ANTT Guidelines

The ANTT Clinical Guideline for Blood Culture Collection

Rationale and supporting evidence
**Glossary**

**Please note:** Historically, the terms below have been defined variously and often ambiguously in the medical literature. The definitions given here by The ASAP are intended to provide a related set of definitions that will support best practice by being accurate, achievable and logical.

**Aseptic/Asepsis** - Free from pathogenic organisms

**Sterile** - Free from microorganisms

**Clean** - Free from visible marks and stains

### Sterile Technique

Describes the infection prevention aim and method adopted by healthcare professionals when undertaking invasive clinical procedures.

Regardless of setting, or patient diagnosis, the aim is always to prevent the transfer of pathogenic microorganisms from the healthcare worker, procedure equipment or the immediate working environment into and onto the patient. In ANTT, it is achieved by ensuring Key-Parts and Key-Sites remain aseptic by a concept termed **Key-Part and Key-Site-Protection**.

### Aseptic Non Touch Technique (ANTT)

A specific type of aseptic technique with a unique theory and practice framework (NICE 2012).

**Aseptic field** (Traditionally termed ‘Sterile’ field)

A designated aseptic working space that contains and protects the procedure equipment from direct and indirect environmental contact-contamination by microorganisms. See aseptic field types below.

#### Critical Aseptic Field

The main aseptic field that ensures asepsis during procedures by providing essential & primary protection from the procedure environment. Critical Aseptic Fields require ‘Critical Management’ (See below).

#### General Aseptic Field

The main aseptic field that promotes asepsis during procedures by providing basic protection from the procedure environment. General Aseptic Fields are used when the procedure Key-Parts are easily and primarily protected by Micro Critical Aseptic Fields (caps and covers). Therefore, General Aseptic Fields only require ‘General Aseptic Field Management’ (See below)**.

**Micro Critical Aseptic Field (MCAF)**

A small Critical Aseptic Field used to protect a Key-Part, e.g. a syringe cap or needle cover.

*Critical Aseptic Field Management (‘Critical Management’, ‘Critically Managed’, ‘Managed Critically’)*

Only sterilized or aseptic equipment may come into contact with a Critical Aseptic Field. Sterilized gloves are required to maintain aseptic continuity.

**General Aseptic Field Management (‘General Management’, ‘Generally Managed’, ‘Managed Generally’)**

Required equipment and covering which may not be technically aseptic are permitted in a General Aseptic Field because all Key-Parts are fully protected by Critical Micro Aseptic Fields.

### Clean Technique

Describes the action and process of rendering an object or person free from visible marks and stains. (NB: ANTT does not recognize or use this term to describe or define aseptic technique.

### Decontamination

A general term that refers to one or more of the processes below:

**Cleaning:** reduces the bio burden and removes foreign material. In healthcare it is typically performed with water, soap or detergent and material such as paper towels or impregnated wipes.

**Disinfection:** the destruction of pathogenic microorganisms, usually by thermal or chemical means.

**Sterilization:** A process by which all viable forms of microorganisms (including spores) are destroyed (APIC 2009).

### Key-Part (Active)

Active Key-Parts are the critical parts of the procedure equipment that come into contact with Key-Sites, any liquid infusion, or with any other active Key-Parts connected to the patient via a medical device. If contaminated during a procedure, Key-Parts provide a route for the transmission of pathogens onto or into the patient, and present a significant infection risk.

### Key-Parts (Inactive)

When Key-Parts such as closed IV ports are not active it is not practical to maintain them as aseptic. Inactive Key-Parts must be rendered aseptic prior to re-use by effective cleaning and disinfection.

### Key-Site

Open wounds and insertion and puncture sites for invasive medical devices.

### Key-Part/Site Protection

The protection of Key-Parts and/or Key-Sites from pathogenic microorganisms. During clinical procedures this is achieved by a range of methods including non touch technique, aseptic field management, basic infection precautions such as hand cleaning and glove usage etc. as defined in ANTT. In between clinical procedures, wounds and medical devices may have Sustained Key-Part Protection from medical equipment or supplies. E.g. A wound care dressing, a passive IV hub cap protector.

### Sterile Technique

A historical term used interchangeably for aseptic technique. (NB: ANTT does not recognize or use this term because due to the ever presence of microorganisms in air, it is virtually impossible to achieve in even the most specialist healthcare environment).
ANTT is a contemporary and unique Theoretical and Clinical Practice Framework for aseptic technique for all clinical procedures...‘From surgery to community care’. It is endorsed or referenced as a best practice example of standardized aseptic technique by a number of organizations including, Epic2 (Pratt et al 2007), The National Institute for Clinical Excellence (NICE 2012), The Australian Guidelines for the Prevention and Control of Infection in Healthcare (ACSQH 2010) the Royal College of Nursing (RCN) Infusion Standards 2010, The American Vascular Access Society (AVA), the Health Protection Surveillance Centre – Ireland (2011).

The ANTT Clinical Practice Framework set out here, forms the first part of a four part model for improving standards of aseptic technique. As a result of widespread international demand and adoption, the standardization of aseptic technique with ANTT has become a major global initiative organized by the Association for Safe Aseptic Practice (ASAP).

Aseptic technique can be further standardized by using ANTT Clinical Guidelines to ‘prescribe out’ variability in practice for a range of common clinical procedures. The guidelines translate the ANTT foundation principles into practice via simple practice prompts which are displayed in clinical areas. The guidelines are designed by experts in each core competency and peer-reviewed nationally. The infection control steps in each guideline are risk evaluated and sequenced to ensure an efficient, logical and safe order. They provide health care organizations with a method to standardized aseptic practice according to evidence based practice and international infection control guidance, and a method to monitor performance. Each guideline is supported by a comprehensive technical rational and evidence base document.

Compliance to the guidelines is established across large health care organizations by the ANTT ‘Executive Board to Ward’ Implementation Audit Cycle.
The ANTT Clinical Guideline for Blood Culture Collection

ANTT Risk Assessment (To determine Surgical or Standard-ANTT)

During any invasive clinical procedure the aim of aseptic technique is to protect the patient from infection. In ANTT, this is achieved by ensuring the asepsis of Key-Parts and Key-Sites by protecting them from operator and environmental contamination.

Different clinical procedures present different levels of complexity. Therefore, in order to be efficient as well as safe, any practice framework for aseptic technique must define what type of aseptic technique and precautions are required for simple and complex procedures, and how to decide between the two approaches. To this end, the ANTT practice framework defines a Standard-ANTT and Surgical-ANTT approach to practice. It is important to note that while the two approaches differ to cater for different levels of procedure complexity, they still adhere to the same fundamental principles of ANTT.

Healthcare workers (HCW) are taught to decide correctly between Standard and Surgical-ANTT, by a simple and logical set of rules and a risk assessment. (See the ANTT Clinical Practice Framework).

ANTT Risk Assessments applied to Blood Culture Collection

Blood culture collection is typically managed safely and most efficiently using Standard-ANTT. The rationale for this is outlined below:

**Standard or Surgical ANTT?**

To determine the need for Standard or Surgical-ANTT for blood culture collection, the HCW first asks...

*‘To maintain asepsis of Key-Parts and/or Key-Sites does the main aseptic field require Critical Management?’*

To answer this question, the HCW considers that blood culture collection typically involves a small number of small Key-Parts. The Key-Parts can easily be protected using Micro Critical Aseptic Fields (MCAF). Therefore the main aseptic field is managed as a General Aseptic Field as it does not require critical management. This represents a Standard-ANTT approach to practice.

**Glove Choice assessment**

To then determine the need for non-sterilised or sterilised gloves the HCW asks...

*‘Can I perform this procedure without touching Key-Parts or Key-Sites directly?’*

Typically, blood culture collection is not technically complex and a non-touch technique (NTT) can be used to protect the Key-Parts and Key-Sites (e.g. the puncture site) from HCW hand contact. Therefore, non-sterile gloves are the glove of choice.
**Preparation:** Consent patient, assess veins visually and patient or nurse cleans arm

**Action**

1. Consent patient.\(^1\)
2. Assess veins.\(^2\)
3. Patient or nurse to clean arm.\(^3\)

**Rationale**

1. Patient consent is a fundamental component of patient safety, protection and satisfaction.
2. Assessing veins at this stage will reduce the contact between HCW hands and patients skin flora once the procedure commences.
3. As well as helping reduce the number of micro-organisms on the site, cleaning the patients arm with warm water will increase blood flow and help facilitate vein identification.

**Notes**

- During this preparation the HCW should prepare the environment immediately surrounding the patient; making sure that the patient’s privacy and dignity can be maintained during the procedure.
- The immediate environment around the patient should be safe for the procedure and the area uncluttered.

**Evidence**

\(^1\) Department of Health: Health Service Circular (1999):
A patient has the right under common law to give or withhold consent to medical examination or treatment. This is one of the basic principles of health care. Patients are entitled to receive sufficient information in a way that they can understand about the proposed treatments, the possible alternatives and any substantial risk or risks which may be special in kind or magnitude or special to the patient, so that they can make a balanced judgement.

Department of Health: Referencing Guide to Consent for Examination or Treatment (2009):
"It is a general legal and ethical principle that valid consent must be obtained before starting treatment or physical investigation, or providing personal care, for a person."

\(^2\) RCN Standards for Infusion Therapy (2010):
"The practitioner performing venepuncture should be knowledgeable about the relevant anatomy and physiology, skin preparation and asepsis, measures to improve venous access, and be aware of the contraindications of venepuncture sites."

\(^3\) Guidelines for Prevention of Surgical Site Infection (1999):
"Thoroughly wash and clean at and around the incision site to remove gross contamination before performing antisepic skin preparation."
### Step 1
With clean hands clean tray according to local policy

<table>
<thead>
<tr>
<th>Action</th>
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<tbody>
<tr>
<td>1. Use a large plastic or metal tray as an aseptic field.</td>
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<tr>
<td>2. Clean the tray with 70% alcohol or alcoholic 2% chlorhexidine solution/wipes.</td>
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<tr>
<td>3. Allow surface to dry before use.</td>
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<table>
<thead>
<tr>
<th>Rationale</th>
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<tbody>
<tr>
<td>1. Whilst disposable trays can be used in ANTT, they should be stored safely, be of sufficient size to protect Key-Parts and safely contain equipment. Plastic or metal trays can be cleaned (i.e. controlled) and provide a sufficiently large, robust and controlled working area. The high sides minimize the risks of dropping equipment and they minimize spills. NB: Small paper trays have none of the above qualities.</td>
</tr>
<tr>
<td>2. Effective cleaning will render the tray aseptic.</td>
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<tr>
<td>3. It's not aseptic until it's dry; while wet the alcoholic solution is disinfecting the surface, interruption of this process could reduce the effectiveness of the cleaning product. Typically, drying time is 30 seconds. It is important to confirm the length of time a particular product needs to produce an acceptable bactericidal effect. The product mentioned below (3) was tested and noted to be effective at 30 seconds – other manufacturers may have different times to effectiveness (for example, the EN 1276 test uses a contact time of 5 minutes).</td>
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<tr>
<td>• Equipment surface decontamination should be risk assessed in the light of specific infection risks within a given population or location and appropriate cleaning products and techniques used as per local policies and procedures.</td>
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<tbody>
<tr>
<td>1. Australian Guidelines for the Prevention and Control of Infection in Healthcare (2010): &quot;Aseptic fields are important in providing a controlled aseptic working space to help promote or ensure the integrity of asepsis during clinical procedures&quot;</td>
</tr>
<tr>
<td>3. ICNA (IPS) Asepsis: Preventing Healthcare Associated Infection (2003): Principles of asepsis 'Prepare the area, including decontamination of the surface to be used with detergent and water followed by drying. They can then be disinfected using a wipe containing 70% alcohol'</td>
</tr>
<tr>
<td>3. Hospital Infection Research Laboratory (2006):*** Allowing the surface to dry ensures the disinfectant agent has been given enough time to kill micro-organisms. When tested in accordance with EN 1276* a solution of 70% isopropyl alcohol (IPA) in a PDI® branded wipe (Sani-Cloth 70®) gave a &gt;5 log_{10}(99.999%) reduction all four of the test organisms** after 30 seconds, under clean (0.03%albumin) and dirty (0.3% albumin) conditions.</td>
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*** 70% IPA as a surface cleaner for medical devices has demonstrated effectiveness at 30 seconds post application
* European test standard maintained by the European Committee for Standardization
** Staphylococcus aureus, Pseudomonas aeruginosa, Escherichia coli, Enterococcus hirae
## Step 2
### Gather equipment and place around tray

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<tbody>
<tr>
<td>1. Gather equipment and place at hand.¹</td>
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<tr>
<th>Rationale</th>
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<tbody>
<tr>
<td>1. Hands are potentially contaminated when gathering equipment from storage cupboards etc. (Cupboard handles are high risk vectors of infection). It’s important therefore to gather all equipment before the last hand clean prior to preparation. Gathering equipment at this point allows the tray time to dry and saves a little time.</td>
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<tr>
<td>• Equipment should be safely stored in a regularly cleaned environment and be easily accessible to staff.</td>
</tr>
<tr>
<td>• Effective stock rotation should be employed to monitor expiration dates of equipment and promote the integrity of packaging.</td>
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<tr>
<td>‘The core steps that must be taken during an aseptic technique, for whatever procedure, including preparation to ensure: that all appropriate sterile items are available, and that the setting is prepared’</td>
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<tr>
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<tbody>
<tr>
<td>‘Additional steps may be included in the aseptic technique depending on many factors including the procedure and the setting. A risk assessment prior to the procedure will define the requirements’</td>
</tr>
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### Step 3

**Clean hands**

with alcohol hand rub or soap and water

### Action

1. Clean hands at this stage.\(^1\)
2. Using effective hand cleaning technique (Appendices 1, 2) with either alcohol hand rub or soap and water.\(^2\)
3. Ensure hands are dry before re-gloving. If soap and water are used, pat hands dry with a paper towel.\(^3\)

### Rationale

1. This hand clean occurs immediately before assembly of equipment and the preparation of BC bottles. This way, hands are optimally clean prior to glove application and non-touch technique Key-Part manipulation.
2. Effective hand cleaning is vital to reduce the risk of contaminating Key-Parts and Key-Sites. The same technique of hand cleaning (covering all surfaces of the hand) should be used when both soap and water or alcohol gel is being used.
3. Wet hands more easily transport bacteria. Pat drying prevents skin degradation and damage.

### Notes

- ANTT always aims to minimise hand-cleaning frequency in order to increase compliance; this is always a risk-assessed balance between clinical effectiveness and staff compliance.
- Soap & water and alcohol hand rub are interchangeable at any stage and should be chosen according to the clinical situation.

### Evidence

1. **ICNA (IPS) Hand Decontamination Guidelines (2002):**
   "Hands readily pick up and transfer microorganisms and should be decontaminated between any activity that will result in more than superficial contact. Expert consensus groups agree that effective hand decontamination results in significant reduction in the carriage of potential pathogens on hands’

2. **WHO Guidelines on Hand Hygiene in Health Care (2009):**
   ‘Use an alcohol-based hand rub as the preferred means for routine hand antisepsis.’

3. **WHO Guidelines on Hand Hygiene in Health Care (2009):**
   The choice of cleaning agent depends upon the clinical circumstances. ‘To achieve a high rate of hand hygiene adherence, healthcare workers need education, clear guidelines, some understanding of infectious disease risk, and acceptable hand hygiene products’ Part II, 1, B. ‘If exposure to potential spore-forming pathogens is strongly suspected or proven, including outbreaks of clostridium Difficile, hand washing with soap and water is the preferred means’

   ‘A good technique covering all surfaces of the hands at the right time is more important than the agent used or the length of time taken to perform it’

5. **WHO Guidelines on Hand Hygiene in Health Care (2009):**
   Part II, 2, B ‘Rinse hands with water and dry thoroughly with a single-use towel. Dry hands thoroughly using a method that does not re-contaminate hands’

   11.1.5 ‘Because wet hands can more easily acquire and spread microorganisms, the proper drying of hands is an integral part of routine hand washing’
### Step 4
**Prepare equipment using a non-touch technique (NTT)**

<table>
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<th>Action</th>
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<tbody>
<tr>
<td>1. Use a non-touch technique at all times.(^1)</td>
</tr>
<tr>
<td>2. Identify Key-Parts and remove equipment from packaging carefully.(^2)</td>
</tr>
<tr>
<td>3. Assemble equipment and arrange in an organized manner in the aseptic field.(^3)</td>
</tr>
<tr>
<td>4. Ensure Key-Parts are protected at all times. NB: Key-Parts must not come into contact with the aseptic field/tray (e.g. prepared syringes can be capped or re-inserted into their original packaging).(^4)</td>
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<thead>
<tr>
<th>Rational</th>
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<tbody>
<tr>
<td>1. Key-Parts should NEVER be touched so as to avoid contact transfer of microorganisms (it is well known that hand decontamination compliance is often poor).</td>
</tr>
<tr>
<td>2. Prevents contamination of Key-Parts.</td>
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<tr>
<td>3. An organized aseptic field decreases chance of inadvertently contaminating Key-Parts.</td>
</tr>
<tr>
<td>4. Exposed Key-Parts increases risk of inadvertent contamination.</td>
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<tr>
<td>• Blood culture bottles should be ‘in date’ and have sealed protective top caps in place.</td>
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<tr>
<td>• All equipment should be checked for expiry date and that packaging integrity is not compromised.</td>
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<tbody>
<tr>
<td>1. Australian Commission on Safety and Quality in Healthcare (2010): “In ANTT, asepsis is ensured by identifying and then protecting Key-Parts and key-Sites by hand hygiene, non-touch technique, using new sterilised equipment and/or cleaning existing Key-Parts to a standard that renders them aseptic prior to use.”</td>
</tr>
<tr>
<td>2. ANTT v2 (2010): “If contaminated, Key-Parts provide a direct route for transmission of pathogens between the procedure and the patient”</td>
</tr>
<tr>
<td>3. ICNA (IPS) Asepsis: Preventing Healthcare Associated Infection (2003): “The core steps that must be taken during an aseptic technique, for whatever procedure, including preparation to ensure: that all appropriate sterile items are available, and that the setting is prepared”</td>
</tr>
<tr>
<td>4. ICNA (IPS) Asepsis: Preventing Healthcare Associated Infection (2003): “Aseptic technique reduces the risk of contamination to vulnerable sites thus helping to prevent HAIs”</td>
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### Step 5
**Apply disposable apron and label bottles**

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<tr>
<td>1. Apply a plastic apron. ¹</td>
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<tr>
<td>2. Label bottles. ²</td>
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<table>
<thead>
<tr>
<th>Rational</th>
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<tbody>
<tr>
<td>1. A disposable apron is worn in accordance with Universal Precautions. ³</td>
</tr>
<tr>
<td>2. Bottles should be labeled at the bed side at this stage to minimize risk of wrongly labeled blood samples and prevent contamination of HCW hands inter procedure.</td>
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<tr>
<td>• Aprons add protection for the HCW from blood splashes and help reduce the risk of microbial transmission from uniforms to bedclothes during invasive clinical procedures.</td>
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<th>Evidence</th>
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<tbody>
<tr>
<td>¹RCN Standards for Infusion Therapy (2010): 2.3.2 ‘disposable plastic aprons should be worn during the performance of infusion procedures’</td>
</tr>
<tr>
<td>Epic2 Guidelines (2007): SP27 ‘Disposable plastic aprons must be worn when close contact with the patient, materials or equipment are anticipated and when there is a risk that clothing may become contaminated with pathogenic microorganisms or blood, body fluids, secretions or excretions’</td>
</tr>
<tr>
<td>Centers for Disease Control and Prevention (CDC). Recommendations for prevention of HIV transmission in healthcare settings (1987): “All healthcare workers should routinely use appropriate barrier precautions to prevent skin and mucous-membrane exposure when contact with blood or other body fluids of any patient is anticipated.”</td>
</tr>
<tr>
<td>²Department of Health Saving Lives: Taking Blood Cultures: A Summary of Best Practice (2007): “Label bottles with appropriate patient information. Ensure that barcodes on the bottles are not covered by additional labels and that any tear-off barcode labels are not removed.”</td>
</tr>
<tr>
<td>³Centers for Disease Control. Recommendations for prevention of HIV transmission in healthcare settings (1987): “All healthcare workers should routinely use appropriate barrier precautions to prevent skin and mucous-membrane exposure when contact with blood or other body fluids of any patient is anticipated.”</td>
</tr>
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### Step 6

**Clean hands**

**with alcohol hand rub or soap and water**

**Action**

1. Clean hands.¹
2. Using effective hand cleaning technique (Appendix) with either alcohol hand rub or soap and water.²
3. Ensure hands are dry before re-gloving. If soap and water are used, pat hands dry with a paper towel.³

**Rationale**

1. A hand clean occurs at this point helping to promote optimally clean hands prior to a critical element of the procedure.
2. Effective hand cleaning is vital to reduce the risk of contaminating Key-Parts & Key-Sites.
3. Wet hands more easily transport bacteria. Pat drying prevents skin degradation and damage.

**Notes**

- ANTT always aims to minimise hand cleaning frequency in order to increase compliance; this is always a risk assessed balance between clinical effectiveness and staff compliance.

**Evidence**

¹ICNA (IPS) Hand Decontamination Guidelines (2002):
‘Hands readily pick up and transfer microorganisms and should be decontaminated between any activity that will result in more than superficial contact. Expert consensus groups agree that effective hand decontamination results in significant reduction in the carriage of potential pathogens on hands’

²Epic2 Guidelines (2007):
‘Current evidence-based guidelines conclude that in both outbreak and non-outbreak situations contaminated hands are responsible for cross-transmission of microorganisms and that effective hand decontamination can significantly reduce both cross-transmission and cross-infection rates for the majority of HCAI in all healthcare settings’

³Department of Health, Winning Ways (2003):
Action Area Four ‘Each clinical team will demonstrate consistently high levels of compliance with hand washing and hand disinfection protocols’

²WHO Guidelines on Hand Hygiene in Health Care (2009):
‘Use an alcohol-based hand rub as the preferred means for routine hand antisepsis.’

‘To achieve a high rate of hand hygiene adherence, healthcare workers need education, clear guidelines, some understanding of infectious disease risk, and acceptable hand hygiene products’ Part II, 1, B ‘If exposure to potential spore-forming pathogens is strongly suspected or proven, including outbreaks of clostridium Difficile, hand washing with soap and water is the preferred means’

‘A good technique covering all surfaces of the hands at the right time is more important than the agent used or the length of time taken to perform it’

³WHO Guidelines on Hand Hygiene in Health Care (2009):
Part II, 2, B ‘Rinse hands with water and dry thoroughly with a single-use towel. Dry hands thoroughly using a method that does not recontaminate hands’

11.1.5 ‘Because wet hands can more easily acquire and spread microorganisms, the proper drying of hands is an integral part of routine hand washing’
### Step 7
Scrub bottle ports
for 15 seconds using 2% chlorhexidine & 70% alcohol wipe

| Action | 1. Use a large sized single use wipe, approximately 8 cm square containing 70% alcohol and 2% chlorhexidine. | 1 |
| 2. Scrub the bottle ports for 15 seconds using different areas of the wipe ensuring to create friction. | 2 |
| 3. Allow port to dry for 30 seconds. | 3 |

| Rationale | 1. A large size wipe will help ensure non-touch technique and protect the port. It also enables the HCP to use different parts of the wipe, which will enable any de-bulking of organisms on the tip. 70% alcohol and 2% chlorhexidine has been found to be the most effective cleaning agent of such devices. |
| 2. This technique provides the required level of friction to kill and remove organisms. Using different areas of the wipe moves the dirt away from the port rather than just moving it around. |
| 3. Cleaning away from the tip will a) help move any organisms away from the tip, and b) promote aseptic handling generally by providing a clean or aseptic IV lumen. |

| Notes | • Ineffective cleaning of the bottle ports may lead to contamination of the sample and potentially compromise test results. |

| Evidence | 1 RCN Standards for Infusion Therapy (2010): "Injection and access caps/ports (which include injection caps, needle-free caps, catheter hubs or administration ports integral to an administration set) must be decontaminated using aseptic technique prior to accessing’ |
| Department of Health Saving Lives: Taking Blood Cultures, A Summary of Best Practice (2007): "Clean the tops of culture bottle with a 2% chlorhexidine in 70% isopropyl alcohol impregnated swab and allow to dry.” |
| 2 Kaler and Chinn (2007): No microorganisms were recovered from any of the access ports that were disinfected for 15 seconds with friction using either alcohol alone of chlorhexidine & alcohol |
| 3 Hibbard (2005): Allowing the surface of the injectable ports to dry ensures the disinfectant agent has been given enough time to kill micro-organisms. A drying time of 30 seconds is based on test methodology of comparative antimicrobial activity in antiseptic agents commonly used to disinfect before clinical procedures, and that this timeframe has demonstrated good activity against microorganisms with a solution of 2% chlorhexidine and 70% isopropyl alcohol (IPA) |
### Action

1. Position arm on drape and pillow.

### Rational

1. A drape provides a general aseptic field which will help reduce the risk of contamination of the site by HCW or environmental dynamics.

2. Using a pillow will help secure the arm in a fixed position and provide comfort for the patient.

### Evidence

1. Australian Commission on Safety and Quality in Healthcare (2010): 
   “Even well cleaned hospitals can be said to be ‘dirty’—busy and dynamic environments resident with unusual antibiotic-resistant organisms. Consequently, aseptic fields are important in providing a controlled aseptic working space to help promote or ensure the integrity of asepsis during clinical procedures.”

2. Dougherty (2008):
   “The practitioner performing venepuncture should minimise discomfort to the patient and utilise measures to reduce the fear, pain and anxiety associated with venepuncture.”
Step 9
Apply disposable tourniquet, identify a vein, relax tourniquet.

**Action**

1. Apply disposable tourniquet¹, identify vein,² relax tourniquet³.

**Rational**

1. Disposable tourniquets will help to prevent cross transfer of organisms between patients.⁴
2. Good knowledge of human anatomy and specifically the venous system will promote accurate venepuncture.
3. The tourniquet is relaxed at this stage to prevent discomfort for the patient caused by extended compression.

**Notes**

- Tourniquets should not be left in a tightened state whilst not actively in use as this is likely to cause local venous compromise and cause the patient discomfort and distress.

**Evidence**

¹ RCN Standards for Infusion Therapy (2010):
   “The use of fabric tourniquets which cannot be cleaned should be discouraged.”

   “The tourniquet must be single patient use where there is the potential for microbial cross contamination between patients.”

² RCN Standards for Infusion Therapy (2010):
   “The practitioner performing venepuncture should be knowledgeable about the relevant anatomy and physiology, skin preparation and asepsis, measures to improve venous access, and be aware of the contraindications of venepuncture sites.”

³ Dougherty (2008):
   “The tourniquet must not be applied for an extended period of time in order to prevent circulatory impairment.”

⁴ Saleem et al (2009):
   “Tourniquet time of more than a minute is associated with a significant increase in risk of haemolysis.”

⁴ JHI (2001):
   “In this study, 200 tourniquets were sampled from health professionals working in a large teaching hospital. A parallel survey of control of infection was also undertaken. Staphylococcus aureus was isolated from 10 (5%) of the tourniquets sampled.”

   “Seventy-five (37.5%) of the tourniquets sampled had visible blood stains; house officers (72.7%) and laboratory phlebotomists (69.2%) had the highest proportion of blood-stained tourniquets.”

⁴ Golder et al (2000):
   “25 of 50 tourniquets in group A had visible bloodstains, confirmed with the Haemoccult test, on the area corresponding to that in contact with the patient’s skin. Cultures from all 50 tourniquets grew heavy skin flora including: coagulase-negative staphylococci, coryneform bacteria, micrococi, Acinetobacter spp, and candida and noncandida ftgl. Bacterial pathogens were cultured from 17 of 50 tourniquets.”
**Step 10**  
**Clean hands**  
with alcohol hand rub or soap and water

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<tr>
<th>Action</th>
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<tbody>
<tr>
<td>1. Clean hands.(^1)</td>
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<tr>
<td>2. Using effective hand cleaning technique (Appendix 1 &amp; 2) with either alcohol hand rub or soap and water.(^2)</td>
</tr>
<tr>
<td>3. Ensure hands are dry before re-gloving. If soap and water are used, pat hands dry with a paper towel.(^3)</td>
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<table>
<thead>
<tr>
<th>Rationale</th>
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<tbody>
<tr>
<td>1. Hands are cleaned at this point because they have come into direct contact with the patient’s skin surface and thus should be considered as contaminated with some level of microbial activity.</td>
</tr>
<tr>
<td>2. For hand cleaning to be effective it must consistently and effectively decontaminate all areas of the hand.</td>
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<tr>
<td>3. Hand hygiene compliance is likely to be compromised to some degree if HCWs experience skin breakdown, soreness or discomfort upon repeated hand decontamination.</td>
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<th>Notes</th>
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<tr>
<td>• ANTT always aims to minimise hand cleaning frequency in order to increase compliance; this is always a risk assessed balance between clinical effectiveness and staff compliance.</td>
</tr>
<tr>
<td>• Soap &amp; water and alcohol hand rub are interchangeable at any stage and should be chosen according to the clinical situation.</td>
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<th>Evidence</th>
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‘Hands readily pick up and transfer microorganisms and should be decontaminated between any activity that will result in more than superficial contact. Expert consensus groups agree that effective hand decontamination results in significant reduction in the carriage of potential pathogens on hands.’ |
| Epic2 Guidelines (2007):  
‘Current evidence-based guidelines conclude that in both outbreak and non-outbreak situations contaminated hands are responsible for cross-transmission of microorganisms and that effective hand decontamination can significantly reduce both cross-transmission and cross-infection rates for the majority of HCAI in all healthcare settings.’ |
| Department of Health, Winning Ways (2003):  
Action Area Four ‘Each clinical team will demonstrate consistently high levels of compliance with hand washing and hand disinfection protocols’ |
‘Use an alcohol-based hand rub as the preferred means for routine hand antisepsis.’ |
The choice of cleaning agent depends upon the clinical circumstances. ‘To achieve a high rate of hand hygiene adherence, healthcare workers need education, clear guidelines, some understanding of infectious disease risk, and acceptable hand hygiene products’ Part II, 1, B  ‘If exposure to potential spore-forming pathogens is strongly suspected or proven, including outbreaks of clostridium Difficile, hand washing with soap and water is the preferred means’ |
‘A good technique covering all surfaces of the hands at the right time is more important than the agent used or the length of time taken to perform it’ |
Part II, 2, B ‘Rinse hands with water and dry thoroughly with a single-use towel. Dry hands thoroughly using a method that does not recontaminate hands’ |
11.1.5 ‘Because wet hands can more easily acquire and spread microorganisms, the proper drying of hands is an integral part of routine hand washing’ |
**Step 11**
**Re-tighten tourniquet**

**Action**
1. Re-tighten tourniquet.¹

**Rational**
1. Re-application of the tourniquet restricts venous blood flow allowing completion of the procedure.

**Notes**
- Tourniquets should not be left in a tightened state whilst not actively in use.²

**Evidence**
¹RCN Standards for Infusion Therapy (2010): 
‘A tourniquet should be properly applied to promote venous distension and to impede venous but not arterial blood flow.’

²Saleem et al (2009):
“Tourniquet time of more than a minute is associated with a significant increase in risk of haemolysis.”

Dougherty (2008):
“The tourniquet must not be applied for an extended period of time in order to prevent circulatory impairment.”

**Step 12**
**Apply non-sterilised gloves**

**Action**
1. Apply non-sterilised gloves.¹

**Rational**
1. Non-sterile gloves are typically the glove type of choice for Standard ANTT (See ANTT risk assessment). If the HCW must re-palpate the puncture site immediately prior to puncture they must stop and re-clean the vein and allow to dry. If clinical circumstances dictate that the vein cannot be cleaned after re-palpation, sterile gloves must be worn to help ensure asepsis of the puncture site (Key-Site).

**Notes**
- An ANTT risk assessment should always be performed before undertaking any clinical aseptic intervention (see BCC Evidence-based Guideline).

**Evidence**
¹NICE Prevention of HCAI in Primary and Community Care (2003):
‘Selection of protective equipment must be based on an assessment of the risk of transmission of micro organisms to the patient, and the risk of contamination of the healthcare practitioners’ clothing and skin by patients’ blood, body fluids, secretions or excretions’

Epic2 Guidelines (2007):
‘The healthcare worker must make a choice between the use of sterile or non-sterile gloves, based on contact with susceptible sites or clinical devices’

‘Appropriate ANTT does not necessarily require sterile gloves; a new pair of disposable non-sterile gloves can be used in conjunction with a non-touch technique, e.g., in changing catheter site dressings’
### Step 13
**Clean skin** –
2% chlorhexidine / 70% alcohol applicator, back and forth & left to right strokes for 30 seconds. Allow to dry

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<th>Action</th>
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| 1. Clean skin with 2% chlorhexidine / 70% alcohol applicator.  
2. Clean the skin in a back and forth, up and down movement for 30 seconds.  
3. Allow to dry. |

<table>
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<tr>
<th>Rational</th>
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| 1. Using a licensed skin applicator will minimize the potential for HCW hand contact with puncture site.  
2. This technique is manufacturer recommended and supported by test results.  
3. Drying recommendation is based upon testing methodology used in a number of studies, manufacturers recommendations and the effectiveness of antiseptic solutions used to decontaminate surfaces and devices. |

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<td>- Concentric prepping is not evidence based – a circular pattern in the same direction may not allow penetration into the cracks and fissures of the skin.</td>
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‘Clean skin with 2% chlorhexidine in 70% isopropyl alcohol impregnated swab and allow to dry.’ |

RCN Standards for Infusion Therapy (2010):  
‘To prevent the entry of microorganisms into the vascular system, the injection access site should be decontaminated with an approved single-use antimicrobial solution, such as chlorhexidine in alcohol (unless contraindicated by manufacturers’ recommendations). The solution should be applied with friction and allowed to dry, immediately before and after use’ |

Fortin (2006), Brooks (2001):  
‘There is evidence supporting a back and forth scrub movement to reduce microbial counts on the skin.’ |

Weinstein (2007):  
‘A quick wipe fails to reduce bacterial counts prior to peripheral cannulation.’ |

The Royal Marsden Hospital Manual of Clinical Nursing Procedures (2004):  
‘Solutions should be applied with friction for up to 1 minute and allowed to air dry for 30–60 seconds.” |

McDonald et al (2007):  
The National Blood Service (UK) conducted an evaluation of 2% chlorhexidine and 70% isopropyl alcohol in an applicator designed to use a friction cross hatching application vs. a 0.5% chlorhexidine and 70% isopropyl alcohol in a wipe – the 2% chlorhexidine and applicator was shown to significantly improve logarithmic bacteria colony counts compared to the 0.5% concentration and wipe delivery. |

Fortin (2006):  
“Our clinical studies, which were conducted with a new chlorhexidine gluconate/isopropyl alcohol (CHG/IPA) skin antiseptic used vigorous back and forth movements, assuring that the antiseptic penetrated into the cracks and fissures of the skin. Our results far exceeded the FDA requirements of a 2 log10 bacterial count reduction on dry site and a 3 log10 reduction on wet site.” |

McDonald et al (2001):  
Larger reduction of bacterial load noted following a back & forth method than with a spiral wipe method.
### Step 14
**Puncture vein (DO NOT RE-PALPATE).**
**Draw blood**

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<tr>
<td>1. Puncture vein (DO NOT RE-PALPATE).[^1]</td>
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<tbody>
<tr>
<td>1. Re-palpation would contaminate the site. If re-palpation is necessary re-clean site with a fresh applicator and allow to dry.</td>
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<tr>
<td>• Re-palpation of the puncture site increases the risk of surface contamination and the potential compromise of testing results.</td>
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### Step 15
**Inoculate blood into bottles using a NTT. Release tourniquet**

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<tbody>
<tr>
<td>1. Inoculate blood bottles using a non-touch technique (NTT).[^1]</td>
</tr>
<tr>
<td>2. Release tourniquet.</td>
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<tbody>
<tr>
<td>1. A NTT will prevent contamination of the port (Key-Part) and potential contamination of the blood sample.</td>
</tr>
<tr>
<td>2. Keeping the tourniquet engaged for the minimum amount of time will help to minimize possible side-effects of prolonged arm compression and promote patient comfort and dignity.</td>
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<tbody>
<tr>
<td>• Tourniquets should not be left on the patient after blood collection; prompt removal will reduce the risk of damage to veins and lessen patient discomfort.</td>
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Step 16
Apply an appropriate dressing to the puncture site

**Action**

1. Apply a sterile dressing.¹

**Rational**

1. The needle insertion has compromised the patient’s skin integrity (even if only for a short time) and appropriate and proportionate precautions should be taken to promote healing and protect the site from contamination and opportunistic infections.

**Evidence**

¹Department of Health Saving Lives: Taking Blood Cultures: A Summary of Best Practice (2007):
“Cover the puncture site with an appropriate dressing.”

---

Step 17
Dispose of sharps

**Action**

1. Safely dispose of all sharps.¹

**Rational**

1. This will reduce the possibility of needlestick injury.

**Evidence**

¹Department of Health Saving Lives: High Impact Intervention No1 (2007):
‘Sharps container should be available at point of use and should not be overfilled’

RCN Standards for Infusion Therapy (2010):
‘All used disposable sharp items should be disposed of in a non-permeable, puncture-resistant, tamper-proof container’
### Action

1. Clean the tray with 70% alcohol or alcoholic 2% chlorhexidine solution/wipes.\(^1\)
2. Allow surface to dry before use.\(^2\)

### Rationale

1. To effectively decontaminate the tray surface and break any chain of infection.
2. Effective cleaning will minimise the risk of cross-infection and reduce any microbial load before storage.
3. It’s not aseptic until it’s dry; while wet the alcoholic solution is disinfecting the surface, interruption of this process could reduce the effectiveness of the cleaning product.

### Notes

- A typical policy for tray cleaning involves using alcohol impregnated surface wipes for pre and post use. In the event the tray is visibly soiled, a detergent wipe is used or the tray is cleaned with detergent and water and dried.
- Equipment surface decontamination should be risk assessed in the light of specific infection risks within a given population or location and appropriate cleaning products and techniques used as per local policies and procedures.

### Evidence

\(^1\) Guideline for Disinfection and Sterilization in Healthcare Facilities (2008):
‘Medical equipment surfaces can become contaminated with infectious agents and contribute to the spread of healthcare associated infections’. *Use of a disinfectant will provide antimicrobial activity that is likely to be achieved with minimal additional cost or work*.

Principles of asepsis *Prepare the area, including decontamination of the surface to be used with detergent and water followed by drying. They can then be disinfected using a wipe containing 70% alcohol*.

Epic2 Guidelines (2007):
SP4 ‘Shared equipment used in the clinical environment must be decontaminated appropriately after each use’

\(^2\) Hospital Infection Research Laboratory (2006):***

When tested in accordance with EN 1276* a solution of 70% isopropyl alcohol in a PDI\(^\circledR\) branded wipe (Sani-Cloth 70\(^\circledR\)) gave a >5 log\(_{10}\) (99.999%) reduction all four of the test organisms** after 30 seconds, under clean (0.03%albumin) and dirty (0.3% albumin) conditions.

*** 70% IPA as a surface cleaner for medical devices has demonstrated effectiveness at 30 seconds post application

* European test standard maintained by the European Committee for Standardization

** Staphylococcus aureus, Pseudomonas aeruginosa, Escherichia coli, Enterococcus hirae
**Step 19**
Dispose of gloves

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<tr>
<td>1. Safely dispose of gloves.¹</td>
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<tr>
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<tbody>
<tr>
<td>1. Gloves must only be used for one patient and one procedure.</td>
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| ¹WHO Guidelines on Hand Hygiene in Health Care (2009):
Part II, 6, C ‘Remove gloves after caring for a patient. Do not wear the same pair of gloves for the care of more than one patient’ |
| Epic2 Guidelines (2007):
SP23 ‘Gloves must be disposed of as clinical waste and hands decontaminated, ideally by washing with liquid soap and water after the gloves have been removed’ |
Step 20
Clean hands
with alcohol hand rub or soap and water

**Action**

1. It is essential that the post procedure hand clean is performed immediately after glove removal before contact with the environment.¹
2. Using effective hand cleaning technique (Appendices 1,2) with either alcohol hand rub or soap and water.²
3. Ensure hands are dry before re-gloving. If soap and water are used, pat-dry hands with a paper towel.³

**Rationale**

1. This hand clean is placed here because the hands will have sweated deep and low-lying organisms to the surface of the skin. This will help in breaking any chain of infection.
2. Effective hand cleaning is vital to reduce the risk of contaminating Key-Parts and Key-Sites.
3. Bacteria can re-establish quickly on moist hands. Pat drying prevents skin degradation and damage.

**Notes**

- Soap & water and alcohol hand rub are interchangeable at any stage and should be chosen according to the clinical situation.

**Evidence**

¹Epic2 Guidelines (2007):
SP6 ‘Hands must be decontaminated immediately before each and every episode of direct patient contact/care and after any activity or contact that potentially results in hands becoming contaminated

‘Hands readily pick up and transfer microorganisms and should be decontaminated between any activity that will result in more than superficial contact. Expert consensus groups agree that effective hand decontamination results in significant reduction in the carriage of potential pathogens on hands’

²Epic2 Guidelines (2007):
‘Current evidence-based guidelines conclude that in both outbreak and non-outbreak situations contaminated hands are responsible for cross-transmission of microorganisms and that effective hand decontamination can significantly reduce both cross-transmission and cross-infection rates for the majority of HCAI in all healthcare settings’

Department of Health, Winning Ways (2003):
Action Area Four ‘Each clinical team will demonstrate consistently high levels of compliance with hand washing and hand disinfection protocols’

‘A good technique covering all surfaces of the hands at the right time is more important than the agent used or the length of time taken to perform it. The ideal technique should be quick, reduce hand contamination to the lowest possible level and be free from notable side-effects to the skin’

‘Use an alcohol-based hand rub as the preferred means for routine hand antisepsis.’

‘To achieve a high rate of hand hygiene adherence, healthcare workers need education, clear guidelines, some understanding of infectious disease risk, and acceptable hand hygiene products’ Part II, 1, B ‘If exposure to potential spore-forming pathogens is strongly suspected or proven, including outbreaks of clostridium Difficile, hand washing with soap and water is the preferred means’

‘Effective drying of hands after washing is important because wet surfaces transfer micro-organisms more effectively than dry ones’

11.1.5 ‘Because wet hands can more easily acquire and spread microorganisms, the proper drying of hands is an integral part of routine hand washing’
Appendices

1. Effective hand cleaning technique: For soap and water (WHO, 2009).

Hand Hygiene Technique with Soap and Water

Duration of the entire procedure: 40-60 seconds

0. Wet hands with water;

1. Apply enough soap to cover all hand surfaces;

2. Rub hands palm to palm;

3. Right palm over left dorsum with interlaced fingers and vice versa;

4. Palm to palm with fingers interlaced;

5. Backs of fingers to opposing palms with fingers interlocked;

6. Rotational rubbing of left thumb clasped in right palm and vice versa;

7. Rotational rubbing, backwards and forwards with clasped fingers of right hand in left palm and vice versa;

8. Rinse hands with water;

9. Dry hands thoroughly with a single use towel;

10. Use towel to turn off faucet;

11. Your hands are now safe.
2. Effective hand cleaning technique: For alcohol hand rubs (WHO, 2009).

**Hand Hygiene Technique with Alcohol-Based Formulation**

- **Duration of the entire procedure:** 20-30 seconds

1a. Apply a palmful of the product in a cupped hand, covering all surfaces;

1b. Rub hands palm to palm;

2. Palm to palm with fingers interfaced;

3. Right palm over left dorsum with interfaced fingers and vice versa;

4. Backs of fingers to opposing palms with fingers interlocked;

5. Rotational rubbing of left thumb clasped in right palm and vice versa;

6. Rotational rubbing, backwards and forwards with clasped fingers of right hand in left palm and vice versa;

7. Once dry, your hands are safe.
References


