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Opinion paper

Working smarter not harder: Coupling implementation to de-implementation

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ABSTRACT

In this paper, we discuss de-implementation as an implicit part of implementation and organizational change, and consider its underlying processes of unlearning to discontinue or deviate from ineffective practice and learning to applying newer, more effective practices. We describe a typology of de-implementation that represents four types of change: partial reduction, complete reversal, substitution with related replacement and substitution with unrelated replacement of existing practice. We also explicate how learning and unlearning needed for effective change vary in these four types of de-implementation. Last, we propose coupling de-implementation and implementation efforts, which serve conceptual and logistical goals of organizational change.

1. Introduction

De-implementation, or the abandonment of an outmoded or disproven clinical practice, has been likened to the mirror image of implementation of new, evidence-based clinical practices.[1] In this view, the de-implementation process can be understood as the implementation process in reverse. We propose that the processes labeled de-implementation actually represents four types of change, each entailing different challenges and dynamics. As result, we contend that the mirror analogy is not necessarily true, as de-implementation and implementation processes may require different strategies. However, it may be useful to jointly consider implementation and de-implementation because of the unlearning that inherently occurs when individuals or organizations learn new practices, discontinue existing but ineffective practices, or both. A promising focus for research is coupling de-implementation with implementation strategies and considering de-implementation effects of implementation strategies.

1.1. Four types of change involving de-implementation

There are four different types of change in which providers cease outmoded or disproven clinical practices. The first type of change is *reduction* or *partial reversal* in the frequency, breadth or scale of an existing outmoded intervention, so that it is provided to only a subgroup of patients who have been demonstrated to realize the greatest benefit. Examples include initiating breast cancer screening at age 50 rather than age 40 for women at average risk,[2] lengthening the interval of cervical cancer screening with cytology (Pap smear) from one to three years,[3] or de-intensifying diabetic medications in older adults with well-controlled diabetes.[4] Reduction initiatives may decrease providers' clinical effort by requiring continued effort on only a subset of patients and less effort in the subset of patients who were not benefitting from the discontinued treatment. It is possible that there will be new clinical effort in risk stratification to identify and appropriately treat still-eligible patients.

The second type of de-implementation is *discontinuation* or *complete reversal of an existing practice without replacement*. Examples of this type of de-implementation include the discontinued use of routine episiotomy during childbirth,[5] hormone replacement therapy for prevention of chronic conditions in postmenopausal women,[6] and the Choosing Wisely campaign's recommendation against routine pre-operative or pre-procedural electrocardiography screening for

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asymptomatic patients with low perioperative risk of death or myocardial infarction.7,8 Discontinuation without replacement is appropriate if there is no evidence of value for any subgroup of patients. The focus in this type of change is entirely on de-implementation and there is no implementation of new practice involved.

The third type of de-implementation involves *substitution/reversal with a related replacement* that is a closely related and more effective practice. For example, inhaled corticosteroids, which increase risk of pneumonia among patients with mild chronic obstructive pulmonary disease, can be replaced by long-acting beta-agonists or muscarinic-antagonists.[9,10] Coronary procedures can be completed via the radial artery in the wrist rather than the common route via the femoral artery in the groin, with fewer bleeding complications,[11] and a particular class of diabetes medications (thiazolidinediones) with unacceptable cardiovascular risk appears to be on its way to being replaced by more effective alternatives.[12] In bariatric surgery for weight loss, the vertical banded gastroplasty procedure that was commonly performed in the 1970s has been completely replaced by more modern procedures (e.g., Roux-en-Y gastric bypass, vertical sleeve gastrectomy). Substitution of related practices should have minimal impact on clinical effort and practice patterns in the long-term because such a substitution largely fits existing expectations and practices.

The fourth type of de-implementation is *substitution/reversal with unrelated replacement*. Examples include acute lower-back pain can be treated with physical therapy rather than lower back imaging and potentially surgery[13,14] and chronic stable angina can often be treated medically instead of with coronary bypass surgery or percutaneous coronary interventions.[15,16] There may be practical challenges to unrelated de-implementation because it requires engagement and buy-in from two different stakeholder groups to effect the designed unrelated changes and substantial change in clinical practices.

2. Learning and unlearning to de-implement

De-implementation has been described as the mirror of implementation,[1] because they have similar cognitive challenges and processes. We argue that this is not always the case, and that de-implementation is a graduated continuum of individual, team, and organizational change that require different strategies in terms of learning and unlearning. Learning refers to the process of acquiring new skills or knowledge. Unlearning is a process of discarding outdated mental models to make room for alternative models.[17,18] In each of the four types of change described above, change requires effort to learn new knowledge and to unlearn what was thought to be effective. Moreover, the relative efforts required for learning and unlearning vary by the type of change.

Table 1 illustrates hypothetical differences in the organizational efforts associated with learning and unlearning in each of the four types of change. The circles denote different levels of effort potentially associated with learning tasks. For example, partial reduction/reversal of practice may require minimal learning effort because new skills are not required for an established practice but some degree of education is needed on the new evidence and updated and restricted patient eligibility criteria. The associated unlearning effort to de-implement in the subgroup of patients where a practice is least effective requires relatively more effort to identify target populations for discontinued practice and to develop systems that implement practice discontinuation (e.g., active monitoring, clinical flags).

Complete reversal or discontinuation of an existing practice without replacement may require significant effort to overcome confirmation bias or loss aversion that might slow or prevent discontinuation, as well as effort to facilitate divestiture of practice (e.g., overcome behavioral inertia). For de-implementation efforts involving replacement, the learning component of organizational change may require a focus on adoption of evidence and engineering new processes to promote new routines. The unlearning objectives may require educating and technical supports to steer practitioners away from outmoded practice.

Strategies known for promoting implementation – educational outreach, reminders, multifaceted interventions[19] – also apply to the learning and unlearning processes that are essential for effective de-implementation. However, strategies for de-implementation will vary in their suitability and impact by the type and context of de-implementation activities. Specifically, persuasive strategies such as provider education, academic detailing, local opinion leaders, and audit and feedback appear to be effective in learning and unlearning to reduce antibiotic prescribing for hospital inpatients.[20] However, persuasive strategies do not appear to be effective in discontinuing advanced imaging for lower back pain.[21]

Table 1
Hypothetical differences in organizational effort, by type of de-implementation activity.

	Partial Reversal	Complete Reversal	Replacement	
			Related	Unrelated
Description	Reducing the frequency, breadth or scale of an existing outmoded practice, so that it is provided to a narrower subgroup of patients.	Universal discontinuation of ineffective practice.	Substitution of existing practice, replaced by a closely related and more effective intervention.	Substitution of existing practice, replaced by a more effective intervention that is unrelated to usual care.
Learning	➢ No new skills, perform routine practice in subset of patients	➢ Adoption of evidence that old practice is not effective in anyone	 ➢ Adoption of innovation that generally fits existing practice and expectations	 ➢ Adoption of evidence that old practice is not effective ➢ Re-engineer clinical processes to facilitate innovation as new routine
Unlearning	 ➢ System and tools to identify target populations to discontinue practice ➢ Establishing policies/practices to support discontinued practice	 ➢ Establishing policies/practices to support divestiture of practice	 ➢ Mechanism to train/educate away from outmoded practice ➢ Establishing policies/practices to support discontinued practice	 ➢ Mechanism to train/educate away from outmoded practice ➢ Establishing policies/practices to support discontinued practice

Policy intervention, such as financial incentives and payment reform may be a potent approach in unlearning efforts for partial reduction or complete discontinuation. For example, Medicare rolled its separate billable payments for medication and ancillary services into a new bundled payment for outpatient dialysis treatment in its efforts to curb unnecessary utilization of erythropoiesis stimulating agents (ESAs) that increase the risk of stroke or death in patients with kidney failure.[22] After the bundled payment eliminated the opportunity to bill for these ancillary services, ESA use declined markedly.[23,24] For other de-implementation involving partial reduction, financial incentives may be an inadequate lever to overcome behavioral inertia or logistical challenges of curtailing care delivery practices to only a subset of patients.

3. Strategies for change: coupling implementation and de-implementation

It would be useful for the field and for practitioners to identify strategies that simultaneously achieve both implementation and de-implementation goals. For example, an effort initially focused on implementation of a new practice may be more favorably received by a health care organization if it is coupled with a de-implementation effort by implementing a new practice that partially or fully replaces an existing practice that is not viewed favorably. Adding de-implementation to the implementation effort could result in an effort neutral change (in the long term) that would be more favorably received by over-burdened clinicians than (yet another) implementation effort without taking something away. Similarly, a more expansive de-implementation effort could include implementation of a more effective replacement. Depending on the nature of the de-implementation activity, a coupled strategy might involve a multicomponent intervention, with some components targeting de-implementation goals and others targeting implementation objectives. In the context of de-implementation involving substitution, this requires practitioners to identify strategies to (1) eliminate existing intervention/practice and (2) replace it with newer, more effective intervention that also address the barriers and facilitators to substitution. An example would be implementing low-value care measures alongside de-implementation of existing performance measures. It should be noted that coupling may not be necessary in all contexts. There may be ineffective practices that are not deeply entrenched that can be removed without introducing a new practice.

A coupling approach serves conceptual, practical and logistical purposes. Implementation of innovation sometimes requires not only have to learn new knowledge/skills (or at least figure out what current knowledge/skills are still relevant) but also having to *unlearn* what is already known (or at least figure how what knowledge/skills no longer apply). Singularly, each of these processes require significant cognitive and logistical effort. Ignoring one aspect of change may result in incomplete or ineffective efforts. By creating a dependence between the two activities, there is likely significant investment in short-term cognitive and physical effort. In the long term, coupling may generate economies of scale to minimize effort and investment for behavior change. As such, coupling may result in effort-neutral change and considerably raise the likelihood for change, as intended. Importantly, evidence is needed to support these hypotheses. As the field evolves, formal consideration of when to couple implementation and de-implementation efforts is a promising area that is ripe for testing, theory development, and refinement.

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