

RW SCIENCE

presents

TOPIC 2
Hand Hygiene



Concept: Hand Hygiene



The Pandemic habit we should not break !

According to CDC, Hand hygiene is a way of cleaning one's hands that **substantially reduces potential pathogens** (harmful microorganisms) on the hands.

According to WHO, Hand hygiene is considered a primary measure for reducing the risk of transmitting infection among patients and health care personnel

- **Overall recommendations:**
When hands are visibly soiled (dirty) – Use soap and water
When hands are infected/ before aseptic technique– Use alcohol-based hand rub
- **Following the correct way of Hand Hygiene practices** helps to reduce the spread of COVID-19 infection and the risks associated with it.



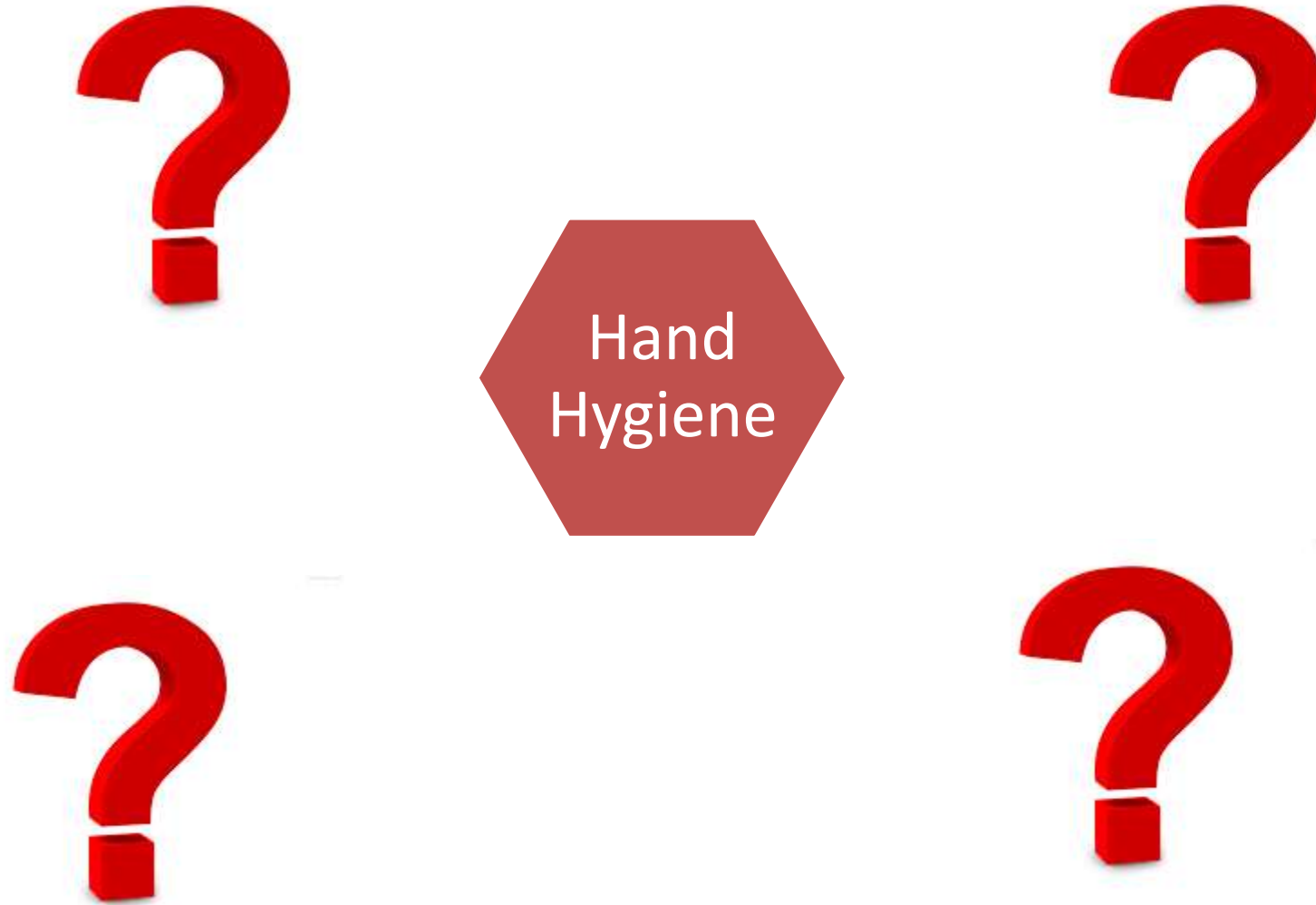
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When hands are visibly soiled
HW

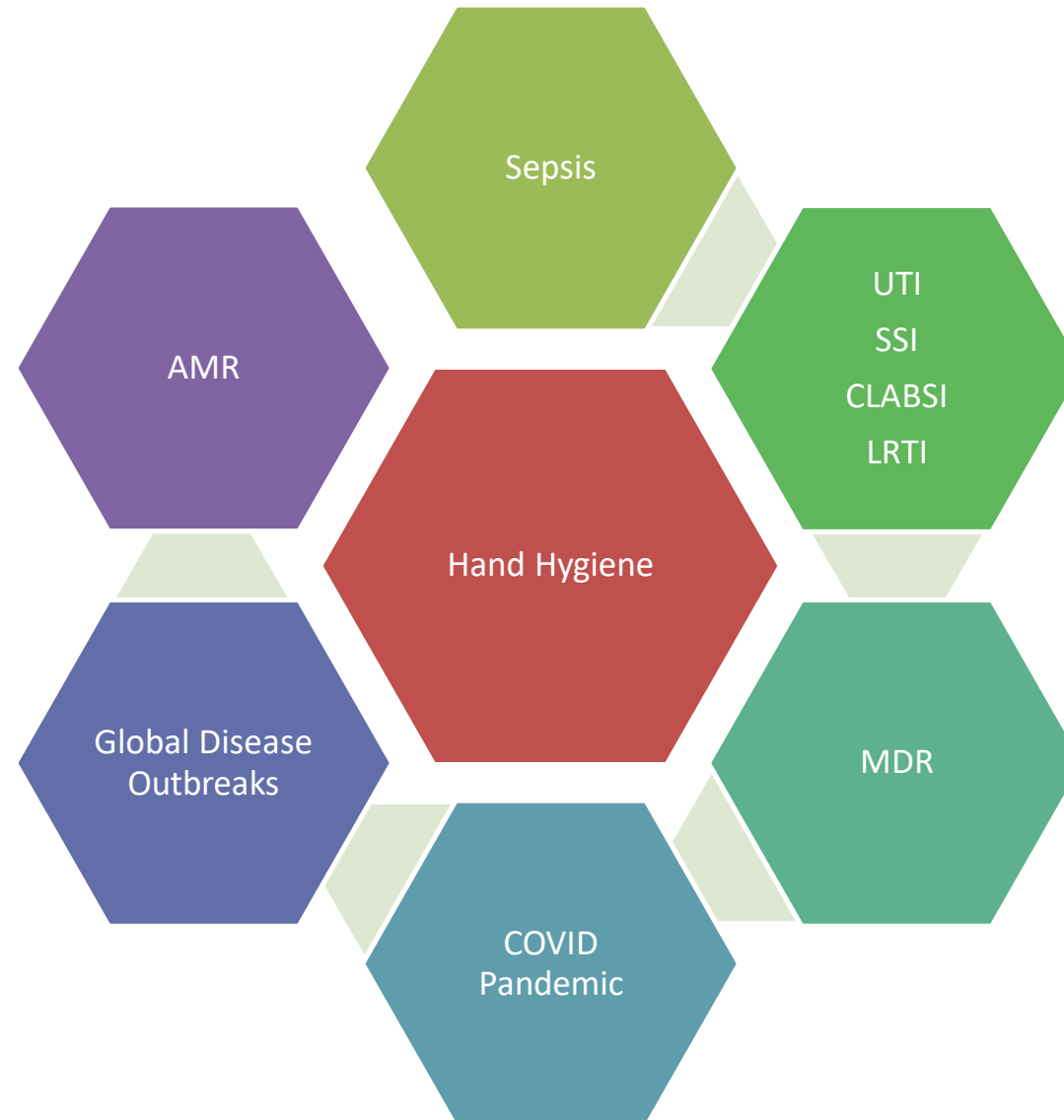


When hands are infected/before aseptic technique
ABHR

Why do Hand Hygiene?



Hand Hygiene & Prevention of Diseases



Concept: Hand Hygiene

- Hands are the most common vehicle for transmission of microorganisms

Germs travel from:

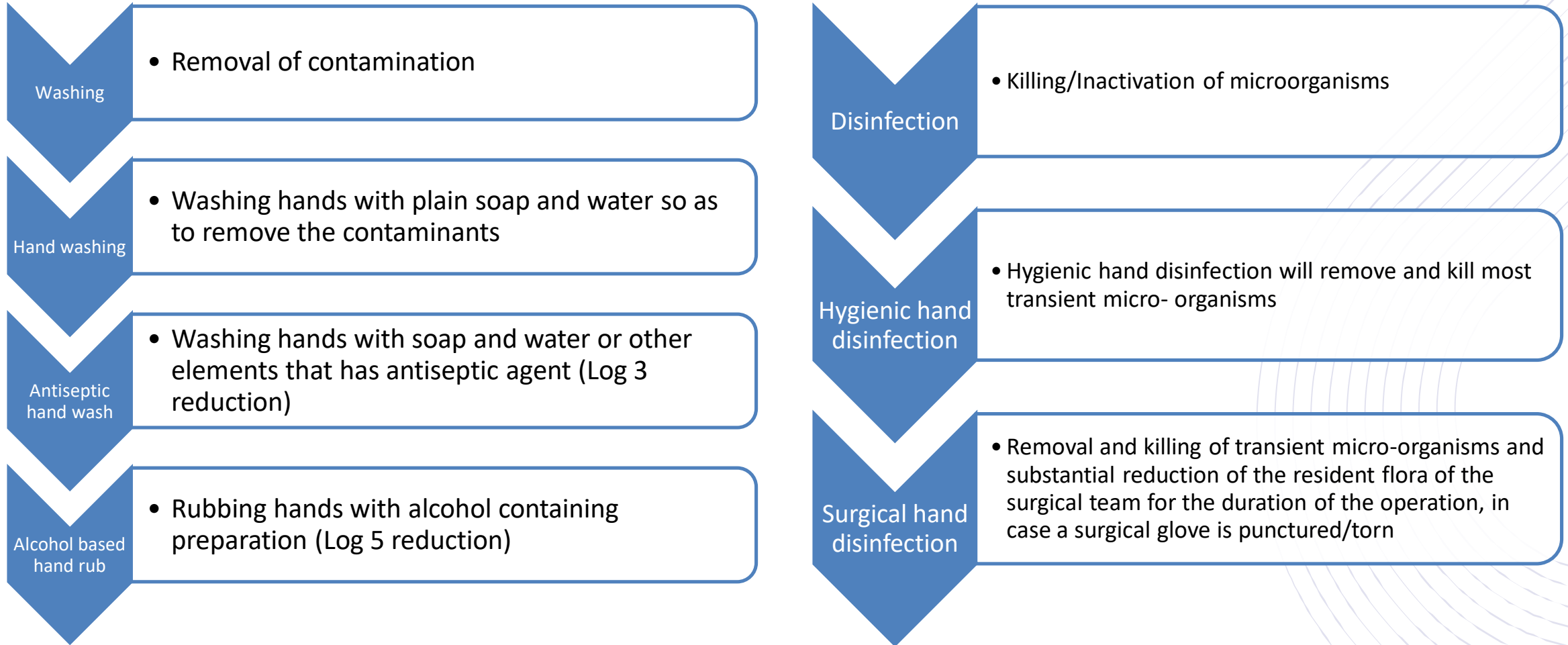
1. Hands to Hands
 2. Hands to Object
 3. Surface to hands and vice versa
- 90% of all HAI are transmitted by hands (Hartmann)
 - On average, 50 % of health care workers do not adhere to recommended hand hygiene practices (Hartmann)
 - Improved compliance in hand hygiene practices can lead to **40% reduction in nosocomial infection rate in the hospital** (Hartmann)

Thus, Hand hygiene has been recognized as the single most important way to prevent the transmission of infectious agents (CDC)

Skin Bacteria

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

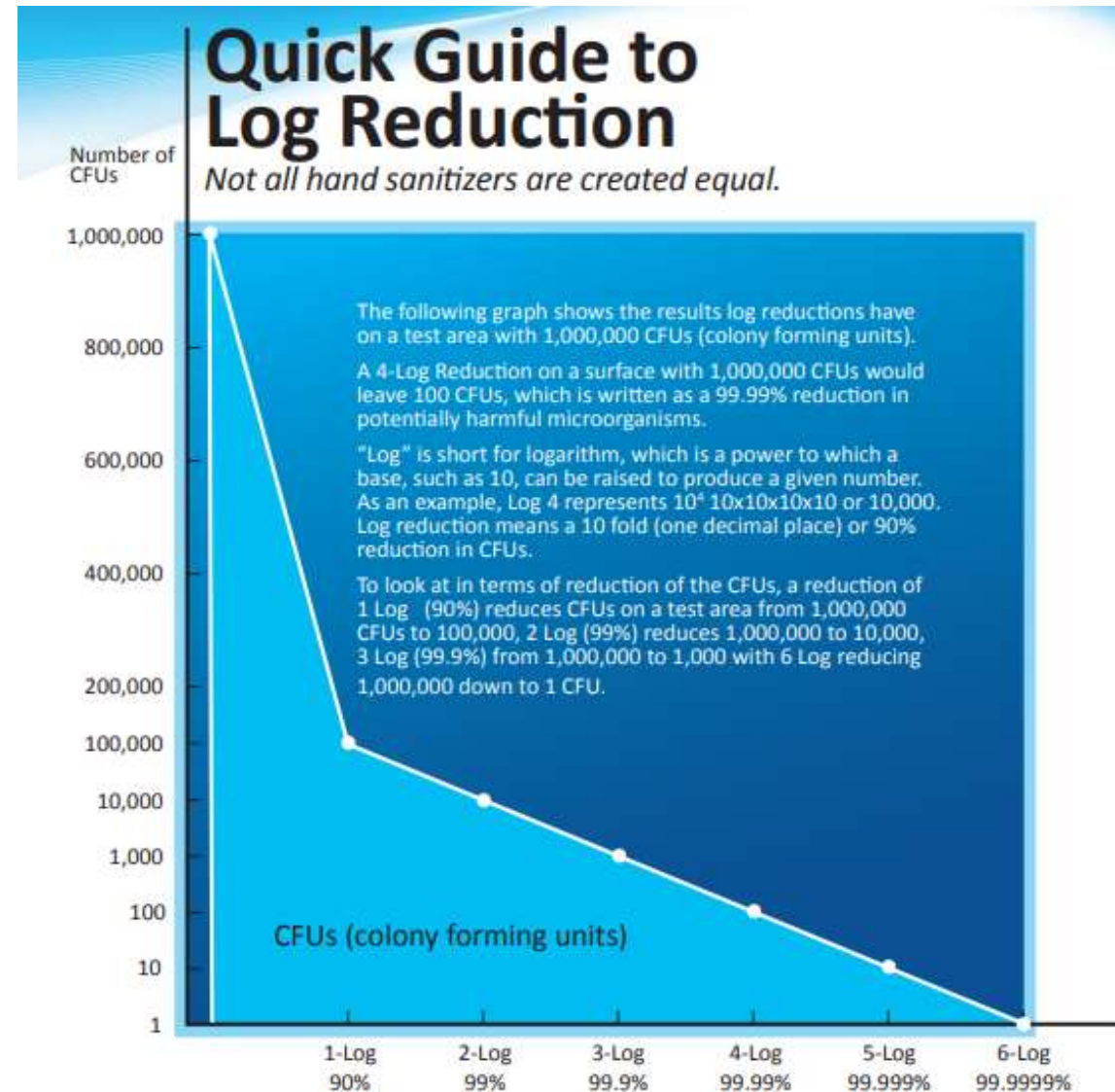
Elements of Hand Hygiene



Concept: Log Reduction in Hand Hygiene *RW* SCIENCE

To Summarize

- 1-Log Reduction (Log_1): Number of CFUs is 10 times smaller
- 2-Log Reduction (Log_2): Number of CFUs is 100 times smaller
- 3-Log Reduction (Log_3): Number of CFUs is 1,000 times smaller
- 4-Log Reduction (Log_4): Number of CFUs is 10,000 times smaller
- 5-Log Reduction (Log_5): Number of CFUs is 100,000 times smaller
- 6-Log Reduction (Log_6): Number of CFUs is 1,000,000 times smaller



A colony-forming unit (CFU, cfu, Cfu) is a unit to estimate the number of *viable* bacteria or fungal cells in a sample

Which EN norms to look for while selecting *RW* SCIENCE products for Hand Hygiene ?

EN Norms	Stands for	Details:
EN 1499	Hygienic hand washing	Test method that stimulates practical conditions to establish whether a product intended for hygienic hand washing effectively reduces the transient microbial flora of the hands during its use.
EN 1500	Hygienic hand disinfection	Test method that evaluates the efficacy of a hygienic handrub, specifically simulates conditions for establishing if a hygienic handrub decreases the release of transient flora from the hands.
EN 12791	Surgical hand disinfection	Test method that simulates practical conditions to determine whether a product intended for surgical hand rubbing effectively reduces the resident and possibly transient microbial flora detected on the hands

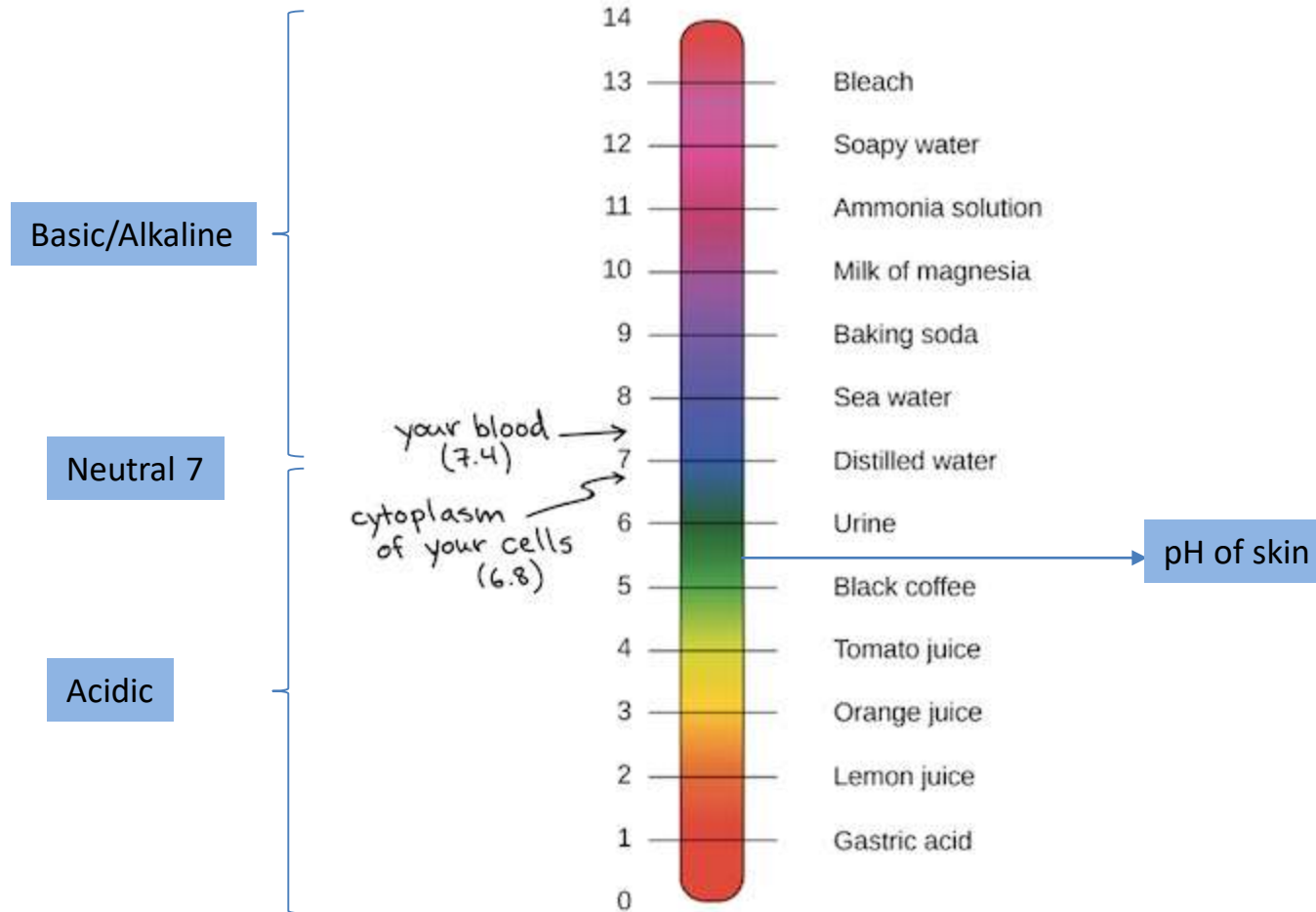
Hygienic and Surgical Hand Disinfection *RW* SCIENCE

Sterillium	Hygienic Hand Disinfection	Surgical Hand Disinfection
What is it ?	Rubbing the dry hands with alcohol-based preparations over a time period of 30 seconds	Preoperative rub-in procedure by the application of a hand disinfectant before donning surgical gloves
Aim	Inactivation of the microorganisms that reached the surface of the skin (Transient skin flora) by contact with contaminated objects, etc.	Removal and killing of transient microorganisms and substantial reduction of the resident flora
Advantages	The procedure can be carried out everywhere and independently of washbasins and water, and features higher skin tolerability than handwashing with water and soap/wash lotions.	Prior to surgeries, medical staff completely wet hands and forearms with a hand disinfectant to reduce the transmission of microorganisms to surgical wounds to the greatest possible extent, even when glove perforation occurs.
Application	Amount:3ml, Time: 30 seconds Provides protection: 3 hours	Amount: 6ml, Time: 90 seconds, Provides Protection: 6 hours (under the glove)

Hand Washing v/s Hand Rub Disinfection

Hand washing (Soap and Water)	Hand Rub Disinfection (Sterillium)
78% reduction in transient flora	99.99% reduction in transient flora
Requires napkins, sink, wash basin, soap, infrastructure. No point of care placement	No water/towel. Strategically can be placed near bed side table, pocket bottle, dispensers etc Point of care
No long term effect on resident flora	Long term and broad spectrum activity upto 180 mins
Frequent use causes skin dryness	Safe for frequent use, contains skin emollients, skin protecting agents
pH of soap is 7.6 – 7.8	pH maintained at 5.5 (matches with skin pH)
Log 3 reduction of microbes using antiseptic hand wash	Log 5 reduction of microbes using ABHR

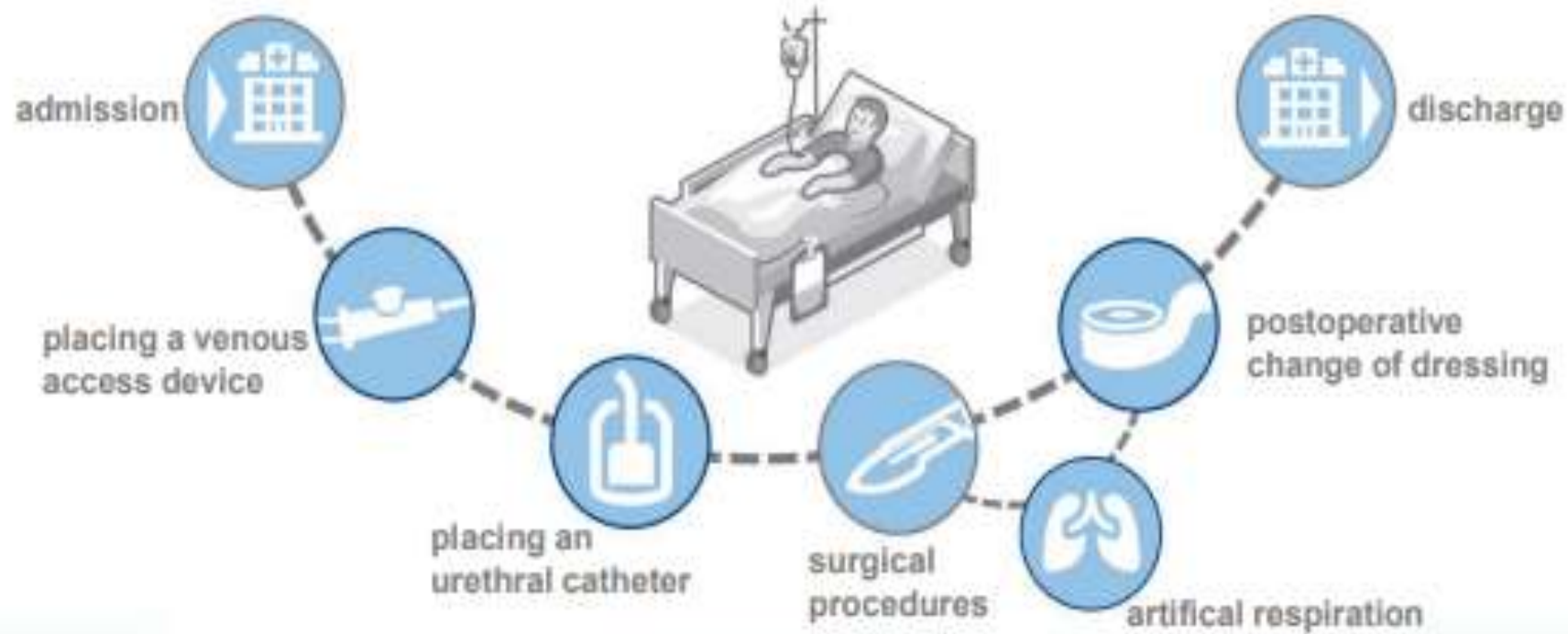
What is pH ?



pH is percentage of Hydrogen concentration in a solution

Note –
While selecting products for hand hygiene, pH is an important parameter to look for skin's health & safety

Potential Risk factors in Patient's Journey *RW*SCIENCE



Common touch points of infection causing microbes during the patient's journey

Most Common Touch Points			
Nurses <ul style="list-style-type: none">•Patient Notes•Blood Pressure Cuffs•Patient Bedside Table•Patient	Physicians <ul style="list-style-type: none">•Patient Notes•Patient Bedside•Notes Trolley•Pager/Phone	Patients <ul style="list-style-type: none">•Bedclothes•Bed frame/Bed rails•Bedside Table•Bedside Chairs•Wound dressing/Wound	Visitors <ul style="list-style-type: none">•Bedside Area•Patient•Wound dressing

Indications for Hand Hygiene (CDC)

Important:

When hands are visibly dirty/soiled – Hand wash (Log 3 reduction) + Dry + Use alcohol hand rub (Log 5 reduction of microbes)

When hands are infected/before aseptic procedure – Use alcohol based hand rub (Log 5 reduction of microbes)

When hands are visibly soiled: 6 Moments for Hand Washing *RW* SCIENCE

(Soap & Water)




1. Entry in the hospital
2. Before Leaving the hospital
3. Before taking meals
4. After taking meals
5. When hands are visibly dirty/soiled
6. After using the washroom

Steps for Hand Washing (WHO)

How to Handwash?

WASH HANDS WHEN VISIBLY SOILED! OTHERWISE, USE HANDRUB

 Duration of the handwash (steps 2-7): 15-20 seconds

 Duration of the entire procedure: 40-60 seconds



Wet hands with water;



Apply enough soap to cover all hand surfaces;



Rub hands palm to palm;



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



Palm to palm with fingers interlaced;



Backs of fingers to opposing palms with fingers interlocked;



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



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



Rinse hands with water;



Dry hands thoroughly with a single use towel;





Use towel to turn off faucet;

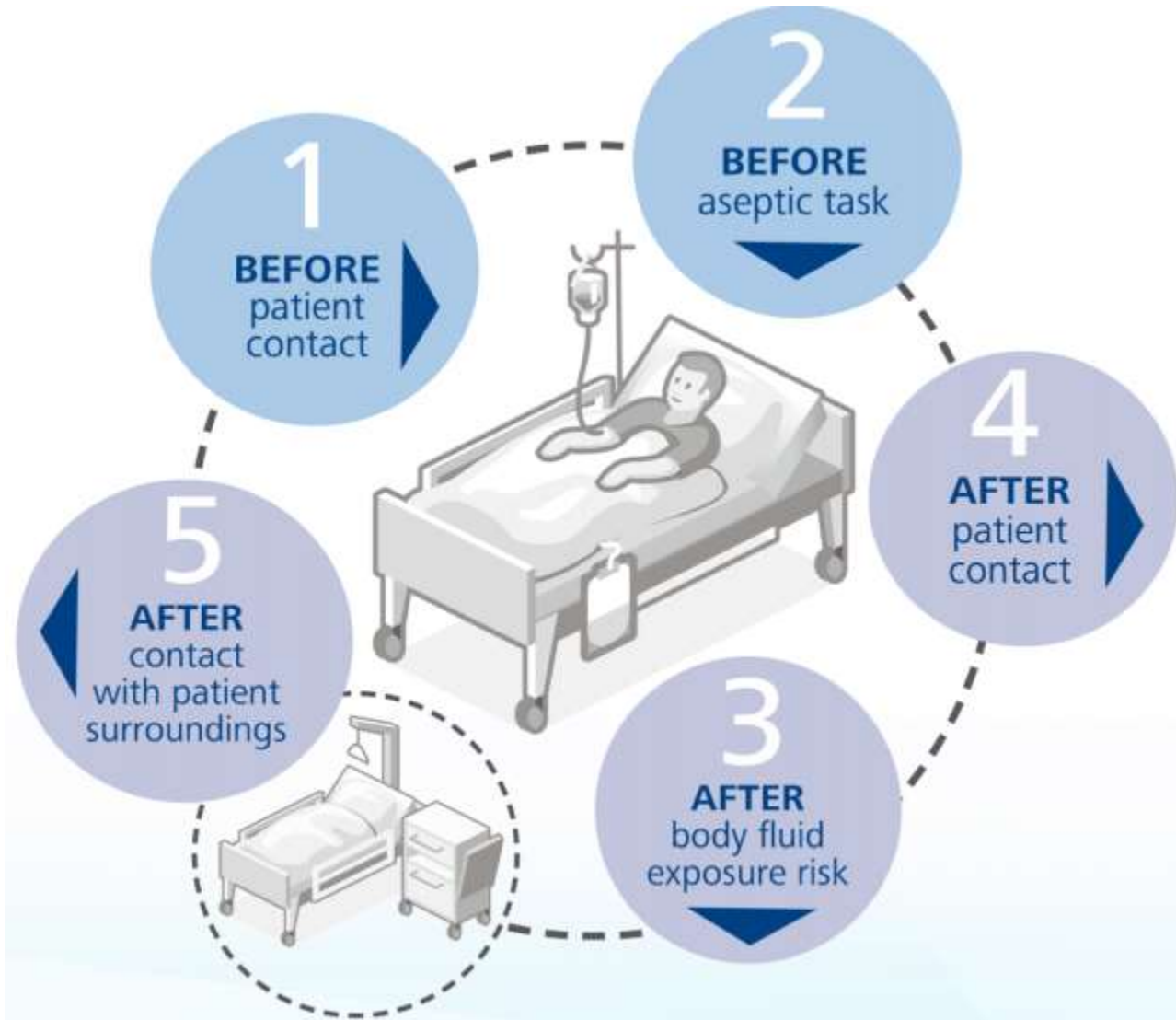


Your hands are now safe.

Why drying hands is important ?

- **Drying hands after using soap and water** is an important step of in hand hygiene after using soap and water, because the transmission of microorganisms is more likely to occur with wet skin than with dry skin.
- Dry hands thoroughly with a method that does not re-contaminate or irritate the hands, such as:
 1. Air-drying (manual drying by movement of hands) 
 2. Using a paper towel or single-use cloth to pat hands dry—towels should not be used multiple times or by multiple individuals because shared towels quickly become contaminated. 
- **Warm-air dryers for drying hands are not recommended in health facilities, as forced air can result in the spread of pathogens through water droplets.**

When Hands are infected: 5 moments of Hand Hygiene *RW* SCIENCE




STEPS	PROTECTS
1	The patient
2	The patient
3	Medical staff
4	Medical staff, Environment
5	Medical staff, Environment

Steps for Hand Rubbing (WHO)

How to Handrub?

RUB HANDS FOR HAND HYGIENE! WASH HANDS WHEN VISIBLY SOILED

 Duration of the entire procedure: 20-30 seconds



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



Rub hands palm to palm;



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



Palm to palm with fingers interlaced;



Backs of fingers to opposing palms with fingers interlocked;



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



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



Once dry, your hands are safe.



Moment 1 & Moment 2

1 Before touching a patient

WHY? To protect the patient against colonization and, in some cases, against exogenous infection, by harmful germs carried on your hands

WHEN? Clean your hands before touching a patient when approaching him/her*

Situations when Moment 1 applies:

- a) Before shaking hands, before stroking a child's forehead
- b) Before assisting a patient in personal care activities: to move, to take a bath, to eat, to get dressed, etc
- c) Before delivering care and other non-invasive treatment: applying oxygen mask, giving a massage
- c) Before performing a physical non-invasive examination: taking pulse, blood pressure, chest auscultation, recording ECG

2 Before clean / aseptic procedure

WHY? To protect the patient against infection with harmful germs, including his/her own germs, entering his/her body

WHEN? Clean your hands immediately before accessing a critical site with infectious risk for the patient (e.g. a mucous membrane, non-intact skin, an invasive medical device)*

Situations when Moment 2 applies:

- a) Before brushing the patient's teeth, instilling eye drops, performing a digital vaginal or rectal examination, examining mouth, nose, ear with or without an instrument, inserting a suppository / pessary, suctioning mucous
- b) Before dressing a wound with or without instrument, applying ointment on vesicle, making a percutaneous injection / puncture
- c) Before inserting an invasive medical device (nasal cannula, nasogastric tube, endotracheal tube, urinary probe, percutaneous catheter, drainage), disrupting / opening any circuit of an invasive medical device (for food, medication, draining, suctioning, monitoring purposes)
- d) Before preparing food, medications, pharmaceutical products, sterile material

3 After body fluid exposure risk

WHY? To protect you from colonization or infection with patient's harmful germs and to protect the health-care environment from germ spread

WHEN? Clean your hands as soon as the task involving an exposure risk to body fluids has ended (and after glove removal)*

Situations when Moment 3 applies:

- a) When the contact with a mucous membrane and with non-intact skin ends
- b) After a percutaneous injection or puncture; after inserting an invasive medical device (vascular access, catheter, tube, drain, etc); after disrupting and opening an invasive circuit
- c) After removing an invasive medical device
- d) After removing any form of material offering protection (napkin, dressing, gauze, sanitary towel, etc)
- e) After handling a sample containing organic matter, after clearing excreta and any other body fluid, after cleaning any contaminated surface and soiled material (soiled bed linen, dentures, instruments, urinal, bedpan, lavatories, etc)

4 After touching a patient

WHY? To protect you from colonization with patient germs and to protect the health-care environment from germ spread

WHEN? Clean your hands when leaving the patient's side, after having touched the patient *

Situations when Moment 4 applies, if they correspond to the last contact with the patient before leaving him / her:

- a) After shaking hands, stroking a child's forehead
- b) After you have assisted the patient in personal care activities: to move, to bath, to eat, to dress, etc
- c) After delivering care and other non-invasive treatment: changing bed linen as the patient is in, applying oxygen mask, giving a massage
- d) After performing a physical non-invasive examination: taking pulse, blood pressure, chest auscultation, recording ECG

Moment 5

5 After touching patient surroundings

WHY? To protect you from colonization with patient germs that may be present on surfaces / objects in patient surroundings and to protect the health-care environment against germ spread

WHEN? Clean your hands after touching any object or furniture when living the patient surroundings, without having touched the patient*

This Moment 5 applies in the following situations if they correspond to the last contact with the patient surroundings, without having touched the patient:

- a) After an activity involving physical contact with the patients immediate environment: changing bed linen with the patient out of the bed, holding a bed trail, clearing a bedside table
- b) After a care activity: adjusting perfusion speed, clearing a monitoring alarm
- c) After other contacts with surfaces or inanimate objects (note – ideally try to avoid these unnecessary activities): leaning against a bed, leaning against a night table / bedside table

5 Moments of Hand Hygiene

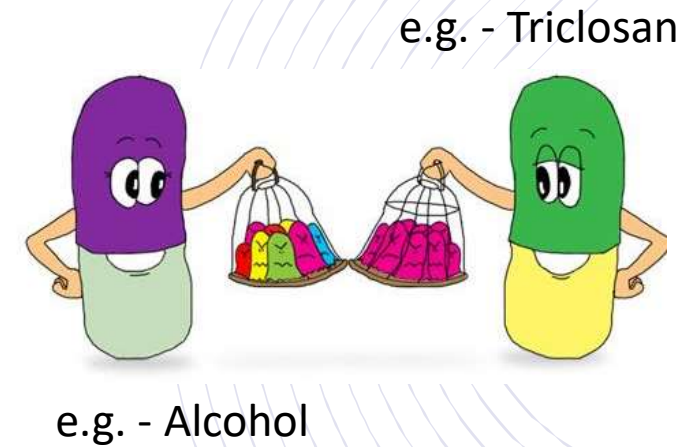
Situation	Moment of Hand Hygiene
Before inserting a urinary catheter	Moment 2
After touching patient's forehead and when leaving the patient zone	Moment 4
After adjusting the patient's bed (patient is not present) and then immediately leaving the patient zone	Moment 5
Before performing an abdominal exam if this is the first time you touch the patient upon entering the patient zone	Moment 1
After cleaning up a blood spill inside the patient zone	Moment 3

Clinical evidences of active agents against pathogens RW SCIENCE

Results of the study (1)

	Soap	Chlorhexidine (2-4 %)	Triclosan (1-2 %)	Ethanol (60-85 %)	Isopropanol (60-80 %)	n-propanol (60-80 %)
Bacteria	-	++	++	+++	+++	+++
Mycobacteria	-	+	unknown	+++	+++	+++
Bacterial spores	-	-	-	-	-	-
Yeasts	-	++	++	+++	+++	+++
Dermatophytes	-	-	+	++	unknown	unknown
Enveloped viruses	-	++	unknown	+++	+++	+++
Nonenveloped viruses	-	+	unknown	+	+	+
Resistance potential	-	moderate	low	none	none	none

+++ active within 30 s; ++ active within 2 min; + active within > 2 min; (+) partly active; - not active

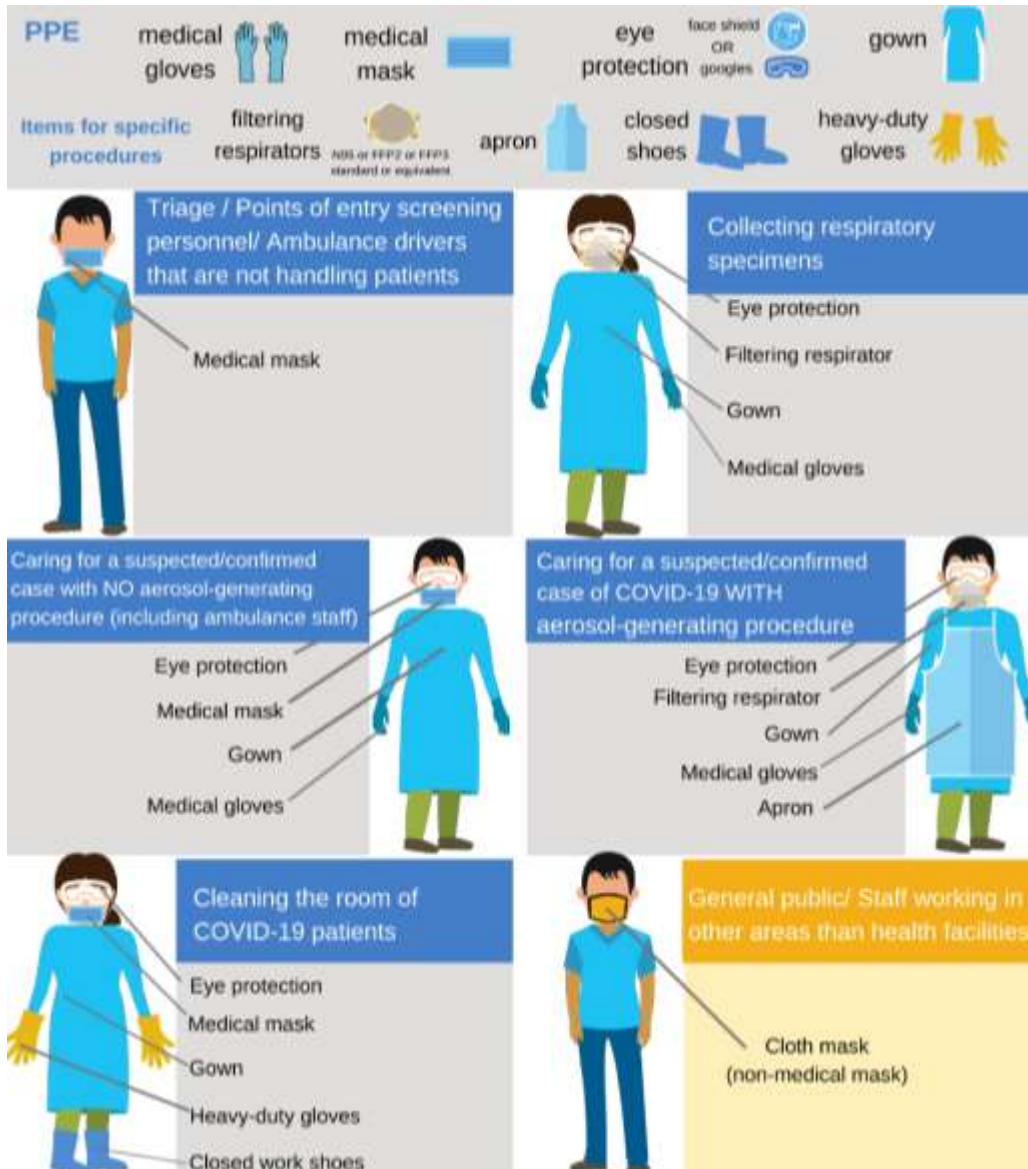


Alcohol based hand disinfectants: **Broad spectrum activity, enhanced skin compatibility, consumes less time, rapid action**

Efficacy of hand hygiene preparation in killing bacteria *RW* SCIENCE



PPE – Personal Protective Equipment



- **Personal protective equipment**, commonly referred to as "PPE", is equipment worn to minimize exposure to hazards that cause serious workplace injuries and illnesses.
- These injuries and illnesses may result from contact with chemical, radiological, physical, electrical, mechanical, or other workplace hazards.
- Personal protective equipment may include items such as gloves, safety glasses and shoes, earplugs or muffs, hard hats, respirators, or coveralls, vests and full body suits.

STERILE GLOVES INDICATED

Any surgical procedure; vaginal delivery; invasive radiological procedures; performing vascular access and procedures (central lines); preparing total parental nutrition and chemotherapeutic agents.

EXAMINATION GLOVES INDICATED IN CLINICAL SITUATIONS

Potential for touching blood, body fluids, secretions, excretions and items visibly soiled by body fluids.

DIRECT PATIENT EXPOSURE: Contact with blood; contact with mucous membrane and with non-intact skin; potential presence of highly infectious and dangerous organism; epidemic or emergency situations; IV insertion and removal; drawing blood; discontinuation of venous line; pelvic and vaginal examination; suctioning non-closed systems of endotracheal tubes.

INDIRECT PATIENT EXPOSURE: Emptying emesis basins; handling/cleaning instruments; handling waste; cleaning up spills of body fluids.

GLOVES NOT INDICATED (except for CONTACT precautions)

No potential for exposure to blood or body fluids, or contaminated environment

DIRECT PATIENT EXPOSURE: Taking blood pressure, temperature and pulse; performing SC and IM injections; bathing and dressing the patient; transporting patient; caring for eyes and ears (without secretions); any vascular line manipulation in absence of blood leakage.

INDIRECT PATIENT EXPOSURE: Using the telephone; writing in the patient chart; giving oral medications; distributing or collecting patient dietary trays; removing and replacing linen for patient bed; placing non-invasive ventilation equipment and oxygen cannula; moving patient furniture.

The Glove Pyramid – to aid decision making on when to wear (and not wear) gloves

- Gloves must be worn according to **STANDARD** and **CONTACT PRECAUTIONS**.
- The pyramid details some clinical examples in which gloves are not indicated, and others in which examination or sterile gloves are indicated.
- Hand hygiene should be performed when appropriate regardless of indications for glove use.

Gloves & its types

Types of Gloves	Advantages	Disadvantages
Latex gloves	<ul style="list-style-type: none">• Rock star of the medical disposable gloves.• Those who aren't allergic, latex gloves are comfortable, relatively cost-effective, and offer a high degree of touch sensitivity.	<ul style="list-style-type: none">• Allergic reactions on hands due to presence of 67% proteins
Vinyl gloves	<ul style="list-style-type: none">• Latex free, made from PVC, a petroleum-based film	<ul style="list-style-type: none">• Offers limited protection against chemical or biomedical exposure.• When stretched, protective barrier is compromised (less intact)
Nitrile gloves	<ul style="list-style-type: none">• More durable and resistant to chemicals• 18- 19% protein• exceptionally puncture-resistant, eliminating the risk of latex allergy reactions.	<ul style="list-style-type: none">• Not so elastic or flexible



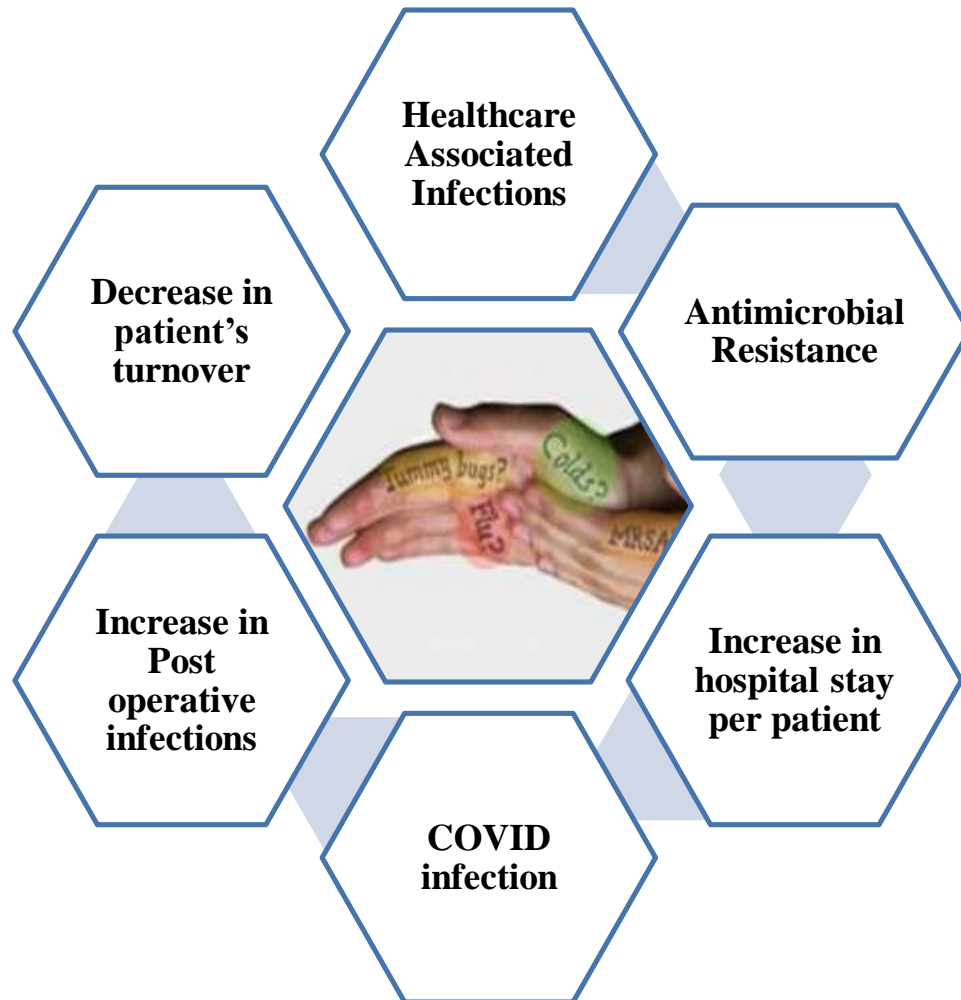
Nitrile gloves > Latex gloves

Will Gloves Replace Hand Hygiene ?

Often there are manufacturing defects, upto 44% have microscopic tears
40k microorganisms can pass through a single puncture, size of pinhead

Scrub + Gloves = Insufficient protection
Sterillium = Chemical glove

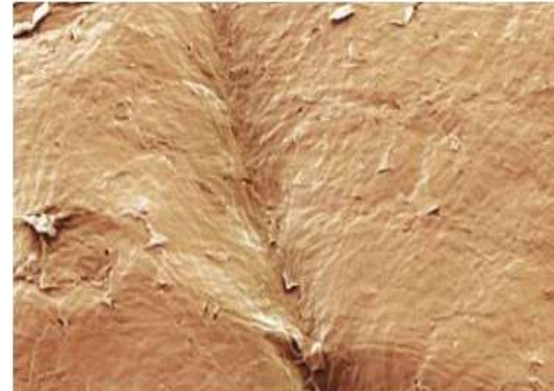
Overall Consequences of Incorrect Hand Hygiene practices and Low Compliance rate



- **Poor compliance** with hand hygiene is common among HCWs.
- Reported reasons for not washing hands include skin irritation, inaccessible handwashing supplies, wearing gloves, “being too busy”, or “not thinking about it”.
- Some HCWs believed that they washed their hands when necessary even when observations indicated otherwise
- On average, 50% of HCW do not adhere to recommended Hand hygiene practices (Hartmann Science)

Do's

- Wash hands only when
 - visibly soiled
 - after using the toilet
 - before eating
 - spores cannot be inactivated by alcohol-based hand disinfectants
- Use cold to lukewarm water
- Use mild wash lotion with a pH-value around 5.5
- To clean fingernails utilise a single-use nail-pick
- Rinse well to remove residual soap
- Dry thoroughly with a single-use towel
- Apply skin care lotion/balm when frequently washing your hands



Normal, healthy skin

- smooth surface



Cracked skin

- surface offers microorganisms niches, ideal for colonisation and propagation

Do's

Fingernails of physicians and nurses need to be short and round



Untreated Hands



Result of the swab taken from untreated hands after coming in contact with the patients

Highest CFU's are found under the nails

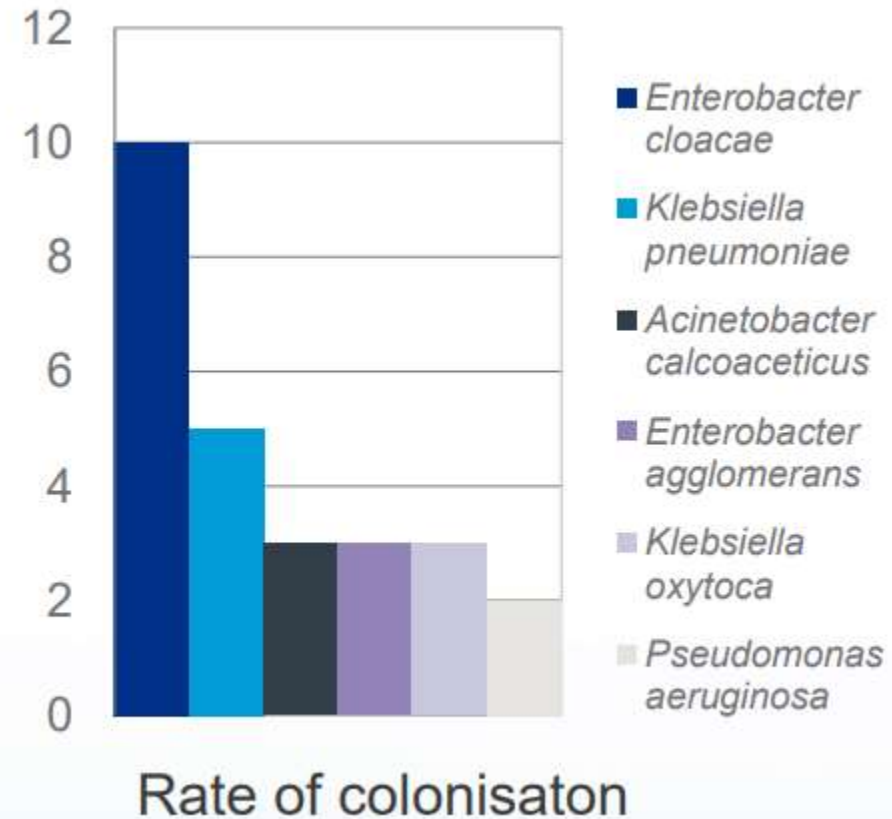
Don'ts

To prevent post operative infections, do not wear ring/jewelery on hands and forearms – it hinders appropriate hand hygiene

Results of the study ⁽¹⁾

	Average CFU / sample
Finger with ring	1 600
Finger without ring	180

Maximum:
560 000 CFU /
sample “with ring”
(*Acinetobacter calcoaceticus*)



Conclusion

There are several measures to prevent hands from becoming a source of contamination

- no jewellery
- intact, well cared-for skin
- short and round fingernails
- no nail varnish
- no artificial nails

Case study 1

Healthcare worker walks in, helps patient to sit up, moves bed table, folds sheets, moves chair into position, assists patient out of bed

Answer – Moment 1 – prior touching a patient

Case study 2

HCW replaces an empty IV fluid bag with a new IV fluid bag

Answer –

Moment 2 – prior to disconnecting the IV line

Moment 3 – after reconnecting the IV line

Case study 3

HCW walks into the room, empties IDC drainage bag, disposes
of urine in pan room

Answer –

Moment 2 – Before emptying IDC drainage bag

Moment 3 – After disposing urine (Exposure risk)

Case study 4

Healthcare worker walks in, helps patient to sit up, moves bed table, folds sheets, moves chair into position, assists patient out of bed, then leaves the room

Answer –

Moment 1 - Before touching the patient

Moment 4 – After touching patient

Moment 5 – After touching patient's surroundings

Case study 5

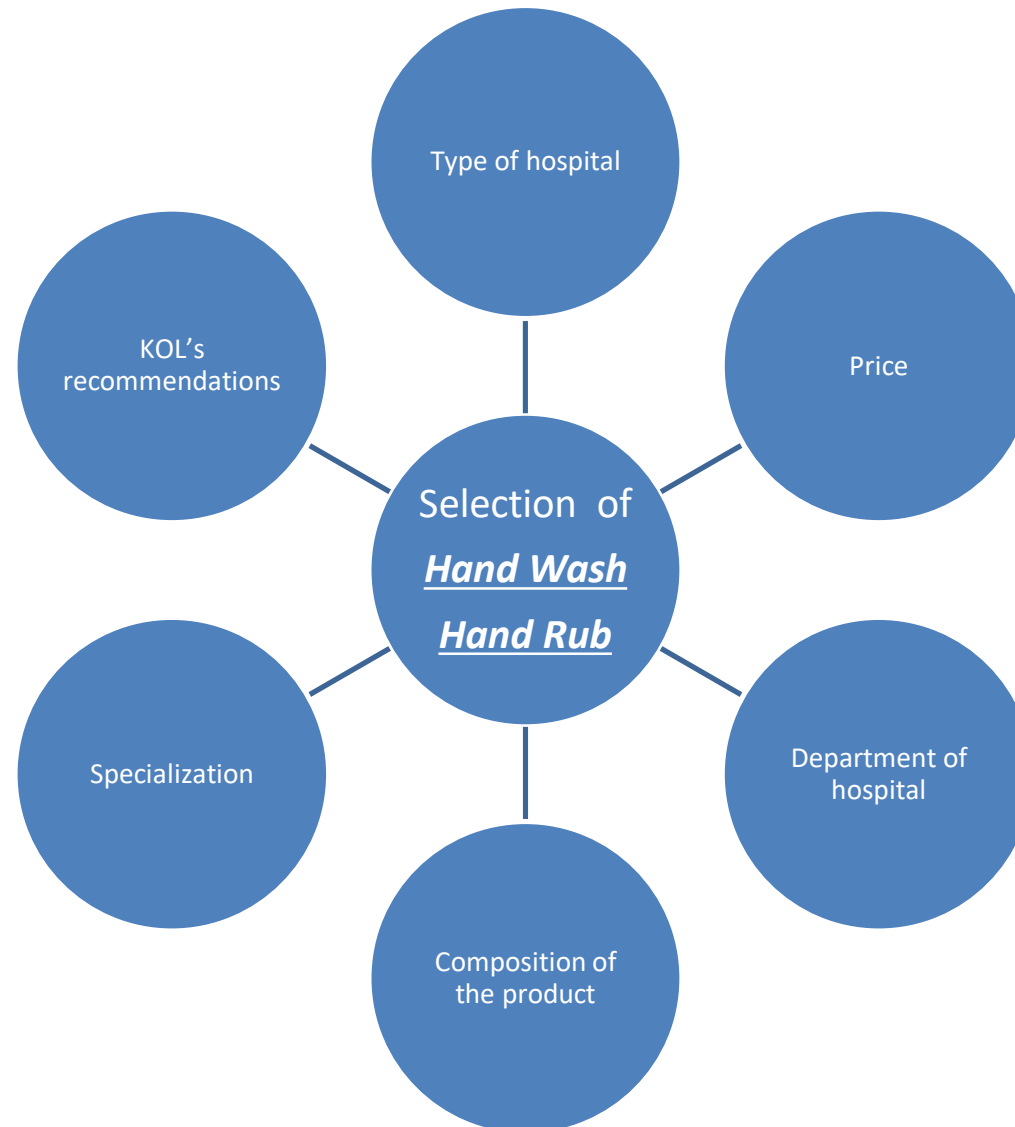
Healthcare worker walks into patient room, moves the bed table closer to the patient, then leaves the room

Answer –

Moment 5 – After touching the patient's surroundings

If he had touched the patient – then moment 1 and moment 4 (BEFORE AND AFTER TOUCHING PATIENT)

Know the right determinants while selecting Hand Hygiene products





Thank you !

RW RAMAN AND WEIL PRIVATE LIMITED

EXCELLENCE IN INFECTION CONTROL