Implement Sci* 2009;4:50. [PubMed: 19664226]
49. Fisher ES, Shortell SM, Savitz LA. Implementation science: a potential catalyst for delivery system reform. *JAMA* 2016;315:339–40. [PubMed: 26813203]
50. Proctor E, Silmere H, Raghavan R, et al. Outcomes for implementation research: conceptual distinctions, measurement challenges, and research agenda. *Adm Policy Ment Health* 2011;38:65–76. [PubMed: 20957426]
51. Rogers EM (2003). *Diffusion of innovations*. New York: Free Press.
52. Prasad V, Ioannidis JP. Evidence-based de-implementation for contradicted, unproven, and aspiring healthcare practices. *Implement Sci* 2014;9:1. [PubMed: 24398253]
53. Niven DJ, Mrklas KJ, Holodinsky JK, et al. Towards understanding the de-adoption of low-value clinical practices: a scoping review. *BMC Med* 2015;13:255. [PubMed: 26444862]
54. Ross-Degnan D, Soumerai SB, Fortess EE, Gurwitz JH. Examining product risk in context. Market withdrawal of zomepirac as a case study. *JAMA* 1993;270:1937–42. [PubMed: 8411550]
55. Lawton B, Rose S, McLeod D, Dowell A. Changes in use of hormone replacement therapy after the report from the Women's Health Initiative: cross sectional survey of users. *BMJ* 2003;327:845–6. [PubMed: 14551101]

56. Shen X, Stuart BC, Powers CA, Tom SE, Magder LS, Perfetto EM. Impact of formulary restrictions on medication use and costs. *Am J Manag Care* 2017;23:e265–e74. [PubMed: 29087150]
57. Prescott LS, Taylor JS, Enbaya A, et al. Choosing Wisely: Decreasing the incidence of perioperative blood transfusions in gynecologic oncology. *Gyneco Oncol* 2019.
58. Voorn VMA, Marang-van de Mheen PJ, van der Hout A, et al. The effectiveness of a de-implementation strategy to reduce low-value blood management techniques in primary hip and knee arthroplasty: a pragmatic cluster-randomized controlled trial. *Implement Sci* 2017;12:72. [PubMed: 28558843]
59. Lasser EC, Pfoh ER, Chang HY, et al. Has Choosing Wisely(R) affected rates of dual-energy X-ray absorptiometry use? *Osteoporos Int* 2016;27:2311–6. [PubMed: 26860499]
60. Chandra K, Atkinson PR, Chatur H, Fraser J, Adams CL. To choose or not to choose: evaluating the effect of a choosing wisely knowledge translation initiative for imaging in low back pain by emergency physicians. *Cureus* 2019;11:e4002. [PubMed: 30989011]
61. Groeneveld PW. Measuring and Improving the Value of Hospital Care. *JAMA Netw Open* 2018;1:e183517. [PubMed: 30646244]

SYNOPSIS

The Choosing Wisely® campaign identified four breast cancer surgical procedures as unnecessary. Evidence suggests only two have been substantially de-implemented. With a growing focus on the elimination of low value practices it is imperative to understand determinants of successful de-implementation.

Table 1 –

Summary of theoretical domains and specific constructs for avoiding re-excision for a close but negative margin and avoiding completion axillary lymph node dissection (ALND) for limited metastatic disease in the lymph nodes.

Domain	Construct	Sample Quote
<i>Avoiding Re-Excision for a Close but Negative Lumpectomy Margin for Invasive Cancer</i>		
Knowledge	Scientific Rationale	"The meta-analysis suggests that there's no additional benefit for re-excision for patients with no tumor on ink for invasive cancer... There's no additional benefit to re-excision."
Skills	Interpersonal Skills	"I can't say that I've ever had anyone ask me for a re-excision... I justify it by saying we have research that shows your surgery was sufficient as far as local surgical therapy... patients are typically happy to hear that." "People have a lot of confidence in our initial discussions."
Beliefs about Consequences	Outcome Expectancies	"The one scenario we sometimes worry about is when it's multiple, like six out of six [margins]". "[In] a younger patient, you might want to be a little more aggressive in terms of trying to get a better margin."
Social Influence	Power	"I will offer the patient the choice to re excise versus not, but I will tell them that the guidelines and the clinical setting do or don't suggest them to do the second operation." "I will offer it to the patient, because it's your decision making really... I still offer them the option."
Goals	Goal Priority	"I would tell them there was no benefit. But, if the patient really wanted it, and it was very important to her, I would do it. Because I feel like most cancer you know there is so much negative on the patient, if there is one little thing that can help them, that would be fine."
<i>Avoiding Completion ALND in Women Meeting ACOSOG z0011 Criteria</i>		
Knowledge	Scientific Rationale	"I believe the data for this particular population is very clear, there's minimal benefit to axillary treatment." "Most of these candidates will fit in some way or the other into Z011, which is old now, almost ten years. I can't think of a time that I've, in the last decade, taken a patient back for [cALND] for micro-metastatic disease."
Social Influence	Group Norms	"When I started practicing, everybody got axillary node dissection for staging. And now almost nobody does. We as a group are losing our enthusiasm for this procedure."

Table 2 –

Summary of theoretical domains and specific constructs for avoiding sentinel lymph node biopsy (SLNB) in women over age 70 with hormone receptor positive tumors.

Domain	Construct	Sample Quote
<i>Avoiding SLNB in Women Over Age 70 with Hormone Receptor Positive Tumors</i>		
Knowledge	<i>Scientific Rationale</i>	<p>"I don't think that there is so much compelling data, specifically regarding the age, to support foregoing a sentinel node biopsy."</p> <p>"I use overall health status because, as you know, not all 70-year olds are created equal. If they have a reasonable expectation of good quality of life, I think that doing a sentinel lymph node biopsy is a good idea."</p>
Beliefs about Consequences	<i>Outcome Expectancies</i>	<p>"Our radiation oncologists are pretty aggressive, so if a negative SLNB would minimize their likelihood of recommending radiation, then that's something that would push me...because we could probably save [the patient] radiation."</p> <p>"I see a lot of healthy 70-year-olds who are motivated to live to 95. It's long enough for the patient to have a recurrence if you didn't do a sentinel node and therefore didn't do some sort of therapy."</p> <p>"I don't think that a sentinel [lymph node biopsy] adds a lot of morbidity."</p>
Social Influence	<i>Social Pressures</i>	<p>"If you talk to medical oncologists, they'll say a 72-year-old with node-positive disease still benefits from the addition of systemic chemotherapy, so I would still [perform a SLNB] in that setting."</p> <p>"Because they (i.e. medical oncology, radiation oncology) would utilize the information, I still assume that the sentinel node biopsy should be performed."</p>
	<i>Power</i>	I believe a patient should have a choice as long as they're well educated in what we do know about that choice."
Beliefs about Capabilities	<i>Professional Confidence</i>	"It would probably add four minutes to the surgery. So, I kind of [think] it is reasonable."
Goals	<i>Goal Priority</i>	"If somebody really said, I'm gonna lose sleep by not knowing this information...then yeah [I would perform [a SLNB]]."

Summary of theoretical domains and specific constructs for avoiding contralateral prophylactic mastectomy (CPM) in women without hereditary breast cancer syndromes.

Table 3 –

Domain	Construct	Sample Quote
<i>Avoiding Contralateral Prophylactic Mastectomy in Women without Hereditary Breast Cancer Syndromes</i>		
Knowledge	<i>Scientific Rationale</i>	<p>"I think the data is very clear on this, that those patients do not have a demonstrated genetic abnormality, or a markedly strong family history of breast cancer do not benefit from the removal of a normal breast."</p> <p>"I generally don't bring it up, truthfully... Removing the other breast is not recommended, and it's not necessary."</p>
	<i>Stress</i>	<p>"100% of [patients] bring it up, the bane of my existence"</p> <p>"Nobody cares about the data. Zero percent of people, lawmakers included. They do not care. ... And if you come out and you speak against something that even remotely is perceived as anti-pink ribbon or anti-breast cancer, people want to stone you."</p>
Emotion	<i>Fear</i>	<p>"Women don't understand there is a difference between getting another cancer in the other breast and having a recurrence. So they think that having a cancer come back in the other breast is the same breast cancer... that it's stage four disease."</p>
	<i>Outcome Expectancies</i>	<p>"If it makes you sleep better at night, there's not a lot I can do about it. Psychologically, this [may] be a significant benefit."</p> <p>"We'll do [a CPM] as long as you know that it's for anxiety, for peace of mind, and not for a recurrence or survival benefit."</p>
Beliefs about Consequences	<i>Anticipated Regret</i>	<p>"It's not necessarily the choice I would make, or would recommend for my loved ones, but that's their decision. And we make sure that they don't regret any of the decisions that they make."</p>
	<i>Power</i>	<p>"I tell patients that it is their decision and that I don't recommend it, but ultimately it's their decision if they'd like to do it."</p> <p>"But people value their autonomy above anything else, even fear. That's just something you have to respect."</p>
Social Influences	<i>Social Support</i>	<p>"Friends have told them that [CPM] is the right thing. They confuse a lot of times their situation with another person's situation."</p> <p>"Friends have a lot of impact. And that's the first thing they hear, and of course from people they love, so it's very hard to convince [patients] that their friends are not correct."</p>
	<i>Modeling</i>	<p>"The Angelina Jolie effect. I've definitely had patients literally say to me, 'Well, Angelina Jolie had this done. Why shouldn't I?'" Even though they don't have a hereditary syndrome."</p>
Professional Role and Identity	<i>Professional Role</i>	<p>"I am there as their coach and counselor and to educate them and if they decide a different route, I will still follow them."</p> <p>"I can't determine what is a value procedure for a patient. I can't do that. So, it's the patient's choice."</p>