

## Description of the 21 interventions, APEASE ratings, and stakeholder qualitative comments

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### Intervention Number 1: Ensure availability of essential supplies for hand hygiene compliance

**Intervention function:** Enablement- increasing means or reducing barriers to increase capability, or opportunity.

#### Intervention description (What does the intervention involve?)

In this intervention, special care is taken to ensure adequate availability of alcohol based hand gel, sinks with hot water and soap, gloves, and other necessary supplies for hand hygiene within patient care zones in the unit. Supplies are monitored closely, including for evening and weekend shifts, and availability of supplies is checked carefully during hand hygiene audits.

#### Strengths (What are the strengths associated with this intervention?)

- Supplies are essential to make compliance possible, and their presence in the physical environment can serve as a prompt to perform hand hygiene.
- Individuals can only be fairly held accountable for their behaviour if the physical environment makes it possible for them to readily comply with hand hygiene requirements.

#### Challenges (What challenges might be encountered in implementing this intervention?)

- Supply levels require close daily monitoring and refilling.
- Adjustments to the physical environment may not be possible everywhere (e.g., some units may not have space for new sinks).

#### Cost (What resources might be needed to implement this intervention?)

- Staff time will be required so that supply levels can be carefully monitored and regularly refilled.
- Financial resources will need to be committed to ensure availability of supplies.

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Rank	Overall	Affordability	Practicability	Effectiveness	Acceptability	Side effects	Equity
1	82.0	74.5	82.0	82.0	88.6	83.5	82.3

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#### Stakeholder comments:

Agreement that this is vital, “a no-brainer”, “an absolute must”; some statements that availability is not generally a problem.

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## Intervention Number 2: Strong hand hygiene role models within professional groups

**Intervention function:** Modelling- providing an example for people to aspire to or imitate.

### Intervention description (What does the intervention involve?)

In this intervention, leaders are recruited at unit level within specific professional groups (e.g., doctors, nurses) to provide a good example to other staff, model good hand hygiene behaviour and support their peers in doing the same, offering reminders, recognition and informal praise for good performance. These individuals also champion and promote ongoing hand hygiene initiatives.

### Strengths (What are the strengths associated with this intervention?)

- Role models have a powerful effect, particularly if they are senior staff whose behaviour junior colleagues will copy.
- Having role models within different professional groups ensures that everyone has a role model to which they can relate.
- Role models within different professional groups know the unique challenges their group faces and can help to mentor their colleagues in dealing with these challenges.

### Challenges (What challenges might be encountered in implementing this intervention?)

- It may be difficult to access busy senior staff and justify the use of their time for this intervention.
- Hand hygiene role models and champions must be carefully selected for the right personal qualities; they should be well-respected, approachable and encouraging of their peers.

### Cost (What resources might be needed to implement this intervention?)

- Staff time will be required to train the selected role models and to update training as required over time. This training may also require other resources (e.g., information packs, meeting space).
- Role models will need to devote some of their time each day to observe and offer feedback and support to their colleagues.

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Rank	Overall	Affordability	Practicability	Effectiveness	Acceptability	Side effects	Equity
2	74.0	76.7	75.0	71.4	73.5	66.1	80.6

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#### Stakeholder comments:

Choice of role model and quality of interpersonal relationships on the ward would be key determinants of success. Some concern that this would be demoralising or nagging.

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### **Intervention Number 3: Comprehensive active education and training for hand hygiene**

**Intervention function:** Education/training- increasing knowledge or understanding/imparting skills.

#### **Intervention description (What does the intervention involve?)**

In this intervention, staff responsible for training in hand hygiene ensure a high standard of comprehensive education and training in basic skills and knowledge, and top up this training on a regular basis as required. This intervention may take many forms and should be tailored according to the needs and resources available at the local level. Some components of an educational programme may include the following:

- Provide education on theoretical issues and evidence-based practices.
- Provide ad-hoc inservice training as required and consider 1:1 sessions with immediate feedback at the bedside.
- Consider carefully the appropriateness of different formats and modes of teaching: videos, coaching, online modules, group education, literature on the ward, practical demonstrations with UV gel and fingertip methods.
- Consider the duration of training sessions carefully: short workshops, lunchtime sessions, day-long seminars, etc.
- Include education on the most up-to-date antiseptic, indications and instructions.
- Educate staff about current campaigns and provide sample language they can use to help patients, families, visitors and peers understand the importance of hand hygiene.
- Employ emotional or fear-based tactics with care to make the consequences of poor hand hygiene feel personal and urgent.

#### **Strengths (What are the strengths associated with this intervention?)**

- Basic knowledge of indications and technique is the foundation of good practice; knowledge of underlying science may be persuasive.
- Regular education and training offers opportunities for healthcare workers to practice their skills, ask questions, and correct misunderstandings or bad habits in a comfortable, supportive environment.
- Immediate feedback in skills training allows for targeted correction of poor practice.
- Use of standardised indications and techniques ensures compliance with best practice.
- Attendance could be incentivised through continuous professional development credits, motivating healthcare workers to keep their skills up to date.

#### **Challenges (What challenges might be encountered in implementing this intervention?)**

- It is possible that staff will become fatigued with messaging about hand hygiene.
- Improving knowledge of hand hygiene does not guarantee improvement in practical skills; similarly, improving practical skills in a training session does not guarantee that staff members will be able or motivated to perform to the same standards on a real ward.

- Education and training can be very resource-intensive in terms of staff time, particularly 1:1 training. Frequent changeovers of staff and turnover of locum staff may make it challenging to ensure that all staff members are up to date with their training requirements.

**Cost (What resources might be needed to implement this intervention?)**

- Staff time will be required for train-the-trainer sessions, provision of education and training sessions, logistics, and record-keeping to ensure that staff are up to date with their training requirements.
- Other resources will be required to conduct sessions, e.g., printed materials, catering, meeting space, hand hygiene supplies.

Rank	Overall	Affordability	Practicability	Effectiveness	Acceptability	Side effects	Equity
3	73.5	63.9	68.2	76.2	80.1	75.0	77.6

**Stakeholder comments:**

Generally positive; implementation details would be important, including timing and hands-on aspects. All professionals should receive training. Some concerns about intervention fatigue and demands on staff time.

## Intervention Number 4: Continuous education through visual communications

**Intervention function:** Education/training- increasing knowledge or understanding/imparting skills.

### Intervention description (What does the intervention involve?)

In this intervention, continuous reinforcement of the hand hygiene message is provided through printed materials and multimedia. Some components of this programme may include the following:

- Use of visual reminders and cues on the ward, such as posters, banners, gadgets, stickers and screensavers.
- Use of stripes and mirrors to increase awareness of the patient zone.
- Varying visual reminders over time so that they stay fresh in people's minds.
- Providing pocket guides and leaflets / brochures to reinforce training.
- Prominent display of educational notices and correct hand hygiene procedures.
- Translation of all visual media into relevant languages.
- Use of promotional t-shirts, videos, banners, stands and a logo to promote hand hygiene campaigns.

### Strengths (What are the strengths associated with this intervention?)

- The ready availability of resources may allow healthcare workers to correct their own misunderstandings or brush up their knowledge without losing face or needing to seek help formally.
- Keeping hand hygiene visibly on the agenda at levels of senior management builds awareness and may help to normalise efforts to improve it.

### Challenges (What challenges might be encountered in implementing this intervention?)

- It is possible that staff will become fatigued with messaging about hand hygiene.
- Improving knowledge of hand hygiene does not guarantee improvement in practical skills; similarly, improving practical skills in a training session does not guarantee that staff members will be able or motivated to perform to the same standards on a real ward.

### Cost (What resources might be needed to implement this intervention?)

- Staff time will be required to generate appropriate materials and rotate them on an ongoing basis.
- Financial resources will also be required for graphic design, printing and production.

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Rank	Overall	Affordability	Practicability	Effectiveness	Acceptability	Side effects	Equity
4	73.4	66.7	80.1	60.9	75.6	72.5	87.9

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#### Stakeholder comments:

Mixed responses around affordability. Easy to implement, but some scepticism that visual materials quickly fade into the background.

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## **Intervention Number 5: Peer-to-peer accountability and support**

**Intervention function:** Enablement- increasing means or reducing barriers to increase capability, or opportunity.

### **Intervention description (What does the intervention involve?)**

**Hand** hygiene campaigns require more than physical resources and adequate staff knowledge to be successful; a social environment on the ward that encourages compliance is also essential to allow healthcare workers to put their knowledge into practice. In this intervention, focus is placed on developing a supportive environment in the unit, in which peers are encouraged and empowered to support one another in good hand hygiene practices, to actively educate one another, to remind their peers of hand hygiene, and to discuss instances where staff don't practice hand hygiene and the reasons why. Friendly reminders and feedback between peers are encouraged and normalised through brief training sessions and posters, role models are appointed, posters are placed in the ward, and poor hand hygiene practice is addressed in a way that is kind and supportive, rather than punitive.

### **Strengths (What are the strengths associated with this intervention?)**

- Healthcare workers within different professional groups know the unique challenges their group faces and can help to mentor their peers in dealing with these challenges.
- Mutual support fosters a sense of camaraderie among staff and can create positive feelings around hand hygiene – everyone is on the same team.
- Staff can receive feedback in real time about their hand hygiene performance, helping them to identify specific challenges for their own practice and take steps to improve.
- Misunderstandings or lack of knowledge about proper hand hygiene practice can be identified and addressed.
- This approach can help to distribute the work of improving hand hygiene, highlighting the fact that responsibility for hand hygiene belongs to everyone, not only a designated infection control team.

### **Challenges (What challenges might be encountered in implementing this intervention?)**

- Some staff may be uncomfortable that their behaviour is being monitored and commented on by their peers; they may feel scrutinised, criticised or “nagged”.
- Similarly, if supportive comments are not well-received or a negative atmosphere develops around the intervention, there is the potential for resentment among colleagues and for ill feeling towards efforts to improve hand hygiene.
- Hierarchy may prove to be an obstacle, if senior staff are reluctant to “correct” the behaviour of very established colleagues.

- Staff shortages or time pressure may limit opportunities for thoughtful engagement between members of staff around hand hygiene.

**Cost (What resources might be needed to implement this intervention?)**

- Staff time will be required to provide initial training for staff on mutual support, and to update training over time as required. This training may also require other resources (e.g., information packs, meeting space).
- Some funding will be required for posters.
- Staff, particularly appointed role models for this intervention, will need to devote some of their time each day to offer feedback and support to their colleagues.

Rank	Overall	Affordability	Practicability	Effectiveness	Acceptability	Side effects	Equity
5	72.5	76.7	75.0	76.8	66.9	56.2	84.0

**Stakeholder comments:**

Potential to be effective, but difficult to do well; potential to create resentment or poor staff morale if individuals feel unfairly targeted. Culture on the ward would be important; psychological safety vs blame culture.

## Intervention Number 6: Monitoring and feedback at unit level

**Intervention function:** Persuasion- using communication to induce positive or negative feelings or stimulate action.

### Intervention description (What does the intervention involve?)

In this intervention, hand hygiene is monitored and feedback is provided to staff at the unit level. Unit-level performance metrics are publicly displayed and fed back to staff on the unit. Summary reports are provided for supervisors and chiefs of services to alert them to good performance and any possible issues. Hand hygiene is included in discussions at relevant committee meetings and kept on the agenda. Inter-site or inter-unit comparisons / rankings are provided to give context for unit performance.

### Strengths (What are the strengths associated with this intervention?)

- Continuous discussion of hand hygiene keeps it on the agenda and encourages continuous improvement.
- Unit-level feedback and comparisons may foster a sense of camaraderie among staff – everyone is on the same team.
- This approach can help to distribute the work of improving hand hygiene, highlighting the fact that responsibility for hand hygiene belongs to everyone, not only a designated infection control team.
- Staff may be encouraged in their efforts if they see sustained good performance or improved performance over time in their own units.
- This approach allows areas with poor performance to be identified, so that resources can be targeted to address specific challenges.
- An increased sense of accountability to patients, management and fellow team members may encourage greater diligence for individual staff members.

### Challenges (What challenges might be encountered in implementing this intervention?)

- Monitoring hand hygiene and publishing findings on an ongoing basis is resource- and time-intensive.
- The Hawthorne effect, whereby people change their behaviour when they know they are being monitored, may lead to observed compliance levels that are higher than the real compliance level day-to-day on the ward.

### Cost (What resources might be needed to implement this intervention?)

- Staff time will be required for training observers, carrying out monitoring, delivering feedback and compiling results.
- Administrative support for record-keeping may also be required.

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Rank	Overall	Affordability	Practicability	Effectiveness	Acceptability	Side effects	Equity
6	71.2	67.9	75.8	70.7	70.3	65.8	76.1

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#### Stakeholder comments:

Monitoring creates a stressful environment for staff. Has been effective in some units. Clarity is important when publishing data.

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## Intervention Number 7: Ongoing /top-up education and training

**Intervention function:** Education/training- increasing knowledge or understanding/imparting skills.

### Intervention description (What does the intervention involve?)

In this intervention, top-up education and training is actively provided on a continuous basis, on a schedule that suits the needs of the unit (monthly, quarterly, etc.)

### Strengths (What are the strengths associated with this intervention?)

- Top-up training helps to keep skills and knowledge fresh for staff, and offers the opportunity to correct misunderstandings or bad habits.
- Continuous training keeps hand hygiene visibly on the agenda for both frontline staff and management.

### Challenges (What challenges might be encountered in implementing this intervention?)

- It is possible that staff will become fatigued with messaging about hand hygiene.
- Continuous top-up training may be very resource-intensive in terms of staff time.
- Frequent changeovers of staff and turnover of locum staff may make it challenging to ensure that all staff members are up to date with their training requirements.

### Cost (What resources might be needed to implement this intervention?)

- Staff time will be required for train-the-trainer sessions, provision of education and training sessions, logistics, and record-keeping to ensure that staff are up to date with their training requirements.
- Other resources will be required to conduct sessions, e.g., printed materials, catering, meeting space, hand hygiene supplies.

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Rank	Overall	Affordability	Practicability	Effectiveness	Acceptability	Side effects	Equity
7	70.5	68.5	68.8	70.7	68.3	67.2	79.7

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#### Stakeholder comments:

Brief top-up sessions are valuable. Some concerns expressed about intervention fatigue / resentment with high frequency of sessions.

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## Intervention Number 8: Tailored education and training for professional groups

**Intervention function:** Education/training- increasing knowledge or understanding/imparting skills.

### Intervention description (What does the intervention involve?)

In this intervention, educational sessions are segregated by professional group. Professional groups face different challenges in delivering care, and may conceptualise their roles in different ways. In this intervention, the members of staff responsible for delivering education and training take these differences into account and tailor their material appropriately, to ensure that it is of maximum relevance to the specific audience.

### Strengths (What are the strengths associated with this intervention?)

- This approach addresses the unique working challenges and priorities of each group in a targeted way.
- Many educational programmes are already segregated by professional group, so this intervention fits within that model.
- Gathering as a group to discuss hand hygiene issues may encourage peer support and open sharing of difficulties and strategies to overcome them.
- Professional groups may differ in the level of education about hand hygiene they have received in the past; therefore, training sessions with mixed groups may be less effective than segregated groups.

### Challenges (What challenges might be encountered in implementing this intervention?)

- Additional resources are required to tailor interventions to different groups and deliver separate sessions.
- The unique challenges and working conditions of individual groups must be properly understood in advance to ensure effective tailoring of the intervention.
- This approach does not support whole-team working with members of different professional groups, which is of critical importance.

### Cost (What resources might be needed to implement this intervention?)

- Staff time will be required for provision of education and training sessions, logistics, and record-keeping to ensure that staff are up to date with their training requirements.
- Other resources will be required to conduct sessions, e.g., printed materials, simulation supplies.

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Rank	Overall	Affordability	Practicability	Effectiveness	Acceptability	Side effects	Equity
8	70.4	64.2	68.4	73.7	73.3	64.2	78.8

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#### Stakeholder comments:

Mixed response; some acknowledgement that different groups have different challenges, but general scepticism that the principles are fundamentally different across groups and that undermining a multidisciplinary approach is worth it.

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## Intervention Number 9: Support for improving the local institutional safety culture

**Intervention function:** Environmental restructuring- changing the physical or social context.

### Intervention description (What does the intervention involve?)

The institutional safety culture refers to the norms, values and basic assumptions about safety within the healthcare organisation. In this intervention, healthcare workers seeking to promote hand hygiene proactively create and foster a positive institutional safety culture on a broader level. The commitment of executives and representatives of professional groups is secured, and at ward level, challenges, opportunities and champions are identified. Infection control and hand hygiene are promoted as a priority at every level of the organisation.

### Strengths (What are the strengths associated with this intervention?)

- This approach embeds hand hygiene within a patient-centred safety culture with commitment at all levels to protecting patients and improving care.
- Staff at all levels of the organisation can be engaged to inform the change process.

### Challenges (What challenges might be encountered in implementing this intervention?)

- Influencing institutional culture is a complex task, and efforts to improve culture around hand hygiene and other safety issues may only take effect over a long period of time.
- Research on effective means to improve safety culture is still developing.
- Improving institutional safety culture at a broad level requires substantial expertise and financial investment.
- **Hand** hygiene, while of critical importance, is only one part of safety culture and may not receive a great deal of attention in a broader programme to improve institutional safety culture.

### Cost (What resources might be needed to implement this intervention?)

- Staff time will be required to determine appropriate targets for improvement efforts and to develop and implement action plans.
- Some investment of finances, resources and time will be required to monitor the programme and measure the outcomes.

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Rank	Overall	Affordability	Practicability	Effectiveness	Acceptability	Side effects	Equity
9	70.3	64.3	71.8	66.6	73.9	67.0	78.0

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#### Stakeholder comments:

Potential to improve patient outcomes, but significant time investment required. Some comments that this intervention is not concerned with practice on the ground - "meaningless bit of jargon", "buzz words".

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## Intervention Number 10: Inclusion of hand hygiene behaviour in all procedural protocols

**Intervention function:** Restriction- using rules to reduce the opportunity to engage in the target behaviour.

### Intervention description (What does the intervention involve?)

In healthcare, a protocol is a document that describes the appropriate actions to take in particular situations; for example, how to diagnose, treat and care for a patient with a specific condition, procedures to stop the spread of infection, or how to report on important events. In this intervention, guidelines for hand hygiene are included in any relevant protocols, with full information on necessary equipment, techniques, ward setup, mandatory training, and auditing practices. The relevant staff are also encouraged to read and adhere to the updated protocols, latest developments and best practices.

### Strengths (What are the strengths associated with this intervention?)

- This approach incorporates hand hygiene into all activities and procedures on the ward in an explicit, detailed way.
- It also provides clarity on times when hand hygiene is necessary, information on the necessary equipment, and instructions on how to complete hand hygiene appropriately.
- Inclusion of hand hygiene in protocols demonstrates commitment to hand hygiene by hospital leadership and makes expectations clear for all staff.

### Challenges (What challenges might be encountered in implementing this intervention?)

- It isn't clear that protocol guidelines have a strong impact on behaviour, or that protocols are frequently consulted or used in real practice at ward level.
- Subject matter experts in both hand hygiene and the relevant procedural protocols will need to collaborate closely in order to ensure that hand hygiene instructions are incorporated in a seamless way into existing documents.
- Protocols may not exist for all procedures.

### Cost (What resources might be needed to implement this intervention?)

- Updating protocols is likely to require a significant time commitment from relevant staff over an extended period of time.
- Some funding will also be required for reprints of protocols where necessary.

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Rank	Overall	Affordability	Practicability	Effectiveness	Acceptability	Side effects	Equity
10	70.3	69.2	78.4	54.0	71.2	69.9	79.3

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#### Stakeholder comments:

Generally negative comments; consensus that protocols and paperwork don't impact real-world practice, especially with staff rotations.

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## Intervention Number 11: Implementation of universal contact precautions during outbreaks of serious infectious illness

**Intervention function:** Restriction- using rules to reduce the opportunity to engage in the target behaviour.

### Intervention description (What does the intervention involve?)

Aside from usual hand hygiene practice, safe disposal of sharps, and other standard precautions to prevent spread of infection, additional contact precautions are recommended to be used when caring for a patient who is known or suspected to be affected by some specific infectious diseases (such as *Clostridium difficile* infection, norovirus, or antibiotic-resistant infections). These additional contact precautions may include use of disposable glove and plastic aprons for all direct contacts with the patient, use of single rooms where available, additional cleaning of the room and deep cleaning upon the patient's transfer / discharge, and additional hygiene measures while transporting the patient. In this intervention, these additional contact precautions are implemented for *all* patients in intensive care unit when an outbreak of serious infectious illness occurs.

### Strengths (What are the strengths associated with this intervention?)

- This intervention may be appropriate during outbreaks of serious illness, as it may reduce the likelihood of serious infections spreading on the ward.
- Patients and their families may be reassured that staff are taking extra measures to reduce the spread of infections.

### Challenges (What challenges might be encountered in implementing this intervention?)

- This is a very conservative and resource-intensive approach to infection prevention.
- Not all ICU wards will be able to support this intervention (e.g., if single rooms are not available).
- The intervention places increased demands on staff, which can lead to poor compliance and less time to spend with patients.
- Additional contact precautions can be anxiety-provoking for patients and evoke feelings of stigma.

### Cost (What resources might be needed to implement this intervention?)

- Implementation of additional contact precautions will require additional physical supplies (gloves, gowns, etc.).
- Additional contact precautions will also require staff time to carry out extra actions, coordinate transport of patients to single rooms, and monitor compliance as appropriate.

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Rank	Overall	Affordability	Practicability	Effectiveness	Acceptability	Side effects	Equity
11	69.9	60.1	70.3	76.9	78.5	62.9	69.6

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### Stakeholder comments:

Already in place in some units, particularly with COVID-19. Significant demands on resources, not always possible to adhere.

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## Intervention Number 12: Screening and identification of patients carrying MRSA and other “superbugs”

**Intervention function:** Persuasion- using communication to induce positive or negative feelings or stimulate action.

### Intervention description (What does the intervention involve?)

In this intervention, patients are screened on admission to determine whether they are carriers of “superbugs”, such as MRSA (Methicillin-Resistant Staphylococcus Aureus) and other pathogens that may cause infections that are difficult to treat and likely to spread to other patients. If a patient is identified as a carrier of a pathogen like MRSA, all relevant staff may be notified and additional precautions may be taken to ensure that it is not spread to other patients in the unit.

### Strengths (What are the strengths associated with this intervention?)

- Staff may feel a heightened sense of urgency around hand hygiene where a clear, high risk of serious infection has been identified.
- Employing additional precautions only for affected patients, rather than employing them for all patients on the ward, reduces the demands on staff time and resources.

### Challenges (What challenges might be encountered in implementing this intervention?)

- Efforts to practice hand hygiene efforts must be employed consistently; not only with certain patients or under certain conditions. Having no patients identified as carriers of dangerous pathogens may induce a false sense of security
- Patients may feel stigmatised if they are clearly designated as needing additional precautions due to their status as carriers.

### Cost (What resources might be needed to implement this intervention?)

- Screening for pathogens will require investment of resources and staff time for collection of samples, testing, and posting of results, as well as communication of the results to the relevant staff.
- Implementation of additional contact precautions for affected patients will require additional physical supplies (gloves, gowns, etc.) as well as staff time to carry out contact precautions, co-ordinate transport of patients to single rooms, and monitor compliance as appropriate.

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Rank	Overall	Affordability	Practicability	Effectiveness	Acceptability	Side effects	Equity
12	69.3	63.4	70.8	73.6	76.4	56.1	76.0

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#### Stakeholder comments:

Already practiced in some ICUs. May imply that hand hygiene is not equally important for all patients. Cost implications may be significant.

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## **Intervention Number 13: Consultation with frontline staff about hand hygiene improvement**

**Intervention function:** Incentivisation- creating an expectation of reward.

### **Intervention description (What does the intervention involve?)**

In this intervention, action plans for hand hygiene improvement are developed based on staff feedback. Staff are consulted through focus groups, interviews, or feedback sessions about barriers to hand hygiene compliance, reasons for poor performance, appropriate and realistic targets, contingency planning, and what individual staff members and unit leadership can do to improve hand hygiene. Cooperation and support for new initiatives is sought during the planning stages, placing staff feedback at the heart of the process.

### **Strengths (What are the strengths associated with this intervention?)**

- Factors that influence the success of an intervention are not always obvious from the outside. Frontline staff are most familiar with the environment and its unique challenges, and can provide critical insight into how an intervention may really work in practice.
- By placing staff consultation at the heart of the planning process, an intervention can implement local solutions at the local level, tailoring the intervention to address the specific needs of a hospital or a unit.
- Involvement in the intervention design process may promote a sense of camaraderie, and increase staff engagement with hand hygiene and motivation to comply with guidelines.
- This approach can be incorporated into any type of intervention.

### **Challenges (What challenges might be encountered in implementing this intervention?)**

- The consultation process may be lengthy and costly. It also requires particular expertise; focus groups/interviews should be conducted in an efficient manner and the data collected must be analysed and protected appropriately.
- Similarly, staff in charge of developing or designing interventions and action plans must have appropriate knowledge of the existing research in the area and what scientific support, if any, exists for different intervention options.
- People sometimes have poor insight into their own behaviour and why they do or do not engage in certain practices; as such, staff insight into why they do or do not engage in hand hygiene at appropriate times may not fully capture the real reasons for their behaviour.
- Care must be taken when discussing reasons for not performing hand hygiene or barriers to compliance. It is important that an accusatory or blaming tone does not develop around the conversation and that negative associations with hand hygiene are not promoted.

**Cost (What resources might be needed to implement this intervention?)**

- Staff time will be required to engage frontline staff in the process, co-ordinate and conduct focus groups / interviews, and analyse the data.
- Some other resources may be required to conduct focus groups / interviews, e.g., printed materials, catering, meeting space.
- Some training may be required to ensure that the consultation process is run effectively (e.g., training staff in how to properly conduct focus groups / interviews).

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<b>Rank</b>	<b>Overall</b>	<b>Affordability</b>	<b>Practicability</b>	<b>Effectiveness</b>	<b>Acceptability</b>	<b>Side effects</b>	<b>Equity</b>
13	68.9	59.3	63.8	78.0	78.1	62.5	72.3

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**Stakeholder comments:**

Mixed response; some responses that staff should be included and consulted, others that minimal insight would be gained.

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## Intervention Number 14: Simulation training for hand hygiene

**Intervention function:** Education/training- increasing knowledge or understanding/imparting skills.

### Intervention description (What does the intervention involve?)

In simulation, healthcare workers are given an opportunity to practice skills in an educational, supportive environment using mannequins, artificial models, virtual / augmented reality technology, and actors or simulated patient interactions. In this intervention, simulation sessions are held with various unit-appropriate scenarios set up for healthcare workers to practice hand hygiene. They are provided with full debriefing after the session to maximise learning, including discussions of the proper times to perform hand hygiene and proper techniques. The effectiveness of their handwashing / handrub technique can be checked using UV light equipment, if available.

### Strengths (What are the strengths associated with this intervention?)

- Simulation offers comprehensive hand hygiene instruction in an environment that more closely matches the real ward than a classroom or workshop setting. This may improve the likelihood of the learning being transferred to the real environment.
- Staff can receive feedback in real time about their hand hygiene performance, helping them to identify specific challenges for their own practice and take steps to improve.
- Misunderstandings or lack of knowledge about proper hand hygiene practice can be identified and addressed.
- This intervention can be folded into other educational programming and can address multiple learning objectives at once (e.g., hand hygiene can be a special focus during a simulation to train healthcare workers to carry out particular procedures or respond to particular emergencies).

### Challenges (What challenges might be encountered in implementing this intervention?)

- Simulation is highly resource-intensive, in terms of both supplies and staff time to set up and deliver simulation training.
- Frequent changeovers of staff and turnover of locum staff may make it challenging to ensure that all staff members have an opportunity to receive simulation training.

### Cost (What resources might be needed to implement this intervention?)

- Staff time will be required for provision of education and training sessions, logistics, and record-keeping to ensure that staff are up to date with their training requirements.
- Other resources will be required to conduct sessions, e.g., printed materials, simulation supplies.

Rank	Overall	Affordability	Practicability	Effectiveness	Acceptability	Side effects	Equity
14	67.6	51.8	65.8	79.9	75.6	70.5	62.0

#### Stakeholder comments:

Generally popular, particularly feedback in situ and demonstrations with UV lightboxes. Access to facilities, resourcing, and demands on staff time make this challenging "but not impossible".

## Intervention Number 15: Proactive corrective action

**Intervention function:** Coercion- creating an expectation of punishment or cost.

### Intervention description (What does the intervention involve?)

In this intervention, senior staff proactively take and record corrective action for healthcare workers whose compliance is unsatisfactory. This corrective action may take the form of additional education, clarification of misunderstandings or doubts, positive reinforcement of good hand hygiene practice, and efforts to modify poor habits. In more serious cases, or where non-compliance is a recurring problem, disciplinary action or sanctions may be considered. Crucially, a standardised process for recording corrective action in a specific form is implemented so that patterns may be identified.

### Strengths (What are the strengths associated with this intervention?)

- This intervention specifically targets staff most in need of improvement.
- The intervention may provide an incentive for staff to be diligent in their hand hygiene practice.
- The intervention also demonstrates support for hand hygiene efforts from senior staff.

### Challenges (What challenges might be encountered in implementing this intervention?)

- It may be challenging to define what constitutes poor performance.
- This intervention may unfairly target staff who work in more challenging environments, where it is difficult to adhere to hand hygiene due to the physical layout of the ward, frequency of emergencies, or other factors.
- Similarly, the intervention may be perceived as punishing those most in need of support.
- The fairness of this approach relies on high quality, reliable monitoring of performance.
- This approach may encourage staff to hide poor performance rather than seek help.
- Staff whose performance is deemed poor may feel exposed or embarrassed.
- Similarly, if the intervention is perceived as being punitive or a negative atmosphere develops around the intervention, there is the potential for resentment among colleagues and for ill feeling towards efforts to improve hand hygiene.
- Hierarchy may prove to be an obstacle, if senior staff are reluctant to “correct” the behaviour of very established colleagues.
- The person or people implementing this intervention must be carefully selected for the right personal qualities; they should be well-respected, approachable and encouraging of their peers, while still in a position of sufficient authority.

### Cost (What resources might be needed to implement this intervention?)

- Staff time will be required to carry out monitoring and corrective actions (e.g., additional education).
- Administrative support for record-keeping may also be required.

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Rank	Overall	Affordability	Practicability	Effectiveness	Acceptability	Side effects	Equity
15	66.7	76.6	72.2	68.0	52.9	51.7	77.6

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#### Stakeholder comments:

Use of fear can be effective, but feeling watched is unsettling in an environment that is already stressful. Difficult for senior staff to implement in a supportive way. Would be important to make expectations clear at the outset and to have a fair approach to all professional groups.

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## Intervention Number 16: Competitions, prizes and rewards

**Intervention function:** Incentivisation- creating an expectation of reward.

### Intervention description (What does the intervention involve?)

In this intervention, individual staff members and units are given material rewards for satisfactory compliance and for reaching compliance targets at unit level. These rewards may take the form of coffee, lunch, recognition ceremonies, or other incentives deemed appropriate at the local level. Alternatively, friendly competitions may be hosted between units, with prizes for units and top individual performers.

### Strengths (What are the strengths associated with this intervention?)

- Friendly competition can create a sense of camaraderie at unit level and create positive associations with hand hygiene.
- Staff may be encouraged in their efforts if they see sustained good performance or improved performance over time in their own units.

### Challenges (What challenges might be encountered in implementing this intervention?)

- This intervention requires staff buy-in and regular monitoring of compliance.
- Identifying rewards that will be valued by all staff members may be difficult.
- There is the potential for discouragement in units with specific challenges or where compliance is poor.
- It is possible that individual team members with poor performance may be perceived by team members as “dragging down” the performance of the unit as a whole.
- Units and individuals with poor performance must be provided with corrective feedback, so that they have the opportunity to improve.

### Cost (What resources might be needed to implement this intervention?)

- Staff time will be required to secure buy-in and monitor compliance to determine performance.
- Some financial investment will be required to fund prizes / rewards.
- Some staff time will also be required to host recognition ceremonies, prize-givings, and other announcements arising from the intervention.

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Rank	Overall	Affordability	Practicability	Effectiveness	Acceptability	Side effects	Equity
16	66.2	61.8	70.9	65.7	67.7	56.6	75.3

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#### Stakeholder comments:

Mixed response; recognition is important, but prizes are unlikely to be effective motivators and the optics could be damaging.

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### **Intervention Number 17: Get staff feedback on the alcohol hand gel to be made available in units for hand cleansing**

**Intervention function:** Enablement- increasing means or reducing barriers to increase capability, or opportunity.

#### **Intervention description (What does the intervention involve?)**

In this intervention, staff input is solicited to inform the choice of alcohol hand gel to be made available in units for hand cleansing. Different types of gel are trialled on wards; this could take the form of 'taster sessions' where staff can sample a range of gels at a time, or where each gel is used on the ward for an appropriate period (e.g., one day, one week, etc.) to allow staff to sample it over the course of a real working day. Staff feedback is then solicited through brief interviews, comment cards, or other appropriate means. This feedback is taken into account when selecting the gel to be purchased and used on the ward.

#### **Strengths (What are the strengths associated with this intervention?)**

- This approach acknowledges both the effectiveness and acceptability of hand gel options; a gel is only effective in real practice if staff are willing to use it.
- Involvement in the process may increase staff engagement with hand hygiene and awareness of the issues.
- Input into the procurement process may help to create a sense of camaraderie between clinical and non-clinical staff groups; this is a decision that impacts on daily practice and can be made in consultation with frontline staff.

#### **Challenges (What challenges might be encountered in implementing this intervention?)**

- The research process may be lengthy and costly.
- Many factors must be considered when making procurement decisions, not only staff feedback. There may be resistance to prioritising feedback over other considerations, such as cost.
- Similarly, staff may feel disregarded if their opinions are sought but ultimately not truly factored into a decision. For this reason, all hand gel options must be realistic choices that could feasibly be implemented.

#### **Cost (What resources might be needed to implement this intervention?)**

- Staff time will be required to engage frontline staff in the research, set up the gels to be trialled (either in 'taster sessions' or in the usual ward environment), gather feedback about the options, and conduct the necessary analysis.
- Funding will also be required to provide gels for trial.

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<b>Rank</b>	<b>Overall</b>	<b>Affordability</b>	<b>Practicability</b>	<b>Effectiveness</b>	<b>Acceptability</b>	<b>Side effects</b>	<b>Equity</b>
17	65.4	56.5	72.9	58.2	69.2	65.5	68.3

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#### **Stakeholder comments:**

General consensus that this wouldn't be effective enough to be worth the cost and resources. Small minority believe that a feeling of ownership over decisions will promote compliance.

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## **Intervention Number 18: Demonstrated support for hand hygiene from hospital leadership**

**Intervention function:** Environmental restructuring- changing the physical or social context.

### **Intervention description (What does the intervention involve?)**

In this intervention, hospital directors, leaders and senior management provide a show of support for hand hygiene efforts and participate in monthly executive walkarounds. Hospital leaders emphasise the importance of hand hygiene for patient safety, the status of current performance, and public commitment to improve, and participate in events to launch or promote improvement efforts. The support of directors and senior staff is demonstrated through visual displays in public areas, showing signed statements of support, results of audits, photos of staff, etc.

### **Strengths (What are the strengths associated with this intervention?)**

- The commitment of leadership may have a positive ‘trickle-down’ effect, inspiring others in the organisation to adopt hand hygiene as a priority.
- Commitment to improving hand hygiene at senior levels may allow for increased investment of funding and other resources in efforts to improve hand hygiene, smoothing the way for future interventions.
- Keeping hand hygiene visibly on the agenda at levels of senior management builds awareness and may help to normalise efforts to improve it.

### **Challenges (What challenges might be encountered in implementing this intervention?)**

- It may be difficult to access busy senior management staff and justify the use of their time for this intervention.
- Messages about hand hygiene from non-clinical staff must be appropriately sensitive to the perspectives and experiences of front-line clinical staff so as not to appear out-of-touch.

### **Cost (What resources might be needed to implement this intervention?)**

- The directors and senior management staff involved will need to devote some of their time to the intervention to promote hand hygiene and participate in events / walkarounds.
- Some funding will be required for posters and other visual displays.

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<b>Rank</b>	<b>Overall</b>	<b>Affordability</b>	<b>Practicability</b>	<b>Effectiveness</b>	<b>Acceptability</b>	<b>Side effects</b>	<b>Equity</b>
18	64.9	69.1	72.1	52.8	62.1	60.7	72.3

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#### **Stakeholder comments:**

Mixed responses on appropriateness; buy-in from management is important but overt displays may be seen as "nagging" if the relationship is poor. Sensitivity to clinical context would be vital. Walkaround aspect generally unpopular; footfall through ICU should be kept to a minimum.

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## Intervention Number 19: Monitoring and feedback for individual staff members

**Intervention function:** Persuasion- using communication to induce positive or negative feelings or stimulate action.

### Intervention description (What does the intervention involve?)

In this intervention, hand hygiene is monitored and feedback is provided to staff at an individual level. Their hand hygiene behaviour is monitored by a trained observer over a period of time, and the observer provides feedback on their performance and advice on specific areas that may need improvement. In particular, feedback may be delivered in the moment as the staff member is working at the bedside, so that poor habits or non-compliance can be immediately corrected.

### Strengths (What are the strengths associated with this intervention?)

- Immediate feedback to individual staff members allows for targeted correction of behaviour.
- Continuous discussion of hand hygiene keeps it on the agenda and encourages continuous improvement.
- This approach can help to distribute the work of improving hand hygiene, highlighting the fact that responsibility for hand hygiene belongs to everyone, not only a designated infection control team.
- Staff may be encouraged in their efforts if they see sustained good performance or improved performance over time in their own practice and in their units.
- This approach allows areas with poor performance to be identified, so that resources can be targeted to address specific challenges.

### Challenges (What challenges might be encountered in implementing this intervention?)

- Monitoring hand hygiene one-to-one on an ongoing basis is resource- and time-intensive.
- The Hawthorne effect, whereby people change their behaviour when they know they are being monitored, may lead to observed compliance levels that are higher than the real compliance level day-to-day on the ward.
- Some staff may be uncomfortable that their behaviour is being monitored and commented on; they may feel scrutinised, criticised or “nagged”.
- Similarly, if feedback is not well-received or a negative atmosphere develops around the intervention, there is the potential for resentment among colleagues and for ill feeling towards efforts to improve hand hygiene.

### Cost (What resources might be needed to implement this intervention?)

- Staff time will be required for training observers, carrying out monitoring, delivering feedback and compiling results.
- Administrative support for record-keeping may also be required.

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Rank	Overall	Affordability	Practicability	Effectiveness	Acceptability	Side effects	Equity
19	60.2	56.2	61.6	71.7	51.6	53.8	65.1

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### Stakeholder comments:

Concerns about Hawthorne effect impacting results and discomfort with being observed at work. Significant resource implications, may lead to resentment among peers.

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## Intervention Number 20: Warning letters

**Intervention function:** Coercion- creating an expectation of punishment or cost.

### Intervention description (What does the intervention involve?)

In this intervention, a warning letter is issued when an individual staff member is repeatedly noted to be negligent in complying with hand hygiene guidelines. The letter may be issued by a designated leader within their professional group or another appropriate authority. This may form part of a stepped approach (e.g., a letter is issued following verbal warnings).

### Strengths (What are the strengths associated with this intervention?)

- This intervention specifically targets staff most in need of improvement.
- The intervention may provide an incentive for staff to be diligent in their hand hygiene practice.
- The intervention also demonstrates support for hand hygiene efforts from senior staff.

### Challenges (What challenges might be encountered in implementing this intervention?)

- It may be challenging to define what constitutes poor performance.
- This intervention may unfairly target staff who work in more challenging environments, where it is difficult to adhere to hand hygiene due to the physical layout of the ward, frequency of emergencies, or other factors.
- Similarly, the intervention may be perceived as punishing those most in need of support.
- The fairness of this approach relies on high-quality, reliable monitoring of performance.
- This approach may encourage staff to hide poor performance rather than seek help.
- Staff whose performance is deemed poor may feel exposed or embarrassed.
- Similarly, if the intervention is perceived as being punitive or a negative atmosphere develops around the intervention, there is the potential for resentment among colleagues and for ill feeling towards efforts to improve hand hygiene.
- Hierarchy may prove to be an obstacle, if senior staff are reluctant to “correct” the behaviour of very established colleagues.
- The person or people implementing this intervention must be carefully selected for the right personal qualities; they should be well-respected, approachable and encouraging of their peers, while still in a position of sufficient authority.

### Cost (What resources might be needed to implement this intervention?)

- Staff time will be required to carry out monitoring and issue warnings.
- Administrative support for record-keeping may also be required.

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Rank	Overall	Affordability	Practicability	Effectiveness	Acceptability	Side effects	Equity
20	59.1	71.0	71.5	54.7	41.4	39.4	75.7

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#### Stakeholder comments:

General consensus that this has potential to create a negative environment and to be upsetting and highly inequitable. Mixed views on whether it would be effective.

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## Intervention Number 21: Hand hygiene breaks

**Intervention function:** Environmental restructuring- changing the physical or social context.

### Intervention description (What does the intervention involve?)

In this intervention, regular breaks for hand hygiene are scheduled. At the appointed times, all staff on the ward pause their work, where it is safe to do so, and thoroughly wash their hands. The break may be signalled by an automated bell, and the campaign may be promoted by senior staff and poster prompts.

### Strengths (What are the strengths associated with this intervention?)

- A group exercise with all staff engaging in the same practice at once could build camaraderie and reinforce compliance.
- Clearly scheduled opportunities for hand hygiene reinforce its importance and demonstrate commitment to good practice.
- Patients may be reassured by the staff's visible, collective commitment to good hand hygiene practice.

### Challenges (What challenges might be encountered in implementing this intervention?)

- Breaks may not be appropriate in all settings (e.g., ICU where acute / emergency situations arise regularly).
- Consultants or visiting staff may not have the opportunity to take part in scheduled breaks.
- Breaks may cause interruptions to patient care or disrupt patients and their visitors.
- Scheduled breaks may negatively impact commitment to hand hygiene outside of these breaks.

### Cost (What resources might be needed to implement this intervention?)

- Some funding may be required for posters and other promotional materials, along with the usual costs of hand hygiene supplies.

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Rank	Overall	Affordability	Practicability	Effectiveness	Acceptability	Side effects	Equity
21	53.9	77.0	37.2	53.1	44.5	39.4	65.4

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#### Stakeholder comments:

Some support, but many concerns about side-effects: practicality of implementing this in a busy ICU, interruptions to patient care, concern that 5 moments would not be adhered to.

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