Journal of Clinical Epidemiology 113 (2019) 129−136

Journal of Clinical Epidemiology

ORIGINAL ARTICLE

The Clinician Guideline Determinants Questionnaire was developed and validated to support tailored implementation planning

Anna R. Gagliardi[a,*], Melissa J. Armstrong[b], Susanne Bernhardsson[c], Margot Fleuren[d], Hector Pardo-Hernandez[e], Robin W.M. Vernooij[f], Melina Willson[g], Guidelines International Network Implementation Working Group

[a]*Toronto General Hospital Research Institute, University of Toronto, Toronto, Ontario, Canada*
[b]*Department of Neurology, College of Medicine, University of Florida, Gainesville, FL, USA*
[c]*Närhälsan, Research and Development, Primary Health Care, Institute of Neuroscience and Physiology, The Sahlgrenska Academy, University of Gothenburg, Region Västra Götaland, Gothenburg, Sweden*
[d]*Faculty of Behavioural and Movement Sciences, Vrije University Amsterdam, The Netherlands*
[e]*Iberoamerican Cochrane Centre, Barcelona, Spain*
[f]*Department of Research, Netherlands Comprehensive Cancer Organisation, Utrecht, The Netherlands*
[g]*NHMRC Clinical Trials Centre, University of Sydney, Sydney, Australia*

Accepted 14 May 2019; Published online 29 May 2019

Abstract

Objectives: The purpose of this research was to generate and validate a questionnaire that identifies determinants of guideline use from the clinician perspective.

Study Design and Setting: From January 2017 to March 2018, a seven-member six-country multidisciplinary team used a five-step multimethod design to search for and compile determinant frameworks, map items to determinants (content validity), select the best items for each determinant (content validity), refine wording of determinants and items (face validity), merge or separate items (construct validity), and review the final questionnaire.

Results: The Clinician Guideline Determinants Questionnaire includes four sections: clinician demographic information (including two determinants: attitudes about/experience with guidelines), 26 close-ended items reflecting clinician- and guideline-specific determinants, four open-ended items reflecting enablers and barriers perceived as most important, and three items on learning style (preferred sources of guideline information).

Conclusion: The Clinician Guideline Determinants Questionnaire is a comprehensive, validated instrument that addresses multiple potential determinants specific to guideline use from a clinician perspective. The Questionnaire can be used at multiple time points in the guideline development cycle to assess determinants of the use of new, updated, or adapted guidelines and before and after interventions to assess their impact on the determinants of guideline use. In future research, we will establish psychometric properties of the new questionnaire. © 2019 The Authors. Published by Elsevier Inc. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

Keywords: Guidelines; Implementation; Determinants; Questionnaire

1. Introduction

Guidelines are widely developed tools that improve quality of care [1]. However, a plethora of research shows that guidelines relevant to a multitude of conditions, clinicians, and settings are underused, resulting in suboptimal health service design and delivery and patient and health system outcomes [2−4]. Substantial resources are invested by hundreds of organizations worldwide to develop guidelines that are not achieving their maximum benefit. Use is more likely when guideline implementation is based on

Conflicts of interest: none declared.

Disclaimer: The views expressed in this article are those of the authors, and G-I-N is not liable for any use that may be made of the information presented.

Funding: Not applicable.

Ethics approval: Not applicable.

Data sharing statement: All data are available in the article or online supplementary files.

* Corresponding author. Toronto General Hospital Research Institute, University of Toronto, Toronto, Canada, Tel.: 416 340 4800; fax: 416 340 4814.

E-mail address: anna.gagliardi@uhnresearch.ca (A.R. Gagliardi).

https://doi.org/10.1016/j.jclinepi.2019.05.024
0895-4356/© 2019 The Authors. Published by Elsevier Inc. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

What is new?

Key findings

- Through five rounds, our multidisciplinary international team generated the Clinician Guideline Determinants Questionnaire, which includes four sections: clinician demographic and background information, 26 close-ended items reflecting known determinants of guideline use, 4 open-ended items to solicit additional determinants, and 3 items pertaining to preferred sources/formats of guidelines.
- We established construct, content, and face validity of items in the Questionnaire, and in the future will establish its psychometric properties.

What this adds to what was known?

- Based on our prior review of 178 instruments, there was no comprehensive, validated questionnaire to identify determinants of guideline use, which enables tailored implementation planning, leading to a greater likelihood of guideline use, and ultimately better health care delivery and improved patient and health system outcomes.

What is the implication and what should change now?

- The Clinician Guideline Determinants Questionnaire can be used at multiple time points in the guideline development cycle to assess determinants of the use of new, updated, or adapted guidelines, and before and after implementation to assess intervention impact.

identified determinants, which are facilitators or barriers of guideline use [5]. Considerable research over four decades was consolidated by Flottorp et al. to generate a checklist of 57 potential determinants of guideline use organized in seven domains: guideline factors, individual health professional factors, patient factors, professional interactions, incentives and resources, capacity for organizational change, and social, political, and legal factors [6,7]. Research shows that interventions tailored to address preidentified determinants are more likely to improve professional practice compared with either no intervention or simple dissemination of guidelines, underscoring the imperative to optimize implementation by preidentifying determinants [8].

Questionnaires are a commonly used approach for identifying determinants because they are relatively inexpensive, reach a large audience, and convenient for busy health care professionals, particularly when administered online [9,10]. Using a scoping review and content analysis, we identified 178 unique questionnaires used between 2005 and 2014 to assess determinants of guideline use [11]. Most asked about self-reported guideline adherence, few probed for specific determinants, fewer asked open-ended questions about determinants, and none were validated. Thus, most are not thoroughly and accurately assessing determinants or generating reliable knowledge on which to tailor interventions that promote guideline use. The use of ''home grown'' incomplete and untested instruments is a recognized limitation [12]. Although guideline developers lack the resources and capacity to themselves develop and validate determinant questionnaires [13], the need for a validated guideline determinants questionnaire is widespread: the 178 questionnaires we identified included 22 different categories of clinical topics among clinicians in various clinical settings in 35 countries on all continents [11].

The purpose of this research was to generate a robust questionnaire for identifying determinants of guideline use among clinicians. Ultimately, use of a standardized questionnaire will generate knowledge by which developers, implementers, or researchers can select and tailor interventions to effectively implement guidelines and improve quality of care.

2. Methods

2.1. Research team

In January 2017, seven members of the Guidelines International Network Implementation Working Group launched this study, representing six countries: Australia, Canada, the Netherlands, Spain, Sweden, and the United States. All possess expertise in health services research and guideline or systematic review development and implementation, and all were authors or peer reviewers of the review of 178 questionnaires [11]. Two members are clinicians (M.J.A. and S.B.).

2.2. Overarching approach

Between June 2017 and June 2018, the team used a multimethod study design (Fig. 1): synthesized framework of determinants of guideline use (construct validity); analyzed the content of 178 questionnaires included in our previous study [11] and mapped all unique questions (items) to determinants (content validity); selected and refined wording of the single best question for each determinant (content validity); and reduced and refine items iteratively to enhance wording of questions so they clearly reflect the intended determinant (face validity); and identified possible overlap between questions or the need to distinguish concepts within a single question (construct validity). All communication took place by email; for all steps, each team member conducted independent review; and A.R.G. compiled and integrated team feedback.

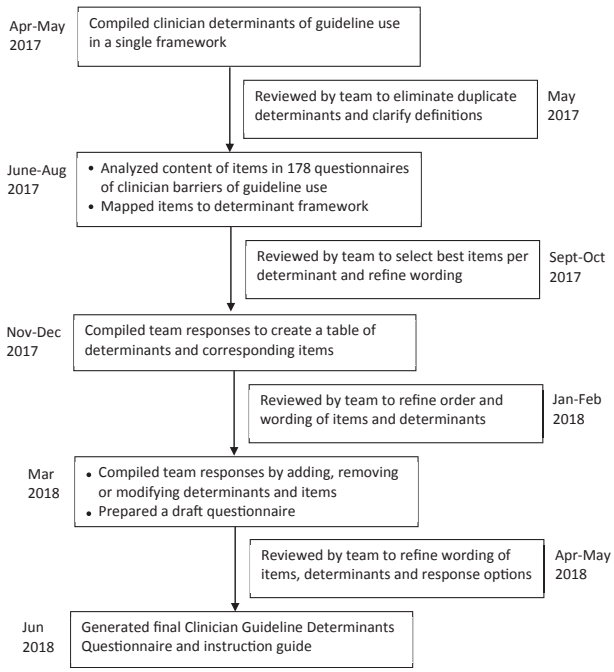

Fig. 1. Multimethod study design and timeline.

2.3. Guiding principles

At the outset, the team established guiding principles:

- The questionnaire should focus on guideline- and clinician-specific determinants as did the previously identified 178 questionnaires [11]; these are more likely to be accurately reported by clinicians than patient, organization, or system-level determinants [7] and may be more actionable with interventions targeted to clinicians.
- Moreover, the questionnaire would be shorter than one that also included questions pertaining to other determinant categories; hence, more easily and quickly completed, promoting higher response rates, a known limitation of survey research [14].
- Additional determinants, if relevant, could be captured in an open-ended question.
- Items (questions or statements) should be framed with the entire guideline as the unit of analysis; separate questions for each recommendation would result in a lengthy questionnaire.
- Response options should be as uniform as possible for ease and consistency of completion.

2.4. Creating a determinants framework (Step 1)

A.R.G. created a blended determinant framework, which was reviewed by the team. A.R.G searched MEDLINE and EMBASE from inception to April 2017, and the gray literature using Google for determinant frameworks using terms that captured the concepts of [attitude or behavior] and [guidelines] and [frameworks] (Appendix 1). The research team was also asked to recommend determinant frameworks other than the Flottorp et al.'s and Fleuren et al.'s frameworks, the most recent and comprehensive determinants frameworks already known to the research team (5,6). Studies screened independently by A.R.G. and a research assistant (A.C.) were eligible if they compiled determinants of innovation or guideline use from a systematic review of the literature or empirical means of data collection from research participants and included clinician determinants. A.R.G. extracted determinants from identified frameworks and tabulated determinants for comparison. This file was reviewed by all team members to eliminate duplicates and clarify definitions. This generated a synthesized framework comprised guideline and clinician determinants of guideline use, which served as a basis for construct validity.

2.5. Mapping items to determinants (Step 2)

All unique items were extracted from the 178 questionnaires of clinician barriers of guideline use [11] and mapped to determinants in the synthesized framework. By doing so, the wording of all items was modified to improve clarity. This generated a set of items matching determinants to establish content validity (Appendix 2). As a pilot test, three individuals, A.R.G. and two research assistants (A.C. and L.L.), independently extracted and mapped items from 10 questionnaires to determinants. Comparison of independent mapping identified some discrepancies that were discussed between A.C., L.L., and A.R.G. Independent mapping was repeated for items from another 10 questionnaires, which resulted in identical mapping. Then A.C. and L.L. proceeded to independently extract all unique items from remaining questionnaires and map them to determinants. Discrepancies were resolved by A.R.G. All unique items corresponding to each determinant were tabulated.

2.6. Choosing and refining items for each determinant (Step 3)

Team members independently reviewed the table of all unique items corresponding to each determinant and selected the one or two items they thought best represented that determinant. They were also asked to refine wording and choose a preferred response option. This step established face and construct validity by identifying (1) the need for new determinants and corresponding items or items for determinants that had not been assessed in the previously identified 178 questionnaires; (2) overlap between determinants; and (3) instances where a single determinant was best represented by more than one item. A.R.G. compiled responses from the team to create a table of determinants, the one or two items for each preferred by most respondents, and prompts for team consideration of issues that needed to be resolved to clarify wording and further

enhance face validity and, in so doing, address potential overlap between determinants and items (Appendix 3).

2.7. Reviewing final determinants and items

Team members independently reviewed the compiled list of determinants, and best items mapped to each determinant to further fine-tune items, determinants, and response options (Step 4). This step added or removed determinants or items, improved their wording, and modified response options, thus improving face and construct validity (Appendix 4). At this stage, two additional open-ended items were added to capture enablers and barriers other than clinician or guideline determinants that may be relevant in a given context. A.R.G. compiled responses to generate a final list of unique items that form the basis of the Clinician Guideline Determinants Questionnaire. This was reviewed a final time by the research team for face validity, including errors in consistency, grammar, or spelling (Step 5). Determinants and corresponding items, response options, and instructions were tabulated to serve as guidance for those administering the questionnaire (Appendix 5).

3. Results

3.1. Determinant framework (Step 1)

After screening 2,370 titles or abstracts, one additional framework was identified [15]. Table 1 summarizes determinants extracted from each framework. The Flottorp et al.'s, Fleuren et al.'s and Chaudhoir et al.'s frameworks included 17, 14, and 10 determinants, respectively [6,7,15]. When compared, two determinants were common to all three frameworks (self-efficacy, format, and organization), and 11 determinants were common to two frameworks (knowledge, awareness and familiarity, skills, attitudes about guidelines, learning style, emotions, nature of the behavior, self-monitoring, underlying evidence, and relevance to patients). The synthesized framework included 25 determinants.

3.2. Items mapped to determinants (step 2)

Appendix 3 summarizes determinants, corresponding items, and the rationale for decisions. A few examples are provided here. The determinant of knowledge about own practice (awareness of own practice in relationship to the recommended practice) was deleted because the underlying concept was similar to that of self-monitoring (capacity for self-monitoring to reinforce adherence). Newly added determinants (and corresponding items) included demographic characteristics (country, profession/specialty, age, gender, career stage) and experience with guideline development (''I have participated in the development of one or more guidelines''). The determinant of capacity to plan change was split into two items to distinguish organizational from individual capacity. The determinant descriptive norm was renamed as normative use by colleagues, and an item added to distinguish colleagues internal (''colleagues in my organization use the guideline'') and external (''colleagues in my profession use the guideline'') to one's organization. The wording of eight determinants was modified; for example, subjective norm became expectation of others.

3.3. Refined determinants and items (Step 3)

Appendix 4 summarizes determinants, items, and the rationale for decisions. A few examples are provided here. The item for the determinant of expected outcome was divided into two questions ''Following the guideline will improve the quality of care delivery'' and ''Following the guideline will lead to improved patient outcomes.'' Two determinants were added—Enablers and Barriers—and for each, two items were added to solicit the single greatest enabler or barrier, and additional enablers or barriers not already listed in the questionnaire. The determinant of self-efficacy was relabeled as self-efficacy in skills to distinguish it from training on the required skills, and the corresponding item was modified to bring greater clarity to the concept of capacity ''I am confident that I possess the skills (i.e., technical, procedural, cognitive, problem-solving) needed to apply this guideline.'' Response options were modified for items pertaining to three determinants. For example, for expectation of others, the categories of ''others'' were listed separately to elicit responses on the influence of each.

3.4. Final questionnaire (Steps 4 and 5)

Appendix 5 includes the final list of determinants, items, response options, and instructions. Questions are organized in four sections: (1) demographic and background information (including two close-ended questions that can be considered determinants: attitudes about guidelines and experience with guidelines); (2) 26 close-ended questions reflecting clinician-specific and guideline-specific determinants of guideline use; (3) four open-ended questions to solicit additional enablers and barriers; and (4) three questions on learning style. Questionnaire users can modify Section 1 by removing or adding demographic characteristics. In Section 2, questionnaire users can use yes/no response options or more informative Likert scales to solicit information about determinants or items can be posed for specific recommendations rather than the entirety of the guideline as the unit of analysis. Changes to determinant questions in this section are not recommended to maintain validity, thoroughly probe for determinants, and ensure uniformity of responses so that, in the future, findings can be pooled across users. Section 3 poses open-ended questions to elicit the most important enablers or barriers; these

Table 1. Blended framework of determinants

Determinant	Flottorp (7)	Fleuren (6)	Chaudoir (15)
Demographic characteristics	—	—	Care provider attributes (i.e., age, years in practice, education)
Knowledge	Pre-existing knowledge or expertise about the targeted condition	Knowledge needed to use the innovation	—
Awareness and familiarity	Aware of and familiar with recommendations	User has learned about the content of the innovation	—
Knowledge about own practice	Aware of own practice in relationship to the recommended practice	—	—
Skills	Skills needed to adhere	—	Perceived skills and ability
Agreement	Agreement with the recommendation	—	—
Attitudes about guidelines	Perception regarding guidelines in general	—	Philosophical stance or value placed on evidence-based medicine
Expected outcome	Belief that adherence will lead to desired outcomes	Perceived probability and importance of achieving client objectives as intended by the innovation	—
Personal benefits or drawbacks	—	Advantages or disadvantages of the innovation for users	—
Intention and motivation	Intention and motivation to adhere	—	—
Professional obligation	—	Innovation fits in with tasks for which the user feels responsible	—
Self-efficacy	Self-perceived competence or confidence in their abilities	User belief in ability to implement the innovation	Self-confidence
Learning style	Preferred ways of learning	—	Cognitive response style or thinking style
Emotions	Extent to which emotions affect adherence	—	Personality, maturity, coping style
Nature of the behavior	Characteristics of the practice (i.e., how frequent)	—	Perceived difficulty of implementing the practice
Capacity to plan change	Capacity to plan necessary changes to adhere	—	Preparedness to implement
Self-monitoring	Capacity for self-monitoring to reinforce adherence	Feedback to user about progress with the innovation	—
Client satisfaction	—	Expected satisfaction with the innovation among clients	—
Client cooperation	—	Expected client cooperation with the innovation	—
Social support	—	Perceived or expected assistance from others to use the innovation	—
Descriptive norm	—	Observed use of innovation among colleagues	—
Subjective norm	—	Perception that others expect one to use the innovation	—
Underlying evidence	Quality of evidence supporting recommendations	—	Evidence
Format and organization of the guideline	How accessible the guideline or recommendation is; the clearness of target population, settings, and recommended action	Extent to which the guidelines are clear	Quality and presentation of research
Relevance to patients	Recommendation is suitable to social context	Relevance to patients	—

questions are optional. The items in Section 4 pertaining to learning style are also optional, or additional response options of relevance to a particular guideline could be added. Appendix 6 presents the Clinician Guideline Determinants Questionnaire.

4. Discussion

This study generated the Clinician Guideline Determinants Questionnaire, which can be used by guideline developers, implementers, or researchers to assess determinants of guideline use and knowledge essential to planning and implementing interventions that support the use of guideline recommendations in practice. The Questionnaire is comprised of four sections: (1) demographic and background information; (2) 26 close-ended questions reflecting determinants of guideline use from the perspective of clinicians; (3) four open-ended questions to solicit the enablers and barriers perceived as most important; and (4) three questions pertaining to learning style. Brief instructions included with the Clinician Guideline Determinants Questionnaire provide users with choices. For example, a Likert scale was considered by Questionnaire developers to be the most informative response option; however, Questionnaire users can choose other types of response options such as yes, no, and not sure. With respect to unit of analysis, the Questionnaire is currently formulated to pose questions for the entire guideline, but users can choose to pose the same items for each recommendation in a guideline. This may lengthen the time required to complete the questionnaire, particularly because guidelines usually include many recommendations; however, this may provide useful information for tailoring the implementation strategy.

The Clinician Guideline Determinants Questionnaire addresses a wide-spread need to better identify determinants of guideline use as revealed by a previous systematic review of 178 unique questionnaires that were not comprehensive or validated [11]. The Questionnaire could benefit the guideline enterprise by systematically identifying determinants, which enables more tailored implementation planning, leading to a greater likelihood of guideline use [8] and ultimately better health care delivery and improved patient and health system outcomes. The Questionnaire could be used in several contexts (Fig. 2). First, the Questionnaire could be administered along with preliminary release of a close-to-final draft of a newly developed guideline so that external review findings are used to finalize the guideline content and format and also to plan interventions for implementing the guideline that will be widely released. Second, the Questionnaire could be used before and after implementation of an intervention that promotes or supports guideline use to demonstrate the impact of the intervention. Third, the Questionnaire could be administered in the months or years after a guideline is released when research or audit demonstrates the guideline is not being applied; at that point, findings could be used to plan interventions to sustain guideline use. Fourth, the Questionnaire could also be administered concurrent with or after adapting or updating a guideline to either consider contextual factors required for adaptation or to anticipate novel barriers of an updated guideline arising from considerable changes in its recommendations that must be accommodated in interventions for implementing the updated guideline.

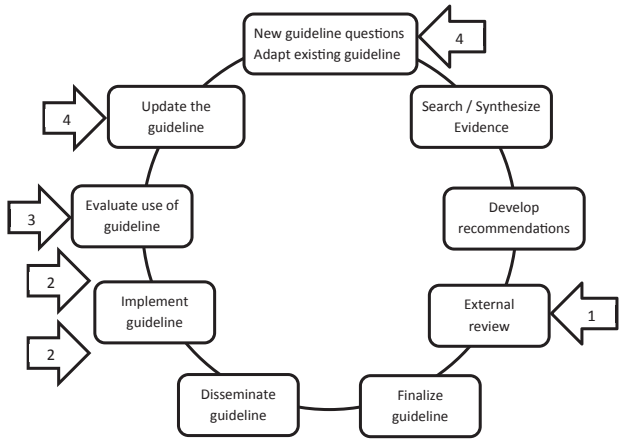

Fig. 2. Options for when to use the Clinician Guideline Determinants Questionnaire in the guideline development cycle. (1) Concurrent with external review to finalize guideline and plan dissemination/implementation; (2) Before and after implementation of an intervention to demonstrate impact on guideline use; (3) Following audit showing guideline not being used to plan an intervention to sustain guideline use; (4) During or after adapting or updating a guideline to plan dissemination, implementation, or interventions specific to new context or recommendations.

The Clinician Guideline Determinants Questionnaire is unique from other instruments designed to assess determinants of the use of innovations. The Determinants of Implementation Behavior Questionnaire (DIBQ), derived from 13 previously published questionnaires, was developed to measure clinician determinants of innovations in general [16] and was adapted in one study to assess determinants of dietary guideline use for children in nonhealthcare settings such as daycare [17]. Other questionnaires have been developed and validated to measure outcomes of successful implementation rather than determinants [18]. Although Fleuren et al. developed a questionnaire to assess 29 potential guideline determinants, it was specific to the context of preventive child health care [19]. A systematic review identified 51 public health implementation measures to assess outcomes of innovation use in schools, pharmacies, nursing homes, or whole communities [20]. In contrast to these instruments [16–20], the Clinician Guideline Determinants Questionnaire is more comprehensive, specific to the context of guideline implementation and determinants of guideline use, informed by questions in 178 published questionnaires relevant to a wide array of clinical topics and settings, based on a synthesized framework of 27

determinants, and was developed by a team representing six countries and multiple specialties and expertise including clinicians, health services research, guideline development, and implementation science.

Despite these strengths, several issues may limit the interpretation and application of this research. Our search for determinant frameworks may not have identified all available frameworks specific to guideline determinants. Although drafts of the Questionnaire were independently reviewed by seven members of the interdisciplinary research team in five iterations, others may not agree with the matching of items to determinants or the wording of determinants or corresponding items. The Clinician Guideline Determinants Questionnaire may be more relevant to physicians compared with nurses or allied health care professionals; our previous systematic review of determinant questionnaires focused on physicians because the vast majority of studies assessed the use of guidelines among physicians [11]. The Questionnaire was developed by a small group of authors and did not seek input from target end users. However, the work described in this article constitutes the very first step, which was to generate the Questionnaire. The Questionnaire will be further tested through broad use by the international guideline community, and we will seek to partner with organizations willing to administer it, along with their feedback so that continuing Questionnaire improvement is dynamic and responsive to the needs of guideline developers and guideline users. Additional ongoing work could include investigating how to offer the Questionnaire in an open, online platform, cognitive interviewing with clinicians to refine wording of concepts or terms that are unclear to them, qualitatively exploring the experience of those who complete the Questionnaire, describing how guideline developers who administer the Questionnaire use the findings to improve their guidelines and/or guideline implementation planning, and synthesizing published research that used the Questionnaire.

5. Conclusions

By drawing on previously published determinant frameworks, questionnaires used to assess determinants of guideline use, and the expertise of an international multidisciplinary team, we generated the Clinician Guideline Determinants Questionnaire. Accompanying instructions provide users with choices for response options, unit of analysis, and questions about demographics, general enablers and barriers, and learning style. The Questionnaire can be used at multiple time points in the guideline development cycle to assess determinants of the use of new, updated, or adapted guidelines and before and after interventions to assess their impact on the determinants of guideline use. By systematically identifying determinants, the Questionnaire will facilitate tailored implementation planning. In ongoing research, we will validate and continue to improve the Questionnaire.

CRediT authorship contribution statement

Anna R. Gagliardi: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Visualization, Writing - original draft, Writing - review & editing. **Melissa J. Armstrong:** Conceptualization, Formal analysis, Investigation, Methodology, Validation, Visualization, Writing - original draft, Writing - review & editing. **Susanne Bernhardsson:** Conceptualization, Formal analysis, Investigation, Methodology, Validation, Visualization, Writing - original draft, Writing - review & editing. **Margot Fleuren:** Conceptualization, Formal analysis, Investigation, Methodology, Validation, Visualization, Writing - original draft, Writing - review & editing. **Hector Pardo-Hernandez:** Conceptualization, Formal analysis, Investigation, Methodology, Validation, Visualization, Writing - original draft, Writing - review & editing. **Robin W.M. Vernooij:** Conceptualization, Formal analysis, Investigation, Methodology, Validation, Visualization, Writing - original draft, Writing - review & editing. **Melina Willson:** Conceptualization, Formal analysis, Investigation, Methodology, Validation, Visualization, Writing - original draft, Writing - review & editing.

Acknowledgments

The authors thank Albina Cako and Laurel Liang for their assistance with data collection and analysis. Members of the Guidelines International Network Implementation Working Group (g-i-n.net/working-groups/implementation) reviewed this article to further refine the interpretation of findings and enhance communication of the findings.

The aim of the Implementation Working Group is to build capacity for guideline implementation by progressing the science of guideline implementation and promoting and supporting the practice of guideline implementation. The Working Group comprised individuals with expertise in guidelines and guideline implementation. To communicate with the current Chair, consult the Guidelines International Network Web site.

The Guidelines International Network (G-I-N; www.g-i-n.net) is a Scottish Charity (SC034047).

Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jclinepi.2019.05.024.

References

[1] Shekelle P, Woolf S, Grimshaw JM, Schunemann HJ, Eccles MP. Developing clinical practice guidelines: reviewing, reporting, and publishing guidelines; updating guidelines; and the emerging issues of enhancing guideline implementability and accounting for comorbid conditions in guideline development. Implement Sci 2012;7:62.

[2] McGlynn EA, Asch SM, Adams J, Keesey J, Hicks J, DeCristoforo A, et al. The quality of health care delivered to adults in the United States. N Engl J Med 2003;348:2635−45.
[3] Runciman WB, Hunt TD, Hannaford NA, Hibbert PD, Westbrook JI, Coiera EW, et al. CareTrack: assessing the appropriateness of health care delivery in Australia. Med J Aust 2012;197:100−5.
[4] McNamara RL, Chung SC, Jernberg T, Holmes D, Roe M, Timmis A, et al. International comparisons of the management of patients with non-ST segment elevation acute myocardial infarction in the United Kingdom, Sweden, and the United States: the MINAP/NICOR, SWEDEHEART/RIKS-HIA, and ACTION Registry-GWTG/NCDR registries. Int J Cardiol 2014;175:240−7.
[5] Francke AL, Smit MC, de Veer AJ, Mistiaen P. Factors influencing the implementation of clinical guidelines for health care professionals. BMC Med Inform Decis Mak 2008;8:38.
[6] Fleuren M, Wiefferink K, Paulussen T. Determinants of innovation within health care organizations: literature review and Delphi study. Int J Qual Health Care 2004;16:107−23.
[7] Flottorp SA, Oxman AD, Krause J, Musila NR, Wensing M, Godycki-Cwirko M, et al. A checklist for identifying determinants of practice: a systematic review and synthesis of frameworks and taxonomies of factors that prevent or enable improvements in healthcare professional practice. Implement Sci 2013;8:1−11.
[8] Baker R, Camosso-Stefinovic J, Gillies C, Shaw EJ, Cheater F, Flottorp S, et al. Tailored interventions to overcome identified barriers to change: effects on professional practice and health care outcomes. Cochrane Database Syst Rev 2015;3:CD005470.
[9] Wensing M. The Tailored Implementation in Chronic Diseases (TICD) project: introduction and main findings. Implement Sci 2017;12:5.
[10] Krause J, Van Lieshout J, Klomp R, Huntink E, Aakhus E, Flottorp S, et al. Identifying determinants for tailoring implementation in chronic diseases: an evaluation of different methods. Implement Sci 2014;9:102.
[11] Willson ML, Vernooij RWM, Gagliardi AR, Guidelines International Network Implementation Working Group. Questionnaires used to assess barriers of clinical guideline use among physicians are not comprehensive, reliable, or valid: a scoping review. J Clin Epidemiol 2017;86:25−38.
[12] Martinez RG, Lewis CC, Weiner BJ. Instrumentation issues in implementation science. Implement Sci 2014;9:118.
[13] Gagliardi AR. "More bang for the buck": exploring optimal approaches for guideline implementation through interviews with international developers. BMC Health Serv Res 2012;12:404.
[14] Marcano Belisario JS, Jamsek J, Huckvale K, O'Donoghue J, Morrison CP, Car J. Comparison of self-administered survey questionnaire responses collected using mobile apps versus other methods. Cochrane Database Syst Rev 2015;7:MR000042.
[15] Chaudoir SR, Dugan AG, Barr CH. Measuring factors affecting implementation of health innovations: a systematic review of structural, organizational, provider, patient, and innovation level measures. Implement Sci 2013;8:22.
[16] Huijg JM, Gebhardt WA, Crone MR, Dusseldorp E, Presseau J. Discriminant content validity of a theoretical domains framework questionnaire for use in implementation research. Implement Sci 2014;9:11.
[17] Seward K, Wolfenden L, Wiggers J, Finch M, Wyse R, Oldmeadow C, et al. Measuring implementation behavior of menu guidelines in the childcare setting: confirmatory factor analysis of a theoretical domains framework questionnaire (TDFQ). Int J Behav Nutr Phys Act 2017;14:45.
[18] Weiner BJ, Lewis CC, Stanick C, Powell BJ, Dorsey CN, Clary AS, et al. Psychometric assessment of three newly developed implementation outcome measures. Implement Sci 2017;12:108.
[19] Fleuren MA, Paulussen TG, Van Dommelen P, Van Buuren S. Towards a measurement instrument for determinants of innovations. Int J Qual Health Care 2014;26:501−10.
[20] Clinton-McHarg T, Yoong SL, Tzelepis F, Regan T, Fielding A, Skelton E, et al. Psychometric properties of implementation measures for public health and community settings and mapping of constructs against the Consolidated Framework for Implementation Research: a systematic review. Implement Sci 2016;11:148.