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Improving quality of care: a continuous process of (de-)implementation

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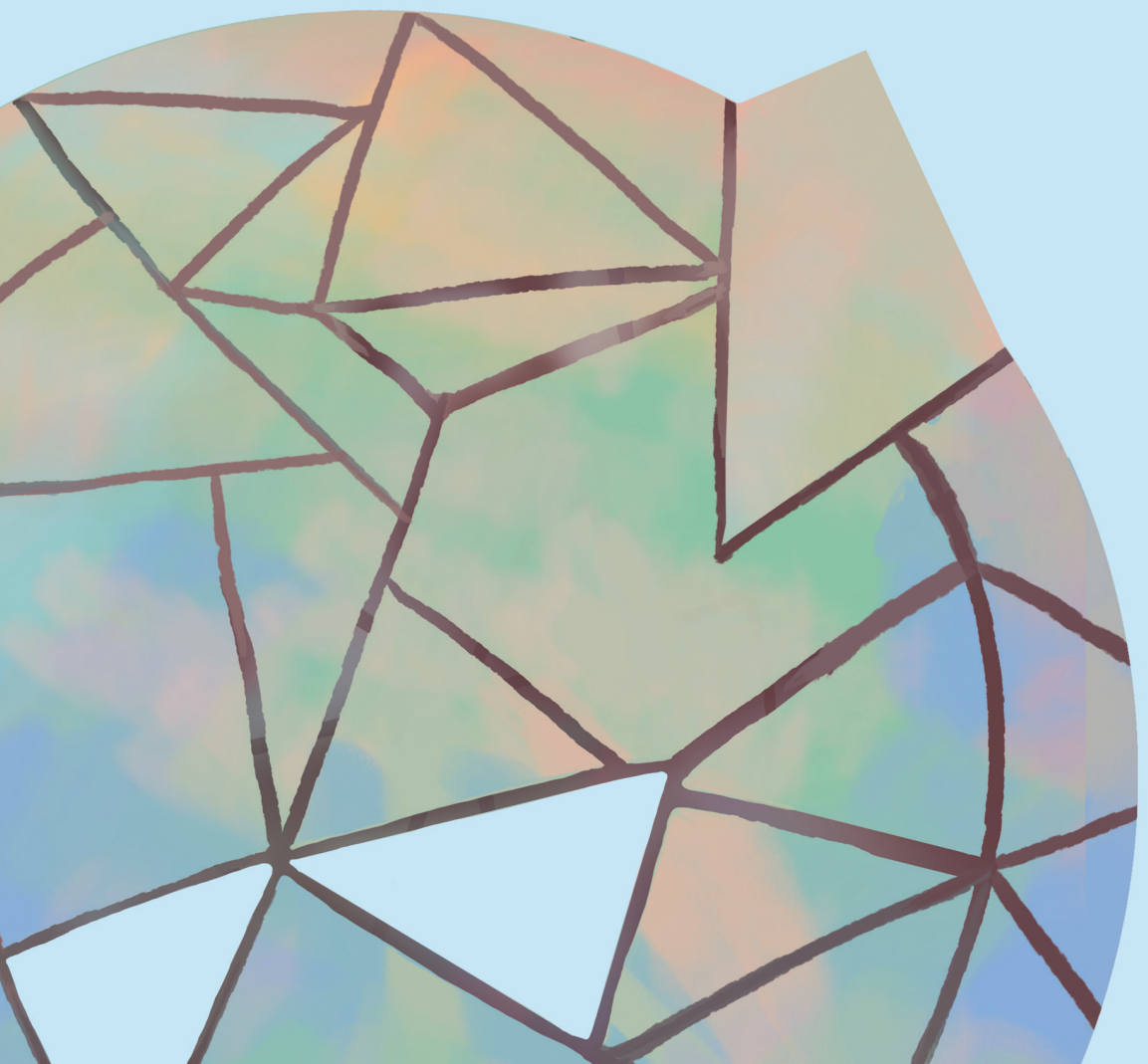
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General discussion

GENERAL DISCUSSION

This thesis aimed to extend the knowledge on effective strategies for de-implementation of low value care and the implementation of underused medical services in orthopedic surgery as well as in nursing practice. Two research questions were formulated:

1. What are effective de-implementation strategies for reducing low value care in orthopedic surgery as well as in nursing practice?
2. What are the differences and similarities between effective de-implementation and implementation strategies in nursing practice?

In this chapter, the main findings of the studies are described and discussed with regard to the two research questions and to the overarching research aim. In addition, the implications for clinical practice and suggestions for future perspective on (de-)implementation strategies are given in the last part of the discussion.

Main findings

Effective de-implementation strategies for reducing low value care

To obtain more insight in effective de-implementation strategies for reducing low value care in orthopedic surgery, a tailored strategy to de-implement low value MRI and knee arthroscopy in patients with degenerative knee disease aged 50 years and over was developed and evaluated (**Chapter 2-4**). For the second focus area on nursing practice, a systematic review on the effectiveness of de-implementation strategies for low value nursing practices was performed (**Chapter 5**).

Before developing a tailored strategy to de-implement low value MRI and knee arthroscopy for degenerative knee disease, we first determined the proportion of low value knee arthroscopies and its indications in patients with degenerative knee disease treated in a sample of Dutch hospitals (**Chapter 2**). The study showed that two third of the patients with degenerative knee disease had a valid indication for a knee arthroscopy based on their medical record, thus one third of patients might have had low value care based on their medical records. In the latter group, the main reason for performing a knee arthroscopy was that the arthroscopy was made during a shared decision between patient and orthopedic surgeon or on patient's request. This study confirmed earlier literature¹⁻³ in that low value MRI and knee arthroscopy for degenerative knee

disease for patients aged 50 years and over is still performed, with subsequent potential for improvement by reducing this type of low value care.

In **Chapter 3**, the determinants (i.e. barriers and facilitators) for de-implementing low value MRIs and knee arthroscopies in patients with degenerative knee disease were investigated among orthopaedic surgeons as well as patients. The study showed that belief of the orthopaedic surgeon in the added value of MRI and knee arthroscopy, and preferences of both patient and orthopaedic surgeon influenced clinical decision making on the diagnostic and therapeutic policy, although it was considered low value. Besides, patients indicated that positive experiences from peers with MRI diagnostics and arthroscopy influenced the clinical decision to a great extent. Evaluation of the identified determinants in the decision-making process, showed that low value MRI and knee arthroscopy can be reduced by strategies changing clinician's "beliefs" on the added value of MRIs and arthroscopies, as well as focus on patient-directed strategies addressing patient's expectations, preferences and their "beliefs" on the added value of MRI and arthroscopies, which was based on experiences from peers.

Next, in **Chapter 4** a de-implementation strategy was developed based on the findings of **Chapters 2 and 3**, and previous literature^{4,5}. The tailored de-implementation strategy for reducing low value MRI and knee arthroscopy consisted of the following components: 1) appointing local clinical leaders, 2) education on the Dutch Choosing Wisely recommendation for MRI's and arthroscopies in degenerative knee disease, 3) training of orthopaedic surgeons to manage patient expectations, 4) performance feedback, and 5) provision of a patient brochure. The tailored de-implementation strategy was evaluated on its effectiveness in Dutch orthopaedic centers using a difference-in-difference analysis that compared the time-trend in the monthly percentage of patients with degenerative knee disease receiving an MRI or arthroscopy weighted by the type of hospital before and after the introduction of the de-implementation strategy between intervention (13 Dutch orthopedic centers) and control centers (all other Dutch orthopaedic centers). All patients aged 50 years and over with degenerative knee disease admitted to Dutch orthopaedic clinics from January 2016 to December 2018 were included in the analyses. The results showed that the weighted percentage of patients in the intervention group receiving a knee arthroscopy on average declined by 0.19% per month. For MRI this declined by 0.15% per month. However, these changes over time did not differ between the intervention and the control group, neither for MRI nor arthroscopy. Because the decline in the percentage of patients aged 50 years and over with degenerative knee disease that received an MRI or arthroscopy was shown in both the intervention and control group, the decline could not be attributed to

the tailored de-implementation strategy. Instead, the overall reduction may also indicate an overall focus by orthopaedic surgeons on reducing low value MRI and knee arthroscopy for patients with degenerative knee disease in the Netherlands.

In the second part of this thesis, we reviewed the effectiveness of multiple de-implementation strategies to reduce low value nursing practices (**Chapter 5**). Both (cluster) randomized design ($n=10$), controlled before-after design ($n=5$), and an uncontrolled before-after design ($n=12$) were included in the systematic review. The included studies focused on the reduction of restraint use, inappropriate antibiotics prescriptions, unnecessary use of indwelling urinary catheters, unnecessary order for laboratory liver function tests, and unnecessary antipsychotic prescriptions. More than half of the studies included in this review showed a significant reduction in low value care during the evaluation period. The majority of the studies with a positive effect included an educational component as part of their de-implementation strategy, like educational meetings, educational materials, educational outreach visits, and educational games. Since studies with and without a positive significant effect included an educational component in their de-implementation strategy, the use of educational components cannot be linked to successful de-implementation. A difference found between studies with or without control group with a positive significant effect showed that the majority of the effective uncontrolled studies used a single faceted strategy, whilst the majority of the effective controlled studies used a multifaceted de-implementation strategy. The results also showed the majority of included studies did not perform a barrier assessment before performing the de-implementation strategy. For that matter and considering the large heterogeneity and small number of studies, no clear conclusions could be made on which strategy is most effective for reducing low value nursing procedures.

The differences and similarities between effective de-implementation and implementation strategies in nursing

To learn more about the differences and similarities between effective de-implementation and implementing strategies in nursing practices, two systematic reviews in nursing were performed (**Chapter 5 and 6**). The results of the systematic review in **Chapter 5**, which evaluated the effectiveness of de-implementation strategies in nursing, were described in the previous section. The systematic review in **Chapter 6** evaluated the effectiveness of implementation strategies on guideline adherence and patient-related nursing outcomes. Both controlled studies ($n=15$) and uncontrolled studies ($n=38$)

were included in the review. The studies included in the review focused on the implementation of guidelines for several topics, including skin care and infection prevention. The majority of the included studies showed a positive and statistically significant effect for either patient-related nursing outcomes or guideline adherence. Most of the studies used a multifaceted implementation strategy including education. Less than half of the studies included in this implementation nursing review (**Chapter 6**) performed a barrier assessment to inform the implementation strategy, and unfortunately if they did, most of them were poorly described. Besides, less information was described in the included articles about whether the tailored implementation strategies were executed as planned (intervention fidelity and engagement)⁶. No specific strategy (single-faceted or multifaceted) could be associated to successful implementation of nursing guidelines regardless the context and type of guideline. Comparison of the review about effective implementation strategies for nursing guidelines (**Chapter 6**) and the review about effective strategies to de-implement low value nursing care (**Chapter 5**) reveals that there is no specific strategy associated to both successful de-implementation of low value nursing care and the implementation of nursing guidelines.

Discussion of the main findings

This thesis aimed to extend the knowledge on effective strategies for de-implementation of low value care and the implementation of underused medical services in patients with degenerative knee disease who consulted an orthopedic surgeon as well as in nursing practice. This paragraph discusses how the main findings on the research questions contribute to this aim.

De-implementation strategies

The effectiveness of de-implementation strategies seems to depend on different factors that are related to A) the selection of low value care to be de-implemented and B) the process of developing the de-implementation strategy.

A. Selection of low value care to be de-implemented: should we take the rising tide phenomenon into account?

Most process models for de-implementation start with prioritizing low value care within the clinical setting to be de-implemented based on identifying the strength of evidence, safety issues related to the low value care (i.e. harmful practices are de-implemented first), potential health impact and cost-effectiveness, and the availability of alternatives⁷. However, based on the results

of **Chapter 4** the rising tide phenomenon (a secular time trend created by the social response on a topic with widespread attention), may also be considered for prioritizing which type of low value care should be de-implemented first⁸. In **Chapter 4**, both the intervention and the control group showed a decrease in the use of low value MRI and knee arthroscopy, meaning that the result could not be attributed towards the developed de-implementation strategy. During the study there was a lot of widespread attention for this topic within the orthopedic community, which had developed and disseminated national Choosing Wisely statements on eliminating low value care. For that matter, this has influenced the de-implementation of low value MRI and knee arthroscopy in both the intervention and control group. In addition, several articles related to the topic were published, (international) meetings were organized to discuss the use of low value MRI and knee arthroscopy, and national and international guidelines were published. Consistent with our findings, the study of Kiadaliri et al.⁹ showed that the development of a national guideline against the use of knee arthroscopy in patients with knee osteoarthritis was associated with a decrease in knee arthroscopy. Reeves et al.¹⁰ showed that clinical practice could change by publishing study results or could be influenced by external factors, which is described by the researchers as the rising tide phenomenon. Overall, this suggests that it is important to examine whether the overall awareness surrounding a certain low value care type is not only increasing within the targeted group of health professionals, but also is accepted with succinct evidence. The level of overall awareness and acceptance should be included as selection criteria for the prioritization of low value care eligible for an active de-implementation process. So, if the overall level of awareness and acceptance are high, a growing number of studies is likely to discuss these low value care policies which stimulate discussions at meetings, thus defining the "low value care" principle for a particular diagnostic or treatment pathway even better. The latter will also result towards a more sustainable deployment of de-implementation capacity. Performing a de-implementation project requires time and involves costs.

B. The development of de-implementation strategies:

To develop more effective de-implementation strategies in the future the role of tailoring, the number of components (single versus multifaceted), and the components themselves should be taken into account.

1. The role of tailoring (de-)implementation strategies

Previous literature shows that tailored (de-)implementation strategies that address determinants for (de-)implementation are more effective¹¹⁻¹³. To tailor a (de-)implementation strategy, first the barriers and facilitators for (de-)implementation need to be explored. Using a determinant framework for this exploration is expected to increase the effectiveness of the implementation¹⁴. However, although the developed de-implementation strategy in **Chapter 4** was tailored towards the barriers and facilitators identified for the de-implementation of low value MRI and knee arthroscopy (**Chapter 3**), and was developed according to the steps of the process-model of Grol and Wensing¹⁵, this strategy was not effective to reduce low value MRI and arthroscopy. As described in **Chapter 4**, there are multiple possible explanations for the ineffectiveness of the tailored de-implementation strategy for reducing low value MRIs and arthroscopy (e.g. widespread attention). Due to the multiple factors influencing the effectiveness of a strategy, it is impossible to make conclusions about the importance of tailoring strategies based on this single study. Also the results of both systematic reviews on nursing services (**Chapter 5 and 6**) did not reveal that tailored (de-)implementation strategies to determinants for (de-)implementation are more effective. However, in both systematic reviews on de-implementation and implementation, no conclusions could be drawn on the importance of tailoring strategies due to a lack of studies that performed a barrier assessment before developing a (de-)implementation strategy. Furthermore the majority of studies did not describe the barrier assessment in detail, thus comparisons were not possible. Finally, the small number of studies that did perform a barrier assessment did not always tailor the strategy towards these factors (**Chapter 6**). This is in line with the findings of Baker et al.¹⁶ who described that studies used different methods to identify determinants of clinical practice and different approaches to selecting interventions to address the determinants. Thus, the absence of studies which did analyze these determinants might have contributed for not finding an association between tailored (de-)implementation strategies and its effectiveness. To extend the knowledge on the importance of tailored strategies, future studies should describe these tailored strategies in more detail (i.e. details of the performed barrier assessment, the use of a determinant framework, and the matching process of de-implementation strategies towards the determinants).

2. Single versus multifaceted strategies

The majority of the effective controlled studies in **Chapter 5** used a multifaceted de-implementation strategy, where the uncontrolled studies with a positive effect used a single faceted strategy. This seems to support the recommendation that a de-implementation strategy for reducing low value care should be multifaceted, and addressing both patient and clinician roles¹⁷. However, different findings were found in the literature regarding the use of single-faceted and multifaceted intervention strategies. Where some articles suggest that multifaceted interventions have the greatest potential to be successful in reducing the use of low value care^{5,18,19}, the review of van Dulmen et al.¹³ found no difference in effectiveness between single-faceted and multifaceted strategies. These overall results might suggest that the number of strategy components does not matter. More research is needed to confirm these findings.

3. Strategy components

The systematic review in **Chapter 5**, performed to assess effective de-implementation strategies for reducing low value care in nursing, showed that almost all controlled studies used a multicomponent de-implementation strategy and included an educational component (e.g., educational meetings and educational materials). However, both studies with a positive effect as well as studies without an effect or with a negative effect included in the systematic review contained an educational component, thus the educational component as such could not be directly linked to a successful de-implementation. Therefore, the results are comparable to those of previous literature, where it was found that educational component is often used for de-implementation^{5,22}, but that the use of education on its own, especially passive education (lectures and educational materials), is mostly not enough to reduce low value care²³. Besides, education has different dimensions and its content is not always explained in detail¹³.

Furthermore, the results of this thesis showed that there is not a most effective strategy for reducing low value care in nursing and orthopedic practice, and that the de-implementation strategies that are currently used (e.g. strategy with an educational component) are not always effective. This can possibly be explained by the fact that there are differences between the type of low value care (e.g. an unnecessary MRI scan or the unnecessary use of indwelling urinary catheters) and that the use of it is context-related; indicating that every type of low value care and every context could require other de-implementation strategies based on different (context-related) determinants.

Evaluation of de-implementation strategies

In order to learn more about (de-)implementation strategies in the future, it is important that strategies are well reported and evaluated. Strategies should use an appropriate methodological design and suitable outcome measures.

A. Reporting

As described in **Chapter 5 and 6**, detailed information on the development and performance of (de-)implementation strategies are frequently missing in studies assessing the effectiveness of (de-)implementation studies. Neither did the majority of studies report on barrier assessment, nor matched these determinants towards strategy components, nor adherence to the de-implementation strategy. To compare different (de-)implementation strategies on its effectiveness for reducing low value care, more details should be reported in articles to specify: 1) the development of the de-implementation strategy including the barrier assessment and matching these determinants towards strategy components, 2) the use of theories, models and framework within the developmental process, 3) details of the components of the de-implementation strategy, and 4) the (de-)implementation strategy fidelity (the extent to which the strategy components are delivered in line with the intended plan). Proctor et al.²⁰ already described that a consistent and a detailed description of used strategies in implementation studies could make it easier to compare the results of those studies and could create a higher reproducibility. To accomplish that studies include a consistent and detailed description, future research should ideally report (de-) implementation details according to standardized formats to compare the results of quality improvement studies^{20,21}.

B. Methodological study design

In order to conclude on effectiveness of de-implementation studies, the methodological design used should fit the research question. Using a design without a control group may lead to wrong conclusions about the effectiveness of the de-implementation strategies. For example, if in **Chapter 4** the effect of the tailored de-implementation strategy on the percentage of patients aged 50 years and over with degenerative knee disease that received an MRI or arthroscopy was not compared with a control group the conclusion could be drawn that the tailored de-implementation strategy showed a positive effect. However, also in the control group a reduction of the use of low value care occurred, indicating that this result could not be attributed towards the tailored de-implementation strategy. In addition, in both implementation and de-implementation studies a before-after design is often used to make causal

inferences (**Chapter 5 and 6**). However, these designs are often not sufficiently reliable to do so and any secular time trend could not be observed. Therefore, for (de-)implementation studies a comparison with a control group is important to evaluate the result of a (de-)implementation strategy and to check for a secular time trend.

Differences between implementation and de-implementation strategies

The reviews in **Chapter 5 and 6** explored effective strategies for (de-)implementing in nursing practice. Due to a lack of high-quality studies and a consistent description of the (de-)implementation strategy, no conclusion could be drawn on a strategy or combination of strategies that could be linked towards successful implementation and/or de-implementation in nursing care. The results of both reviews were compared to detect any similarities and differences between (de-)implementation strategies used. A similarity found for both implementation as de-implementation was that an educational component was often used as part of the (de-)implementation strategy, but that it was mostly not effective on its own. This is in line with previous literature where it is described that only education is not enough²².

Based on both reviews (**Chapter 5 and 6**), no differences were found between the implementation and de-implementation strategies used in nursing, which does not automatically indicate that implementation and de-implementation strategies are indeed the same. Patey et al.²³ showed namely, that the techniques used to change the behavior within strategies differ between implementation and de-implementation. Unfortunately, the reviews in **Chapter 5 and 6** did not review the used behavior change techniques underlying the strategies. Furthermore, the results of the reviews do not automatically indicate that the strategy components of implementation and de-implementation strategies should be the same. After all, no conclusions could be drawn on the effectiveness of (de-)implementation strategies. Based on literature, we expect that effective strategies for implementation and de-implementation will show some similarities, but also some differences. As literature describes that strategies tailored to determinants for (de-)implementation are likely more effective and that determinants for implementation and de-implementation differ, effective strategies are also expected to be different. A previous study of van Bodegom-Vos et al.²⁴ showed, for example, signals that organizational determinants are more related to implementation; where motivational, economic and political determinants are more associated with de-implementation. This indicates that different types of determinants could play a role for both implementation and de-

implementation. In addition, Van Bodegom et al.²⁵ described “uncertainty” about the consequences of withholding tests or treatments as important determinant that hampers de-implementation. This uncertainty includes among healthcare professionals fear to make a mistake, being sued by patients or get complaints, and for financial consequences. Among patients and the public, this uncertainty is related to a poor willingness of patients, society and healthcare providers to accept that there is always a degree of uncertainty. All these different forms of uncertainty could result in the use of more unnecessary diagnostic testing and treatments, driven by several cognitive biases¹⁴. Examples of these biases are the tendency to favor action over inaction (action bias) and to avoid experiencing regret by not performing a medical service (anticipated regret). Based on these differences in determinants influencing implementation and de-implementation other strategies maybe effective. In literature it is assumed that strategies that address these biases may be more effective for de-implementation. Besides other strategies, de-implementation is viewed as more challenging as it is harder to stop doing things than starting something new because reducing low value care requires different knowledge, mindset and/or skills (e.g., skills for communicating with patients and/or colleagues) of healthcare professionals²⁶.

Implications for clinical practice and further research

In this paragraph the implications of the research described in this thesis for (research) practice will be discussed and suggestions will be made to improve research about improving quality of care (*Table 1*).

More high-quality research is needed regarding strategies for effective implementation of nursing guidelines and for de-implementation of low value nursing and orthopedic care, which use reporting guidelines for a more transparent description of the (de-) implementation strategy. Based on the findings of **Chapter 4-6** we notice that many different (de-)implementation strategies are used to improve quality of care. Unfortunately, there is not a strategy or a combination of strategies that seems to be the most effective for implementing nursing guidelines or for de-implementing low value nursing and orthopedic care. To be able to compare the effectiveness of (de-)implementation strategies, reporting guidelines should be used for a more detailed description of the (de-)implementation strategy^{20,21}. Using these reporting guidelines could also contribute to a higher reproducibility.

Future (de-)implementation studies should perform a barrier assessment, report how strategy components are matched to identified determinants, and evaluate the fidelity of the (de-)implementation strategy. Previous literature showed that tailored (de-)implementation strategies that address determinants for (de-)

implementation seems to be more effective¹¹⁻¹³. Furthermore, to explain or improve the effectiveness of a (de-)implementation strategy, insight is needed into the extent to which the intervention is delivered as intended (intervention fidelity)⁶. Nowadays, it is often unclear why a (de-)implementation strategy is chosen and why it is expected to be effective. Besides, more research is needed about the best way to tailor interventions towards the determinants.

Future studies should use a control group (usual care) to assess the effectiveness of the (de-)implementation strategy. Based on the results **Chapter 2-4** where a tailored de-implementation for reducing the use of low value MRI and knee arthroscopy was developed, it could be concluded that it is important for the assessment of (de-)implementation strategies to use a control group (usual care). In **Chapter 4** there was already a declining trend (a secular time trend) for both intervention and control group, which ensured that the wrong conclusion was made about the effectiveness of the tailored strategy.

For the selection of low value care to be de-implemented in daily practice, the rising tide phenomenon should be considered. Based on the results of **Chapter 4**, it seems important to identify for which type of low value care there is a rising tide phenomenon (a secular time trend created by the social response on a topic with widespread attention). In that case, there is less priority to start an active de-implementation process for this certain type of low value care.

For clinical practice, it is recommended for education of healthcare professionals that knowledge about (de-)implementation and associated skills should be trained, even as the mindset among healthcare professionals about seeing quality improvement as a continuum of healthcare evaluation. The evolving knowledge on clinical evidence stresses that also daily clinical practice is evolving and should be seen as a continuum of healthcare evaluation aimed at reducing risks to patients by eliminating low value care or alternately proposing more effective, sometimes more efficient, healthcare. This continuum process of healthcare evaluation is complex and requires knowledge about de-implementation. Besides, it might require a different mindset and/or skills (e.g., skills for communicating with patients and/or colleagues) of healthcare professionals than for implementation initiatives. In addition, it is easier to start doing something new than to stop with old behavior²⁶, even more so in the surgical field it was easier to introduce a new surgical technique for wrist surgery than de-implement surgical treatment for plaster²⁷.

Table 1. An overview of implications for clinical practice and further research.**Implications for clinical practice and further research:**

- More research is needed about a strategy/combination of strategies for effective implementation of nursing guidelines or de-implementation of low value nursing and orthopedic care, with studies using reporting guidelines for a more transparent description of the (de-)implementation strategy.
- (De-)implementation studies should perform a barrier assessment, report how strategy components are matched to identified determinants, and evaluate the fidelity of the (de-)implementation strategy. More research is needed about the best way to tailor interventions towards the determinants.
- Future studies should use a control group (usual care) to assess the effectiveness of the (de-)implementation strategy.
- For the selection of low value care to be de-implemented in daily practice, it is advised to consider the rising tide phenomenon.
- In the education of healthcare professionals' knowledge about (de-) implementation and associated skills should be trained, even as the mindset among healthcare professionals about seeing quality improvement as a continuum of healthcare evaluation.

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