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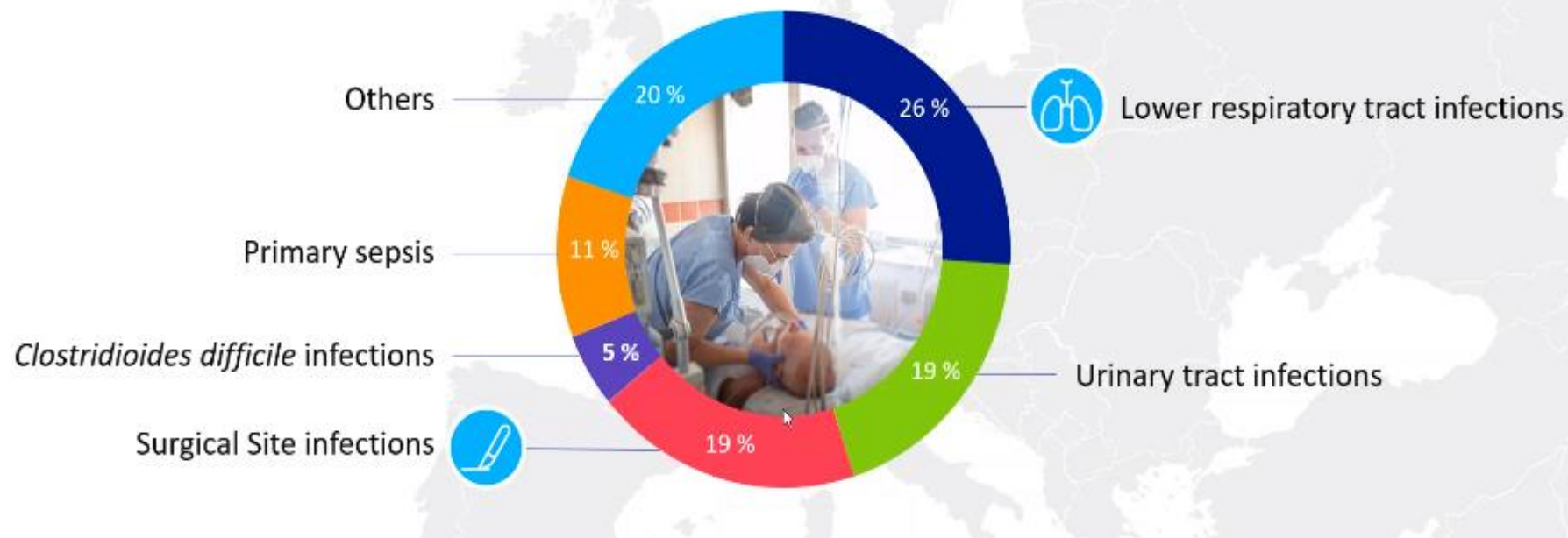
Topic 5
Skin Disinfection



Nearly 20% of HAI's are caused by SSI

Health care-associated infections

The most common HAIs in Europe¹



Source: BODE

Skin Disinfection and its importance



In hospital practice the removal of bacteria from the skin is desired essentially for two reasons:

- To prevent **cross infection** by blocking the transfer of pathogenic bacteria from the hands of nurses and doctors to the susceptible tissues of patients;
- To prevent **self-infection** of patients by blocking the transfer of pathogens from the skin to the underlying tissues on a knife blade or a needle.

Skin Antisepsis

- Invasive procedures such as injections, punctures or surgeries penetrate the skin's natural protective barrier, allowing microorganisms to enter deeper skin layers and cavities and trigger infections there.
- Systematic skin antisepsis reduces the risk of microorganisms entering the body and thus the risk of infection
- Skin antisepsis intends to **prevent endogenous infections** when penetrating the skin (injections, punctures, incisions), intact healthy skin & mucous membrane

Skin Disinfection and its importance



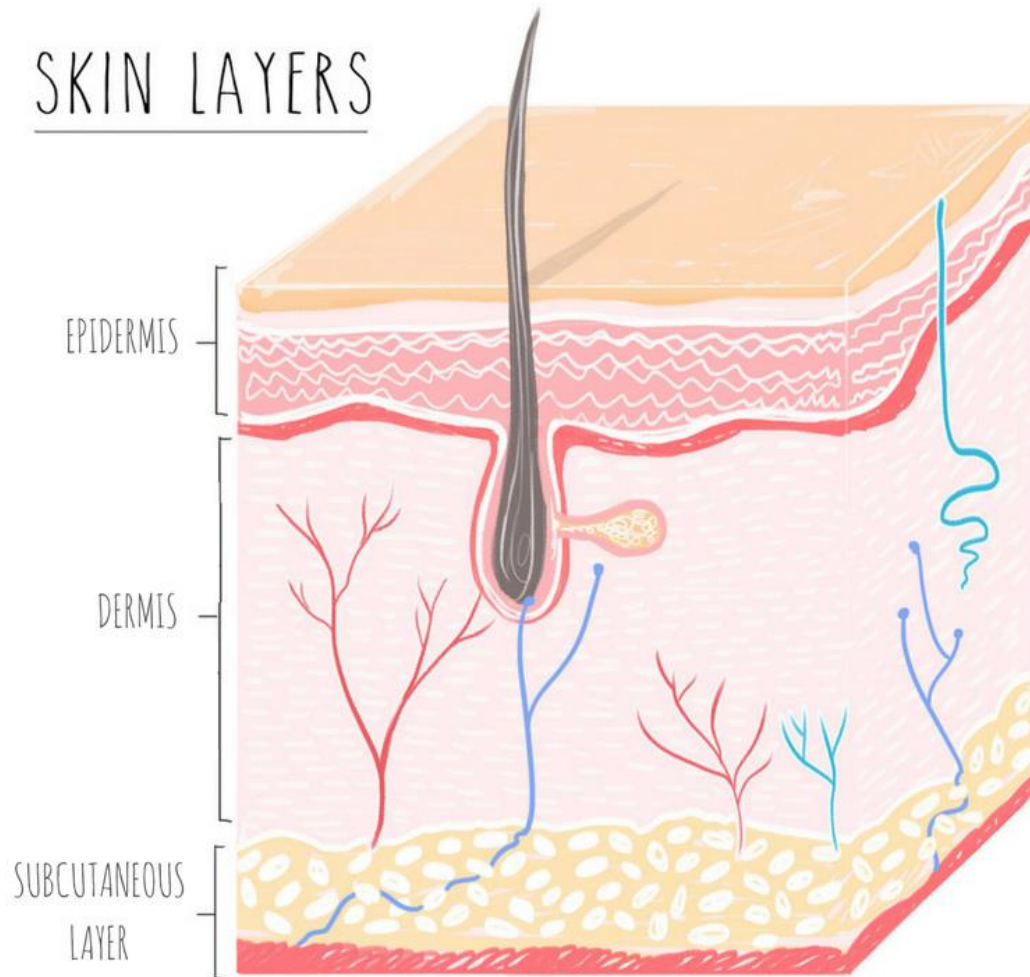
A large proportion of health care-associated infections originate from the patients' own flora. The aim of this procedure is to reduce the microbial load on the patient's skin as much as possible before incision of the skin barrier

Nosocomial Infection: Surgical Site infection

| | |
|----------------------|---|
| What is SSI ? | A surgical site infection is an infection that occurs after surgery in the part of the body where the surgery took place |
| Causes | Caused by <i>Staphylococcus</i> , <i>Streptococcus</i> (Gram Positive) and <i>Pseudomonas</i> (Gram negative), they infect a surgical wound through various forms of contact, such as from the touch of a contaminated caregiver or surgical instrument, through germs in the air, or through germs that are already on or in your body and then spread into the wound. |
| Symptoms | Redness, delayed healing, fever, pain, tenderness, warmth, or swelling, dermatitis, rashes |
| Prevention | <ol style="list-style-type: none">1. Follow hand hygiene practices2. Sterile clothing and drapes3. Clean air4. Careful use of antibiotics5. Controlled blood sugar levels6. Controlled body temperature7. Proper hair removal. |

Understanding Skin and its flora

SKIN LAYERS



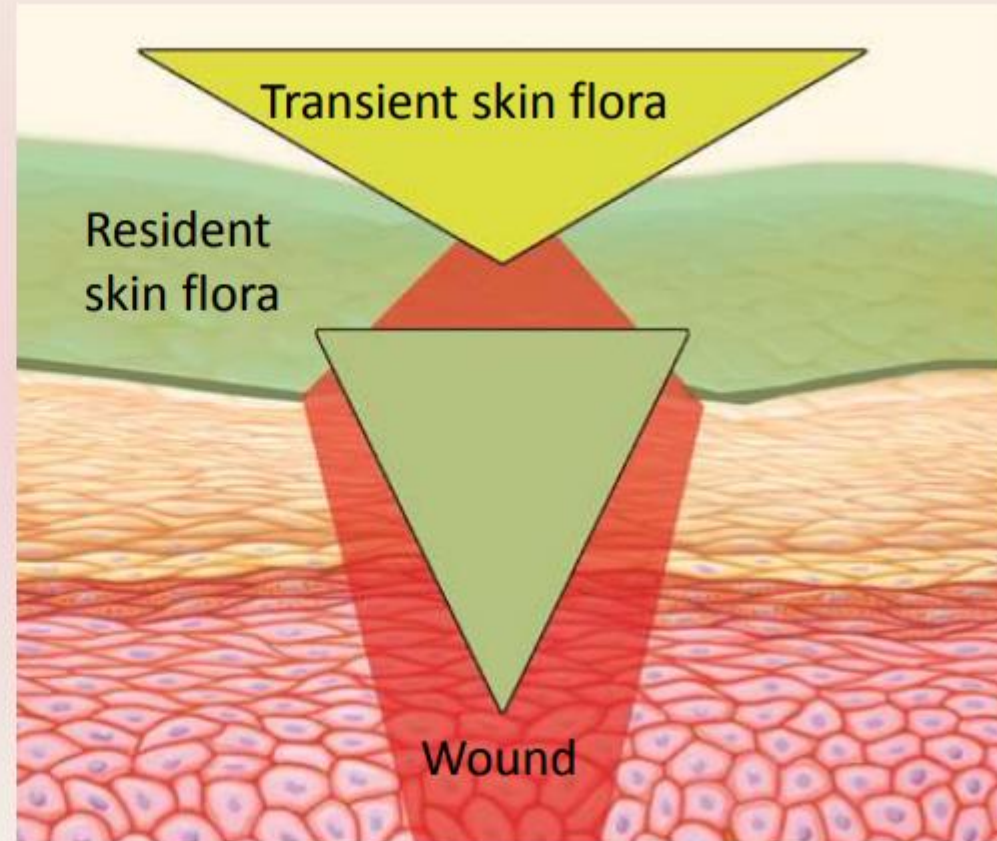
| Resident | Transient |
|---|---|
| <ul style="list-style-type: none">• Normally live on skin• Low pathogenic value• Not usually associated with cross transmission | <ul style="list-style-type: none">• Do not normally live on skin• High pathogenic value• Often associated with cross transmission |

Skin Flora

- The **epidermis** is the outer layer of skin, and you can think of it as the body's first line of defense against bacteria, viruses and even the environment
- The **dermis** layer includes blood and lymph vessels, which are in charge of delivering nutrients to your skin and removing by-products or toxins.
- Sweat glands live in the dermis. This layer of fat is the deepest layer of skin, and it basically attaches your bones to your muscle and bones

Skin Layers

- Wound infections are caused by both, resident skin flora and transient skin flora.
- The transient skin flora is not to be found on the patients skin but transmitted by vehicles:
 - hands
 - devices
 - surfaces



Risk and prophylaxis of infections



- prior to injections, taking blood samples and punctures



- postoperative skin antiseptic of sutures and wound edges



- post exposition prophylaxis

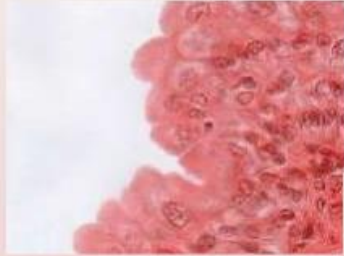


- care of accesses like catheters, drains, tubes etc.



- prior to surgical procedures

Risk and prophylaxis of infections



- procedures on mucous membrane, e.g. transurethral catheterisation, operation on genitals.



- contaminated or infected wounds

AWARENESS!!

- the application on **wounds and mucous membrane** is not indicated with the common skin disinfectants based on alcohol!!



Surgical site infection (SSI) accounts for more than 15% of all healthcare associated infections and affects at least 5% of patients who have surgery. ^{1 2}

Impact of SSIs

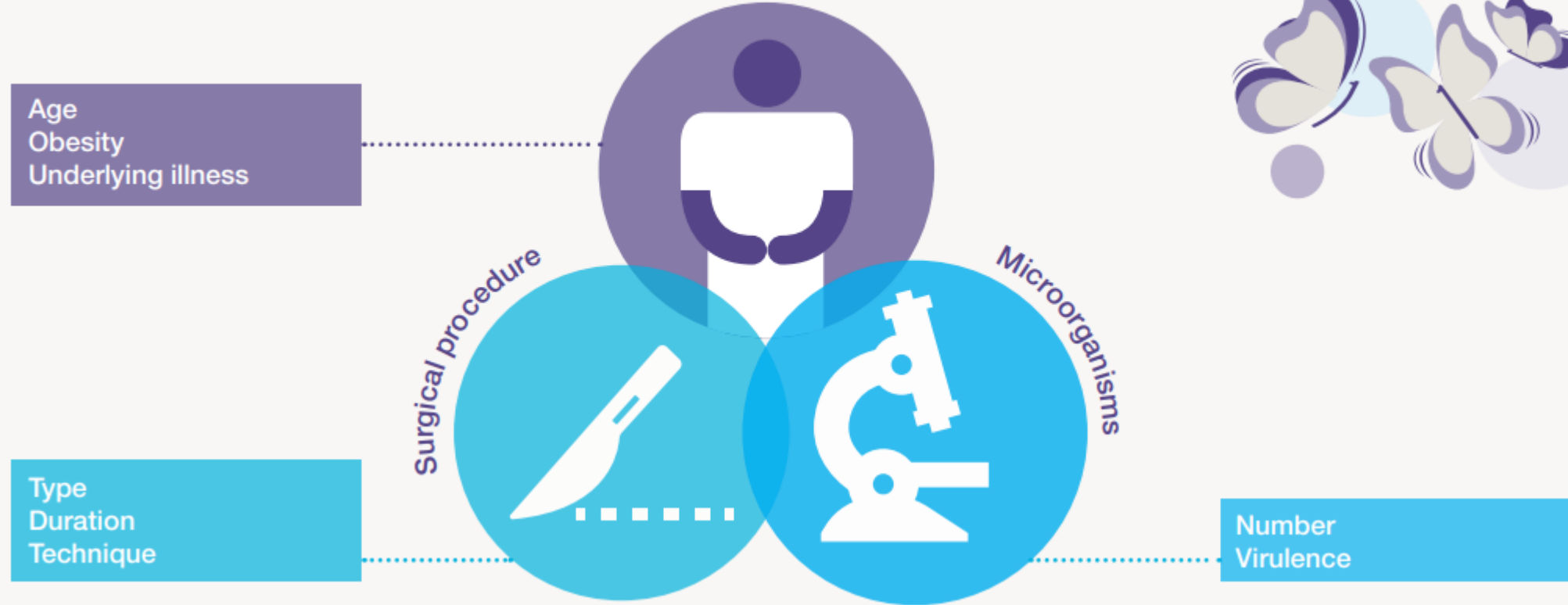
Surgical Site Infections are associated with an increase in ³⁴:



SSI & its consequences

Factors affecting risk of SSI

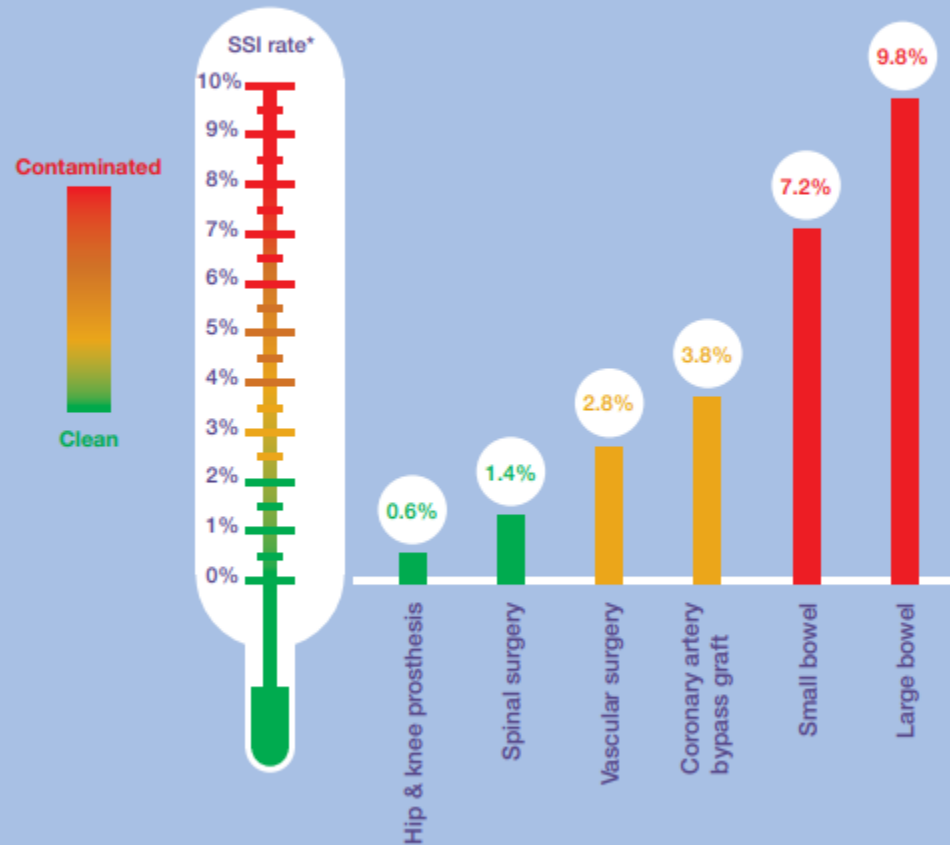
Figure 3.



SSI & its risk level

Table 1.

Rates of SSI vary with different categories of surgery



Microorganisms can be introduced into the incision site during the procedure. They may be directly introduced from the personnel involved in the operation but also indirectly on airborne particles that settle into the open tissues or on to instruments used in the procedure. The longer the procedure the greater the length of time that tissues are exposed to contamination.

The efficacy of the patients' immune response is also an important factor in determining whether microorganisms in the incision site are able to multiply to cause infection.

The risk of SSI increases with:

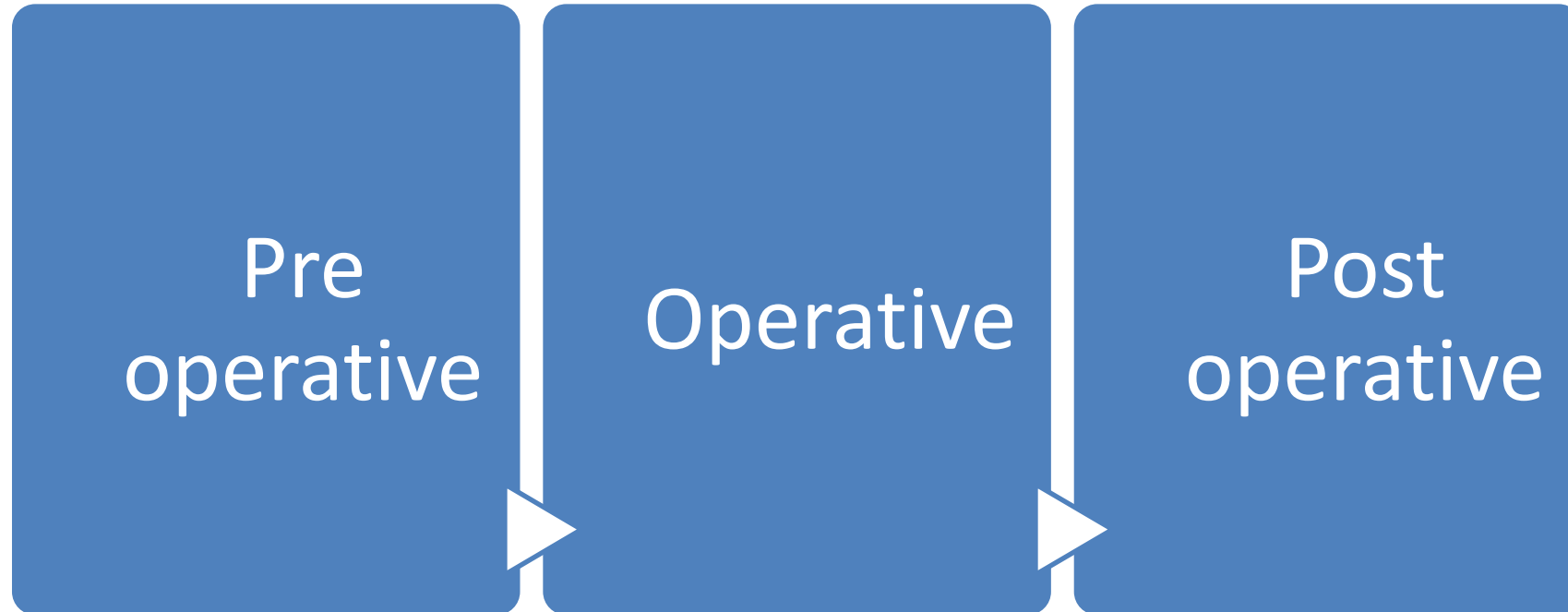
- The age of the patient
- A diminished immune response due to an underlying illness (e.g. diabetes) or immunosuppressive therapy.
- Where local conditions impair healing e.g. obesity⁵

A surgical technique that minimises damage to tissues and prevents haematoma formation reduces the risk that microorganisms left in the incision site are able to multiply and subsequently cause SSI.

*Based on SSI detected in inpatients and readmissions after surgery

Source: Surveillance of Surgical site infection in NHS hospitals in England, 2015/16

Phases of Surgery



Pre – surgical preparations

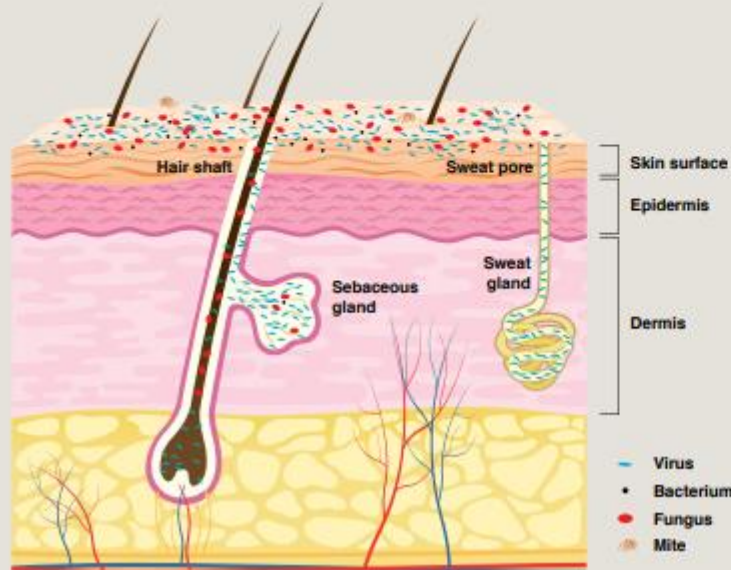
Why skin preparation is important to prevent SSI

Human skin is colonised by a large number of microorganisms known as the 'resident' or 'normal' flora which tend to live deep in the skin folds, sebaceous glands and hair follicles. The surfaces of the skin can also be contaminated with microorganisms from body excretions/secretions, dirt or from contact with contaminated surfaces or items ('transient' flora). Whilst all these microorganisms are harmless on the surface of the skin, if they get into a surgical incision they can cause a surgical site infection.

Cleansing of the skin prior to surgery is therefore required to remove as many microorganisms as possible from the skin surface.

Soap and water physically removes dirt and secretions, and with it the transiently located microorganisms.

Antiseptic agents such as alcohol, chlorhexidine, triclosan and iodine contain agents that can rapidly kill both resident and transient microorganisms. Some agents are also able to suppress their regrowth for the duration of the surgical procedures.



There are several steps recommended for preoperative skin preparation:



Pre-operative washing



Appropriate hair removal from incision site



Disinfection of site of incision



Reducing skin recolonisation



Pre & Intra operative preparations

Note:

1. Wear **short-sleeved clothes**, if clothing protocols allow.
2. Carry out **hygienic hand disinfection** before every puncture.
3. Immediately prior to the puncture: carry out skin antiseptics; pay attention to the exposure time.
4. The skin antiseptic can be applied by a soaked swab
5. When spraying the skin antiseptic: skin antiseptics should be carried out near the skin. To ensure optimal spread of the skin antiseptic spray from a distance of approx. 5 cm.
6. The Centers for Disease Control and Prevention (CDC) recommend applying the skin antiseptic for preoperative antiseptics in **concentric circles**, beginning in the middle. The prepared area should be large enough to be able to extend the puncture site, if necessary
7. Independent of the procedure, always pay attention to the manufacturer's information on exposure times

Summary



WHEN should the recommendations be applied?

- > This recommendation is applicable in the preoperative period.
- > Surgical site skin preparation is performed prior to surgery within the OR, immediately before draping and incision for the surgical procedure.



WHO should support these recommendations to ensure successful implementation?

- > Depending on where the facility/surgical services stand with regards to this recommendation, the following staff should be involved in putting it in place or updating local policies/standards or improving compliance with the recommendation

1 OR and surgical teams are the key players in ensuring compliance with this recommendation according to gold standards;

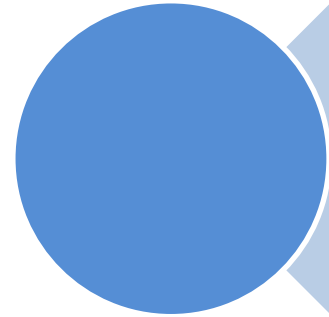
2 infection prevention and quality improvement teams can facilitate uptake/update of the standard procedures for surgical skin preparation according to the recommendation and monitor compliance;

3 pharmacists and procurement services to obtain or locally produce alcohol-based CHG solutions;

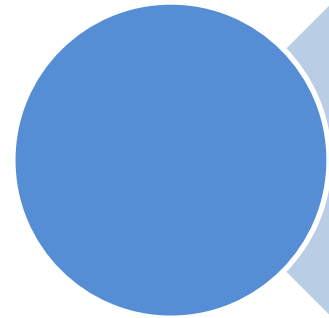
4 senior administrators (including finance managers) should be involved in the decision-making on implementing the recommendation to ensure that an adequate budget is available for continuous product provision, thus motivating staff to comply with the recommendation in the context of an institutional safety climate.

Important
KOLs

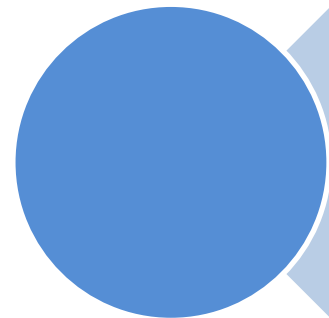
Properties of an Ideal Skin Antiseptic *RW* SCIENCE



Rapidly active against a wide range of microorganisms (esp. pathogens)



Should kill the organisms and not merely inhibit their growth



Should not damage the skin or the underlying tissues either by direct toxic action or by sensitization.



History of Skin Antiseptics

| Compounds | Actions |
|------------------|--|
| Ordinary Soap | Limited activity against some bacteria, are inactive against staphylococci |
| Phenol | Toxicity |
| Mercury | Bacteriostatic |
| Acridine dyes | Bacteriostatic |

Comparison of top skin prepping agents *RW*SCIENCE

| Combination | 2 – Propanol + BKC (benzalkonium chloride) | Ethanol + CHG (chlorohexidine gluconate) (2%) | Povidone Iodine |
|-----------------------------|---|--|---|
| Action | <ul style="list-style-type: none"> • High stability • 2 – propanol has broad spectrum Bactericidal activity against Gram positive and negative, shows sustained effect • BKC – residual effect; inhibits intraoperative bacterial growth • Low incidence of contact dermatitis • Good Skin – fold – hold effect • Minor activity against viruses/fungi • Far superior to PI 7.5% w/v in terms of antibacterial activity (4-10 times) | <ul style="list-style-type: none"> • Wide range of microbial coverage • Recommended by CDC • Excellent residual activity, binds to the stratus corneum • Provides bactericidal activity for 24 hours after a 2 min application | <p>Broad coverage antiseptics Microbicidal activity (Gram positive & negative) Minimum residual activity Stains the cloth/skin/hair Contact dermatitis may occur if left for long time Loses its microbicidal activity if comes in contact with blood</p> |
| Areas of application | <p>Preoperative use Excellent Prepping and Dressing Disinfectant</p> | <ul style="list-style-type: none"> • Before/during catheterization/ intravenous site prep/covering fractures with cast • Dries up quickly within 30 seconds, exposure time 15 sec | <ul style="list-style-type: none"> • To skin before injection, drawing blood/punctures/minor injury • Gynecology and Urology dept. • Disinfection of mucous membrane and damaged skin |



Always prefer this composition



Thank you !

RW RAMAN AND WEIL PRIVATE LIMITED

EXCELLENCE IN INFECTION CONTROL