



Developing infection prevention and control guidelines for healthcare professionals in the Netherlands: an evaluation of the process

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ARTICLE INFO

Article history:

Received 17 January 2025

Accepted 18 June 2025

Available online 4 July 2025

Keywords:

Guidelines

Infection prevention

Infection control

Hospital infection

Evidence-based evaluation



SUMMARY

Background: Nosocomial infections in healthcare pose potentially life-threatening risks to patients and can drive up healthcare costs. To address this, the Dutch Collaborative Partnership for Infection Prevention Guidelines (SRI) creates evidence-based guidelines to reduce infections in hospitals, long-term care facilities, and public health settings.

Aim: To evaluate professionals' experiences with the evidence-based guideline development process in order to gain insights into the feasibility of the current process.

Methods: Guideline development group (GDG) members from 2021 to 2022 were surveyed. Data on expectations prior to participation; experienced workload; satisfaction with the composition of the GDG, the guideline development process, and generic or domain-specific guidelines; and implementation factors, were collected and analysed.

Findings: Eighty out of 168 (48%) members of 17 GDGs responded. Expectations were clear to 46 (57%) respondents prior to participating. Twenty-seven (34%) respondents found time investment higher than expected, especially literature screening. Seventy (88%) respondents agreed that their association was represented sufficiently, and 69 (86%) reported that there was sufficient knowledge on infection prevention. However, 25 (31%) respondents expressed that Grading of Recommendations Assessment, Development and Evaluation (GRADE) is unsuitable to assess available evidence, although not offering alternatives. Thirty-two (40%) respondents wished for the adaptation of generic guidelines into domain-specific guidelines.

Conclusion: Respondents emphasized the need for adaptation of generic guidelines into domain-specific guidelines, implying the necessity to develop guidelines that closely align with the needs of the field. Addressing areas for improvement – such as workload management, methodological concerns, and implementation strategies – are crucial to optimize the development process and ensure the guidelines' impact on infection prevention.

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Introduction

Healthcare-associated infections (HAIs) pose a significant and enduring global challenge. These infections impose a heavy burden on patients, complicating their treatment, extending hospital stays, fostering microbial resistance to antimicrobials, inflating healthcare expenditures, and potentially leading to life-threatening consequences [1].

Guidelines are essential to initiate and sustain effective infection prevention and control (IPC) measures on a national level to minimize the occurrence of nosocomial infections in healthcare settings. From 1981 to 2017, the Dutch Working Party on Infection Prevention (Werkgroep infectiepreventie (WIP)) developed infection prevention and control guidelines to minimize the impact of nosocomial infections. Despite its longstanding and renowned status, the WIP lost both support from its base and financial support, and was disbanded. Four years later, the Dutch Collaborative Partnership for Infection Prevention Guidelines (Samenwerkingsverband Richtlijnen Infectiepreventie (SRI) [2]) was established by the Dutch Ministry of Health, Welfare and Sport [3]. The primary task of the SRI for the first five years was to develop evidence-based guidelines and recommendations for infection prevention for all healthcare domains (hospital settings, long-term care, and public health settings). This was to be done on the basis of the old WIP guidelines as a starting point, whereby those guidelines needed for all three healthcare domains were to be developed by multi-domain, 'generic' working groups [3].

To our knowledge, SRI is the first IPC guideline organization to develop generic guidelines through a single, broadly representative working group encompassing all healthcare domains, simultaneously. Evaluating the guideline development process is crucial, particularly as the effectiveness of guidelines is not solely dependent on their content, but also on the transparency and feasibility of their development methods [4,5]. There is increasing recognition that guideline development must involve systematic feedback from stakeholders and iterative assessments to ensure that the process is both sustainable and fit-for-purpose across diverse healthcare domains [6]. Given the novelty of the SRI's multi-domain, generic approach, such evaluation is essential to understand its strengths, limitations, and applicability for long-term implementation. This study therefore evaluates the novel SRI guideline development process in the Netherlands, focusing on its feasibility, workload, and stakeholder satisfaction, to identify areas for improvement and enhance future strategies.

Methods

All guidelines that were part of this evaluation were developed as described previously [3]. In brief, for each guideline, a multidisciplinary guideline development group (GDG) was composed with balanced expertise. Balance was defined as diversity in healthcare setting (hospital, long-term care, and public health) and professional background (e.g. infection prevention specialists, clinicians, or public health professionals). Members were nominated by their respective professional associations or organizations, ensuring formal stakeholder representation. IPC guidelines needed for all three

healthcare domains were developed by multi-domain GDGs into a generic guideline. Guidelines needed for a single healthcare domain were developed by a domain-specific GDG into a domain-specific guideline. Each GDG met regularly with a supporting advisor, who provided both methodological and procedural support throughout all phases of the guideline development process. Clinical questions for each guideline were formulated based on the old WIP guidelines as a starting point and were subject to external consultation and comment. Data were summarized using GRADE (Grading of Recommendations Assessment, Development and Evaluation) [7,8].

Questionnaire

Anonymized data were collected through an unvalidated structured questionnaire using Microsoft forms. The questionnaire used in our study was developed specifically for the purpose of evaluating the process of developing infection prevention and control guidelines in the Netherlands. The questionnaire was developed collaboratively by a team of infection prevention experts and guideline methodologists involved in the SRI process. We based the questionnaire items on key themes from existing literature on guideline development (such as AGREE II) and on practical considerations relevant to our national context. Although the instrument was not formally validated, steps were taken to ensure face validity. Specifically, the draft questionnaire was reviewed by four independent experts in infection prevention and guideline development, who provided feedback on clarity, relevance, and comprehensiveness. An editor proofread the questionnaire to ensure readability and clarity. The questionnaire was then refined based on this input. Data were collected on: expectations prior to participation, experienced workload, satisfaction regarding the composition of the GDG, satisfaction with the guideline development process, satisfaction with generic or domain-specific guidelines, and practicability for implementation. Satisfaction and experiences were measured using a 5-point Likert scale. Each question allowed an open field for additional remarks. The questionnaire was distributed via email to all GDG members who participated in guidelines that were developed in 2021 and 2022. GDG members only received one invitation if they participated in the development of multiple guidelines. The survey was open from August 2nd, 2023 until September 15th, 2023. A reminder message was sent every two weeks to maximize the response rate. Likert scale data were analysed in R version 4.3.2 [9].

Results

In total, 168 members of GDGs participated in the development of 17 guidelines (see Table 1). Of the 168 GDG members invited to complete the process evaluation questionnaire, 80 (48%) responded. Of the respondents, 55% (44/80) were medical specialists and IPC experts, 18% (14/80) were other medical specialists, 13% (11/80) were from public and/or long-term healthcare, and 14% (11/80) were from other organizations (see Supplementary File S1 for specific organizations). Respondents reported spending a mean time of 46 min to complete the questionnaire.

Table I

Overview of response rate per guideline

| Guideline | Response ^a | Percentage |
|---|-----------------------|------------|
| Disinfection of skin and mucous membranes including punctures | 9/10 | 90% |
| Isolation | 11/13 | 85% |
| Hand hygiene and personal hygiene healthcare worker | 8/10 | 80% |
| Multidrug-resistant organisms | 8/10 | 80% |
| Infection prevention in the operating theatre complex | 9/12 | 75% |
| Flushers and grinding systems (including urine discharge and bowel movements) | 6/8 | 75% |
| <i>Clostridioides difficile</i> | 5/7 | 71% |
| Meticillin-resistant <i>Staphylococcus aureus</i> | 6/9 | 67% |
| Basic hygiene in community care | 5/8 | 63% |
| Cleaning and disinfection of areas | 6/10 | 60% |
| Cleaning, disinfection, and sterilization of (re-usable) medical devices | 7/14 | 50% |
| Flexible endoscopes | 6/12 | 50% |
| Catheterization of the bladder | 4/9 | 44% |
| Preparation and administration of medication outside of the pharmacy | 4/13 | 31% |
| Accidental blood contact | 2/7 | 29% |
| Personal protective equipment | 4/16 | 25% |
| Scabies | 1/9 | 11% |

All published guidelines are available at: <https://www.sri-richtlijnen.nl/richtlijnen/alle-richtlijnen>.

^a Guideline development group members could have participated in multiple guideline development groups, making the counts in this table not mutually exclusive.

General questions and expectations prior to participation

The highest response rate was from GDG members who developed the guideline 'Disinfection of skin and mucous membranes including punctures' (90%), while the lowest response rate was obtained from GDG members from the 'Scabies' guideline (11%). For a complete overview see Table I. Notably, participants may belong to more than one GDG.

Eighty-nine percent (71/80) of respondents participated from the onset of the SRI guideline development process. The expectations of the guideline development process were clear to 57% (46/80) of respondents prior to joining. Sixty percent (48/80) found the time investment in line with expectations, whereas 40% (32/80) found that the time investment was not in line with their expectations. Of those 32 respondents who found that the time investment was not in line with their expectations, 84% (27/32) reported that it was higher than expected. The remaining respondents did not clarify whether the time investment was higher or lower than expected. Overall, respondents reported spending a median of 6.0 h (interquartile range: 6) per month on guideline development (including individual work, group work, and meetings), which in general was scheduled for 24 months.

Only 50% (40/80) of the GDG members had previous guideline development experience regarding infection control or other professional guidelines. The optional guideline

development training was followed by 54% (43/80) of respondents, of whom 79% (34/43) found the training helpful for gaining a better understanding of the guideline development process, 79% (34/43) agreed with the timing of the training, and 81% (35/43) found the training helpful in fulfilling the activities necessary for the guideline development. Respondents who did not find the training helpful reported reasons including the inapplicability to infection prevention or a belief that the training would be more helpful in an earlier stage of the development process.

Experienced workload

Experienced workload was assessed for seven aspects of the guideline development process: literature selection; writing of recommendation(s) and considerations; reviewing other modules; processing comments and gathered input in the reviewing phase; the timing of meetings; the frequency of meetings, and preparations; and development of a framework with clinical questions, research questions and PICOs. Overall, literature selection, which consisted of a screening based on title and abstract, was experienced as the highest workload. Nearly half (49%; 39/80) of the respondents reported experiencing this as burdensome. Subsequently, 42% (34/80) of respondents also indicated that their involvement in formulating/writing parts of the considerations was burdensome (Figure 1). All other aspects were generally experienced as neutral or less burdensome.

Satisfaction regarding composition of the guideline development group

The majority of the GDG members were satisfied with the composition of the GDG. In total, 88% (70/80) of respondents reported that their association/organization was represented sufficiently in the GDG, and 86% (69/80) said there was sufficient knowledge of infection prevention present in the GDG. Of all respondents, 92% (74/80) felt that they were able to voice their opinion and 84% (67/80) felt that their opinion was listened to sufficiently (Figure 2). Eighty-five percent (68/80) of respondents thought that a multidisciplinary GDG is of added value and 81% (61/80) agreed that it is of added value that the GDG consisted of members from multiple healthcare domains (hospital, long-term care and public health). Moreover, 80% (64/80) of the respondents believed that the modules based on expert opinion were derived from the consensus of the entire GDG, 75% (60/80) of respondents agreed that the problem areas from the field have been introduced during the problem area assessment, and 66% (53/80) of respondents agreed that their problem areas are described sufficiently in the guideline. In total, 40% (32/80) of respondents did not agree that the guideline development process was hindered by the limited number of research questions addressed, and only 10% (8/80) of respondents found that assembling a multidisciplinary GDG is unnecessary if the reviewing phase is broadened (involving all relevant associations and organizations).

Satisfaction with the guideline development process

In total, 69% (55/80) of respondents reported that the GRADE method is a suitable way to judge the evidence in the

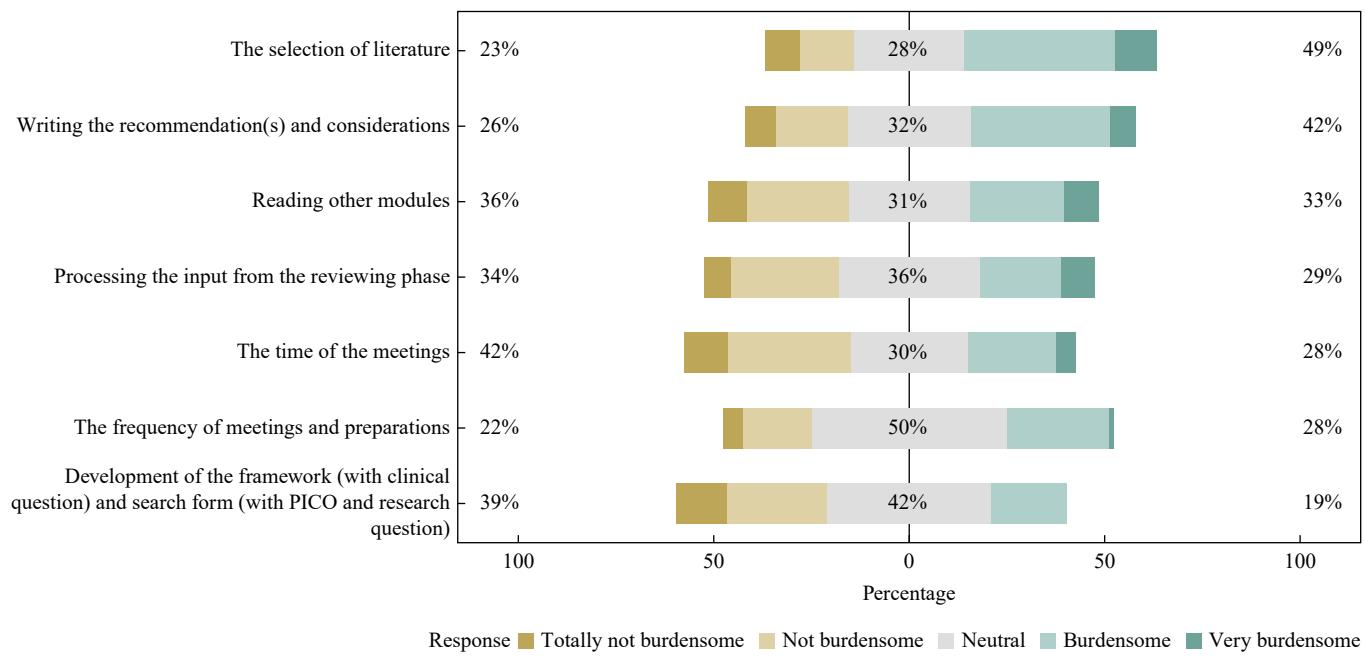


Figure 1. Results from the Likert scale on experience workload of guideline development aspects.

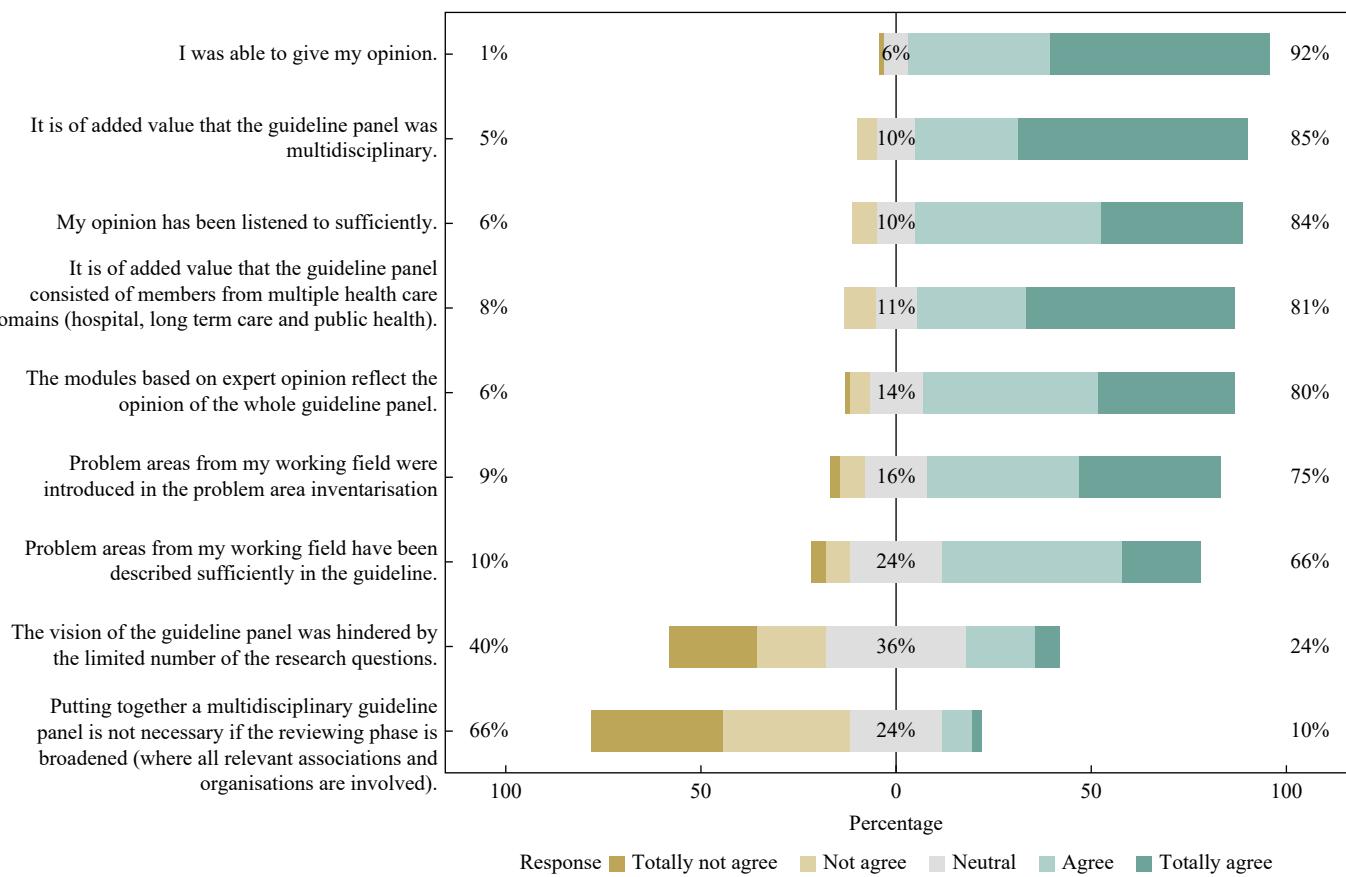


Figure 2. Results from the Likert scale on composition of the guideline development group.

available scientific literature and 60% (48/80) thought the process of searching, selecting, and analysing the literature following the GRADE methodology leads to a complete and

correct image of the available literature to answer the research question. None of the remaining 31% (25/80) of respondents who disagreed with GRADE could suggest an

alternative. Most of those respondents argued that they felt like the GRADE methodology is more suitable for disease-specific guidelines where RCTs are feasible, which is not the case for the field of infection prevention and control.

Satisfaction with generic or domain-specific guidelines

In total, 40% (32/80) of the respondents reported a need for an additional guideline and/or protocol alongside a generic guideline. Of the respondents, 48% (38/80) agreed that a serial guideline development process, where guidelines are initially developed by a primary party and then adapted by the other domains, enhance the applicability of guidelines by better aligning with the domain-specific needs of the users.

Implementation

Of the participants, 84% (67/80) expect enough support in their field for the guideline to be implemented into standard practice (Figure 3). Furthermore, 84% (67/80) of respondents think the final guideline is of high quality. In total, 86% (69/80) of respondents agreed that the broad reviewing phase (where all relevant associations and organizations are involved) improves the support of the guideline. Sixty-nine percent (55/80) of respondents expect that the recommendations of the guideline will be implemented sufficiently and 35% (28/80) of respondents thought that during the guideline development process sufficient attention was given to the implementation of the guideline.

Discussion

The development and implementation of evidence-based guidelines for infection prevention are crucial to mitigate the burden of HAIs globally. In this study, we evaluated the development of the first infection prevention guidelines by a new guideline development structure (SRI) among stakeholders and the feasibility of developing generic or domain-specific guidelines. While the overall response seems very favourable towards the new structure, we observed that a noteworthy portion of the respondents (40%) emphasized the urgent need for adapting generic guidelines into domain-specific guidelines and/or protocols. This finding may be an underestimation due to the disproportionate distribution between GDG members

from hospital settings and long-term care, and public health settings. This observation corresponds with signals received from supporting advisors, during the development stage of these generic guidelines, who observed significant discussions within the various multi-domain, 'generic' GDGs regarding domain differences and feedback from stakeholders in long-term care. Multi-domain 'generic' GDGs indicate varying needs regarding level of detail and presentation of relevant information, as well as discussions on domain characteristics. In addition, stakeholders from long-term care have now received additional financial support to adapt generically developed guidelines for their purpose. These struggles are experienced as demotivating for GDG members and lead to significant time pressure and complexity. In addition, advisors experienced that the reviewing phases of generic guidelines result in overwhelming amounts of feedback, which is considered unmanageable.

Another key aspect found was the experienced workload throughout the guideline development process. Variations were observed in perceived workload across different aspects, with selecting literature being identified as the most labour-intensive task. It is widely acknowledged that the number of randomized controlled trials in infection prevention remains low due to the inherent challenges in demonstrating significant outcome differences resulting from the implementation of individual IPC measures and the large number of confounding factors that are always present. Moreover, many infection prevention and control measures tend to produce significantly more benefits than harms (or vice versa). Consequently, there's often little incentive to conduct randomized controlled trials aimed at establishing evidence for these measures. As a result, guidelines are often based on observational studies highlighting the effect of infection prevention and control measures. In addition, due to the frequently multi-modal or bundle approach to prevent HAIs, the value of a single preventive measure frequently cannot be determined, even if well conducted, sound evidence is present, such as in the case of catheter-related bloodstream infections [10]. However, searching for observational studies using generic search terms often results in large numbers of studies found, with considerable background noise. Manual screening of identified literature can therefore be labour intensive, highlighting the importance of efficient strategies for literature review and synthesis to streamline the guideline development process and

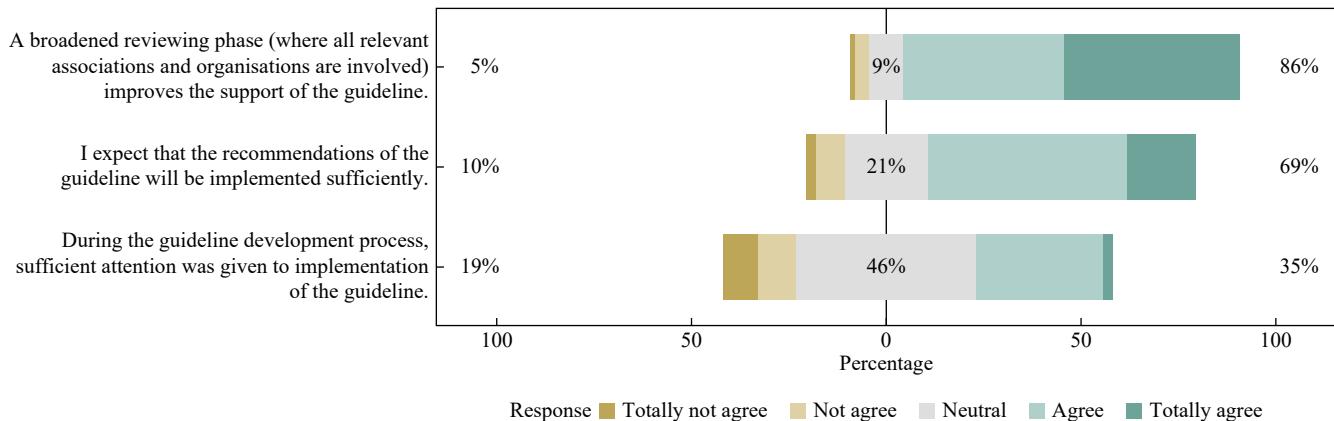


Figure 3. Results from the Likert scale on implementation of the guideline.

optimize resource utilization. In the future, artificial intelligence programmes, such as ASReview, could help minimize the workload for GDG members [11].

An additional noticeable result is the large proportion of GDG members who found that insufficient attention was given to include implementation strategies during the guideline development process. The Dutch AQUA guideline outlines the expected responsibilities of guideline-developing organizations, including raising awareness, addressing national barriers, and applying structured strategies for implementation, monitoring, and evaluation [12]. However, many organizations continue to rely on passive dissemination and lack systematic implementation planning. As a result, limited attention is paid to practical, context-specific barriers that hinder real-world applicability and uptake [13].

However, there is a lack of research specifically examining the implementation of IPC guidelines as formal, strategic documents. Most existing studies evaluate practical adherence to individual IPC measures, rather than implementation barriers of IPC guidelines themselves. Therefore little is known about how the inherent characteristics of IPC guidelines affect their translation into actionable local practices, particularly in high-income healthcare systems such as the Netherlands. To address this, further research is needed to assess IPC guideline-related barriers that influence their implementation in clinical practice. This could involve the use of structured frameworks such as the Consolidated Framework for Implementation Research (CFIR) or the Implementation of change model by Grol and Wensing, which provide systematic methods for identifying and addressing barriers to implementation [14,15]. Furthermore, early and continuous stakeholder engagement, particularly involving end-users, can ensure that guidelines are feasible and contextually appropriate.

The lack of randomized controlled trials not only increases the number of studies found in systematic literature searches but also affects the strength of recommendation using GRADE methodology [16–18]. Therefore, using the GRADE method for evidence evaluation received mixed feedback, with a considerable proportion (31%) of respondents expressing doubt about its suitability, suggesting the need for further exploration of alternative methods or adaptations to better align with the needs of guideline development in IPC [18]. One alternative might be the use of good-practice statements instead of evidence-based recommendations. However, to date, there is no consensus on validating the grading of those statements [18]. Furthermore, use of the GRADE Evidence-to-Decision (EtD) framework ensures a balanced review of available evidence and leaves room for other considerations, which are based on expert opinion or literature not included in the systematic literature analyses [16,19].

Finally, most respondents expressed satisfaction with the composition of GDG, highlighting sufficient representation of associations/organizations and expertise in infection prevention. Moreover, multidisciplinary GDGs were perceived as valuable, emphasizing the importance of diverse perspectives in guideline development to ensure comprehensive coverage of relevant domains and perspectives. This is further highlighted by expectations regarding guideline implementation which were generally optimistic, with most respondents anticipating sufficient support and implementation of the final guidelines

into standard practice. This is partly in contrast with the fact that 40% of GDG members believe that domain-specific adaptation is a necessity.

The fact that 86% of respondents agreed that a broadened reviewing phase (where all relevant associations and organizations are involved) would improve the support of the guideline is, to say the least, surprising. This finding appears to contrast with the existing practice, since all stakeholders are invited to participate at multiple stages of the guideline development process to contribute, and draft guidelines are sent for comments to all Dutch medical specialist associations, the Dutch Society for IPC in the Health Care setting, several branch organizations for acute and long-term care, and the Dutch public health service. This discrepancy may suggest a perception gap: while formal mechanisms for inclusion exist, some stakeholders may still feel that their feedback is not sufficiently acknowledged, integrated, or influential in the final outputs. This highlights the importance not only of engaging stakeholders but also of ensuring that engagement is perceived as meaningful and impactful.

Potential limitations of this study should be noted. Due to the relatively small number of respondents, sub-analyses could not be performed. Questions and items in the process evaluation questionnaire were not validated. However, questions were based on input from experts in the field. Another limitation of this study is the 52% (88/168) non-response rate among GDG members, which may introduce response bias and limit the generalizability of our findings. For instance, non-responders may include individuals who were dissatisfied with the guideline development process, potentially underestimating negative feedback on aspects such as workload or methodology suitability. Conversely, time constraints or lack of engagement among non-responders might also mean that the results disproportionately reflect the views of those more invested in the process. Because participation was anonymous, data were not systematically collected for non-responders, so there are no data to conclusively assess this potential source of bias. Nonetheless, the possibility that certain stakeholder groups are underrepresented among respondents should be considered when interpreting the results.

Based on these findings, SRI plans to adapt and refine the guideline development process by reassessing the feasibility and suitability of developing generic guidelines across multiple domains. Furthermore, strategies for better domain-specific adaptation will be explored. In addition, SRI will establish a solid and transparent revision plan, ensuring that IPC guidelines undergo regular revision based on emerging evidence and/or field feedback. The guideline development cycle will thus be made continuous and dynamic, reinforcing the practical applicability, relevance, and uptake of IPC guidelines across healthcare settings.

In conclusion, a substantial portion of the respondents emphasized the urgent need for adapting generic guidelines into domain-specific guidelines and/or protocols. However, it is important to note that this percentage may be an underestimation, given the disproportionate distribution between the number of working group members from medical specialist care versus public and long-term care. This finding, along with the signals received from SRI advisors and feedback from professionals in the field, underscores the necessity to adjust the approach to developing guidelines that more closely align with

the needs of the field, while not losing the coordination and overview between the domains. In addition, addressing the identified areas for improvement, such as experienced workload, methodological considerations, and implementation strategies, is essential for optimizing the effectiveness and impact of IPC guidelines. Continued collaboration and engagement among stakeholders, along with ongoing evaluation and refinement of guideline development processes, are paramount for advancing IPC efforts and ensuring the safety of patients and healthcare providers across healthcare domains.

Conflict of interest statement

None declared.

Funding sources

This work was undertaken by SRI, which received funding from The Ministry of Health, Welfare and Sport.

Ethical approval

Not required.

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