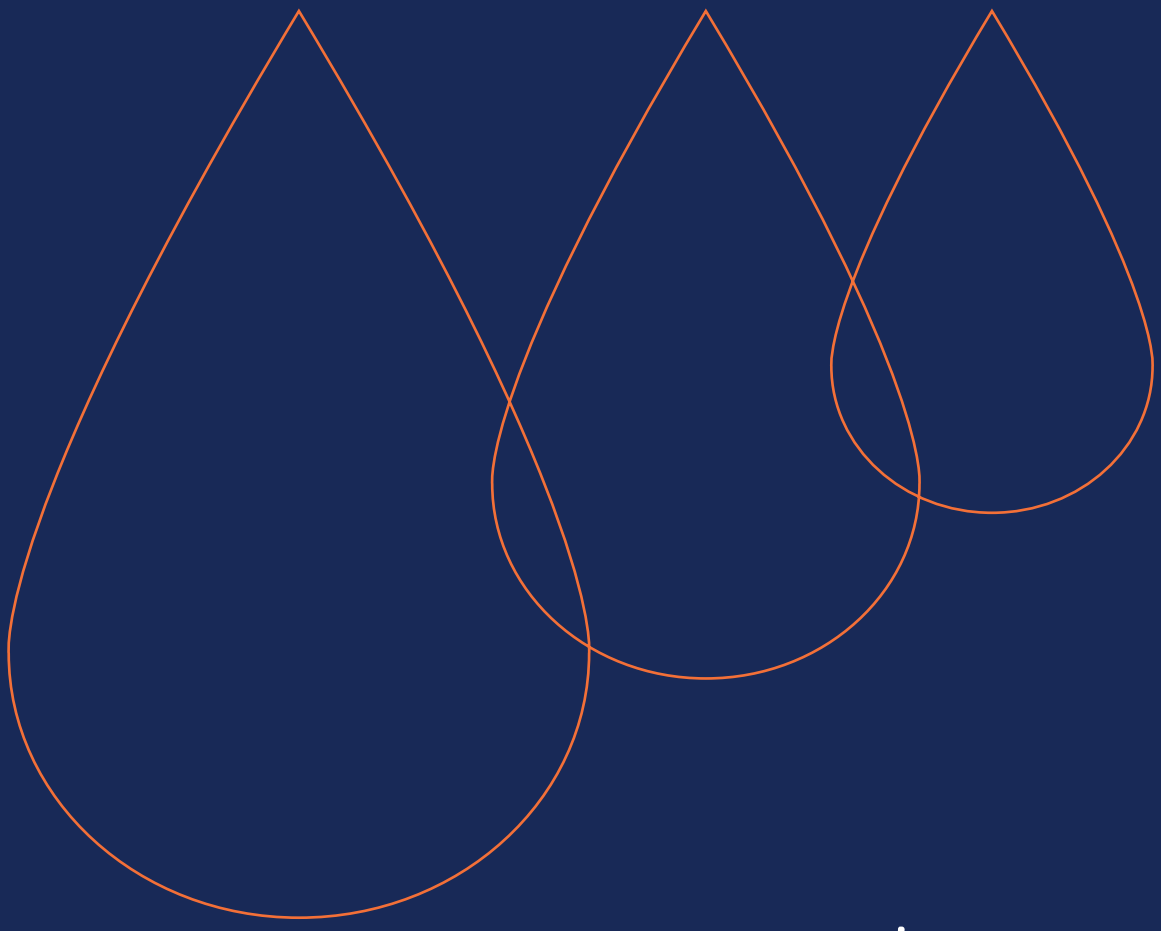
WHO research agenda for hand hygiene in health care 2023–2030:

summary



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CHAPTER 1

Background

Health care-associated infections (HAIs) affect the quality of health care services, jeopardizing patient safety and increasing health care costs. Infection prevention and control (IPC) is an evidence-based solution to prevent harm and reduce costs. Hand hygiene is vital for safe health care delivery, yet practices at the point of care remain suboptimal worldwide. Average hand hygiene compliance without specific improvement interventions remains at around 40% but can be as low as 2% in low-income countries and 20% in high-income countries *(1, 2)*. In critical care, such as intensive care units, average compliance levels are around 60%, with significant disparities between high- and low-income countries (64% vs. 9%) *(3)*. A comprehensive research agenda is therefore necessary to improve our understanding of factors influencing hand hygiene behaviour and to strengthen appropriate interventions. This agenda will provide insightful ideas for researchers to focus their projects and funding proposals and will direct donors towards the areas of hand hygiene evidence that require urgent support and innovation. It will also guide decision-makers and stakeholders at the national and international level and support country efforts in updating and strengthening hand hygiene promotion programmes. Global collaboration and investment in hand hygiene research remain essential to promote safe and effective care worldwide.

CHAPTER 2

Methodology for the development of a WHO research agenda for hand hygiene in health care

2.1 Technical Advisory Group (TAG) on hand hygiene in health care

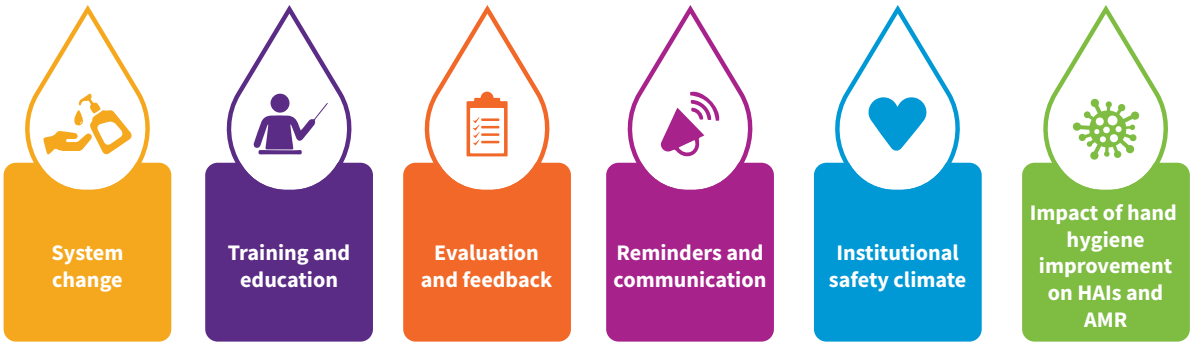
In 2021, a TAG was established to develop the research agenda on hand hygiene, and in the future, on other aspects of IPC in health care. The TAG includes 27 members from various relevant disciplines, selected for their technical expertise, taking geographical and gender balance into account.

2.2 Evidence review and mapping

A logical building block for the research agenda priorities on hand hygiene in health care was a list of research priorities previously identified by leading global experts, scientists, clinicians, and WHO secretariat members in the publication *Hand hygiene: a handbook for medical professionals*, the first comprehensive, authoritative review on this topic *(4)*. This list of research priorities served as the structural basis for review and discussion by the WHO TAG. In addition, the work to develop the WHO hand hygiene research agenda was informed by a systematic literature review jointly undertaken by the Hygiene Hub at the London School of Hygiene and Tropical Medicine (United Kingdom) and WHO to map the most recent evidence on hand hygiene in health care facilities.

Six core domains for the hand hygiene research agenda in health care settings were identified (Fig. 1) according to the WHO multimodal improvement strategy for hand hygiene *(5)*. Research priorities corresponding to the need for evidence on hand hygiene in health care were identified within each domain and grouped according to different technical areas. TAG working groups were formed for each of the six hand hygiene domains, with the task of discussing the draft research priorities and providing suggestions for improvement and potential study designs.

Fig. 1. Six core hand hygiene domains



HAIs: health care-associated infections; AMR: antimicrobial resistance.

2.3 Consultative processes and Delphi study for consensus building

The knowledge and consensus of experts in IPC and hand hygiene were sought to identify the research priorities for hand hygiene at the global level. The ultimate goal was to produce a list of prioritized research statements relevant to the need for evidence on hand hygiene in health care facilities for the six core hand hygiene domains identified by the TAG. Eight TAG consultations were held to identify draft research priority statements within each domain. Subsequently, a prospective Delphi consensus-building exercise and mixed iterative surveys were undertaken. Five Delphi surveys were conducted between April 2022 and February 2023, each involving two rounds of sequential surveys covering all six identified hand hygiene domains, to achieve consensus on the final set of future research priorities (Box 1).

Box 1. Delphi surveys to address the research priorities for all six hand hygiene domains

Delphi 1	System change
Delphi 2	Training and education*
Delphi 3	Evaluation and feedback
Delphi 4	Reminders and communication*
Delphi 5	Institutional safety climate
Delphi 6	Impact of hand hygiene improvement on HAIs and AMR

HAIs: health care-associated infections; AMR: antimicrobial resistance.

**Delphi 2 and Delphi 4 were combined together.*

Participants included TAG members and additional external experts identified through literature searches and WHO stakeholder networks identified for each Delphi survey, taking geographical and gender balance into account. Participants with expertise in IPC, water, sanitation and hygiene (WASH), global health and relevant disciplines, such as infectious diseases, epidemiology, patient safety, public health, implementation science, including clinicians, scientists, researchers and policy-makers were selected. Participants were provided with a final table of research priorities previously developed through the TAG working groups and a preparatory meeting was held prior to launching each Delphi survey. To achieve consensus on the final set of future research priorities, two rounds of Delphi surveys were held.

Participants were requested to evaluate the importance of each research priority by assigning a score based on a 5-point Likert scale ranging from “totally agree” to “totally disagree” using a web-based survey platform. Specifically, they were requested to rank the research priorities according to those where they deemed more research evidence was required. To evaluate the importance of the research priorities, participants were instructed to consider the impact/significance, cost effectiveness, and feasibility of conducting research on each identified research priority.

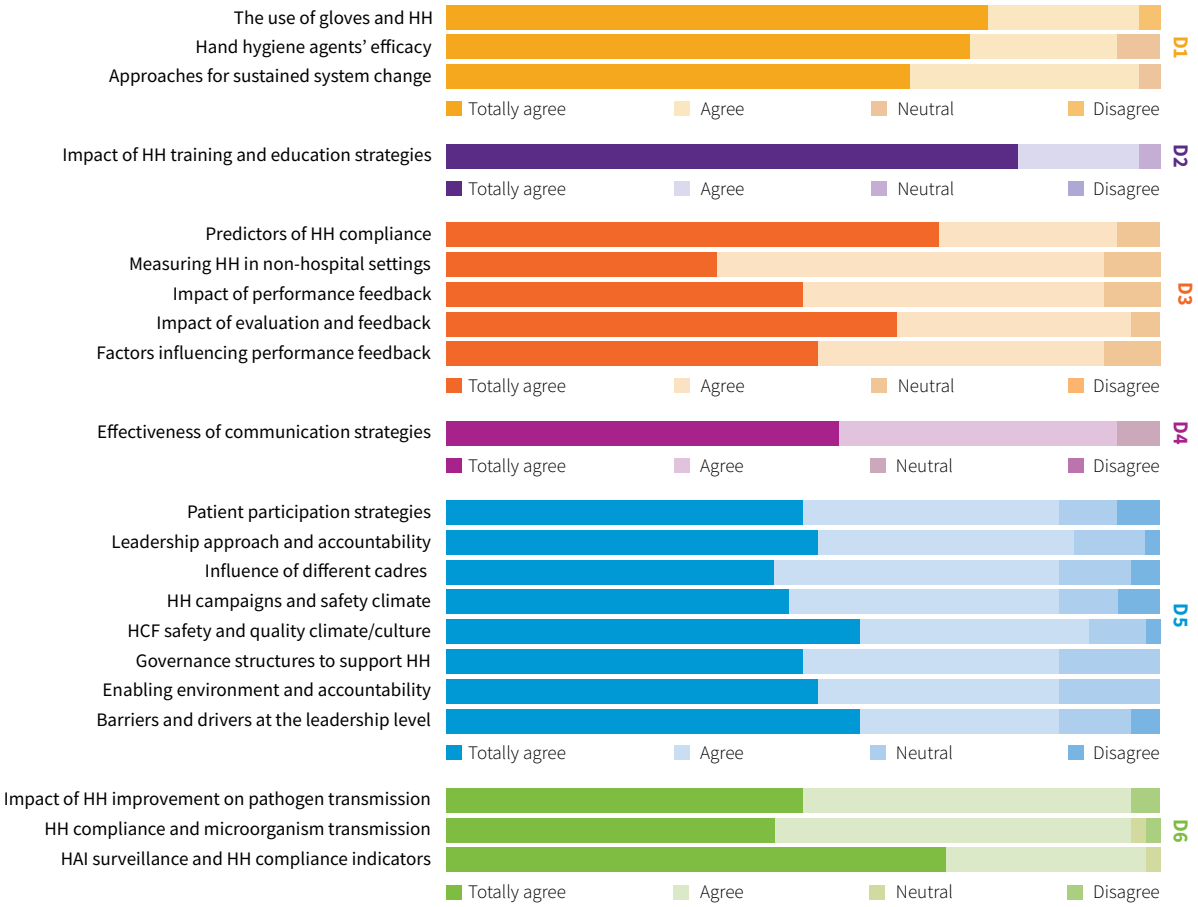
In the first round, participants were provided with the identified research priorities and scored each one. “Consensus” was achieved if 70% or more of the responses fell within the Likert scale ranges “totally agree”, “agree”, “disagree”, and “totally disagree”. Disagreement was considered to occur if 35% or more of the responses fell within both of the two lowest ranges on the Likert scale. In the second round, research priorities with less than 70% consensus were reconsidered by participants, either confirming or changing them. Each survey round lasted about 10-14 days, and participants received reminders to participate. Survey responses were anonymous.

CHAPTER 3

Hand hygiene research priorities

In the consultative process, 192 research priorities were identified. Subsequently, following the Delphi surveys, a total of 178 research priorities achieved consensus. A high level of consensus was achieved for a large number of research priorities, with agreement levels exceeding 80%. This summary presents the highest priority statements included in the new WHO hand hygiene research agenda. To identify these statements, the study group adopted the following pragmatic approach similar to other research agendas (6): a cut-off point was established at the 90th percentile (90% of the responses in the distribution fall below this value). This cut-off point was used to select only research statements that achieved the highest level of agreement. By setting the cut-off at the 90th percentile, it allowed for a more selective and focused approach, which enabled the identification of the top 10% of the highest-ranked research priorities in terms of consensus agreement. A total of 21 high-priority statements were identified and are shown in Fig. 2 and listed in more detail in Annex.

Fig. 2. Highest hand hygiene research priorities by domain



D: domain; HAIs: health care-associated infections; HH: hand hygiene; HCF: health care facility.

3.1 Discussion of findings

This work provides clear guidance to health care stakeholders on the priorities for hand hygiene research. The main goal of setting an evidence- and expert consensus-based research agenda on hand hygiene is to accelerate knowledge generation about the best interventions to improve practices. In turn, this will improve quality of care and patient outcomes and reduce the risk of HAIs and AMR. Importantly, this research agenda provides guidance to researchers by focusing especially on the six core hand hygiene domains (Fig. 1). It also offers valuable guidance to policy-makers and donors to allow them to direct their investments to areas of hand hygiene research that still have significant gaps.

3.2 System change

The use of alcohol-based handrub formulations has been a revolutionary innovation in changing systems to perform hand hygiene and leading to substantial progress in practices worldwide. However, knowledge gaps remain in this area. The highest research priorities include identifying approaches or interventions needed to facilitate sustained system change in the context of a multimodal improvement strategy, assessing the efficacy of hand hygiene agents in removing a range of organisms, including *Clostridioides difficile (Clostridium difficile)* spores and respiratory viruses, and evaluating the use of gloves and their influence on hand hygiene compliance and pathogen transmission.

3.3 Training and education

A significant amount of research has already been conducted on training and education interventions for hand hygiene improvement, and only one high-priority research statement in this area was identified, although 15 priorities were identified in total. The highest priority is to evaluate the impact of different hand hygiene training and educational strategies on the knowledge and skills of health and care workers across all levels of the health system (primary, secondary, tertiary and long-term care).

3.4 Evaluation and feedback

Monitoring of hand hygiene indicators is a challenging activity to implement as it requires expertise, human resources and time, especially for compliance audits. Thus, conducting research on the most efficient methods and best uses of data to influence decisions and behaviours is paramount. The highest research priorities in this area include assessing the use of data feedback on barriers to and predictors of hand hygiene compliance, determining the impact of evaluation and feedback on physicians' hand hygiene practices, investigating methods for measuring hand hygiene compliance in non-hospital settings, assessing factors that influence the effectiveness of hand hygiene performance feedback, and determining the impact of performance feedback on hand hygiene compliance, while considering various contexts, such as baseline compliance and the organizational structure.

3.5 Reminders and communication

The only identified high research priority in the domain of reminders and communication is to determine the effectiveness of different elements of communication strategies (focused on the importance/role of hand hygiene) on hand hygiene behaviour of health and care workers.

3.6 Institutional safety climate

The institutional safety climate is an essential organizational factor, but this area has been shown to be the least implemented among the components of the WHO multimodal hand hygiene improvement strategy *(7,8)*. The identified research agenda can be a very useful tool as it is crucial to conduct research to further explore the relationship between the safety climate in a health care facility and appropriate hand hygiene behaviour, with a particular focus on the influence of leadership engagement. Within the institutional safety climate domain, the highest research priorities include assessing the influence of different health workforce cadres on the safety climate, exploring the role of hand hygiene campaigns in shaping the institutional safety climate, and identifying effective governance structures and leadership approaches to improve hand hygiene. Notably, the priorities seek to understand the barriers to and drivers of institutionalizing hand hygiene as a priority, and the relationship between patient participation/empowerment strategies and establishing a safety climate that values hand hygiene.

3.7 Impact of hand hygiene on HAI/AMR

HAI and/or AMR prevalence or incidence are the ideal outcome to be studied in hand hygiene and IPC research. However, measuring the direct impact of hand hygiene interventions on these indicators is challenging and influenced by several factors. Although data proving the effectiveness of hand hygiene improvement on reducing HAIs and AMR exist, increasing the evidence and its quality in this field would be extremely beneficial for patient safety and would attract more investment by decision-makers. The highest research priorities include determining the association between an increase in hand hygiene compliance and a reduction of transmission, colonization and/or infection by microorganisms of interest (including multidrug-resistant organisms), in particular in long-term care and home care settings, developing feasible standardized methods and indicators for HAI surveillance and hand hygiene compliance monitoring, and establishing the link with HAI reduction in low-resource settings.

CHAPTER 4

Conclusions

This summary provides guidance on the highest priorities for hand hygiene research; a full publication including all hand hygiene research priorities identified by the experts will subsequently be issued by WHO. This research agenda is set to accelerate knowledge generation and ultimately improve the quality of care and patient outcomes, including reducing the risk of HAIs and AMR. Notably, the highest priorities in the research agenda seek to understand the barriers to and drivers of institutionalizing hand hygiene as a priority, and the relationship between patient empowerment strategies and establishing a safety climate that values hand hygiene. The agenda can be a useful tool for researchers and donors to direct their investments to areas of hand hygiene research that still have significant gaps. Increasing the evidence and its quality regarding hand hygiene improvement strategies will also be extremely beneficial to direct policy-makers and implementers towards the most effective and cost-effective interventions. Ultimately, this agenda will contribute to improving compliance with hand hygiene and ensuring patient safety.

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ANNEX

Highest priority research statements by domain

Domain 1. System change

- To identify approaches or interventions required to facilitate sustained system change in the context of the WHO multimodal improvement strategy.
- To assess hand hygiene agents' efficacy in removing a range of organisms from health and care workers' hands, including *Clostridioides difficile* spores and respiratory viruses, and the impact on transmission and HAI.
- To evaluate the use of gloves and the influence on hand hygiene adherence and pathogen transmission.

Domain 2. Training and education

- To evaluate the impact of different hand hygiene training and educational strategies (face-to-face and virtual, participatory, team and task-based strategies that are participatory and include bedside and simulation) on the knowledge and skills (for example, appropriateness of hand hygiene technique) of health and care workers across all levels of the health system (primary, secondary, tertiary and long-term care).

Domain 3. Evaluation and feedback

- To assess the use of data on barriers and predictors of hand hygiene compliance during feedback to improve hand hygiene action.
- To determine the impact of evaluation and feedback to improve physicians' hand hygiene practices, and sustain gains achieved.
- To investigate methods for measuring hand hygiene adherence in non-hospital settings (such as home care, ambulatory care, emergency medical services, nursing homes, long-term care, etc.).
- To assess factors influencing the effectiveness of hand hygiene performance feedback.
- To determine the impact of performance feedback on hand hygiene compliance (taking numerous contexts into account, such as baseline hand hygiene compliance, simultaneous hand hygiene promotion interventions, and organizational structure).

Domain 4. Reminders and communication

- To determine the effectiveness of different elements of communication strategies (focused on the importance/role of hand hygiene) on the hand hygiene behaviour of health and care workers.

Domain 5. Institutional safety climate

- To assess the influence of different cadres of the health workforce on the institutional safety climate.
- To determine the relationship between a health care facility's safety and quality climate and the culture related to hand hygiene (and IPC).
- To assess the role of hand hygiene campaigns (including promotional messages and campaign communications, reminders in the workplace) in shaping/influencing a sustained institutional safety climate.
- To explore the influence of an enabling environment (built environment, materials and equipment for hand hygiene) on personal accountability for hand hygiene.
- To determine the relationship between a leadership approach that demonstrably values hand hygiene (for example, allocates resources, plans, evaluates, contextualizes, and refreshes strategies for hand hygiene improvement) and the personal accountability of individual health and care workers.
- To identify the most effective governance structures for shaping/influencing an institutional safety climate that supports hand hygiene.
- To assess the barriers and drivers at the leadership/management and individual level to institutionalize hand hygiene as a priority.
- To determine the relationship between patient participation/empowerment strategies and the establishment of an institutional safety climate that values hand hygiene.

Domain 6. Impact of hand hygiene on HAI/AMR

- To determine the association between hand hygiene compliance increase and the reduction of transmission/colonization/ infection by microorganisms of interest (including multidrug-resistant organisms) (for example, non-linear relationships, threshold effects, etc.).
- To assess the impact of hand hygiene improvement on pathogen transmission/colonization/infection in long-term care and home care.
- To develop feasible standardized methods and indicators for HAI surveillance and hand hygiene compliance monitoring for both local evaluation and international benchmarking, and establish the link with HAI reduction in low-resource settings.

IPC: infection prevention and control; HAI: health care-associated infection; AMR: antimicrobial resistance.

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