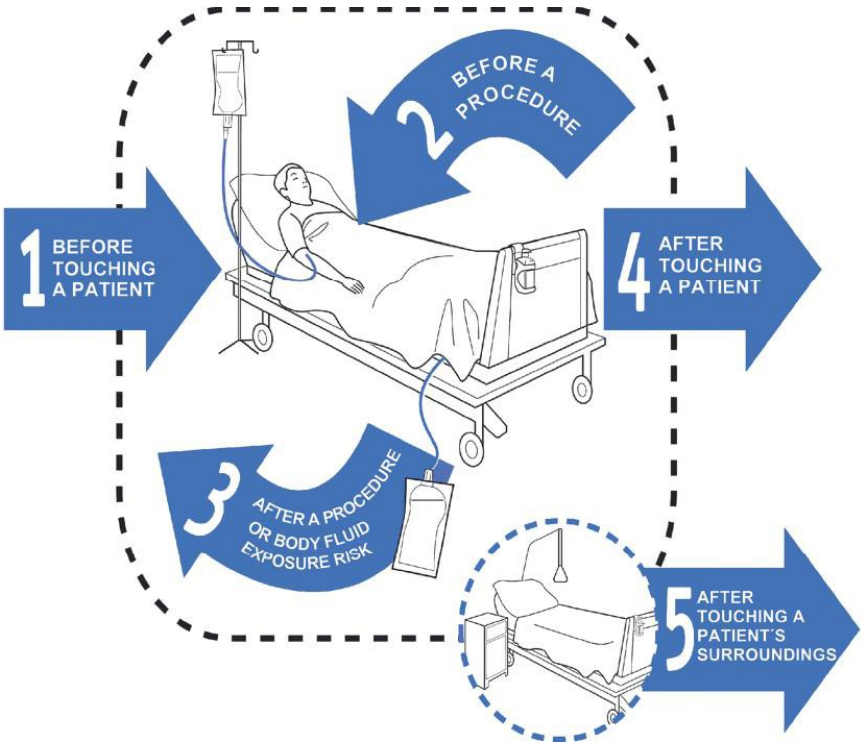
NHHI
National Hand Hygiene Initiative

National Hand Hygiene Initiative Manual



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1 Background

The Australian Commission on Safety and Quality in Health Care (the Commission) established the National Hand Hygiene Initiative (NHHI) in 2008 as part of a suite of initiatives to prevent and reduce healthcare-associated infections in Australia. The Commission contracted with Hand Hygiene Australia (HHA) at this time to coordinate and support implementation of the NHHI, in conjunction with the states and territories, and the private sector.

With the support of HHA and public and private health service organisations, there has been substantial progress in regard to increasing hand hygiene compliance in Australia. HHA has provided significant and valuable support for the NHHI through a range of educational resources, the support of auditing through resource development and training, and in the support of hand hygiene compliance reporting.

After 10 years, and significant success, HHA and the Commission have both agreed that the NHHI coordination and support role will be provided by the Commission. The Commission thanks HHA for its support for health service organisations during this time.

A stakeholder consultation process will form part of a review to advise on the way in which the NHHI can best contribute to the overall requirements of infection prevention and control strategies into the future. The Commission will consider the outcome of this consultation process, and the options for future arrangements, in liaison with states and territories and the private sector to ensure that there is continuity and sustainability of the NHHI. The review provides the opportunity to ensure that the NHHI remains responsive to the future needs of health service organisations.

From 1 November 2019 the Commission is coordinating and supporting all aspects of the NHHI.

For more information go to: https://www.safetyandquality.gov.au/our-work/healthcare-associated-infection/hand-hygiene.

1.1 About this Manual

This manual is part of the toolkit for implementing the NHHI. It contains recommendations based on the World Health Organization (WHO) Guidelines on Hand Hygiene in Health Care, modified for the Australian setting. It includes information on hand hygiene and infection prevention and control practices associated with hand hygiene.

This manual does not address surgical hand hygiene. See WHO Guidelines on Hand Hygiene in Health Care for further information.

For more information on infection prevention and control in the Australian health care system see:

- Australian Guidelines for the Prevention and Control of Infection in Healthcare
- National Safety and Quality Health Service Standards
- Australasian College of Infection Prevention and Control

1.2 The effect of hand hygiene on healthcare-associated infection

There is convincing evidence that improved hand hygiene can reduce infection rates. Between 1977 and 2011, there were more than 20 hospital-based studies, including systematic reviews, on the impact of hand hygiene on the risk of HAI were published. Despite study limitations, almost all studies showed an association between improved hand hygiene practices and reduced infection and cross transmission rates. Research published in 2018, describing the effects of the NHHI after eight years, provides even stronger evidence of the association between improved compliance and decreased incidence of HAIs.

It is important to note that, although the introduction of an alcohol-based handrub was a key factor for improvement in nearly all the studies, improved hand hygiene compliance and reductions in HAIs are due to the overall effect of a multi-modal approach to improving hand hygiene promotion strategies. This includes the introduction of alcohol-based handrub, a marked and sustainable increase in hand hygiene compliance, and a significant reduction in HAIs.

1.3 Historical perspective on hand hygiene

Hand washing with soap and water has been used to improve personal hygiene for centuries. However, the link between hand washing and the spread of disease was only established in the mid 1800's.

Below is a summary of key historical events of relevance to hand hygiene and infection prevention and control:

- 1800's: an Austrian doctor, Ignaz Semmelweis, is considered to be the first person who established that hospital-acquired diseases were transmitted via the hands of healthcare workers (HCWs)
- 1980's: first national hand hygiene guidelines published in the USA
- 2000: Didier Pittet et al published a landmark study proving that a hand hygiene culture change program involving the introduction of alcohol-based handrub, education of staff and hand hygiene promotion can significantly improve HCW hand hygiene compliance, and in turn reduce HAIs
- 2002: alcohol-based handrub is defined as the gold standard of care for hand hygiene practices in healthcare settings, whereas hand washing is reserved for particular situations

only

- 2005: WHO released the Advanced Draft of the WHO Guidelines on Hand Hygiene in Health Care, which was based on the most extensive review of literature on hand hygiene in healthcare to date; in 2009, the final WHO Guidelines were released
- 2008: the Commission established the NHHI following endorsement by all Australian health ministers
- 2012: the NSQHS Standards (first edition) were released by the Commission, NSQHS Standard 3: Preventing and Controlling Healthcare Associated Infections included actions requiring health service organisations to have a hand hygiene program consistent with the NHHI and jurisdictional requirements
- 2017: Second edition of the NSQHS Standards released, which maintain the requirements in relation to hand hygiene programs in healthcare organisations
- 2018: HHA published the results of a study investigating the effects of the NHHI after eight years, which showed an association between the improvement of hand hygiene compliance rates in Australia's largest public hospitals and a decline in the incidence of healthcare-associated *Staphylococcus aureus* bacteraemia (SAB).

1.4 Transmission of organisms by hands

Transmission of healthcare-associated organisms from one patient to another via healthcare workers' (HCWs) hands requires five sequential steps:

1. Organisms are present on the patient's skin, or have been shed onto inanimate objects immediately surrounding the patient
2. Organisms must be transferred on the hands of HCWs
3. Organisms must be capable of surviving for at least several minutes on HCWs' hands
4. Hand hygiene by the HCW must be inadequate or entirely omitted, or the agent used for hand hygiene inappropriate
5. The contaminated hand or hands of the caregiver must come into direct contact with another patient or with an inanimate object that will come into direct contact with the patient.

Healthcare workers must perform hand hygiene before and after every patient contact to prevent patients becoming colonised with healthcare-associated organisms from other patients and the hospital environment. Emphasis must also be placed on preventing the transfer of organisms from a contaminated body site to a clean body site during patient care. Hand hygiene should also be performed after contact with inanimate objects, including medical charts and equipment in the immediate vicinity of the patient.

1.5 Barriers to hand hygiene

Poor hand hygiene practice among HCWs is strongly associated with HAI transmission and is a major factor in the spread of antibiotic-resistant organisms within hospitals.

Despite this, efforts to improve the rate of hand hygiene compliance have generally been ineffective or their efficacy poorly sustained. Numerous barriers to appropriate hand hygiene have been reported including:

- Hand hygiene agents causing skin irritation and dryness
- The perception that patient needs take priority over hand hygiene
- Hand washing sinks/basins inconveniently located and/or not available

- The perception that glove use dispenses with the need for additional hand hygiene
- Insufficient time for hand hygiene, due to high workload and understaffing
- Inadequate knowledge of guidelines, protocols or technique for hand hygiene
- Lack of positive role models and social norms
- Lack of recognition of the risk of cross-transmission of microbial pathogens
- Until recently, lack of scientific information showing a definitive impact of improved hand hygiene on healthcare associated infection rates
- Simple forgetfulness.

1.6 Other barriers to hand hygiene

1.6.1 Jewellery and watches

The wearing of jewellery and watches should not inhibit the ability of the HCW to perform correct hand hygiene. Several studies have shown that skin underneath rings is more heavily colonised than comparable areas of skin on fingers without rings. Wearing rings increases the carriage rate of gram-negative bacteria and Enterobacterales on the hands of HCWs.

Hand hygiene policies and education should include a section on appropriate jewellery to be worn in the workplace. The consensus recommendation from WHO is to strongly discourage the wearing of finger and wrist jewellery during healthcare. The wearing of a simple flat band during routine care may be acceptable, but in high risk settings all rings or other jewellery should be removed.

1.6.2 Fingernails, nail polish and artificial nails

Numerous studies have documented that subungual areas (under the nail) of the hand harbour high concentrations of bacteria. Freshly applied nail polish does not increase the number of bacteria recovered from periungual skin, but chipped nail polish may support the growth of larger numbers of organisms on fingernails. Even after careful hand washing or surgical scrubs, HCWs often harbour substantial numbers of potential pathogens in the subungual spaces.

Healthcare workers who wear artificial nails are more likely to harbour gram-negative pathogens on their fingertips than are those who have natural nails, both before and after hand washing. Whether the length of natural or artificial nails is a substantial risk factor is unknown, because the majority of bacterial growth occurs along the proximal 1 mm of the nail adjacent to the subungual skin. Long, sharp fingernails, either natural or artificial, can puncture gloves easily. They may also limit a HCW's performance in hand hygiene practices, and tear or scratch a patient's skin.

Artificial/painted nails refers to all types of nail coverings, including, but not limited to, polish, shellac, signature nail systems and acrylic nails.

Each healthcare facility should develop policies on the wearing of artificial fingernails or nail polish by healthcare workers.

The consensus recommendations from WHO are that HCWs do not wear artificial fingernails, extenders or nail polish when having direct contact with patients, and natural nails should be kept short ($\leq$ 0.5cm long).

1.7 The National Hand Hygiene Initiative

The NHHI is multi- faceted, and includes the use of alcohol-based handrub, monitoring hand hygiene compliance, education regarding hand hygiene and alcohol-based handrub, and measuring infection rates. Whilst the educational message is applicable to all healthcare settings, monitoring compliance and infection rates is specific to hospitals.

Key features of the NHHI include the following:

1.7.1 Use of alcohol-based handrub

Alcohol-based handrub should be placed at point-of-care including on the ends of patient beds, on trolleys and in clinical areas. Clear signage regarding appropriate use should be present. Ensuring alcohol-based handrub is readily available at the point-of-care can reduce many of the potential barriers to good hand hygiene.

Education should be provided clearly stating the advantages of alcohol-based handrub. Primarily, that it takes approximately 15–20 seconds to decontaminate hands, is less irritating and drying than soap and water, and does not require the use of paper towels. See Chapter 3 regarding specific alcohol-based handrub product selection.

1.7.2 Ensuring uniform hand hygiene education

To assist with improving HCWs' general knowledge about hand hygiene and infection prevention and control, a range of hand hygiene online learning modules has been designed for specific HCWs.

Executive endorsement of the hand hygiene learning modules as a compulsory requirement for all staff and students has proven successful in many institutions for improving hand hygiene compliance. The program assists with education, even in situations where there are high rates of staff turnover.

The delivery of any broader infection prevention and control education within a healthcare facility should also be used as an opportunity to reinforce the importance of hand hygiene.

The Commission also provides a suite of e-learning infection prevention and control modules. These modules cover the fundamental principles of infection prevention and control and are freely available on the Commission's website.

1.7.3 Monitoring and performance feedback

Hand hygiene compliance is the established outcome for assessing the effectiveness of a hand hygiene program within facilities participating in the NHHI. Hand hygiene compliance auditing is conducted by auditors trained and validated as part of the standardised NHHI training program, using the same auditing tools. This allows for data comparison between Australian healthcare facilities.

For the purposes of national reporting, hand hygiene compliance auditing in health care facilities is currently measured continuously across three audit periods each year.

The number of acute inpatient beds at each facility will dictate the number of

observations to be undertaken once an initial pilot period has been completed (see Section 7.3). Local auditing of hand hygiene compliance can be conducted any time, according to the needs of each organisation, in addition to the national audits.

The standardised hand hygiene compliance audit form or mobile data entry via https://nhhi.safetyandquality.gov.au/mobile on a mobile device should be used for all audits (see Appendices 1, 2, 3, 4).

Hand hygiene compliance auditing may not be an appropriate outcome measure for facilities in the non-acute, primary care or mental health settings. A number of additional assessment tools are available for use when compliance auditing is not a suitable outcome measure.

1.7.4 Ensuring culture change

It is imperative that a hand hygiene program is not only about collection of hand hygiene audit data. To ensure culture change and improved hand hygiene behaviours of healthcare staff, a hand hygiene program must include appropriate access to hand hygiene facilities, training and education, promotion, auditing and feedback of results as a minimum. All components are equally important to achieve lasting changes. Healthcare organisations can track their progress and plan for improvement by using the WHO Hand Hygiene Self-Assessment Framework (see Section 8.3).

1.8 Outcomes of the first two years of the National Hand Hygiene Initiative

After two years 521 hospitals around Australia were participating in the NHHI with a national hand hygiene compliance rate of 68.3%. However, hand hygiene compliance before patient contact was 10%–15% lower than after patient contact. Among sites new to the 5 Moments audit tool, hand hygiene compliance improved from 43.6% at baseline to 67.8% ($P < 0.001$). Hand hygiene compliance was highest among nursing staff (73.6%) and lowest among medical staff (52.3%) after 2 years.

National incidence rates of methicillin-resistant SAB were stable for the 18 months before the NHHI commenced (July 2007 to 2008; $P = 0.366$), but declined after implementation (2009–2010; $P = 0.008$). Annual national rates of hospital-onset SAB per 10,000 patient-days were 1.004 and 0.995 in 2009 and 2010 respectively, of which about 75% were due to methicillin-susceptible *S. aureus*.

The NHHI was associated with widespread sustained improvements in hand hygiene compliance among Australian HCWs. Although specific linking of changes in SAB rates to the NHHI was not possible, further declines in national SAB rates were expected.

1.9 Effects of the Australian National Hand Hygiene Initiative after eight years on infection control practices, health-care worker education, and clinical outcomes: a longitudinal study

Eight years after the implementation of the NHHI, a longitudinal study of the effects of the national, standardised culture-change program showed that the NHHI had been associated with significant sustained improvement in hand hygiene compliance and a decline in the incidence of healthcare-associated SAB (HA-SAB).

The study showed that between 2009 and 2017, increases were observed in healthcare facility participation nationally from 105 hospitals in 2009 to 937 hospitals in 2017. Increases were also observed in overall hand hygiene compliance (36,213 [63.6%] of 56,978 Moments [95% CI 63.2–63.9] in 2009, compared with 494,673 [84.3%] of 586,559 Moments [84.2–84.4] in 2017; p<0·0001).

Compliance also increased for each Moment type and for each HCW occupational group, including for medical staff (4,377 [50.5%] of 8,669 Moments [95% CI 49.4–51.5] in 2009 compared with 53,620 [71.7%] of 74,788 Moments [71.4– 72.0]; p<0·0001). Over the same period 1,989,713 NHHI online-learning programs were completed.

Over this period of time, improved hand hygiene compliance in Australia's major public hospitals (n=132) was associated with declines in the incidence of HA-SAB (incidence rate ratio 0.85; 95% CI 0.79–0.93; p≤0·0001): for every 10% increase in hand hygiene compliance, the incidence of HA-SAB decreased by 15%.

1.10 Who should participate in the National Hand Hygiene Initiative?

The NHHI is designed for all healthcare facilities. Product placement, staff education and program promotion are relevant in all healthcare settings whether an acute tertiary facility, or the local GP clinic. However, the hand hygiene compliance auditing has been designed specifically for acute healthcare facilities.

Routine hand hygiene compliance auditing is not recommended as an outcome measure in the non-acute, primary care, or mental health setting. However, all facilities should be aware of their jurisdictional requirements when planning a hand hygiene program, which may include auditing in these areas. If auditing is required, then it is recommended that it be performed in areas where one-on-one care is provided to a patient by a HCW, and areas where procedures are conducted.

Other program evaluation tools are recommended for use in the non-acute, primary care, or mental health services. These might include: staff hand hygiene knowledge surveys, hand hygiene technique audits, product placement/availability audits, and reports of online-learning program completion by staff. Visit the NHHI website for relevant audit tools.

WHO has published Hand Hygiene in Outpatient and Home-based Care and Long-term Care Facilities: A Guide to the Application of the WHO Multimodal Hand Hygiene Improvement Strategy and the "My Five Moments for Hand Hygiene" Approach. This document explains the evidence of how the 5 Moments for Hand Hygiene can be incorporated into the non-acute setting. It also gives detailed examples in non-acute settings of how to audit according to the 5

1.10.1 National Safety and Quality Health Service Standards and the National Hand Hygiene Initiative

The primary aims of the National Safety and Quality Health Service (NSQHS) Standards are to protect the public from harm and to improve the quality of health service provision.

The Preventing and Controlling Healthcare-Associated Infection Standard includes Action 3.8, which requires health service organisations to have a hand hygiene program that:

- Is consistent with the current National Hand Hygiene Initiative, and jurisdictional requirements
- Addresses noncompliance or inconsistency with the current NHHI.

Supporting workbooks and implementation guides and a range of other information for health service organisations, dental practices, and mental health facilities is available on the Commission's NHHI web page.

2 The 5 Moments for Hand Hygiene

2.1 Aim

To ensure all staff involved in the 5 Moments for Hand Hygiene culture change program understand the concepts of the 5 Moments for Hand Hygiene.

2.2 What are the 5 Moments for Hand Hygiene?

The 5 Moments for Hand Hygiene is based on a theoretical model of how infectious agents can be transferred between a HCW and patients. It is inclusive of all occasions where a patient's safety can be endangered by the care given by a HCW, where opportunity exists for transfer of infectious agents between HCW, patient and the healthcare environment.

The levels of evidence that support the 5 Moments for Hand Hygiene are as follows:

- 1A - Strongly recommended for implementation and strongly supported by well- designed experimental, clinical, or epidemiological studies

- 1B - Strongly recommended for implementation and supported by some experimental, clinical, or epidemiological studies and a strong theoretical rationale.

The 5 Moments for Hand Hygiene and associated levels of evidence are:

- **Moment 1**: Before touching a patient (1B)
- **Moment 2**: Before a procedure (1B)
- **Moment 3**: After a procedure or body fluid exposure risk (1A)
- **Moment 4**: After touching a patient (1B)
- **Moment 5**: After touching a patient's surroundings (1B).

2.2.1 Key terms within the 5 Moments for Hand Hygiene

Patient
Includes any part of the patient, their clothes, or any medical device that is connected to the patient.

If the patient were to get up out of bed and walk off, what would still be attached? These items become part of the "patient".

Procedure
Is an act of care for a patient where there is a risk of direct introduction of a pathogen

into the patient's body.

Body fluid exposure risk

Any situation where contact with body fluids may occur. Such contact may pose a contamination risk to either healthcare worker or the environment.

Patient zone

Includes the patient and the patient's immediate surroundings.

The patient zone is a space dedicated to an individual patient for that patient's stay. This area is cleaned between the discharge of one patient and the arrival of the next to minimise the risk of transmission of organisms between patients. Assumptions are generally made that within the patient zone the patient flora rapidly contaminates the entire patient zone; and the patient zone is cleaned between patients.

Within the patient zone there are two critical sites: the clean site (for example, intravenous [IV] access point) that needs to be protected against microorganisms; and the body fluid site (for example, indwelling catheter) that leads to the HCW's hands being exposed to body fluid.

Healthcare zone

Refers to all regions outside of the patient zone. This includes the curtains, partitions and doors between separate patient areas.

The healthcare zone can include shared patient areas as these areas are not cleaned between patients. Assumptions are generally made that within the healthcare zone there are organisms foreign and potentially harmful to all patients, and that transmission of these pathogens to the patient results in exogenous infection.

Curtains

Patient bed curtains are outside the patient zone and are frequently contaminated with microorganisms foreign to the patient inside.

Touching the curtains after caring for a patient is considered to be equivalent to leaving the patient zone.

Hand hygiene should be performed between touching the curtains and touching the patient and vice versa.

2.3 The 5 Moments for Hand Hygiene: detail

Moment 1 – Before touching a patient

WHEN:

Perform hand hygiene on *entering the patient zone* before *touching the patient*

WHY:

To protect the patient against acquiring foreign organisms from the hands of the HCW.

Hand Hygiene Before:	Examples:
Touching a patient in any way:	Shaking hands, assisting a patient to move, touching any medical device *connected* to the patient (e.g. IV pump, indwelling catheter), allied health interventions
Any personal care activities:	Bathing, dressing, brushing hair, putting on personal aids such as glasses
Any non-invasive observations:	Checking the patient's pulse rate, blood pressure, oxygen saturation, or temperature. chest auscultation, abdominal palpation, applying ECG electrodes, cardiotocography
Any non-invasive treatment:	Applying an oxygen mask or nasal cannulae, fitting slings/braces, application of incontinence aids (including condom drainage)
Preparation and administration of oral medications:	Oral medications, nebulised medications
Oral care and feeding	Feeding a patient, brushing teeth or dentures

TO PREVENT: Patient colonisation with healthcare microorganisms

Healthcare workers are likely to have microorganisms on their hands. Performing hand hygiene before touching a patient prevents these microorganisms being transferred to the patient during patient contact.

Moment 2 – Before a procedure

WHEN:

Immediately before a procedure. Once hand hygiene has been performed, nothing else in the patient's environment should be touched prior to the procedure starting

WHY:

To protect the patient from potential organisms (including their own) from entering their body during a procedure.

Hand Hygiene Before:	Examples:
Insertion of a needle into a patient's skin, or into an invasive medical device:	Venepuncture, blood glucose level, arterial blood gas, subcutaneous or intramuscular injections, IV flush
Preparation and administration of any medications given via an invasive medical device, or preparation of a sterile field:	IV medication, nasogastric (NG), tube feeds, percutaneous endoscopic (PEG) feeds, baby NG/gavage feeds, set up of a dressing trolley
Administration of medications where there is direct contact with mucous membranes:	Eye drop instillation, suppository insertion, vaginal pessary insertion
Insertion of, or disruption to, the circuit of an invasive medical device:	Procedures involving the following: endotracheal tube, tracheostomy, nasopharyngeal airway devices, suctioning of airways, urinary catheter, colostomy/ileostomy, vascular access systems, invasive monitoring devices, wound drains, PEG tubes, NG tubes, secretion aspiration
Any assessment, treatment and patient care where contact is made with non-intact skin or mucous membranes:	Wound dressings, burns dressings, surgical procedures, digital rectal examination, invasive obstetric and gynaecological examinations and procedures, digital assessment of newborn palate

TO PREVENT: Endogenous and exogenous infections in patients

Healthcare workers are likely to have microorganisms on their hands, or may pick up microorganisms from the patient's skin, performing hand hygiene immediately before a procedure prevents these microorganisms entering the patient's body during the procedure.

Moment 3 – After a procedure or body fluid exposure risk

WHEN:

Hand hygiene immediately after a procedure or body fluid exposure risk as hands could be contaminated with body fluid

Even if you have had gloves on you should still perform hand hygiene after removing them as gloves are not always a complete impermeable barrier. Hands may also have been contaminated in the process of removing the gloves.

WHY:

To protect yourself and the healthcare surroundings from becoming contaminated by the transmission of potential organisms from the patient.

Hand Hygiene After:	Examples:
After any Procedure:	See Moment 2
After any potential body fluid exposure:	Contact with a used urinary bottle / bedpan, contact with sputum either directly or indirectly via a cup or tissue, contact with used specimen jars / pathology samples, cleaning dentures, cleaning spills of blood, urine, faeces or vomit from patient surroundings, after touching the outside of a drain tube or drainage bottle Contact with any of the following: blood, saliva, mucous, semen, tears, wax, breast milk, colostrum urine, faeces, vomitus, pleural fluid, cerebrospinal fluid, ascites fluid, lochia, meconium, pus, bone marrow, bile, organic body samples e.g. biopsy samples, cell samples

TO PREVENT: Colonisation/Infection in HCWs, contamination of the healthcare environment, and transmission of microorganisms from a colonised site to a clean site on the same patient or another patient.

After touching a patient, the HCW will have the patient's microorganisms on their hands; these microorganisms can be transmitted to the next patient/surface that the HCW touches.

Moment 4 – After touching a patient

WHEN:

After touching a patient. Perform hand hygiene before you leave the patient zone.

WHY:

To protect yourself and the healthcare surroundings from becoming contaminated with potential organisms from the patient.

Hand Hygiene After:	EXAMPLES:
After any Moment 1 except where there has been a potential exposure to body fluids:	See Moment 1 and 2

TO PREVENT: Colonisation/Infection in HCW, and contamination of the healthcare environment

After touching a patient, the HCW has the patient's microorganisms on their hands; these microorganisms can be transmitted to the next patient/surface the healthcare worker touches.

Moment 5 – After Touching a Patient's Surroundings

WHEN:

Hand hygiene *after touching a patient's surroundings* even when the patient has not been touched. Always perform hand hygiene before leaving the patient's room.

WHY:

To protect yourself and the healthcare surroundings from becoming contaminated with potential organisms from the patient's surroundings.

Hand Hygiene After:	EXAMPLES:
After touching the patient's immediate surroundings when the patient has <u>not</u> been touched:	Patient surroundings include: bed, bedrails, linen, table, bedside chart, bedside locker, call bell/TV remote control, light switches, personal belongings (including books, mobility aids) chair, foot stool, monkey bar

TO PREVENT: Colonisation/Infection in HCWs, and contamination of the healthcare environment

After touching the patient's environment, the HCW will have microorganisms on their hands; these microorganisms can be transmitted to the next patient/surface the HCW touches.

2.4 Two patients within the same patient zone

Two or more patients may be in such close contact that they occupy the same physical space and touch each other frequently. For example, a mother and her newborn child, or twins occupying the same cot. The two close patients may be viewed as occupying a single patient zone. Hand hygiene is still required when entering or leaving the common patient zone, and before and after procedures on the individual patients, but the indication for hand hygiene when moving between the two patients is little preventative value because they are likely to share the same microbial flora.

3 Alcohol-based handrubs

3.1 Aim

To successfully implement and sustain a hand hygiene program a major factor is to ensure the choice of hand hygiene solution is acceptable to the users, and that all logistical issues in product installation have been addressed.

A well-planned and well-executed installation of hand hygiene products is an essential step in any program to enhance hand hygiene adherence.

Before deciding on the selection and placement of alcohol-based handrub for your facility, it may be useful to provide healthcare workers with the opportunity to evaluate these products.

To gain better compliance, the selection strategy requires input from a multi-disciplinary team.

3.2 Why use an alcohol-based handrub?

Research has demonstrated that alcohol-based handrubs are better than traditional soap and water because they:

- Result in a ***significantly*** greater reduction in bacterial numbers than soap and water in many clinical situations, (see Figure 3.2 below)
- Require ***less time*** than handwashing
- Are gentler on skin and cause ***less skin irritation*** and dryness than frequent soap and water washes, since all handrubs contain skin emollient (moisturisers)
- Can be made readily ***accessible*** to healthcare workers
- Are more cost effective.

Both soap and alcohol-based handrub products are necessary for the introduction of a hand hygiene program; a soap and water wash is required if hands are visibly soiled, and either product can be used if hands are visibly clean.

As wet hands can more readily acquire and spread microorganisms, the proper drying of hands is an integral part of routine hand hygiene. Single-use paper towels are the most effective way to dry hands and reduce the risk of the transmission of viruses. Evidence indicates that paper towels help minimise the spread of viruses including ones associated with various diseases, including those causing gastro-intestinal infections such as Norovirus and Rotavirus.

In a study published in 2016, Kimmitt identified that jet air dryer produced over 60

times more viral plaques than a warm air dryer and over 1300 times more than paper towels. Air dryers should not be placed in clinical or patient areas due to the possible risks associated with their use. Hand dryers may be considered in non-clinical areas, such as public toilets.

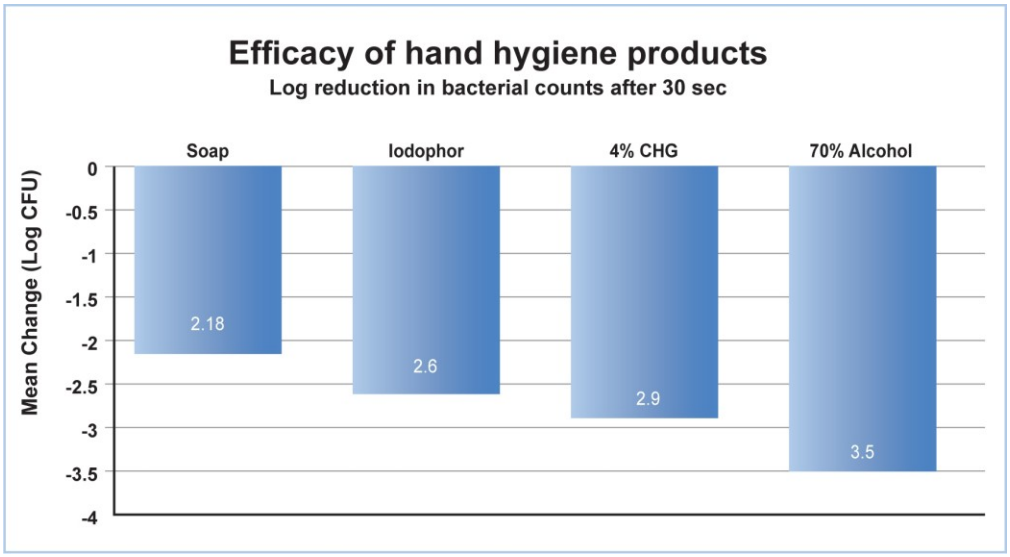
3.2.1 Alcohol-based handrub is the product of choice

Alcohol-based handrub is the gold standard of care for hand hygiene practice in healthcare settings, whereas hand washing is reserved for situations when the hands are visibly soiled, or when caring for a patient with *Clostridioides difficile* or a non-enveloped virus (for example, norovirus).

Alcohol-based handrub is the hand hygiene product of choice for all standard aseptic technique procedures. Surgical scrub is required for surgical aseptic technique. For definitions on standard vs. surgical aseptic technique see Section 3.1.6 of the 2019 Australian Guidelines for the Prevention and Control of Infections in Healthcare.

Alcohol-based handrub is also the recommended product for the prevention of intravascular catheter related infections.

Figure 3.2 Effectiveness of different hand hygiene products



Original data from: Ayliffe GAJ et al. J Hosp Infection. 1988; 11:226

With the exception of non-medicated soaps, every new formulation for hand hygiene should be tested for its antimicrobial efficacy to demonstrate that:

- It has superior efficacy over normal soap, or
- It meets an agreed performance standard.

3.3 Product selection

When selecting an alcohol-based handrub product, it is recommended that:

- The product meets the EN1500 testing standard for bactericidal effect (see Section 3.4.1)

- The Product has Therapeutic Goods Administration (TGA) approval as a hand hygiene product for a healthcare setting.

Other factors that should also be considered include:

- Dermal tolerance
- Practical considerations, such as availability, convenience, functioning of dispenser, and ability to prevent contamination
- Aesthetic preferences such as fragrance, colour, texture and ease of use
- Cost issues.

Please note that the above information on product selection is a recommendation only. The NHHI does not promote specific products. Product selection is ultimately the choice of each healthcare facility.

The following information is the current evidence available to assist healthcare facilities in choosing an appropriate alcohol-based handrub.

3.4 Alcohol-based handrub performance testing (in vivo laboratory based tests)

3.4.1 EN 1500 (European Committee for Standardisation)

Testing requires 18–22 subjects, and a culture of *Escherichia coli.* Subjects are randomly assigned to two groups, where one uses the test handrub, and the other a standard reference solution (60% v/v isopropanol). The groups then reverse roles (cross over design). The mean acceptable reduction with a test formulation shall not be significantly inferior to that with the reference handrub.

3.4.2 ASTM E-1174-13 (ASTM International – used by USA and Canada)

Testing requires two groups of 54 subjects. The indicator organism (*Serratia marcescens or E. coli*) is applied and rubbed over hands. The test handrub is then applied. The efficacy criteria are a 2-$\log_{10}$ reduction of the indicator organism on each hand within five minutes after the first use, and a 3-$\log_{10}$ reduction of the indicator organism on each hand within 5 minutes after the tenth use.

3.4.3 Comparison of alcohol-based handrub test procedures

The performance criteria in the above tests are not the same; therefore, a product could meet one criterion but not the other. The level of reduction in microbial counts needed to produce a meaningful drop in the hand-borne spread of HAIs remains unknown.

It is recommended that products tested using the EN 1500 criteria are selected, as this test more closely reflects the use of an alcohol-based handrub in a typical clinical situation. The efficacy criteria for the ASTM E-1174-13 are extremely low, with non-medicated soap and water being able to achieve a 3-$\log_{10}$ reduction of the indicator organism within 1 minute. Furthermore, five minutes is too long to wait between patients after using an alcohol-based handrub.

3.5 The activity of alcohol-based handrubs

The activity of alcohol-based handrubs against bacteria, fungi and viruses is affected by a number of factors, as detailed in Table 5, and including:

3.5.1 Type of alcohol

Isopropanol and ethanol both have in-vitro activity against bacteria, fungi and viruses. When tested at the same concentration, isopropanol is more efficacious than ethanol; however, ethanol has greater activity against viruses than isopropanol.

3.5.2 Alcohol-only alcohol-based handrub *versus* alcohol-chlorhexidine alcohol-based handrub

Although alcohols are rapidly germicidal when applied to the skin, they have no appreciable persistent or residual activity. The addition of a low concentration of chlorhexidine to an alcohol-based handrub results in significantly greater residual activity than alcohol alone and therefore potentially improves efficacy.

Notably, most published clinical studies that have demonstrated reductions in HAIs with the use of alcohol-based handrub, have been associated with the use of alcohol-based handrub that contains at least 70% alcohol (isopropanol), 0.5% chlorhexidine and a skin emollient.

To date there has been one published clinical study showing that alcohol-only alcohol-based handrub is effective in reducing HAIs (indeed, it is one of the formulations recommended by WHO). However, this study was conducted in a developing healthcare setting using a product that has higher concentrations of alcohol than what is currently available on the Australian market.

3.5.3 Alcohol concentration

There is a clear positive association between the extent of bacterial reduction and the concentration of alcohol contained in alcohol-based handrub products.

Furthermore, the concentration for maximum efficacy is different for isopropanol than ethanol. For example, alcohol-based handrub containing 60% isopropanol is associated with similar cutaneous bactericidal activity as alcohol-based handrub that contains 77% ethanol.

When comparing alcohol concentrations, it is important to look at the unit of measure, not just the numerical value of the concentration. Alcohol concentrations can be reported in a number of ways:

- Volume/Volume (V/V)
- Weight/Weight (w/w)
- Weight/Volume (w/V)

These different measures of alcohol concentration are not equivalent For example, a sample of ethanol labelled with a concentration of 70% V/V is equivalent to an ethanol sample labelled as 62.39% w/w.

Significant differences in the efficacy of alcohol-based handrubs appear to be due to a product's overall concentration of alcohol with higher concentrations being more effective.

3.5.4 Alcohol absorption

The selection of an alcohol-based handrub may be influenced by religious factors. According to some religions, alcohol consumption is prohibited. Recent studies have demonstrated minimal rates of cutaneous alcohol absorption such that there should be no concern for healthcare workers. An Australian study suggested that isopropanol might be less likely to be absorbed than ethanol. Thus, healthcare workers concerned about absorption for religious reasons may elect to use an alcohol-based handrub that contains isopropanol rather than ethanol. An awareness of commonly held religious and cultural beliefs is vital when introducing new concepts to today's multicultural healthcare community.

When implementing a hand hygiene campaign with an alcohol-based handrub in a healthcare setting where religious groups are represented, it is important to include focus groups on this topic to allow HCWs raise concerns about the use of alcohol-based handrubs, help them to understand the evidence underlying this recommendation, and to identify possible solutions to overcome obstacles. The same process should be used when implementing alcohol-based handrubs into areas where there may be concerns about misuse of alcohol.

3.5.5 Solutions versus gels versus foams

Laboratory studies have found that alcohol-based handrub solutions are more effective than alcohol-based handrub gels that contain an equivalent concentration of alcohol. Historically, gels contain approximately 10% less effective alcohol than a similar solution. For example, an alcohol-based handrub gel containing 60% alcohol has similar effective alcohol activity as a 50% alcohol-based handrub solution.

Technically it has proven difficult to develop alcohol-based handrub gels that contain ≥70% alcohol without the gel becoming less viscous and more solution-like. Thus, the first generations of gel formulations have reduced antimicrobial efficacy compared with solutions.

There is some evidence to suggest gels are preferred to solutions, and have a trend towards improved compliance. Evidence suggests that the efficacy of alcohol-based gels may depend mainly on concentration and type of alcohol in the formulation, rather than on product consistency.

Alcohol-based handrub foams are also available, but to date are used less frequently. There is currently minimal clinical evidence available for the use of alcohol-based foams.

Recommendations for product selection are outlined in Section 3.3; it does not matter if the product chosen is a solution, gel or foam.

3.5.6 Alcohol-based handrub volume and drying time

The volume of hand rub dispensed is important. One ml of alcohol has been shown to be substantially less effective than 3 ml. The effective volume of alcohol- based handrub (2–3 ml; 1–2 squirts from most alcohol-based handrub dispensers) generally takes 15–20 seconds to dry on hands. Hence, alcohol-based handrub drying time is a convenient indicator that sufficient alcohol-based handrub has been applied. It is important to follow the recommendations of the manufacturer, which are usually found on the alcohol-based handrub bottle.

In clinical practice often smaller volumes are used than what is recommended in the

testing of alcohol-based handrubs. Unless high concentration products are used, there is no significant reduction in contaminants with small volumes of alcohol-based handrub.

It is essential that the team in charge of implementing the alcohol-based handrub educate their staff about the correct use of the product. Specific education is required to ensure the correct dose is administered: it is important to follow manufacturer's instructions for use, and to recognise that the number of squirts required for the alcohol-based handrub to be effective may differ between products, or the size of the healthcare worker's hands. Alcohol-based handrub should never be applied to gloves or to inanimate objects as a cleaning agent.

3.5.7 If hands are wet when alcohol-based handrub is applied

The antimicrobial efficacy of alcohol is very sensitive to dilution with water and is therefore vulnerable to inactivation, especially if only small volumes of alcohol-based handrub are applied. For instance, if 60% isopropanol were rubbed onto wet hands in two portions of 3 ml (each for 1 minute), the mean log bacterial reduction achieved is 3.7, as compared to 4.3 with dry hands. Thus, it is recommended that alcohol-based handrub be applied to dry hands.

Table 5. Antimicrobial spectrum and characteristics of hand-hygiene antiseptic agents

Group	Gram-positive bacteria	Gram-negaitive bacteria	Mycobacteria	Fungi	Viruses	Speed of action	Comments
Alcohols	+++	+++	+++	+++	+++	Fast	Optimum concentration 60-90%; non-persistent activity
Chlorhexidine (2% and 4% aqueous)	+++	++	+	+	+++	Intermediate	Persistent activity; rare allergic reactions
Iodine Compounds	+++	+++	+++	++	+++	Intermediate	Causes skin burns; usually too irritating for hand hygiene
Iodophors	+++	+++	+	++	++	Intermediate	Less irritating than iodine; acceptance varies
Phenol Derivatives	+++	+	+	+	+	Intermediate	Activity neutralised by non-ionic surfactants
Triclosan	+++	++	+	–	+++	Intermediate	Acceptability on hands varies
Quarternary ammonium compounds	+	++	–	–	+	Slow	Used only in combination with alcohols; ecologic concerns

3.6 Alcohol-based handrub limitations

3.6.1 Bacterial spores

Alcohol has virtually no activity against bacterial spores. Washing hands with soap and water is preferred in this situation because it is the best method of physically removing spores from the hands. However, the vegetative form of *Clostridium difficile* (CDI) is highly sensitive to alcohol-based handrub.

The November 2018 ASID/ACIPC position statement – Infection Control Guidelines for Patients with *Clostridium difficile* Infection in healthcare facilities recommends the primary use of alcohol-based handrub in accordance with the WHO 5 Moments for Hand Hygiene when caring for patients with CDI. Gloves should be used during the care of patients with CDI, to minimise spore contamination, and if hands become soiled, or gloves have not been used, then hands must be washed with soap and water.

3.6.2 Non-enveloped (non-lipophilic) viruses

Alcohol has poor activity against some non-enveloped viruses; for example, rotavirus, norovirus, polio, Hepatitis A. However, there is conflicting evidence suggesting that alcohol-based handrub is more effective than soaps in reducing virus titres on finger pads. Thus, unless gloves have been worn, soap and water hand hygiene is preferred.

3.6.3 Other organisms

Alcohol has a poor activity against tropical parasites, and protozoan oocysts. Hand washing is preferred.

3.6.4 Alcohol tolerance

In an article published in August 2018 some findings were reported regarding the tolerance of *Enterococcus faecium* to alcohol. The study found that some strains of *E.faecium* collected after 2010 were more tolerant to a 23% alcohol solution when compared to older *E.faecium* strains, suggesting a potential increase of tolerance to low concentrations of alcohol. As highlighted in a letter to the editor published in The Lancet Infectious Diseases in September 2018, these study findings are likely to have minimal implication in terms of hand hygiene and the use of alcohol-based hand rubs as these formulations contain much higher alcohol concentrations; for example, 60%–90%. It should be noted that in the same study the authors found no difference between newer and older isolates in bacterial log reduction found when exposed to a 70% alcohol solution. The study findings emphasise the importance of ensuring appropriate selection of alcohol-based handrub for the clinical setting as well as maintaining high rates of hand hygiene compliance. For product recommendations, see Section 3.3.

3.7 Repeated alcohol-based handrub use

There is no maximum number of times that alcohol-based handrub can be used before hands need to be washed with soap and water.

3.8 Glove use

Inappropriate glove use often undermines efforts to sustain correct hand hygiene according to the 5 Moments and has been shown to increase the risk of transmission of HAIs. Wearing gloves does not replace the need for hand hygiene.

Wearing gloves does not replace the need for hand hygiene.

Gloves do not provide complete protection against hand contamination. Microorganisms may gain access to the HCWs' hands via small defects in gloves, or by contamination of the hands during glove removal. Microorganisms colonising patients may be recovered from the hands of approximately 30% of HCWs who wear gloves during patient contact.

Gloves can protect both patients and HCWs from exposure to infectious agents that may be carried on hands. As part of standard precautions single use gloves must be worn for:

- Contact with sterile sites and non-intact skin or mucous membranes
- Any activity that has been assessed as carrying a risk of exposure to blood, body substances, secretions and excretions.

The recommendation to wear gloves during an entire episode of care for a patient who requires contact precautions, without considering indications for their removal, such as for hand hygiene, could lead to the transmission of microorganisms. Hayden and colleagues found that HCWs seldom enter patient rooms without touching the environment, and that 52% of HCWs whose hands were free of vancomycin-resistant Enterococci (VRE) upon entering rooms contaminated their hands or gloves with VRE after touching the environment without touching the patient.

Hand hygiene products and gloves should be made available inside isolation/contact precaution rooms to allow for appropriate hand hygiene to occur during the care of a patient.

When should gloves be changed?

- Between episodes of care for different patients, to prevent transmission of microorganisms
- During the care of a single patient, to prevent cross-contamination between body sites
- If the patient interaction involves touching portable computer keyboards or other mobile equipment that is transported from room to room.

Sterile gloves must be used for surgical aseptic procedures and contact with sterile sites. Single use gloves should always be discarded.

Hand hygiene is required with glove use:

- Hand hygiene should be performed before putting on gloves
- Hand hygiene should be performed after removing gloves
- Gloves should be removed to perform hand hygiene during the care of a single patient as indicated by the 5 Moments for Hand Hygiene
- Single use gloves should not be washed, but discarded.

Prolonged and indiscriminate use of gloves should be avoided as it may cause adverse reactions and skin sensitivity.

For more information on gloves, refer to the Australian Guidelines for the Prevention and Control of Infection in Healthcare (Section 3.3 Personal Protective Equipment).

Always ask yourself:

- Why am I wearing gloves?
- Am I wearing gloves instead of cleaning my hands?
- Who am I trying to protect?
- Would frequent hand hygiene be better?

3.9 Alcohol-based handrub placement for improved hand hygiene compliance

Critical to the success of the program is having alcohol-based handrub readily available to HCWs in their work area and near the patient, at the point of care. Dispensers act as a visual cue for hand hygiene behaviour, and their strategic and ubiquitous placement makes the product highly accessible for frequent use. Placement of alcohol-based handrub needs to be consistent and reliable. Clinical staff should assist with the decision-making process, as they generally best understand the workflow in their area. Although this may be time consuming the benefit of behavioural adherence will be marked.

Where possible, alcohol-based handrub should be placed at the foot of every bed, or within each patient cubicle. An article by Traore (2007) concluded that “availability of a handrub at the point of care increased hand hygiene compliance independently of the type of product used, time of day, professional category and other confounders”.

The placement of alcohol-based handrub can have a significant effect on the hand hygiene compliance of HCWs. Medical staff have been found to have a hand hygiene compliance rate of 54% when the alcohol-based handrub was in their line of sight on entering a patient’s room, compared to 11.5% when they couldn’t see the alcohol-based handrub dispenser. When designing new healthcare facilities, consideration should be given to appropriate placement of alcohol-based handrubs.

The placement of dispensers next to sinks is strongly discouraged as this can cause confusion for some HCWs who may think they need to rinse their hands with water after using alcohol-based handrub.

Where alcohol-based handrub should be placed

Ensuring alcohol-based handrub is available at the point-of-care improves hand hygiene compliance.

Point-of-care is the place where three elements come together:

- The patient
- The HCW
- The care or treatment involving contact with the patient.

A hand hygiene product should be easily accessible generally within arm's reach of where patient care or treatment is taking place. Products should be accessible without having to leave the patient zone.

The placement of alcohol-based hand rub needs to be aligned with a risk assessment of the patient population. For further information please refer to the alcohol-based handrub section of the NHHI website for the generic risk assessment form.

The following alcohol-based handrub placement locations are suggested:

- On the end of every patient bed (fixed or removable brackets)
- Affixed to mobile work trolleys (for example, intravenous, medication and dressing trolleys)
- High staff traffic areas (for example, nurse's station, pan room, medication room and patient room entrance)
- Other multi-use patient-care areas, such as examination rooms and outpatient consultation rooms
- Entrances to each ward, outpatient clinic or Department
- Public areas (for example, waiting rooms, receptions areas, hospital foyers, near elevator doors in high traffic areas).

A clear decision needs to be made about whose responsibility it will be to replace empty alcohol-based handrub bottles. Workplace agreements or job descriptions may need to be changed to accommodate prompt replacement of these bottles. Never pour alcohol-based handrub from one bottle into another as this may lead to contamination of the bottle and its contents, and will mix different production batches. Most alcohol-based handrub approved for use within Australian healthcare facilities are registered as a pharmaceutical product, with a batch number to enable tracking of the product should it be required.

3.10 Safe alcohol-based handrub placement

There are a number of risks to patients and staff associated with the use of alcohol-based handrub. However, the benefits in terms of its use far outweigh the risks. A risk assessment should be undertaken and a management plan put in place. This particularly applies to clinical areas managing patients with alcohol use disorders, and patients at risk of self-harm (see Appendix 5).

3.10.1 Placement recommendations

- The maximum size of an individual alcohol-based handrub dispenser should not exceed 500mls
- No more than 80 individual alcohol-based handrub dispensers (each with a maximum capacity of 500ml) should be installed within a single smoke compartment
- In corridors that are at least 1.8m wide, there should be at least 150cm between each alcohol-based handrub dispenser
- Dispensers should not project more than 15cm into corridor egress
- Wall mounted brackets should be located at a height of between 92cms and 122 cm above the floor (avoid placing at eye level)
- Dispensers should not be located over carpeted areas, unless the area is protected by active sprinklers
- Dispensers should not be located over, or directly adjacent to ignition sources (for example, electrical switches, power points, call buttons, or monitoring equipment)
- Alcohol-based handrub dispensers should be separated from heat sources and electric motors
- Dispensers should be installed according to manufacturer's recommendations and to minimise leaks or spills
- Regular maintenance of dispensers and brackets should occur in accordance with manufacturer's guidelines
- Product usage signs should be clearly visible and laminated
- Regular monitoring of each area is recommended for misuse, or removal of product
- Each facility should take adequate care regarding the placement of each dispenser so as to protect vulnerable populations, for example in psychiatric units, drug and alcohol units, paediatric units and units caring for cognitively impaired patients
- Alcohol-based handrub bottles should be designed so as to minimise evaporation due to the volatile nature of alcohols
- Site-specific instructions should be developed to manage adverse events, such as alcohol-based handrub ingestion, eye splashes or allergic reactions.

3.10.2 Clinical area placement considerations

Special consideration is necessary when locating alcohol-based handrub in clinical areas where ingestion or accidental splashing of alcohol-based handrub is a particular risk. Accidental ingestion of alcohol-based handrub has been reported, but is uncommon.

Such areas include:

- Paediatrics – in general, alcohol-based handrub should be located within the point-of-care when caring for children (See Section 3.11)
- Mental Health/Dementia Units – alcohol-based handrub should be located within the point-of-care when caring for mentally ill patients, patients

undergoing alcohol- or drug-withdrawal, or where there are cognitively impaired patients

- Public areas - alcohol-based handrub placement in high traffic areas requires clear signage addressing appropriate use and the need for parents to carefully supervise their children

  Bracket design is important since alcohol-based handrub placement may be affected if alcohol-based handrub brackets are ill-fitting (for example, varying sizes of bed rails can affect the efficacy of some alcohol-based handrub brackets). Consider brackets that are removable, or product that can be removed from brackets easily in case short term patient demands warrant it. Take into account bracket availability and installation costs, since these expenses can be substantial.

Small personal bottles that HCWs carry with them may be more appropriate in some of the above areas.

3.11 Soap and water hand hygiene placement

The design of healthcare facilities can influence the transmission of HAIs. Easy access to hand hygiene products can assist in promotion of their use.

The Australasian Health Facility Guidelines have been written to “help disseminate current industry knowledge regarding good health facility design and accepted clinical practice”. These guidelines contain practical information and resources regarding health facility infrastructure, with specific guidance on hand hygiene, hand basin types and uses, and hand hygiene schedule and placement in Part D.

3.12 Paediatric exposure to alcohol

Alcohol-based handrub can be placed in paediatric wards/facilities. The placement of alcohol-based handrub within neonatal intensive care unit (NICU), special care nursery (SCN), maternity wards, and on cots should follow the recommendations above for product placement at point-of-care.

The placement within general paediatric wards should remain within the point-of-care, except where a child may have an intellectual disability or cognitive impairment or where the child could intentionally or unintentionally harm themselves. Personal bottles of alcohol-based handrub could be used in any area where alcohol-based handrub cannot be placed at the point-of-care.

Recent research has shown increasing use of alcohol-based handrubs in the home and community settings, which have corresponded with an increase in the number of calls to poisons centres regarding children misusing the products. However, Miller et al in 2009 report that alcohol-based handrubs appear relatively safe when misused by children under six years of age as the exposure invariably occurred as a brief ‘taste’ or accidental ocular or dermal exposure, resulting in little or no toxicity. This is supported by anecdotal evidence from Australian Poisons Centres, and recent publications from an American Poison’s centre.

Further research has shown that use of an alcohol-based handrub by children in day care centres is safe. Even though children put their hands in their mouth or in contact with other mucous membranes directly after alcohol-based handrub use, there was

nil measurable alcohol detected by breathalyser in any of the children tested.

3.13 Alcohol-based handrub and sterilisation departments

AS/NZS 4187:2014 is the Australian standard for sterilisation departments. Section 5.6.12 Hand Hygiene states that there should be sufficient hand hygiene facilities available and accessible in all work areas. The hand hygiene products for use can be ***either*** alcohol-based hand rubs or liquid soaps. Hand creams shall not be used when performing reprocessing activities.

3.14 Staff preference

The level of HCW acceptance of alcohol-based handrubs is a crucial factor in the success of any hand hygiene program. The following features can influence alcohol-based handrub acceptability:

- Product availability: product should be readily available within the point of care (for example, bedside) and in all patient-care areas
- The emollient agent(s) in the alcohol-based handrub should prevent skin drying and irritant skin reactions, but not leave a sticky residue on hands
- Risk of skin irritation and dryness. Proactive and sympathetic management of this problem is vital (see Section 3.15)
- Drying characteristics: in general, alcohol-based handrub solutions have lower viscosity than gels and therefore tend to dry quicker
- Fragrance and colour: these may increase the initial appeal but may cause allergenic reactions, and are therefore discouraged
- There is some evidence to suggest that gels are preferred to solutions, however it is important for staff to evaluate products themselves prior to implementation where possible.

3.15 Hand care issues

Intact skin is a first line defence mechanism against infection. Damaged skin can not only lead to infection in the host, but can also harbour higher numbers of microorganisms than intact skin and hence increase the risk of transmission to others. Damaged skin on HCWs is an important issue and needs to be seriously addressed.

The vast majority of skin problems among HCWs that are related to hand hygiene are due to irritant contact dermatitis. Irritant contact dermatitis is primarily due to frequent and repeated use of hand hygiene products - especially soaps, other detergents, and paper towel use, which result in skin drying. The initial use of alcohol-based handrub among such healthcare workers often results in a stinging sensation. However, recent studies have suggested that the ongoing use of emollient-containing alcohol-based handrub leads to improvement in irritant contact dermatitis in approximately 70% of affected healthcare workers. Also, the use of an oil-containing lotion or a barrier cream three times a shift can substantially protect the hands of vulnerable healthcare workers against drying and chemical irritation,

preventing skin breakdown.

It is important to ensure that the selected alcohol-based handrub, soaps, and moisturising lotions are chemically compatible to minimise skin reactions among staff.

The following information was developed and provided by The Occupational Dermatology Research & Education Centre, Skin & Cancer Foundation Inc.:

Occupational contact dermatitis is an inflammatory skin condition which occurs when workplace substances damage the skin. Usually the hands of healthcare workers are affected, although other exposed skin may be involved, such as the arms, face and neck.

There are three main types of contact dermatitis: irritant contact dermatitis (ICD), allergic contact dermatitis (ACD) and contact urticaria.

Irritant contact dermatitis (ICD) is the most common form of dermatitis experienced by healthcare workers. It often starts with dryness in the web spaces between the fingers.

Common causes of ICD affecting healthcare workers include:

- Repeated exposure to water, including hand washing and scrubbing
- Skin cleaners, antiseptic washes, detergents, liquid and bar soaps
- Drying of the skin using paper towels
- Heat from hot water
- Sweating, especially when wearing occlusive gloves for extended periods of time
- Glove powder
- Low humidity: hands often get drier in winter

Once ICD has developed, the penetration of allergens (substances that cause allergy) through the damaged skin barrier is facilitated. Similarly, the damaged skin barrier is more prone to transmit infection, so it is important to both prevent ICD and treat it early. The use of alcohol hand rubs reduces the exposure of the skin to irritants when compared to traditional hand washing (incorporating warm water, use of skin cleansers and paper towels), and can reduce the likelihood of developing ICD.

Allergic contact dermatitis (ACD) is a delayed type of allergy that causes dermatitis on areas of the skin exposed to allergens. Allergy is very individual; one person may be allergic to a substance that another person can use without problems.

ACD can occur at any time, after someone has been using the same product for many years or for just a few weeks. Dermatitis generally develops some hours or even 1-2 days after contact with the allergen, but does not occur the very first time an individual is exposed to the substance. People may not have had a history of allergies before and in fact are probably less likely to be 'allergic' types. The clinical features of ACD cannot be reliably differentiated from ICD.

ACD will often complicate pre-existing ICD, when the skin barrier has become damaged. Once an allergy to a substance has developed, it is generally life-long.

Special note: The preservative methylisothiazolinone is currently causing very high rates of ACD. All healthcare workers with contact dermatitis should check the ingredients of their own products and avoid it where possible. Methylisothiazolinone may be found in some liquid soaps, shampoos, sunscreens, hair products, moisturisers and disposable wipes, particularly baby wipes.

Contact urticaria is a different type of allergic skin reaction, occurring immediately rather than being delayed. Allergy to latex, or natural rubber protein, is a form of contact urticaria and healthcare workers are exposed to latex in many brands of disposable gloves but also in other medical products.

Powdered latex gloves also increase the risk for latex allergy as the powder facilitates the transfer of the latex allergen to the skin and also aerolises it, so latex proteins that have attached to the powder can be inhaled, or enter the skin via cracks and splits in the skin.

Factors that may contribute to dermatitis include:

- Fragrances and preservatives. Commonly the cause of contact allergies; these should be kept to a minimum or eliminated when selecting an alcohol-based handrub
- Washing hands regularly with soap and water immediately before or after using an alcohol-based handrub is not only unnecessary, but may lead to dermatitis
- Donning gloves while hands are still wet from either hand washing or applying alcohol-based handrub increase the risk of skin irritation
- Using hot water for hand washing
- Failure to use supplementary moisturisers
- Quality of paper towels.

The management of hand care problems associated with the use of hand hygiene products requires early recognition and a systematic approach to ensure success.

Strategies for minimising occupational hand dermatitis include:

- Use of a hand hygiene product that contains skin emollient to minimise the risk of skin irritation and drying. Several studies have demonstrated that such products are tolerated better by healthcare workers and are associated with better skin condition when compared to plain or antimicrobial soap
- Use the hand hygiene and hand care products supplied by the healthcare facility. The suite of products should be compatible, and less likely to cause irritation due to chemical interaction
- Educating staff on the correct use of hand hygiene products
- Educating staff on caring for their hands, including the regular use of skin moisturisers both at work and at home - such moisturising skin-care products need to be compatible with alcohol-based handrub
- Providing a supportive attitude towards staff with skin problems.

Alcohol-based handrub produces the lowest incidence of irritant contact dermatitis of all the hand hygiene products currently available. True allergy to alcohol-based handrub is rare and allergy to alcohol alone has not been reported to date.

Although some reports have suggested that irritant contact dermatitis can occur in up to 30% of healthcare workers; the incidence of this problem among a recent study of Victorian healthcare workers was extremely low (0.47%), representing one cutaneous adverse event per 72 years of healthcare worker exposure. Minimisation of irritant contact dermatitis is essential for improved hand hygiene compliance.

Healthcare workers should notify the hand hygiene representative if skin irritation occurs following the use of alcohol-based handrub. All complaints should be taken seriously and a review process instigated.

All healthcare facilities should have access to referral for follow up that may include: an Occupational Dermatologist, local Doctor, or emergency department for HCWs with persistent skin problems. See Appendix 6 for an example of a skin care questionnaire for healthcare workers; alternatively go to the generic skin care assessment form.

3.15.1 WHO consensus recommendations on skin care

The WHO consensus recommendations on skin care:

- Include information regarding hand care practices designed to reduce the risk of irritant contact dermatitis and other skin damage in education program for HCWs
- Provide alternative hand hygiene products for HCWs with confirmed allergies or adverse reactions to standard products used in the healthcare setting
- Provide HCWs with hand lotions or creams to minimise the occurrence of irritant contact dermatitis associated with hand antisepsis or hand washing
- Advise that, when alcohol-based handrub is available in the healthcare facility for hygienic hand antisepsis, the use of antimicrobial soap is not recommended
- Recommend that soap and alcohol-based handrub should not be used concomitantly.

For levels of evidence on consensus recommendations please see WHO Guidelines on Hand Hygiene in Health Care.

3.16 Fire safety

A number of studies have confirmed the safety of alcohol-based handrub. Despite many years of use, there have been no documented fires directly related to the presence of alcohol-based handrub in hospital wards in Australia, and only one documented in the USA. To further reduce the risk of fire following the application of alcohol-based handrub, hands should be rubbed together until dry and all alcohol is evaporated (See Appendix 5).

3.17 Ingestion

Accidental and intentional ingestion of alcohol-based products used for hand hygiene have been reported. Alcohol toxicity can occur after ingestion, but the effects depend on the amount ingested, and the age/size of the person ingesting it.

Symptoms and signs of alcohol intoxication include: dizziness, lack of coordination, hypoglycaemia, abdominal pain, nausea, vomiting, and haematemesis. Signs of severe toxicity include respiratory depression, hypotension and coma.

With careful consideration of alcohol-based handrub product placement, and securing product in fixed or lockable brackets in high risk areas (for example, mental health, alcohol detoxification units), the risk of this potential problem can be minimised.

As with any intervention, the availability and use of alcohol-based handrub, while being associated with major benefits in terms of reduced risk of acquiring HAIs, may also occasionally be associated with some small risks. Thus, a carefully considered Risk Management strategy should be employed for the safe use of these products (see Appendix 5).

3.18 Storage and safety

Ensure a material safety data sheet (MSDS) for alcohol-based handrub is available in areas where product is stored (check with local occupational, health and safety regulations).

All alcohol-based handrub products are flammable with flash-points ranging from 21°C to 24°C, depending on the type and concentration of alcohol present. They should be stored away from high temperatures or flames.

When considering the requirements for minor storage, the total quantities of all flammable liquids must be considered. Minor storage of all flammable liquids should be consistent with AS1940:2017 (the storage and handling of flammable and combustible liquids).

For further product safety information contact your product supplier or local fire service.

3.19 Cost

The promotion of hand hygiene is highly cost effective, and the introduction of a waterless system for hand hygiene is a cost-effective measure. While the purchase price of alcohol-based handrub is an important factor in product selection, it is far less important than the acceptability of the alcohol-based handrub to healthcare workers. There is little point having a cheap alcohol-based handrub available that has poor healthcare worker acceptance and is therefore rarely used, resulting in poor rates of hand hygiene compliance.

The key driver for alcohol-based handrub selection should not be simple purchase cost. However, a study in the dental setting has reported that use of alcohol-based handrub is more cost-effective than antimicrobial soap, and the expenditure on alcohol-based handrub products when compared with excess hospital costs associated with healthcare associated infection can easily be justified.

Cost is an important consideration on set-up, and the ongoing funding source within the health service needs to be clearly identified for the sustainable success of the program.

3.20 Detergent wipes for hand hygiene

Detergent wipes or alcohol wipes should not be used for hand hygiene as they are no more effective than washing hands with soap and water. Detergent impregnated wipes are the recommended cleaning product for shared patient equipment. They should be used to wipe over equipment between patients, for example the blood pressure cuff.

3.21 Non-alcohol based handrubs

Use of handrubs other than alcohol-based handrubs is not recommended. This is because of the superiority of alcohol-based handrubs in terms of acceptability and tolerability by HCWs, and activity against a broad range of microorganisms.

In addition, products should meet the EN1500 testing standard for bactericidal activity and be approved by the TGA for hand hygiene use in healthcare settings.

4 Hand Hygiene Promotion and Healthcare Worker Education

4.1 Aim

To develop and maintain an ongoing education program to initiate and sustain hand hygiene behaviour change. All HCWs and support staff should be included in educational activities.

Education is critical to the success of the culture change program and careful planning is essential.

To achieve a high rate of hand hygiene compliance, healthcare workers need education, clear guidelines, some understanding of modes of disease transmission, and acceptable hand hygiene products.

4.2 Education about hand hygiene and the patient

Patients who develop HAIs can potentially have a lengthy recovery process, require further treatment, delayed return to work, and suffer emotional and financial burdens.

Patients receiving care in the healthcare environment expect clean hands on the people caring for them, however most would feel uncomfortable asking a healthcare worker if they had clean hands, or to clean them before beginning their care. Hand hygiene should be performed in front of your patient so that they know you have clean hands prior to their care.

Although HAIs cannot be entirely eliminated, there are strategies which have been proven to significantly reduce their occurrence.

The Australian Charter of Healthcare Rights states that all people have a right to receive safe and high quality health care that meets national standards and be cared for in an environment that is safe and makes them feel safe. Hand hygiene is one strategy to meet this requirement.

Hand hygiene is the single most important strategy to reduce HAIs and applies to everyone - staff, patients and their visitors.

4.3 Online Learning Management System (LMS)

Hand hygiene education and assessment can play a key role in sustaining good hand hygiene practice and maintaining the NHHI. The implementation of education and assessment will vary between healthcare facilities. An online hand hygiene learning package has been shown to be effective in supporting this process.

The NHHI online learning modules have been developed to increase knowledge regarding hand hygiene practices.

All modules and associated information can be accessed here.

The online learning modules include a series of educational slides, followed by questions, and provide immediate feedback after each section is answered. Users can only move to the next section after they have selected the correct answers. A user is considered “educated in basic hand hygiene theory” on completion of a module.

4.3.1 Hand hygiene online modules

There are a number of online learning modules to assist with education on hand hygiene for different professional groups. The modules developed include:

Allied health module
Target audience: All allied health professionals. An allied health professional is a general term that covers most health professionals who are not doctors, dentists or nurses.

Dental module
Target audience: All dental/oral health staff and students

Medical module
Target audience: All medical practitioners

Non-clinical module
Target audience: Healthcare facility support staff. This includes all staff and volunteers who enter patient areas, but do not provide clinical care for patients.

Nursing/midwifery module
Target audience: All staff performing nursing/midwifery duties.

Renal/dialysis module
Target audience: All staff working within the dialysis clinical setting

Royal Australasian College of Surgeons module
Target audience: All candidates in a surgical training program provided by the Royal Australasian College of Surgeons.

Standard theory module
Target audience: Any person requiring hand hygiene knowledge who does not associate with the other packages available.

Student health practitioner
Target audience: All students who will work as a part of their training within clinical areas of a healthcare facility.

There is also a hand dermatitis learning module, which is hosted on behalf of the Occupational Dermatology Research & Education Centre, at the Skin & Cancer Foundation, Melbourne. This module is aimed at healthcare workers and student health practitioners who would like to learn more about hand care in the clinical environment.

4.3.2 Individual users of the learning management system

The NHHI LMS is freely accessible to anyone wishing to complete online training in hand hygiene.

In order to access a training module, each individual is required to register as a learner the first time they use the system. Once registered, each learner will be provided with a unique login in order to access their training modules, training history, and certificates.

For further information, please see the LMS Instructions for Learners.

4.3.3 Registration of organisations to use the learning management system

Any healthcare facility can become a registered organisation for the NHHI LMS. Registering an organisation provides the ability to report on numbers of staff who have completed the education package.

For information on registering your healthcare organisation, please review the NHHI online learning frequently asked questions.

It is recommended that a hand hygiene learning module be included in the mandatory training competencies for all HCWs. Links to the NHHI LMS could be made available to staff via local training systems, or during orientation programs for new staff.

Ideally new employees should complete a hand hygiene learning module on commencement of employment, or as soon as possible after. This condition could be written into employment contracts, and made a requirement for all student healthcare workers prior to commencement of clinical placements.

Monitoring the completion of these modules can be monitored by the LMS administrators for each individual organisation.

4.3.4 Administrators of the learning management system

On registration of an organisation in the NHHI LMS, an individual is required to be nominated as administrator. This person will have access to the reporting and administration tasks for an individual organisation. There can be more than one individual nominated for this role.

The person who is nominated as the administrator may differ depending on the size of the healthcare organisation. This may be the hand hygiene lead, the education

and training officer, human resources, quality department, or an administrative assistant.

There are two levels of administrator in the NHHI LMS:

4.3.4.1 Organisation administrator

The organisation administrator has access to reporting and administrative tasks for an organisation in the NHHI LMS.

If you have organisation administrator access, please see the Instructions for Organisation Administrators for further information.

4.3.4.2 Region administrator

The *region administrator* has access to reporting and administrative tasks for one or more organisations in the same region in the NHHI LMS. A region is a group of healthcare organisations (for example a health service with multiple hospitals).

If you have *region administrator* access, please see the Instructions for Region Administrators for further information.

4.3.5 Troubleshooting

For assistance with questions from learners regarding the NHHI LMS, see:

Having trouble logging in?

Frequently Asked Questions

4.4 Education for all healthcare workers

Healthcare worker education is a key component of any multi-modal intervention strategy. Basic education sessions for all healthcare workers should include the following:

- Definition, impact and burden of HAIs
- Common pathways for disease transmission, specifically the role of hands
- Prevention of HAIs and the role of hand hygiene
- 5 Moments for Hand Hygiene – with key messages
  - When to perform hand hygiene
  - How to perform hand hygiene, using alcohol-based handrub or soap and water
  - Use of alcohol-based handrubs
  - Use at point of care
  - Use of clinical scenarios to teach the 5 Moments will improve understanding and uptake in clinical work.

4.4.1 Delivery of hand hygiene education

There can be a high turnover of staff in healthcare facilities. Therefore, as well as introductory education sessions, a program with regular updates should be planned. These could take the form of specific orientation programs, in-service lectures or special workshops. Where possible, hand hygiene coordinators should work with education departments in their facility to identify the most appropriate methods specific to the audience and facility.

On a day-to-day basis in healthcare facilities, many opportunities arise for informal education. These opportunities may include:

- Medical and nursing rounds
- Nurse Unit Manager/clinical unit meetings
- Ward "walkabouts"
- Increased presence on the ward by the hand hygiene program coordinator and infection prevention and control staff
- Program staff acting as a resource for all staff
- Working one-on-one with staff to improve hand hygiene practices
- Corridor/tearoom conversation
- Prompt feedback of hand hygiene compliance results, including rewards/incentives for good results
- Individual HCW performance feedback is encouraged during the audit cycle. This will promote individual behaviour change. If individual feedback is given it is important to stop auditing that individual for that session.

High profile promotional activities are also recommended to raise awareness of hand hygiene. For example, these can be planned to coincide with World Hand Hygiene Day on 5 May each year, or International Infection Prevention Week during October each year.

4.4.2 Using hand hygiene compliance data to target education

Hand hygiene compliance data should be utilised as an educational tool for all healthcare workers. Hand hygiene compliance reports (see Section 7.8 on Reporting Results) give individual facilities the ability to develop targeted education aimed at specific HCW groups or departments. These reports include data on the hand hygiene performance of a number of HCW groups, and will assist with identifying priority areas for education.

Hand hygiene compliance rates are both a useful outcome measure for the hand hygiene program, and a valuable educational tool for HCWs. Reporting local hand hygiene audit results to HCWs is an essential element of a multi-modal strategy. Timely feedback and discussion assists in engaging HCWs in effective cultural change and in developing locally relevant improvement initiatives.

The overall ward reports should be given to the managers of the wards, with subsequent reporting to all ward staff followed by further training as indicated from the audits.

The overall facility reports should be presented to the healthcare organisation management at regular intervals, and should become a standard agenda item for hospital executive and quality and safety meetings.

4.4.3 Staff ownership

Staff ownership of the program should be encouraged and supported through:

- Regular and timely feedback to ward staff of hand hygiene compliance rates – national, state and hospital rates, but specifically their own ward data
- Recognition of each ward/department's achievements
- Enthusiastic ward/department staff should be appointed as hand hygiene "liaison officers" or "ward champions" to take responsibility for hand hygiene promotion in the ward/department
- Ensuring each ward/department nominates a staff member to be accountable for the hand hygiene portfolio (see Section 4.4.1)
- The use of education tools and displays
- Provision of audit tools to ward staff to assess product availability (Appendix 7)
- Staff completion of the NHHI online learning modules. It is recommended that all employees complete the appropriate package on employment and on an annual basis
- Ward-based promotional activities

4.4.1 Hand hygiene program liaison officers

The appointment of ward/department-based hand hygiene liaison officers or champions is helpful in linking the ward and the hand hygiene program and assist with the NHHI.

This role involves:

- Acting as role models for all staff
- Motivating staff
- Facilitating involvement and ownership of the project by healthcare workers in each ward
- Presenting outcome data to staff
- Monitoring product placement and availability by conducting audits
- Assisting with promotional activities in their ward
- Assisting HCWs in their ward to complete the online learning package
- Educating new staff in hand hygiene, including ward/department orientation to hand hygiene product placement, correct usage and storage
- (Optional) hand hygiene compliance auditing as long as the hand hygiene liaison person has been trained as an auditor and is able to be released from their normal duties to conduct audits.

4.5 Education of medical staff

Some of the strategies suggested above may not be appropriate for medical staff. Numerous published studies suggest that medical staff repeatedly under-perform in hand hygiene compliance and can be difficult to reach with education to generate behaviour change. Results from the NHHI demonstrate that medical staff have lower hand hygiene compliance than most other healthcare workers.

Hand hygiene medical champions should become involved and encourage medical staff to act as role models for all others. Although a multi-modal approach is likely to be most effective, one-on-one discussions with key/high profile medical officers are especially valuable, particularly for senior medical staff.

Successful programs should:

- Identify those willing to be role models
- Discuss any potential challenges to implementation with medical staff
- Identify medical opinion leaders, clinical champions and department/unit heads
- Regular attendance by infection prevention and control staff at medical ward rounds, enables informal hand hygiene education to senior and junior medical staff during these rounds
- As with all HCWs, medical staff should be regularly assessed for their rates of HHC and be provided with rapid feedback of results
- Regular scientific presentations at surgical and medical meetings, including

Grand Rounds are especially important

- Target interns and resident medical officers during formal education sessions and orientations that are a required component of all medical training programs
- Encourage all medical staff to complete an online learning module annually.

There are two online learning modules tailored specifically for medical and surgical staff which can be found here.

4.6 Education of student healthcare practitioners

Performing hand hygiene in a healthcare setting is a learned behaviour. To achieve genuine hand hygiene culture change it is imperative that healthcare student education becomes a high priority. The student health practitioner hand hygiene online education module consists of:

- A hand hygiene module giving evidence-based education on all aspects of hand hygiene in healthcare
- Links to extended scope hand hygiene information
- A hand hygiene program implementation checklist for teaching facilities.

Hand hygiene education should ideally be part of the core educational content of all health-related courses. It is important to include students and their mentors in all your hand hygiene education sessions in all healthcare settings.

4.7 Hand hygiene educational tools

There is an array of NHHI promotional materials available to assist educational sessions as outlined above:

- Hand hygiene online learning modules
- Video clips
- A 10 min educational video on “The 5 Moments Explained”, which includes a demonstration of each of the 5 Moments individually, or as a continuous video “The 5 Moments in Action”:
- Generic slide presentations:
  - Targeting specific groups of HCWs on hand hygiene
  - The 5 Moments

4.8 Education of auditors

The education sessions suggested above will not be adequate to equip staff to audit compliance with the 5 Moments for Hand Hygiene. This requires specific training, and may not be suitable for some groups of HCWs (for example, non-clinical staff).

Auditor training can only be provided by the Commission’s endorsed NHHI provider or a coordinator who has passed the required assessments at a Gold Standard Auditor training workshop. Refer to Section 5.6 for details on auditor training.

4.9 Promotion of hand hygiene

Promotion of hand hygiene in each hospital can be undertaken in many ways. The following are a few popular suggestions:

4.8.1 *Talking Walls* campaign

A popular method to assist with staff ownership is the Geneva *Talking Walls* Model.

The principle of *Talking Walls* is to use art and humour to reinforce the principles of infection control and prevention through improved hand hygiene among staff. Staff from each ward can be invited to help design a poster featuring their own hand hygiene message. The resulting posters can then be placed throughout the hospital acknowledging the ward's creativity. This promotes program ownership and reinforces the NHHI by directly involving local HCWs.

4.8.2 Other promotional activities

Many promotional activities can be conducted for little or no cost to the hospital.

- Awards for the best performing ward/HCW category
  - Measure and graph hand hygiene compliance for each ward/department or HCW category around the organisation and award prizes for the best performance, or most improved
  - If you have a network of hospitals together the award could be at a hospital level
- Program Awareness via:
  - Internal magazines/newsletters
  - Pay slip notices
  - Screen savers
- Rewarding individual hand hygiene compliance
  - During hand hygiene observation sessions, awarding staff observed to be highly compliant with hand hygiene with praise/stickers/chocolates
- Competitions
  - Quizzes, crosswords, word search
  - Slogan competitions
- Involve local community
  - Encourage schools/kindergartens to promote hand hygiene
  - Patient involvement in the hand hygiene program

5 Local Implementation of the National Hand Hygiene Initiative

5.1 Aim

To form a multidisciplinary team to lead the implementation of the NHHI at each healthcare facility.

5.2 Program implementation model

Once your facility has identified the need to participate in the NHHI and the hand hygiene compliance auditing program, the following steps are recommended for program implementation:

- Choosing a steering committee, including a hand hygiene coordinator and medical champion who, along with the infection prevention and control team and/or the safety and quality team, will be the core team responsible for the project
- The coordinator should have an understanding of hand hygiene and infection control issues and ideally a broader experience in quality and safety; he/she should be able to access high level management staff within the facility
- The hand hygiene coordinator should attend a Gold Standard Auditor training workshop. Bookings can be made via the NHHI website.
- After successful completion of auditor training a new organisation will be set up for your facility in the NHHI Hand Hygiene Compliance Application (HHCApp) database to enable hand hygiene compliance data collection
- Choose auditing staff (see Section 5.5) who have time available to assist in the auditing process and are able to attend auditor training
- Conduct a baseline hand hygiene compliance audit in a pilot ward (see Section 5.7 on department selection)
- Introduce an alcohol-based handrub or evaluate a current product on selected pilot wards.
- Place hand hygiene product in the pilot department as per product placement information (see Section 3.9–3.11)
- Educate all staff on the pilot wards on the 5 Moments for Hand Hygiene (see Chapter 2)
- Audit the pilot department and evaluate the impact of the program by comparing

pre and post implementation hand hygiene compliance audit data

- Expand the hand hygiene education and product placement to the departments chosen for NHHI hand hygiene compliance data submission
- Expand the hand hygiene education and product placement to the whole of the healthcare facility
- Monitor the key outcome measure of hand hygiene compliance
- Use the hand hygiene compliance data to guide the hand hygiene program improvement cycle (see Chapter 8)
- Use the WHO Self-Assessment Tool for Program Evaluation (see Section 8.3)

5.3 Forming a hand hygiene project team

The hospital executive can demonstrate commitment and support for the hand hygiene program through interest, participation and regular reporting on the hand hygiene program at executive meetings, and to the hospital board.

5.3.1 Selecting a steering committee

Identifying key members of a health service is a critical element for engaging clinical and non-clinical staff in the project, and for supporting the core hand hygiene program team.

It is important that an executive sponsor is identified and that they are a part of the steering committee. Staff from the departments of infection prevention and control, infectious diseases, microbiology and pharmacy (where available) should have an active role in the program implementation throughout the organisation, and should be the key drivers of the steering committee.

The following list identifies some potential members for this committee:

Project Officer/Program Coordinator	Microbiology laboratory representative	Clinical education representative
Executive member/sponsor	Medical and/or surgical representative	Patient representative/ consumer
Medical Champion	Quality Improvement representative	Supply/Stores Department
Infection Control Consultant(s)	Human resources	Allied Health
Pharmacist	OH&S representative	Environmental Services representative
Infectious Diseases Physician(s)	HH program representative from each pilot ward (ward champion)	Public relations/corporate development representative

5.3.2 Allocate roles and responsibilities for the steering committee

Areas for consideration include:

- Line of reporting for committee members
- Staff and patient education
- Hand hygiene program marketing
- Collection of hand hygiene compliance data
- Hand hygiene product selection, including alcohol-based handrub
- Hand hygiene product placement: a well organised and executed plan for installation of hand hygiene products is an essential step in any program to enhance hand hygiene adherence in healthcare settings
- Implementation of policies and procedures including hand hygiene guidelines, participation in hand hygiene education, work, health and safety (WHS) management of alcohol-based handrub (Appendix 5).

5.4 Development of policies and protocols

To embed the change in hand hygiene practices into the culture of each healthcare institution a number of policies need to be developed:

- Hand hygiene policy recommending the use of alcohol-based handrub by all HCWs
- Education of healthcare workers with formal assessment of knowledge about hand hygiene; support for this by hospital executive can greatly assist with its implementation
- Clear documented guidelines about wearing jewellery and acrylic/false nails in clinical areas due to increased risk of microbial colonisation
- Guidelines for management of healthcare workers with dermatitis potentially associated with hand hygiene product use (see Appendix 6)
- Clear guidelines on placement of alcohol-based handrub in healthcare facilities (see Section 3.9–3.11)
- Work, health and safety policy on storage of alcohol-based handrub (as per alcohol-based handrub MSDS from company supplying product) (see Section 3.18)
- Work health and safety risk assessment for product placement (see Appendix 5)
- Protocols for management of accidental ingestion, or splash injury from alcohol-based hand rub.
- Education and evaluation of hand hygiene auditors on knowledge of hand hygiene compliance assessment (see Section 5.6), including yearly requirements for re-validation

- Identify staff in the facility responsible for replacing empty alcohol-based handrub containers, and those responsible for the installation, maintenance and replacement of brackets for alcohol-based handrub.

Alcohol-based handrub products within at the point of care will improve hand hygiene compliance, but multidisciplinary strategies are required to implement and monitor hand hygiene recommendations in the long term.

For other infection prevention guidelines please refer to the Australian Guidelines for the Prevention and Control of Infection in Healthcare.

For information on a 'bare below the elbows' policy see Section 9.4.

5.5 Selecting auditors

Careful thought and planning is required to choose the most suitable people to conduct hand hygiene compliance audits. The appropriate people will vary between facilities.

The number of auditors needed to collect the required amount of hand hygiene compliance data for submission to the Commission's NHHI database will vary depending on healthcare facility size (see Section 7.3).

Points to consider when selecting auditors include:

- Have time available to conduct audits
- Have a background as a clinical health professional
- Availability to attend NHHI auditor training
- Have a good understanding of auditing/feedback/education processes
- Acknowledge and understand safety and privacy concerns of patients and staff
- Have the ability to provide immediate feedback to staff for good hand hygiene practices, and educate on correct hand hygiene practice
- Auditors from a variety of health professions could promote widespread acceptance/ownership/participation in activities to improve hand hygiene within their area

5.6 Hand hygiene auditor training

There are two types of training offered as part of the NHHI: Gold Standard Auditor (GSA) and General Auditor (GA) training.

To ensure consistency of the auditing program and to ensure validation of auditors, GSA training is only available via specific workshops, which will be coordinated by the Commission.

Table 5.6

	Taught by	Can provide hand hygiene education	Can conduct audits	Can train new general auditors
Gold Standard	ACSQHC	Yes	Yes	Yes
General Auditor	Gold Standard	Yes	Yes	**No**

5.6.1 Auditor training requirements

5.6.1.1 Gold Standard Auditor

To become a GSA, participation is required in a workshop run by either the Commission, or a specific jurisdictional coordinator. GSA workshop content is standardised nationally.

The states and territories participation in GSA training to date should allow for sufficient audit capacity to the end of 2019. Following the transfer of support for the NHHI to the Commission from 1 November 2019, further consultation with the states and territories and the private sector will occur to determine the existing number and distribution of GSAs and a method for projecting the demand for GSAs. The Commission will then establish a training model, which will aim to increase access and develop a sustainable approach to meeting requirements of each jurisdiction. In the meantime, requests for GSA training in 2020 can be made via the NHHI website, or by contacting your jurisdictional coordinator.

Once qualified as a GSA, attendees are given login access to the training resources via the NHHI LMS, which allows access to all teaching materials and marking guides required to conduct GA workshops in their own facilities. If you are a qualified GSA and do not have a login please contact the NHHI Helpdesk.

You are required to provide proof of your currency as a validated GSA before access can be given to the training resources.

5.6.1.2 General Auditor

The mandatory content of the GA training program is identical to parts of the GSA training, as all auditors need to collect data in a standardised manner to ensure the validity of data.

To be a GA, individuals must:

- Complete the Auditor pre-workshop online learning module on the NHHI learning management system (https://nhhi.southrock.com),
- Attend and pass a workshop conducted by a GSA. There is a minimum of 5 hours content that must be presented.

See the Auditor training section of the NHHI website for detailed instructions.

5.6.1.3 Successful completion requirements

All workshop attendees must pass a written and DVD quiz. The pass mark is ≥90%. Attendees must also show competence in hand hygiene compliance auditing in the practical session.

Gold Standard Auditors must follow a standardised procedure for non-successful participants to gain auditor qualifications. This procedure is available to GSAs via the Auditor Training pages of the NHHI website.

5.6.2 Inter-rater reliability and validation

Inter-rater reliability should be addressed in the auditor training programs by pairing hand hygiene auditors for observations of the same session and then comparing observations recorded, using the trained and validated person as the gold standard.

Each hand hygiene auditor should be paired with each of the other validated auditors (if more than two observers). Until there is >90% inter-rater agreement in all recordings (for example, type of HCW, HCW activity, hand hygiene Moment, hand hygiene performance), the official data collection process should not begin.

Intra-rater reliability should be addressed through use of the NHHI 5 Moments training DVD. This DVD should be observed on at least two occasions, with data recorded on the appropriate DVD quiz form or mobile device. The rate of agreement for all recordings is then calculated. If there is less than 90% agreement, hand hygiene observers should seek further training.

If regular auditing is not done, practice sessions are recommended prior to each data collection period to ensure reliable results. Careful attention is required to ensure that observations are recorded correctly and there is consistent reporting, not only by the individual auditors (intra-rater reliability) but also between the various auditors (inter-rater reliability). The hand hygiene team should discuss issues as they arise and reach a united approach.

5.6.3 Annual auditor validation

Annual validation is a method of ensuring all auditors remain up-to-date with their knowledge of the 5 Moments definitions and audit practices. This in turn ensures valid and reliable data being submitted as a part of the NHHI.

All trained auditors, both GSAs and GAs, need to complete annual validation to

maintain their auditor status. This is a NHHI requirement, and if not met will result in the auditor being removed from the HHCApp, and unable to enter data.

It is the responsibility of each hand hygiene program lead to ensure all auditors in their organisation(s) are validated. It is also the responsibility of each GSA to ensure that auditors they have trained have completed their annual validation online learning program and are registered on the NHHI Auditor Register.

This validation is standard for both GSA and GA and requires:

- The annual collection of a minimum of 100 moments; the 100 moments must be entered into HHCApp against the auditor's name.

  Hand Hygiene Lead instructions:
  - Run the Auditors and Sessions report in HHCApp to provide a list of all auditors attached to your organisation.
  - Select the previous 12 months using the Start and End Date.
  - Leave the Audit periods at 'All'.
  - Check the box to include auditors with no data.
  - Review the 'total moments' column.

- The annual completion of the Annual Auditor Validation module. This is required 12 months after the successful completion of the Auditor PreWorkshop Quiz, which is a mandatory component of an auditor training workshop**,** and can be accessed via: NHHI Online Learning Modules

  Hand Hygiene Lead instructions:
  - Run Custom Role Reports 'Any Status/All Learners/Multiple Courses/Result in the NHHI learning management system
  - Select 'Annual Auditor Validation' and 'Auditor PreWorkshop' Quizzes
  - Select the previous 12 months in the completion date field.
  - See LMS Reporting Instructions for further assistance

5.6.4 Lapsed auditor revalidation

If a period of 12 months or more has elapsed between auditing periods for any auditor, then prior to submitting data they are required to

- Complete the Annual Auditor Validation online learning program
- Contact their facility GSA/hand hygiene program manager. If you are the only auditor in your facility, contact your NHHI jurisdictional co-ordinator
- Undertake a NHHI training DVD quiz
- Forward completed quiz to their hand hygiene lead or NHHI jurisdictional co-ordinator
- Undertake auditing in the clinical setting alongside a current auditor

Auditors who do not collect any data following their training for a period of two years are required to attend another auditor training workshop.

5.7 Selection of departments for auditing

Selection of one department is recommended to start the pilot implementation of the program. It is important to choose a department where motivation and interest is high, and the improvement gain is likely to be substantial, thus impacting on the roll out to subsequent areas.

By piloting the program in one department, any initial problems with product placement or supply, staff motivation and education can be addressed prior to rolling out the program to the rest of the hospital.

Several factors need to be considered when determining which departments should be audited. As hand hygiene is the single most important element of strategies to prevent HAIs, departments known to have greater potential for high infection rates should be targeted. Improvements in hand hygiene compliance rates in these areas will have the greatest impact on the prevention of infection and provide a safer environment for patients. Generally, these departments also have the greatest staff/patient activity and interaction, which results in higher numbers of Moments being audited in shorter time periods.

Auditing departments where there is little staff/patient activity and interaction (for example, non-acute settings) will result in a small number of moments being observed and resources required to undertake auditing may be better utilised measuring other aspects of a hand hygiene program such as product placement and education.

The selection of departments should occur in conjunction with the appropriate committee at the hospital (for example, infection prevention and control, hand hygiene, quality improvement) and with executive approval.

Once a hand hygiene program has been established and hand hygiene compliance is audited regularly, hospitals should ensure all wards/departments participate in the program throughout the year. Auditing and reporting results to each ward/ department encourages ownership of the program by the whole hospital.

5.7.1 Department selection for hand hygiene compliance auditing

All eligible departments should be audited a minimum of once per year (ideally each National Audit Period). At least 100–200 moments should be collected for each high risk area each year.

Eligible departments:
Eligible areas provide acute care. For the purposes of the NHHI, they are further stratified into high risk and standard risk:

High risk eligible departments include:
Critical care, neonatal care, oncology/haematology, transplantation, renal. High risk departments may also include those with known or suspected high rates of HAIs, high prevalence of patients with multi-resistant organisms, crowded accommodation, and previous low hand hygiene compliance.

Standard eligible departments include:
Surgical, medical, mixed, maternity, paediatrics, acute aged care, perioperative, emergency departments, radiology, sub-acute.

Other departments that can be included:
The following departments within an acute organisation could be included in National Audits (based on a risk assessment): Ambulatory care, dental, mental health, palliative care, and long term care.

Departments that should not be included:
CSSD, kitchen, laundry, other areas where there are no patients.

6 Auditing hand hygiene compliance

6.1 Aim

To accurately assess hand hygiene compliance in accordance with published guidelines using a standardised hand hygiene observation assessment tool.

6.2 Auditing with the 5 Moments for Hand Hygiene tool

Hand hygiene compliance auditing is the established outcome measure for assessing the effectiveness of a hand hygiene program within the NHHI. Hand hygiene compliance is a valid and reliable measure within the acute care sector, in both public and private hospitals throughout Australia. Data are currently submitted to the NHHI database by the majority of Australian acute hospitals.

The NHHI hand hygiene compliance auditing method is by direct observation of HCWs. Direct observation by trained and validated observers is the gold standard to monitor compliance with the 5 Moments for Hand Hygiene.

Table # Rules for auditing the 5 Moments

Rules	Extended Definition
Moment 1	**HH Moment 1** is recorded only once the HCW touches the patient.
Moment 2	**HH Moment 2** is recorded immediately prior to any procedure • Once Hand Hygiene has been performed, nothing in the patient's environment can be touched prior to the procedure starting.
Moment 3	**HH Moment 3** is recorded immediately after a procedure of body fluid exposure risk: • Nothing else should be touched prior to performing hand hygiene • Touching the outside of a drain or drainage bag (eg urinary catheter, wound drain, chest tube drain, CSF drain), even when the circuit is not broken, is considered a body fluid exposure risk • Can be recorded as a stand alone HH Moment when there is a body fluid exposure risk, but no patient contact - e.g. cleaning a spill of vomit, urine or faeces.
Moment 4	**HH Moment 4** is recorded after touching the patient • Touching the patient surroundings after touching the patient is recorded as a single ***Moment 4.*** • If after ***Moment 3*** there is touching of the patient surroundings before leaving the patient zone this is recorded as a ***Moment 4.***
Moment 5	**HH Moment 5** is recorded when the HCW leaves the patient zone after touching the patient's immediate surroundings and the patient has not been touched. • When multiple items in the patient surroundings are touched, only one ***Moment 5*** is recorded.
Notes	
Before/After Moments	Generally for every 'before' Moment there should be an 'after' Moment recorded, unless the auditor does not witness the action. • **Moment 1** is generally followed either a ***Moment 3 or Moment 4*** • **Moment 2** is generally followed by ***Moment 3*** • **Moment 5** is a stand alone Moment as there is no patient contact. • There are a few situations when two "afters" may be recorded sequentially, however you will never have a M1 and a M2 in a row.
Action missed if not observed	The HCW must be observed to perform HH as they approach the patient. If HH is not observed it should be recorded as a "missed" action (i.e. HH not performed).
Only audit what you observe	No "before" Moment can be recorded if auditing commences after a HCW is already touching a patient, or in the process of performing a procedure. No "after" Moment can be recorded unless the Moment is observed.
Curtains	Patient bed curtains are outside the patient zone and are frequently contaminated. Touching the curtains is equivalent to leaving the patient zone. HH should be performed between touching the curtains and touching the patient, and vice versa.
Double Moments	Two moments for HH can occur simultaneously e.g. when moving directly from one patient to another without touching anything in between. In this situation, a single HH action covers the two moments for HH, as Moments 4 and 1 coincide. When moving from touching a patient to performing a procedure on that same patient Moments 4 and Moment 2 coincide. When auditing in either situation, both Moments should be recorded as individual Moments on the data collection form.
When not to record a Moment	HHC is audited by HCW compliance with the 5 Moments; it is not audited by HCW performing a HH action. HH actions not corresponding to a recognised Moment are not recorded, e.g. when a HCW walks into a patient's room, does HH and walks out without touching anything. In this case no Moment had occurred, despite HH taking place, so no Moment can be recorded.

HH = Hand Hygiene; HCW = Healthcare Worker; HHC = Hand Hygiene Compliance

6.3 One action - two Moments

Often two moments for hand hygiene will coincide. Typically, this occurs when moving directly from one patient to another without touching anything in between. In this situation a single hand hygiene action will cover two moments for hand hygiene, as Moments 4 and 1 coincide:

For example, moving from touching one patient to another patient:

- Hand hygiene is performed after touching patient A = Moment 4
- HCW goes to the next patient area and touches patient B on the shoulder = Moment 1
- The one hand hygiene action after touching a patient counts as the hand hygiene for before touching a patient also.

Another example is when moving from touching a patient to performing a procedure on that same patient:

- After touching the patient, hand hygiene performed = Moment 4
- HCW changes the IV fluid bag on the same patient = Moment 2
- The one hand hygiene action after touching the patient counts as the hand hygiene before the procedure.

When auditing in either situation, both Moments are recorded as separate Moments on the audit tool.

If the hand hygiene action (rub/wash) is missed in either of the above situations the Moments are still recorded the same, however both the actions will be entered as “missed”.

6.4 When not to record a Moment

Hand hygiene compliance is audited by Moments; it is not audited by hand hygiene action.

It is important to understand that hand hygiene actions not corresponding to an opportunity (or reason for hand hygiene), and therefore are additional and not required, should not be audited by the observer. For example, HCW walks into a patient’s room, does hand hygiene then walks out without touching anything – no Moment is recorded.

6.5 Overcoming bias in auditing

Observer bias is introduced by inter-observer variation in the observation. The NHHI training schedule of validation of auditors has been created to minimise this bias.

Selection bias is introduced by selecting HCWs, care settings, and observation times with specific hand hygiene behaviour. In practical terms, this bias can be

minimised by randomly choosing locations (from your set reporting wards) and times of the day to audit.

When HCWs know hand hygiene compliance is being measured, they often initially attempt to behave correctly. This is known as the Hawthorne effect. Evidence suggests that the Hawthorn effect may only increase compliance in areas that already have good compliance rates, but there will be no noticed effect on wards starting with low compliance. This indicates that people who know when hand hygiene should occur will improve their practice under auditing conditions. However, people who don't know the correct hand hygiene Moment to perform cannot improve their performance without further education.

However, with repeated observations, HCWs generally grow accustomed to the observer and are less affected by their presence, particularly if they know the auditor and are comfortable being observed.

6.6 Preparation for collection of hand hygiene compliance data

To ensure valid and reliable data collection, only people trained and validated by the NHHI auditor training program are able to collect data for submission to the NHHI database.

6.6.1 Equipment required to conduct a hand hygiene audit

The following equipment is required to conduct an audit:

- Mobile device with internet access to NHHI HHCApp or
- Copies of NHHI audit forms (see Appendix 1)
- NHHI coding sheet (see Appendix 2)
- NHHI audit ward summary sheet (see Appendix 9)

6.6.2 Healthcare worker (HCW) parent codes required for auditing

Table 6.6.2.1: Standard codes

HCW Code	Type of HCW	`Extended Definition
N	Nurse/Midwife	All nurses – RN, Div 1, Div 2/EN, Midwives, Agency Staff, Domiciliary nurses, Psychiatric
DR	Medical Doctor	All doctors – Consultants, Registrars, Residents, Interns, Visiting Consultants, GPs
PC	Personal Care staff	PSA, AIN, PCW, wardsman, orderly, warders, ward/nursing assistants
AH	Allied Health	Physiotherapists, Occupational therapists, Dieticians, Speech Pathologists, Radiographers, Pharmacists, P&O, Allied Health Assistants, Podiatrists, Music/Play therapists, Audiologists, Plaster technicians, ECG technicians
D	Domestic staff	Staff engaged in the provision of food and cleaning services, maintenance people
AC	Administrative and Clerical staff	Ward clerks, admissions officers
BL	Invasive Technician	Phlebotomists, Dialysis technicians
SN, SAH, SDR, SPC	Students	Students of N, AH, DR, PC
O	Other	Persons not categorised elsewhere
AMB	Ambulance	Ambulance workers, patient transport

Table 6.6.2.2: Dental codes

HCW Code	Type of HCW	`Extended Definition
DO	Dentist	All dentists, specialist dentists
DT	Dental Therapist	Dental therapists, dental hygienist, dental prosthetist, oral health therapists
DA	Dental Assistant	Dental assistant, dental nurse
DL	Dental Technician	Dental technician, laboratory staff (no patient contact)
S	Student	Student, in front of any of the above codes e.g. SDO includes persons undertaking study to become a dentist etc.

6.6.3 Adding personalised healthcare worker codes

Organisation administrators can add their own HCW codes into the HHCApp system. These codes will need to be listed under one of the HCW parent codes (see Section 6.7.2). For example, data could be collected specifically on surgical registrars by adding “Surgical Registrar” under the parent code of DR. This allows for facilities to run local reports for specific groups of HCWs.

Please see the HHCApp Instructions for Use for detailed instructions on how to add personalised HCW codes.

6.7 Conducting a NHHI hand hygiene compliance audit

This section details the steps required to conduct a hand hygiene compliance audit:

6.7.1 Timing of audits

Three NHHI hand hygiene compliance audits are conducted each year (see Section 7.3). It is recommended that auditing commences at least six to eight weeks prior to the due date for data submission. This allows time for feedback/reporting of results, education, or any other interventions to improve hand hygiene compliance to be implemented in the eight weeks prior to the next audit cycle.

Some facilities are required to report hand hygiene compliance results on a monthly basis, and are therefore required to audit on an ongoing basis throughout the year. If this is the case it is still important to feedback results and to implement new interventions at regular times throughout the year. If you need to report monthly, please consider reporting on your progress with your interventions/action plans rather than just “data” each month, then after the close of an audit period, report on your data (three times a year).

6.7.2 Time to complete a hand hygiene compliance audit

To achieve valid results, hand hygiene compliance should be assessed on a defined minimum number of hand hygiene observations (Moments). The time taken to complete the required number of observations will vary depending on the level of clinical activity in the observed area, the experience of the auditor, and the time of day the audit is conducted.

The data collection schedule will be influenced by the number of acute beds in each facility (see Section 7.3), the number of trained staff available to undertake hand hygiene observations, and the option taken for the selection of wards (See Section 5.7). Hand hygiene compliance rates should be reflective of a cross-section of the facility’s healthcare workers, rather than just repeated or prolonged observations on a small number of healthcare workers.

6.7.3 Preparation of the wards

Unit managers should be notified prior to commencing compliance auditing. Wards/departments should be asked to ensure alcohol-based handrub products are in all the appropriate places before auditing commences. If there are barriers to hand hygiene (for example, no available alcohol-based handrub, soap or paper towels), this should be recorded in the notes section of the audit tool, then reported to the shift or unit manager prior to leaving the area.

6.7.4 Conducting a hand hygiene compliance audit

The following steps are involved when conducting a hand hygiene audit:

- Arrive at target ward/department and introduce yourself to the shift manager and inform them of your role
- Always perform hand hygiene upon entering a ward to audit. It is very important to lead by example
- Hand hygiene auditors are encouraged to be open and honest about what they

are doing, and show the audit tool and how the data collected is de-identified; this may be for staff, patients or visitors

- There needs to be at least one patient and one HCW present in a room to start auditing; if neither are present, move to another room
- Auditors need to position themselves to view the patient bed, sink, and alcohol-based handrub area; however, they must remain out of the workflow area of the observed staff. The presence or absence of a convenient location from which to observe patient beds and hand hygiene facilities may impact on which patient bays are selected for observation
- When a patient's bed curtains are drawn, permission should be sought from the relevant HCW and patient to allow auditors to continue to view activities in the area. Although there may be some occasions when this is not appropriate, these are rare. Observing HCW activities behind closed curtains in the ICU is often necessary
- Hand hygiene compliance should be assessed on all categories of HCWs who enter observed ward bays; try not to observe the same HCW for the entire audit session
- The number of HCWs observed at one time depends on their level of activity and the competency of the auditor. More than one HCW can be observed simultaneously, provided their hand hygiene Moments can be accurately observed and recorded. If this is not possible, then the compliance of additional HCWs should not be recorded until the index HCW has left the bay, or has ceased activity. It is better to record fewer Moments accurately than many Moments inaccurately.
- A hand hygiene Moment is only documented when the field observer can accurately observe the HCW and the Moment that has been completed. If an auditor is unsure whether the observed HCW performed hand hygiene, then such Moments should not be recorded. The only exception is when a HCW is observed to enter a room and go directly to the patient.
- A Moment finishes when a HCW:
  - Moves from one patient to another
  - Leaves the room on completion of patient care
  - Touches the curtain partition in a multi-patient room
  - Moves from touching a patient to doing a procedure or vice versa.
- A Moment can finish in another area outside a patient room if patient care is not yet completed; for example, transporting a bedpan to the pan room
- The observational audit session has no specific time frame, it can be conducted for as long or as little time as the auditor has allocated

- At the conclusion of an audit session the following needs to be completed:
  - Thank the shift manager and highlight any problems that need addressing immediately; for example, no hand hygiene product available
  - If data is collected on a mobile device a report can be generated immediately to provide feedback to the ward.

There can be circumstances where it is not appropriate to conduct a hand hygiene observation session; these include:

- Emergency situations where hand hygiene is secondary to patient safety (for example, when any hospital 'code' is called)
- End-of-life care
- If the patient, or patient's family object
- During private discussions between HCWs and patient/ patient's family.

6.8 How to use the hand hygiene audit tool

All hand hygiene compliance data should be recorded for each of the 5 Moments either via a mobile device that syncs data directly into the NHHI HHCApp database, or on the standard NHHI paper data collection form (see Appendix 1) and later manually entered.

The NHHI hand hygiene compliance audits can only be conducted by trained and validated staff. Data collection can be via paper or mobile device. However, the use of mobile devices for data collection is strongly recommended, as this removes duplication of data entry.

6.8.1 Data collection via a mobile device

If using a mobile device, user instructions can be found on the NHHI website.

In particular, please read the mobile device troubleshooting guide. Versions are available for both Apple and Android devices.

Access to the mobile data entry site is via a mobile phone/tablet device, using this URL: https://nhhi.safetyandquality.gov.au/mobile

There are multiple data validation codes within the mobile data entry system that will ensure that the required information is entered correctly.

To enable practice using either version of HHCApp, without harming your data set, you can use the following practice login:

Auditor Username: Ignaz

Password: Ignaz1

Each trained auditor requires an individual login to enter hand hygiene data. Logins must never be shared.

6.8.2 Paper based data collection – Using the NHHI Audit Tool

For each session fill in the demographic details on arrival at target ward

- Health Service = Hospital or facility name
- Session number = The audit number for that particular ward which is then transferred to the hand hygiene ward summary sheet (see Appendix 9)
    - The first audit on a specific ward will be session number 1
    - The second audit on the same ward will be session number 2
    - The first audit on a different ward will be session number 1 on that ward
- Start and Finish times are for your own personal statistics to enable you to calculate the amount of time it takes to conduct each audit. This information can then be reported to your senior management to assist with staffing requirements.

For each Moment observed the following should be recorded on the audit form:

- HCW code – needs to be filled in every time a Moment is observed
- Moment – fill in the Moment observed.
    - Only one Moment should be filled in per box. If multiple Moments are observed, a new box needs to be filled in for each moment (see Appendix 3)
- Action – needs to be filled in for every Moment observed or missed:
    - If no hand hygiene action is observed then it is recorded as a missed action
    - If the HCW performs hand hygiene then proceeds to touch their face/nose/mouth or touches items in the healthcare environment prior to touching the patient then this should be recorded as a missed hand hygiene action
    - If a HCW is observed to do hand hygiene incorrectly (for example, one handed, minimal volume alcohol-based handrub or no soap) this should be recorded as a missed action
- Gloves – are only recorded if the HCW puts gloves on in a Before Moment (1 or 2), takes gloves off in an after Moment (3, 4, or 5), or continues from one Moment to another with the same pair of gloves:
    - Even if gloves are worn for patient care, hand hygiene still needs to be performed and recorded before and after glove use
    - If no gloves are worn, then the “gloves” box is left blank.

6.8.3 Tips for accurate data collection and entry

On a mobile device each new auditing session should be started on the Sessions page by pressing the Add Session button.

For paper-based data collection each session on each ward should be recorded on a new data collection form.

6.8.4 At the conclusion of the ward visit:

For mobile data collection:

- Ensure you press the Done button, and press OK to the message asking if you have finished with this session.
- Sync your data
- Logout by pressing the Logout button and accept and confirm the logout.

For paper based data collection:

- Check that all demographic fields on each NHHI 5 Moments audit sheet are correct and legible
- Check that there is a HCW/Moment/Action (+/- Gloves) in each box, if one item is missing that Moment needs to be crossed out as it is incomplete and it cannot be used
- Add up total number of Moments, and the total number of correct Moments (rub or wash) collected and write the total on the bottom right corner of audit sheet (see Appendix 1)
- Fill in HHA ward summary sheet for each session on each ward ensuring that all fields are filled in (see Appendix 9).

6.9 Patient safety and privacy during hand hygiene audits

Any unsafe practices that are observed during hand hygiene auditing should be addressed immediately or reported to the appropriate manager for follow-up; otherwise, compliance rates should be reported after an audit has been fully completed.

Observation does not justify infringing the principle of patient privacy. Auditors should show discretion regarding where they place themselves and their movements whilst conducting audits. It is recommended that patients be informed on admission that hand hygiene audits are regularly conducted as a quality improvement activity. Patients or their family may request they not be involved in an audit.

6.10 Hand hygiene and healthcare workflows

No HCW deliberately chooses not to perform hand hygiene as it is required for patient, staff and environmental safety. Non-compliance with hand hygiene according to the 5 Moments may be as a result of the HCW's environment or workflow. If a HCW doesn't have the right equipment, or hand hygiene product easily available they will be unable to perform hand hygiene as required.

Two common clinical activities where hand hygiene compliance is often suboptimal have been mapped out below. This process mapping identifies workflows to maximise hand hygiene compliance by making it easier for staff to comply with the 5 Moments for Hand Hygiene. Examples available on the NHHI website include:

Blood Collection

- Practice Guidelines
- Audit Guidelines

Dialysis

- Practice Guidelines
- Audit Guidelines

When auditing hand hygiene compliance, it is worthwhile to note if there are particular activities of patient care where hand hygiene is regularly suboptimal. To address this, ask the relevant staff to assist you to map out the required task (see above examples), and to design a solution themselves to make hand hygiene by the 5 Moments easier to comply with. Involving staff in this process promotes a sense of ownership of hand hygiene and hand hygiene improvement.

7 Data submission, validation and reporting

7.1 Aim

To enable correct data entry, data submission to HHA, and accurate reporting of hand hygiene compliance results.

To ensure all data collected is validated as a correct representation of hand hygiene compliance.

7.2 Hand Hygiene Compliance Application

The HHCApp has been developed for use by Australian hospitals to conveniently report their hand hygiene compliance rates as part of the NHHI. The HHCApp is an online web-based application for hand hygiene monitoring, consistent with the WHO hand hygiene observation method.

The HHCApp is the portal to the NHHI database for data entry and reporting of all hand hygiene audit data. Data can only be collected and entered by trained and validated hand hygiene auditors. Once auditor training has been completed the trainer is responsible for supplying a personalised login for each auditor to use to enter data into the HHCApp.

All new healthcare facilities joining the NHHI need to contact the Commission to be set up in the HHCApp database and to be given login access. A pre-requisite to being given access to HHCApp is having a trained auditor at the facility who is able to manage data collection and reporting.

There are two options for data entry into HHCApp:

HHCApp Desktop
The desktop version allows the user to enter hand hygiene compliance data that has been collected on paper. If a user has administrator access, HHCApp desktop can also be used to access reports and administrator functions.

HHCApp Mobile
The mobile version allows an auditor to enter hand hygiene data in real time as they audit. **HHCApp Mobile is not an App**; it is a webpage that can be accessed via the internet browser of a mobile device. If using this option to enter data, please ensure you login to begin, and when finished, sync your data and use the 'logout' button on completion to minimise errors.

7.3 Requirements for national data submission

National hand hygiene compliance audits should be undertaken at three **set** times each year.

National Audit Periods:
Audit One: 1 November to 31 March
Audit Two: 1 April to 30 June
Audit Three: 1 July to 31 October

Entry of data via the HHCApp is required by the last day of each audit period. No late data entry will be accepted.

Data can only be collected by trained and valid hand hygiene auditors.

Each organisation needs to ensure that the data they submit is correct. Failure to verify data may result in hand hygiene compliance data not being accepted into the NHHI data set.

The hand hygiene lead for each organisation is required to press the 'submit for approval' button in HHCApp to demonstrate that data collection has been completed. Data submission can be completed anytime in the lead up to the final day of the audit period, but must be completed by the last day. For further information: How to submit a completed audit

Please note: By pressing the 'submit for approval' button you are closing off the audit for your organisation, which does not allow for further data entry for that audit period.

7.3.1 Acute hospital data submission

Both public and private acute hospitals are required to follow the department selection process (See Section 5.7.1), collect the required number of moments as per Table 7.3.1.1 below, and then submit their data to the NHHI three times a year. See: Guidelines for Data Submission.

Table 7.3.1.1

Number of acute inpatient beds	Minimum Total number hand hygiene moments per audit
> 400	2,450
301 to 400	2,100
201 to 300	1,750
151 to 200	800
101 to 150	600
51 to 100	200
25 to 50	100
<25 **	50

** Auditing in hospitals with <25 beds is dependent on jurisdictions. See Table 7.3.1.2 below.

Table 7.3.1.2

Jurisdiction	Auditing required in hospitals <25 beds
New South Wales	Yes
Victoria	Yes
Queensland	No
South Australia	No – refer to jurisdictional representative for options
Western Australia	No – further information here
Tasmania	Yes
Northern Territory	Yes
Australian Capital Territory	Yes

7.3.2 Day hospital data submission

Day hospitals are required to collect the required number of moments as per Table 7.3.2.1 below, and then submit their data to the NHHI three times a year. See the recommendations for data collection in day hospitals and Guidelines for Data Submission.

Table 7.3.2.1 Day hospital size categories and required number of moments by hospital size

Day Hospital Size	Definition	Required number of hand hygiene audits per year	Required number of hand hygiene observations per facility
Large	Standalone facility performing >5,000 procedures per annum	3	350
Medium	Standalone facility performing 2,000 - 5,000 procedures per annum	3	200
Small	Standalone facility performing <2,000 procedures per annum	3	100

7.3.3 Standalone/Satellite Dialysis/Oncology data submission

Standalone/satellite dialysis/oncology centres are required to collect the required number of moments as per Table 7.3.3.1 below, and submit their data to the NHHI three times a year. See the recommendations for data collection in dialysis/oncology centres and Guidelines for Data Submission.

Table 7.3.3.1 Standalone/Satellite Dialysis/Oncology size categories and required number of moments per category

Peer Group	Definition	Required number of hand hygiene audits per year	Required number of hand hygiene observations per facility per audit
Large	Facility performing ≥5,000 procedures per annum	3	200
Small	Facility performing <5,000 procedures per annum	3	100

7.3.4 Dental data submission

Where sites deem hand hygiene auditing to be appropriate Table 7.3.4.1 below provides guidance regarding the collection of representative hand hygiene compliance data by solo, group and hospital based dental services as part of the NHHI. See also Guidelines for Data Submission.

Table 7.3.4.1 Dental service description and required number of moments by size

Peer Group	Definition	Required number of hand hygiene audits per year	Required number of hand hygiene observations per facility per audit
Solo practice, solo practitioner or very small oral health service	An oral health/dental practice with a single dentist or an oral health service with a single dental chair/surgery	Hand hygiene compliance auditing not appropriate	
Small oral health service/dental practice	Oral health/dental practice with a total of 2 - 5 dental chairs/surgeries in one or more locations	3	50
Medium sized oral health service/dental practice	Oral health/dental practice with between 6 and 10 dental chairs/surgeries in one or more locations	3	100
Large oral health service/ dental hospital	Any dental oral health services/dental hospitals with more than 10 dental chairs/surgeries in one or more locations	3	200

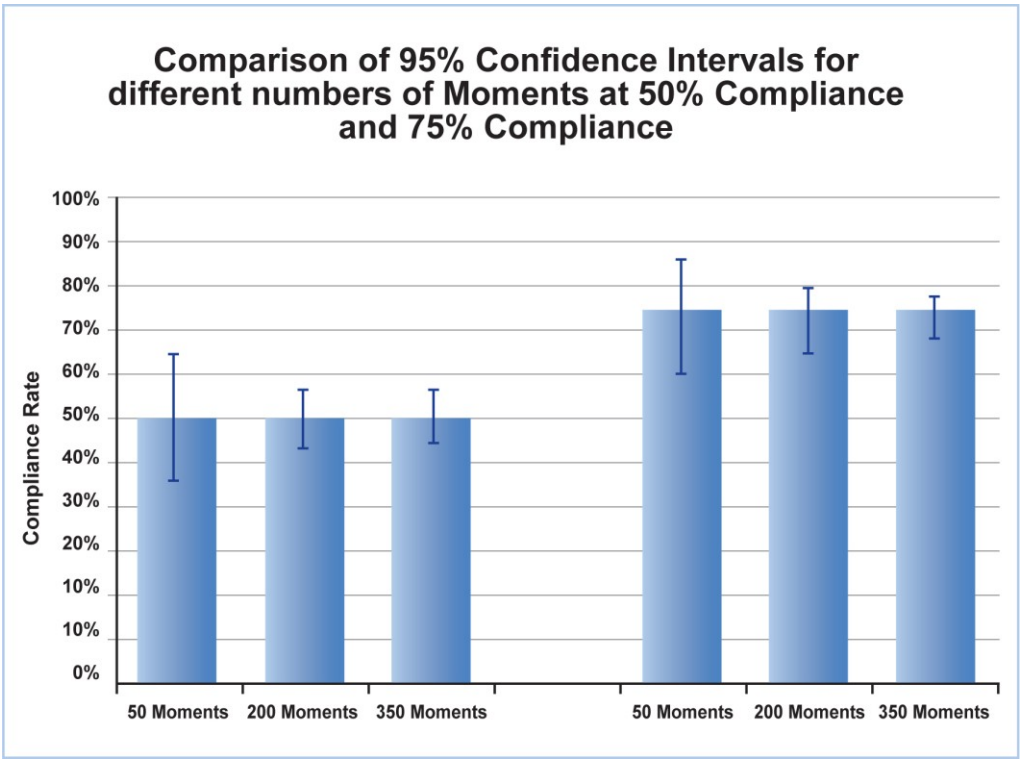
7.4 Rationale for number of Moments to be collected

Compliance data will be used for comparison, be it at a ward, hospital, jurisdictional or national level. When data is used for comparison, it is important to note that a higher number of Moments audited will generate a more reliable compliance rate.

For example, consider a ward that has audited 50 moments, generating a compliance rate of 50%, and an exact binomial 95% confidence interval (95%CI) of 36% to 64%. This means the real compliance rate could be anywhere between 36% and 64%. If another ward audits 350 Moments and generates a compliance rate of 50%, the 95%CI is 45% to 55%. In this latter case, because the 95% confidence interval is narrower, we have more confidence that the real rate is close to 50%.

It is recommended that 95% confidence intervals are included when reporting compliance rates. See Chart 7.4.1 below for a further demonstration on the effect on confidence intervals when the numbers of Moments are increased.

Chart 7.4.1 Confidence Intervals and Moments Audited



7.5 HHCApp roles and administration

Several roles are available in HHCApp with differing functionality. The role assigned determines what each user can see and do and at what level. Users cannot access data or administrative functions above the level that they are assigned.

7.5.1 User Roles

Jurisdictional Administrators – can access all data and perform all administrative functions for their state.

Region Group/Region/Organisation Group Administrators – can access all data and perform all administrative functions for all organisations within their region group, region or organisation group.

Organisation Administrators – can access data and perform administrative function for their organisation(s) only.

Auditors – can audit only.

Reporters – can access reports for their department, organisation or region.

Data entry – can enter data for their department or organisation.

Role	Action					
	Data Entry	Reports	Departments • Add • Remove • Inactivate	HCW Type • Add • Remove • Inactivate	Audit Periods • Add • Submit	Auditors • Add • Remove • Reset logins
State Administrator	✓	✓	✓	✓	✓	✓
Region Group Administrator	✓	✓	✓	✓	✓	✓
Region Administrator	✓	✓	✓	✓	✓	✓
Organisation Group Administrator	✓	✓	✓	✓	✓	✓
Organisation Administrator	✓	✓	✓	✓	✓	✓
Auditor	✓	✗	✗	✗	✗	✗
Reporter	✗	✓	✗	✗	✗	✗
Data Entry	✓	✗	✗	✗	✗	✗

Quick Start Guide

Review the Quick Start Guide for the HHCApp.

7.5.1.1 Primary Contacts

Organisations that have more than one Organisation Administrator need to assign a Primary Contact. This indicates the hand hygiene program lead.

7.5.1.2 Automatic Update of Users

There are two automatic updates that occur overnight for all HHCApp users:

Deletion of user

HHCApp users who meet the following criteria will be deleted from HHCApp:

- Created >1 year
- No data
- Never logged in OR hasn't logged in for >1 year

If you need to reinstate a deleted user please contact the NHHI Helpdesk.

Removal of role

HHCApp users who meet the following criteria will have their 'role' removed (for example, auditor is one of the assigned roles in HHCApp):

- Created > 1 year ago
- Has session data but no data added for >18 months
- Never logged in OR Hasn't logged in for >18 months.

Administrators in HHCApp are able to reinstate auditor roles once the auditor has passed the lapsed auditor pathway.

7.5.2 Managing Users

Organisations are responsible for users attached to their organisation, and the roles that they are assigned to. Appropriate consideration of data governance needs to be given when allocating roles within HHCApp.

Users only require one login which remains with them if they move to another facility. This login should be personalised and not generic.

Administrators can also export a list of users using the 'Users' tab at the top right of the HHCApp home page.

For further information on how to manage users in HHCApp please see the HHCApp instructions webpage.

Please note: The Organisation Administrator is responsible for ensuring all Auditors attached to their organisation meet the Annual Auditor Validation requirements.

7.5.3 Managing Departments

Organisations are responsible for the set-up, and management of wards/departments within their organisations. Currently, there are 22 Department Types; see Data Definitions webpage.

Careful consideration must be given to any changes to departments in HHCApp.

The following steps are suggested:

- Create a new department if your organisation has expanded and a new department is being opened.
- Edit the name of a department if a department has changed name, but the case mix remain the same. This is important for historical reporting and ensuring the data is still for the same department.
- Archive (inactivate) a department if the department has closed

OR

If the case mix has changed significantly, archive the department and create a new department.

Parent departments can be created to give the ability to group a number of departments for reporting purposes.

For further information on how to manage departments in HHCApp please visit the HHCApp web page.

7.5.4 Managing HCW types

There are set national HCW types listed in HHCApp for all organisations, based on classifications set by the Australian Institute of Health and Welfare (AIHW) data dictionary. Currently there are 21 Parent HCW Types; details can be found on the Data Definitions webpage.

Administrators are able to create 'local' categories for stratified local reporting if required. For example, AH (Allied Health) can be split into PT (Physiotherapy), OT (Occupational Therapy) etc.

For further information on how to manage HCW types in HHCApp please see the HHCApp webpage.

7.5.5 Managing Audit Periods

National audit periods are automatically added to each organisation providing that organisation submitted data in the previous audit period. If an audit period was missed, the national audit period will need to be added manually by the organisation.

An Organisation Administrator can also add 'Local Audits'. Data entered into a local audit is for local use only and is not included in the national data set.

For further information on how to manage Audits in HHCApp please see the HHCApp webpage.

7.6 Data validation

Each individual who is responsible for the submission of hand hygiene compliance data to the NHHI should validate their healthcare facility data prior to submission to eliminate errors.

Data validation is required to be completed before final submission of data to the NHHI database. While an audit is active in HHCApp, changes can be made to data if errors are found. Once and audit is submitted and the status in HHCApp is pending approval, then changes can only be made after discussion with your jurisdictional coordinator, or the Commission.

The following should be used as a guide to assist recognition of data errors, whether it is data input, auditor, or other errors.

7.6.1 Correct number of moments

The first data validation check is to ensure that the right number of moments have been collected for your facility. Please refer to Section 7.3 to find the required number of moments for submission per organisation.

If you work at an acute hospital you may need to collect a specific number of moments for each ward, depending on your choice of ward selection (see Section 5.7.1).

7.6.1.1 For those with Organisation Administrator access

Login via HHCApp desktop (rather than the HHCApp mobile)

From the home screen, under the Reports heading banner

- Click on “Compliance rate by Department”

In the search filters - select:

- National Audit Period - the current audit period
- Organisation – the required facility (This is only applicable if you are an organisation administrator at multiple facilities)
- Check the box ‘Include departments with no data’.
- Click Run Report

This report details the overall facility Total Moments, and below that, each department’s Total Moments. Does it match your required number of moments overall? Does it match your required number of moments per ward? Are there departments that have significantly higher HHC than other departments, and can this be explained by known hand hygiene practices or may it be due to auditor differences?

If the required number of moments have not been met check that data hasn’t been entered for a “local” audit period instead of a “National” audit)

From the home screen, under the Reports heading banner

- Click on “Compliance rate by department”

In the search filters select:

- Local Audit Period – select all available in turn
- Organisation – The required facility (This is only applicable if you are an organisation administrator at multiple facilities)
- Click Run Report
- If there is data here that should be a part of the National audit then:
  - Click on Sessions from the top horizontal menu
  - In the search filters select Audit type – Local
  - Click on the specific session
  - In the Session Details section – Change the audit filter to “current National audit name
  - Click Save.

Check that data hasn’t been entered against the wrong department by running the Compliance rate by department report as described at the start of this section. If there is data entered against a department that wasn’t part of the facility data collection this audit period then:

- Click on Sessions in the top horizontal menu
- Click on the department name where the data has been entered inaccurately
- In the Session Details section - Change the department filter to “the required department”
- Click Save

If data you believe has been collected is not found please contact the Commission via handhygiene@safetyandquality.gov.au

7.6.1.2 For those with Region or Organisation Group Administrator access

Login via HHCApp desktop (rather than the HHCApp mobile)

From the home screen, under the Reports heading banner

- Click on “Compliance rate by Organisation”

In the search filters - select:

- National Audit Period - The current audit period
- Click Run Report

This report details the overall group “Total Moments”, and below that each organisation “Total Moments”. Are all members of your group visible in this report? If a facility in your group is not visible in the report this is due to no data being entered for that facility for the data period searched. Secondly, have all of your organisations submitted their required number of moments?

7.6.2 Compliance rate by individual auditor

- The Auditor and sessions report can be run at an organisational level or above. This report provided details on the data collected by each auditor at an organisation, including number of moments collected and compliance rate collected by an individual auditor.

The auditor and sessions report can be used to:

- Confirm auditors have collected 100 moments in a year for annual auditor validation
- Identify if a review of auditing processes is required

A review of auditing processes should be conducted if the following are identified:

- An auditor has >95% hand hygiene compliance
- Any auditors with hand hygiene compliance significantly higher or lower than the majority of auditors

To review auditing processes:

- Consider department type where data is collected; for example, high hand hygiene compliance and all data collected in NICU, low hand hygiene compliance and all data collected in emergency department, or high hand hygiene compliance but all other auditors that audited the same wards had similar results.
- Ensure auditor is currently validated
- Conduct side by side audit with auditor
- Follow-up with extra theory if required.

7.6.3 Further data validation checks

7.6.3.1 Compliance rate by Moment report

When reviewing the Compliance Rate by Moment report the general spread of Moments is: a larger amount of Moment 1 and Moment 4 data, approximately 10–15% Moment 2 data, approximately 10–15% Moment 3 data, and a variable amount of Moment 5 data.

Look for any anomalies, for example Moments that have 100% compliance; is this an accurate reflection of your organisation's practices?

Also review the Moment by HCW data - do you have administrative/clerical (AC) doing procedures? Which auditor collected this data?

7.6.3.2 Compliance rate by healthcare worker

When reviewing the Compliance Rate by HCW report, look for any anomalies including: HCW groups that have 100% compliance, is this an accurate reflection of your organisation's practices?

7.7 Data Submission

Once data validation has been completed or the organisation, it is a requirement of each organisation to formally submit the data to the NHHI database.

Only users with Organisational Administrator (or higher) access are able to submit the data. Data submission is completed by pressing the “submit for approval” button.

Please see these instructions on how to complete the submission process.

Once data submission is completed, the “status” of the audit changes from “active” to “pending approval”. No further data can be entered for the audit. If an auditor tries to sync mobile data at this stage the data will be synced as local data, with the audit name in the following format: AuditorName_temp_audit_date_time.

After completion of data validation at a jurisdictional and national level the audit status changes to “complete”.

7.8 Reporting results

Feedback of results to all concerned is fundamental to any data collection process. Feedback is an essential part of every quality cycle, and feedback of improved audit results assists in maintaining local support and enthusiasm for the hand hygiene program. More importantly feedback of poor compliance rates that remain unchanged requires intervention to avoid a complacent workforce.

Guidelines are available for step by step instructions on how to generate reports from the NHHI HHCApp.

Reports for organisations can be produced at any time from HHCApp.
The hand hygiene organisation administrator can choose to report by national audit period, local audit period, or by a specific date range e.g. Monthly.

7.8.1 Standard Reports

The following reports are available to all users with reporting access:

- **Compliance rate by State –** only available to users with access to a jurisdiction.
- **Compliance rate by Region Group –** only available to users with access to a Region Group; for example, health service level within a jurisdiction.
- **Compliance rate by Region –** only available to users with access to a Region; for example, a specific group of organisations within a Region Group.
- **Compliance rate by Organisation Group –** only available to users with access to an Organisation Group; for example, a specific group of organisations that are across more than one jurisdiction.
- **Compliance rate by Organisation –** only available if you have access to multiple organisations.

- **Compliance rate by Department –** an organisation report with hand hygiene compliance for all departments on one report. This report can be filtered for 'Department Type'.

- **Compliance rate by HCW Type –** a report with hand hygiene compliance for each HCW type on one report. Can be run at an organisation level, or for a specific department.

- **Compliance rate by Moment –** report with hand hygiene compliance for each Moment on one report. Can be run at an organisation level, or for a specific department. This report can also be filtered for 'HCW type'.

- **Compliance rate by Department Type –** groups hand hygiene compliance data by department type, rather than individual departments; for example, all medical department hand hygiene compliance combined.

- **Combined Compliance rate by Moment and HCW type –** includes both the HCW type report and Moment report into one file.

- **Auditor and sessions –** this report provides details on the data collected by each auditor at an organisation, including number of moments collected and compliance rate collected by an individual auditor.

- **Action by Moment –** a report detailing which hand hygiene action was used for each moment, rub, wash, missed. Can be run at an organisation level, or for a specific department.

- **Export CSV Line Data –** this report provides a file of the raw line data for each moment.

- **Required Moments –** this report provides a one line summary for each organisation including the number of moments required, the number submitted and the difference between the two.

- **Poster report –** this report provides a one page summary of hand hygiene for the selected region/organisation/department relevant to the user's level of access. The report details overall hand hygiene compliance, hand hygiene compliance by moment, and hand hygiene compliance by HCW in the selected area. This report is useful as a summary report for management, or as a poster to display hand hygiene results for the public.

- **Zero reports –** most of the above reports now have the option to include entities without data. This allows for gaps in data collection to be easily found.

7.8.2 Custom Reports

If the standard reports do not provide the hand hygiene data in a format you require you may be able to create the report you require using the custom reports.

The following reports are available to all users with reporting access:

Snapshot report

- Step 1 – Choose the date range of the data for the report
- Step 2 – Choose which data set you require
- Step 3 – Decide how you want the data presented

Trend report

- Allows reporting change in performance over time

7.9 State/territory reporting of hand hygiene compliance

Hand hygiene compliance rates for each jurisdiction are released by the relevant health departments in each state/territory. Please contact your HHA jurisdictional coordinator for further details.

7.10 National reporting of hand hygiene compliance

Overall rates of hand hygiene compliance (including 95% confidence intervals) will be reported nationally three times per year. All data submitted is analysed by the Commission, fed back to each jurisdiction and submitted to the AIHW.

Data entered into HHCApp is only reported by the Commission as national aggregate data. No identifying data is published by the Commission.

7.11 National hand hygiene benchmark

The national hand hygiene benchmark is set by the Australian Health Ministers' Advisory Council (AHMAC). Since 2017, the benchmark has been 80%.

The 2017 benchmark of 80% relates to all 5 Moments for Hand Hygiene. All health services, especially those with lower rates of Moments 1 and 2 are encouraged to take action to raise compliance in these critical areas.

Since 2010, the rate of compliance for individual health services across Australia has been reported on the MyHospitals website.

8 Sustaining a hand hygiene program

8.1 Aim

To maintain and continuously improve a hand hygiene program.

8.2 Key features of long-term sustainability include the following:

8.2.1 Hospital-wide rollout

For this program to be successful the enthusiastic and continued support of your facility executive is essential. Healthcare worker acceptance and ownership of the NHHI program assists sustainability.

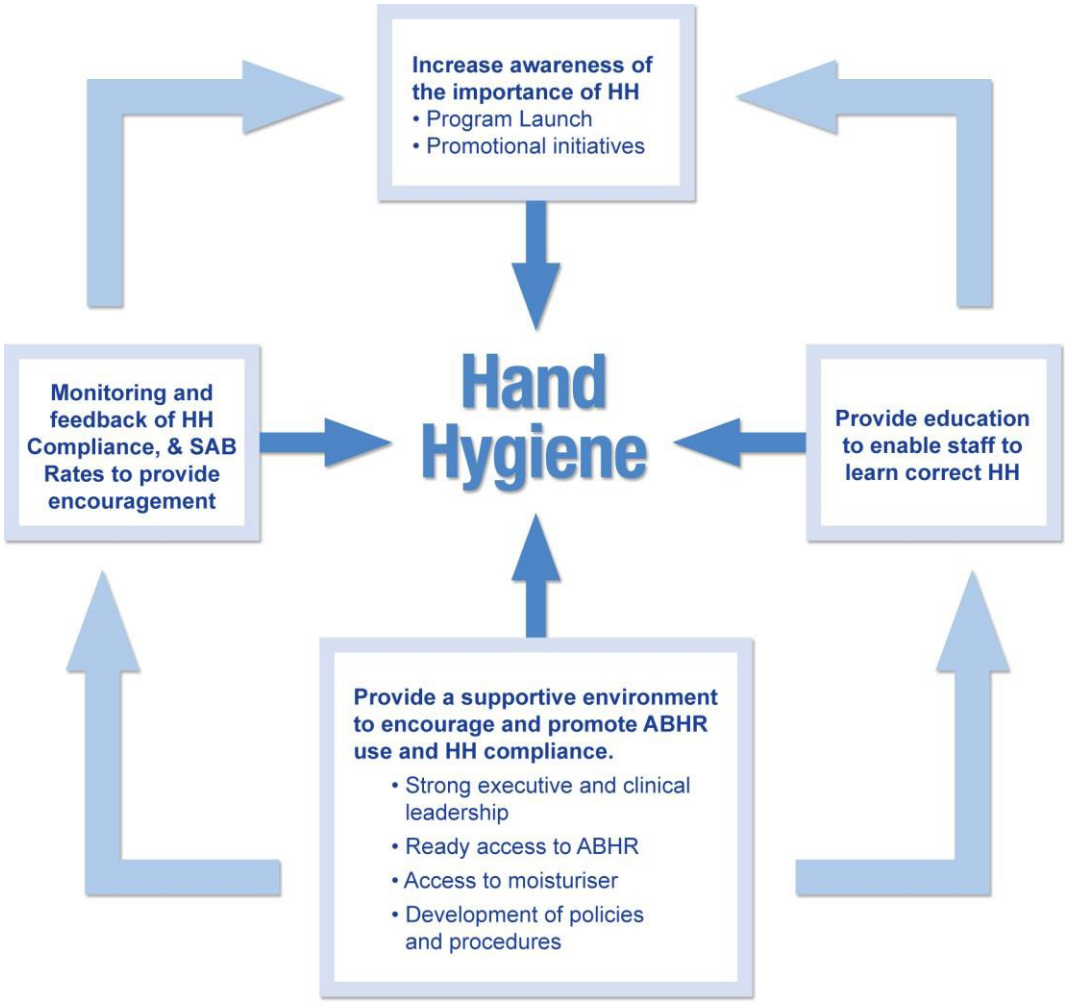
Ongoing tasks of hand hygiene project team:

1. Initiate reporting of hand hygiene compliance results as a regular infection control or quality report to the chief executive officer/health facility board
2. Extend program to wards that have not been audited for the national program
    - Ensure healthcare facility ownership by progressing the hand hygiene education and auditing program to **all** wards/departments. For continued improvement and sustainability of the hand hygiene program, it is imperative that all departments are included in the program.
3. Report results back to wards
    - As per any quality activity, it is important after conducting an audit to feedback the results to the relevant groups; for example, hand hygiene compliance rate per ward or HCW group. This will encourage ownership of the program at an individual level (see Section 7 on how to run data reports)
4. Evaluate hand hygiene program performance
    - See Section 8.3

8.2.2 Region/jurisdiction level involvement

The support of all Australian health ministers for the objectives of the NHHI and the hand hygiene benchmark provide the framework for participation by all healthcare facilities in the program.

Figure 8.2.2.1 Hand hygiene culture change



8.2.3 Hand hygiene culture change and sustainability of the hand hygiene program

Once a hand hygiene program is firmly established within a healthcare facility it is important to review and continually refresh it. When relaunching your program, please remember that the hand hygiene program is **not** just about hand hygiene auditing, or completing an online learning package. It is a program of education, monitoring and feedback that results in a behavioural and cultural change across all staff.

The following section suggests ways, as detailed in Figure 8.2.2.1, to create sustainability within the hand hygiene program:

8.2.3.1 Increase the awareness and importance of hand hygiene

It is important to evaluate and relaunch a hand hygiene program every one to two years to revitalise existing staff enthusiasm and to capture the attention of new staff. The WHO Hand Hygiene Self-Assessment Framework is a useful tool for hand hygiene program evaluation.

See Section 8.3 for further detail.

The following are questions to ask, or suggestions to follow, to relaunch a hand hygiene program:

- Have you written an improvement plan? Did you write this in conjunction with the Self-Assessment Framework and your hand hygiene compliance reports?
- Have you reviewed your hand hygiene program data? Is your hand hygiene compliance increasing over time? Are your infection rates decreasing over time?
- From your hand hygiene data: what areas need addressing for the relaunch? Which HCW group or particular Moment has the lowest compliance? This will help to prioritise education requirements
- Re-engage with your major stakeholders about the importance of the hand hygiene program; for example, chief executive officer, heads of departments
- Promote awareness of the hand hygiene program to all staff via newsletters or payslip messages etc.
- Provide latest evidence based practice updates.

8.2.3.2 Provide education

Aim to provide education to **all** healthcare worker groups annually, with additional education sessions regularly throughout the year to target clinical staff and high risk groups.

Utilise the NHHI promotional resources or resources provided by your jurisdiction, including:

- Video in-service – The 5 Moments Explained
- Online learning modules for various HCW groups
- There are also many other educational resources on the NHHI website, including the PowerPoint presentations aimed at specific healthcare worker groups.

8.2.3.3 Provide a supportive environment to encourage and promote alcohol-based handrub use and hand hygiene compliance

- Conduct staff surveys on awareness of the hand hygiene program, and ask staff for suggested improvements.
- Conduct product availability surveys
  - Product availability should be reviewed regularly to ensure correct placement and full containers
  - Over time the frequency can be decreased, with an annual survey recommended.

8.2.3.4 Using the hand hygiene evaluations for culture change

In a facility where the hand hygiene program is being implemented for the first time, data indicating gaps in good practices and knowledge, or a poor perception of the problem, can be used to raise awareness and convince HCWs that there is a need for improvement.

This feedback helps to promote local area ownership of hand hygiene issues, and should encourage changes to practice where indicated from the feedback. Discussing hand hygiene compliance data at the local level should promote the development of local initiatives to address the specific issues.

Subsequently, after implementation, regular and timely reporting of data is crucial to demonstrate improvement; thereby sustaining the motivation to perform good practices and making continuous individual and institutional efforts. See Section 7 on how to generate hand hygiene compliance reports.

The hand hygiene compliance reports can be used to compare healthcare worker categories against each other. It could be used as a competition for staff to improve their hand hygiene compliance; for example, nurses versus medical staff, students versus qualified staff. They may be used to stimulate competition between wards, or, if in a network, hospital against hospital. This will encourage ownership of the program by these groups. The hand hygiene compliance reports could be used to target education for those with lower scores, or to give prizes for the best performances.

8.2.3.5 Improving culture-change in specific settings; an Emergency Department example

Hand hygiene practices in the emergency department setting represent a unique challenge with distinct environment, staff and patient factors compared with inpatient wards.

Interventions, including the placement of hand hygiene products within the point-of-care and staff education may be more complex in this setting.

The WHO Hand Hygiene Self-Assessment framework has been adapted to support the improvement of hand hygiene compliance in the ED setting. See: Emergency Department Self-Assessment Framework.

Self-assessment frameworks may also be developed for use in other specific settings in the future.

8.3 WHO Self-Assessment Framework

According to the WHO Self-Assessment Framework, an ideal hand hygiene culture change program should include:

- An easily available and continuous supply of alcohol-based handrub that meets the recommendations of HHA
- Appropriate availability of sinks, soap, and paper towel
- Mandatory hand hygiene training of all healthcare workers on commencement of employment, with ongoing education throughout the year
- Staff available to conduct hand hygiene education throughout the facility
- Validated staff to conduct hand hygiene compliance assessments (where applicable)
- Regular hand hygiene compliance audits (where applicable)
- Regular feedback of hand hygiene compliance audit/program measures, including immediate feedback and data trends over time, to:
    - healthcare workers
    - facility leaders
- Hand hygiene promotional materials throughout the facility
- Establishment of a hand hygiene project team that has dedicated time to regularly promote hand hygiene
- Clear commitment from the CEO, Director of Nursing, and Medical Director
- Patient engagement programs
- Initiatives to support local continuous improvement; for example online learning programs, hand hygiene newsletters.

8.3.1 Is your facility a hand hygiene leader?

The WHO has developed an additional section to the Self-Assessment Framework, for organisations that wish to be considered a leader in hand hygiene. The section includes criteria for a very comprehensive hand hygiene program that can be held as an example for other facilities to aspire to.

Facilities may wish to review these leadership criteria as part of their hand hygiene program evaluation.

9 Other useful interventions

9.1 Aim

Other infection prevention interventions are available to complement the successful implementation, and sustainability of a hand hygiene culture change program.

9.2 Additional audit tools to complement the hand hygiene program

In the NHHI hand hygiene compliance tool, neither the duration of the hand hygiene action, nor other quality aspects of hand hygiene such as the quantity of product used, technique of hand hygiene, donning/doffing of gloves, type of gloves used, length of fingernails, or presence of jewellery are assessed. Once the hand hygiene program has been well established in your facility these are items you may wish to address whilst conducting the hand hygiene compliance audit, but they will not be reportable to the NHHI database.

A number of additional audit tools available for each healthcare facility on the NHHI website.

9.3 Bare below the elbows

Some hand hygiene culture change programs advocate a ‘Bare below the Elbows’ policy for all HCWs. Whilst there is currently limited evidence to promote this as a formal recommendation, WHO recommends that long sleeves be avoided. Long sleeves have been found to be contaminated with organisms, and can impede appropriate hand hygiene.

9.4 Hand hygiene in shared patient areas

There are many shared patient areas within healthcare facilities; for example, waiting rooms, group based therapy rooms. Staff within these areas may move between patients regularly.

If a HCW has contact with patients within a shared area then the principles of the 5 Moments for Hand Hygiene remain.

Patients should also be instructed to perform hand hygiene on entering and leaving a

shared area.

Personal alcohol-based handrub packs for staff may be more appropriate in these areas.

If patients are sharing equipment appropriate cleaning protocols should be followed. However, this may not be practicable where equipment is passed between patients quickly; for example, passing a ball in an exercise class. Ensure that all shared equipment is cleaned between sessions/groups.

Glossary

The following terms are referred to throughout this manual:

Alcohol-based handrub

A TGA-listed alcohol-containing preparation designed for reducing the number of viable micro-organisms on the hands without the use or aid of running water, and which is listed on the ARTG as a medicinal product.

Alcohol wipes

An alcohol-containing wipe used to clean non-soiled shared patient equipment in between each patient use e.g. Blood pressure cuffs.

Aseptic technique

An aseptic technique aims to prevent microorganisms on hands, surfaces and equipment from being introduced to susceptible sites. Therefore, unlike sterile techniques, aseptic techniques can be achieved in typical ward and home settings.

Bacteraemia

The presence of bacteria in the blood.

Body fluids

Any substance secreted by the body with the exception of sweat. These include: blood, lochia, saliva, secretions from mucous membranes, pus, gastric and respiratory secretions, semen, tears, wax, breast milk, colostrum, urine, faeces, meconium, vomitus, pleural fluid, cerebrospinal fluid, ascites fluid, biliary fluid, bone marrow, pus, organic body samples – for example, biopsy samples, organ and cell samples.

Body fluid exposure risk

Any situation where contact with body fluids may occur. Such contact may pose a contamination risk to either healthcare worker or the environment.

Contact

The touching of any patient or their immediate surroundings or performing any procedure.

Curtains

Patient bed curtains are outside the patient zone and are frequently contaminated with microorganisms foreign to the patient inside.

Touching the curtains after caring for a patient is considered to be equivalent to leaving the patient zone.

Hand hygiene should be performed between touching the curtains and touching the patient and vice versa.

Decontaminate hands

Application of either an antimicrobial soap/solution and water or an alcohol-based hand rub product, to the surface of the hands. This process reduces microbial counts on hands.

Detergent wipes

A detergent-containing wipe used for cleaning lightly soiled shared patient equipment in between each patient use.

Emollient/humectant

Ingredient(s) added to hand hygiene products to moisturise and protect the skin from frequent product use.

Glove use

Glove use by HCWs is recommended for two main reasons: to prevent microorganisms which may be infecting, commensally carried, or transiently present on healthcare worker's hands from being transferred to patients and from one patient to another; and to reduce the risk of healthcare workers acquiring infections from patients.

Hand care

Actions to reduce the risk of skin damage or irritation. For example, using a moisturiser regularly throughout the day.

Hand hygiene

A general term applying to processes aiming to reduce the number of microorganisms on hands. This includes: application of a waterless antimicrobial agent (e.g. alcohol-based handrub) to the surface of the hands; and use of soap/solution (plain or antimicrobial) and water (if hands are visibly soiled), followed by patting dry with single-use towels.

Hand hygiene action

A hand hygiene action can be undertaken either by rubbing with an alcohol-based handrub, or hand washing with soap and water.

Hand hygiene compliance

Is a measurement of appropriate hand hygiene. It is defined when hand hygiene is considered necessary and is classified according to one of the 5 Moments.

If the action is performed when there is no indication and it has no impact in terms of preventing microbial transmission, then it is not considered to be an act of hand hygiene compliance.

The number of Moments constitutes the denominator for assessing hand hygiene compliance. The actual hand hygiene actions undertaken are compared to the number of *Moments* observed to calculate the rate of hand hygiene compliance.

Hand hygiene non-compliance is defined when there is an indication for hand hygiene (a Moment) and yet no hand hygiene was undertaken.

Hand hygiene moments

Moments are based on those defined by the WHO Guidelines on Hand Hygiene. Some minor modifications have been made for Australian healthcare settings.
A Moment is when there is a perceived or actual risk of pathogen transmission from one surface to another via the hands. Healthcare workers' hands will come in contact with many different types of surfaces while undertaking a succession of tasks.

The 5 Moments for hand hygiene are:

Moment 1: Before touching a patient
Moment 2: Before a procedure
Moment 3: After a procedure or body fluid exposure risk
Moment 4: After touching a patient
Moment 5: After touching a patient's surroundings

Hand hygiene opportunity

In Australia the term 'Moment' is used.

However, the WHO define a hand hygiene opportunity as the time between the moment when hands becoming colonised after touching a patient/surface and the moment in which hands touch the next patient/surface; i.e. the opportunity when hand hygiene should be performed.

Hand hygiene product

Any product used for the purpose of hand hygiene, including soap and water

Hand washing

The application of soap and water to the surface of the hands.

Healthcare-associated infections (HAIs)

Infections acquired in healthcare facilities ('nosocomial' infections) and infections that occur as a result of healthcare interventions ('iatrogenic' infections), and which may manifest after people leave the healthcare facility.

Healthcare zone

Refers to all regions outside of the patient zone. This includes the curtains, partitions and doors between separate patient areas.

The healthcare zone can include shared patient areas as these areas are not cleaned between patients. Assumptions are generally made that within the healthcare zone there are organisms that are potentially harmful to all patients, and that transmission of these pathogens to the patient results in exogenous infection.

Healthcare workers

All people delivering healthcare services, including students and trainees, who have contact with patients or with blood or body substances.

Immunocompromised

Having an immune system that has been impaired by disease or treatment

Inter-rater (or observer) reliability

A measure of agreement or consistency of ratings by two or more observers on a series of common subjects.

Intra-rater reliability

A measure of agreement or consistency of two or more ratings by a single observer on a series of common subjects.

Invasive medical device

Devices which, in whole or part, enter the body through an orifice or through any surface of the body. This includes penetrating skin, mucous membranes, organs or internal cavities of the body. Examples include surgical instruments, implantable devices, dental equipment, intravascular devices, medical and therapeutic devices.

Methicillin-resistant *Staphylococcus aureus* (MRSA)

Strains of *Staphylococcus aureus* that are resistant to many of the antibiotics commonly used to treat infections. Epidemic strains also have a capacity to spread easily from person-to-person.

Methicillin-susceptible *Staphylococcus aureus*

Staphylococcus aureus that is susceptible to methicillin/flucloxacillin.

Work, Health and Safety (WH&S)

Is an area concerned with protecting the safety, health and welfare of people engaged in work or employment. The goal of all work, health and safety programs is to foster a safe work environment.

Outcome measure

A feature used to describe the effects of care on the health status of patients and populations (for example, infection rate).

Patient

A person who is receiving care in a health service organisation.

Patient contact

Involves touching the patient and their immediate surroundings, or performing any procedure on the patient.

Patient surroundings

All inanimate surfaces that are touched by or in physical contact with the patient (such as bed rails, bedside table, bed linen, invasive devices, dressings, personal belongings and food) and surfaces frequently touched by healthcare workers while caring for the patient (such as monitors, knobs and buttons).

Patient zone

Includes the patient and the patient immediate surroundings.

The patient zone is the area dedicated to an individual patient for their care. The patient zone is cleaned after one patient leaves, and before the next patient arrives.

Assumptions are generally made that within the patient zone the patient flora rapidly contaminates the entire patient zone; and the patient zone is cleaned between patients.

Point-of-care

The place where three elements come together: the patient, the healthcare worker, and the care or treatment involving contact with the patient or his/her surroundings. A hand hygiene product should be easily accessible and as close as possible – within arm's reach of where patient care or treatment is taking place. Point-of-care products should be accessible without having to leave the patient zone.

Procedure

An act of care for a patient where there is a risk of direct introduction of a pathogen to the patient.

Process measure

An index of the degree to which a service or procedure is performed correctly and

appropriately, e.g. timing of surgical antibiotic prophylaxis, measuring how many times staff wash their hands.

Recommendation

A guideline; sample suggestion; to advise.

Reliability

The extent to which a measurement is consistent and free from error.

SAB

Staphylococcus aureus bacteraemia

Separations

A separation from a healthcare facility occurs anytime a patient leaves due to discharge, death, or transfer

Standard aseptic technique

Clinical procedures managed with standard aseptic non-touch technique will characteristically be technically simple, short in duration (approximately less than 20 minutes), and involve relatively few and small key sites and key parts. Standard aseptic technique requires a main general aseptic field and non-sterile gloves. The use of critical micro-aseptic fields and a non-touch technique is essential to protect key parts and key sites.

Sterile task

A task performed in such a way as to avoid microbial contamination or inoculation.

Structured observation

A method to quantify healthcare worker behaviour using a format that is structured in a manner that is likely to avoid bias and improve consistency. Structured observations provide information on what people actually do, rather than on what they say they do or did. They also provide information on the associated activities and behaviours that precede and follow hand hygiene compliance.

Surgical aseptic technique

Surgical aseptic technique is demanded when procedures are technically complex, involve extended periods of time, large open key sites or large or numerous key parts. To counter these risks, a main critical aseptic field and sterile gloves are required and often full barrier precautions. Surgical aseptic technique should still utilise critical micro aseptic fields and non-touch technique where practical to do so.

Surgical hand preparation

The process of eliminating transient and reducing resident flora prior to surgery. This comprises removal of hand jewellery, performing hand hygiene with liquid soap if

hands are visibly soiled, removing debris from underneath fingernails and scrubbing hands and forearms using a suitable antimicrobial formulation.

Validity

Refers to the accuracy of a measure. It is the extent to which a measuring instrument actually measures what it is supposed to measure.

WHO

World Health Organization

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Appendices

1. Hand hygiene compliance assessment form
2. Hand hygiene compliance Form Coding Sheet
3. Sample of a Completed hand hygiene compliance assessment form
4. HHCApp Instructions for Use
5. HHA OH&S Risk Assessment
6. Skin Care Questionnaire
7. Moments for Hand Hygiene Auditor Training
8. Hand hygiene Ward Summary Sheet