

**KWAZULU-NATAL
PROVINCIAL ADMINISTRATION
DEPARTMENT OF HEALTH**

**GUIDELINES FOR THE
MANAGEMENT OF
INFECTION CONTROL**

COMPILED BY: The KwaZulu-Natal Infection Control Committee

**DEPARTMENT OF HEALTH
KWAZULU-NATAL**

**GUIDELINES FOR THE MANAGEMENT
OF INFECTION CONTROL**

The Infection Control Committee of the Department of Health has over the years compiled and updated guidelines to assist institutions in managing infection control.

These guidelines have now been collated into a handbook. While this has been done to make it an easier reference, this handbook should in no way be considered the last word in infection control. The guidelines are here to assist institutions in compiling policies that are relevant and specific to themselves, taking into account their own nature and circumstances.

Comments and suggestions relating to these guidelines and other areas where guidelines may be needed can be sent to:

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For Attention: Secretary - Infection Control Committee
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April 1996

INDEX

CHAPTER

1. Cleaning and Disinfection Policy
2. Hand Hygiene
3. Protective Gear
4. The Care of Wounds
5. Infections in Burns
6. Care of Endoscopes
7. Disposal of Refuse Waste and "Sharps"
8. "Sharps" Disposal
9. Laundry
10. The Prevention of Intravenous Associated Infections
11. Guidelines on Management of Intravenous Lines
12. Guidelines for T.P.N Management
13. Maintenance and use of Respiratory Equipment
14. Principles of Urinary Catheterization
15. Guidelines for Specimen Collection
16. Isolation Policy
17. AIDS
18. Sterilization of B.C.G. Tools
19. Sterilization of Ear Pieces
20. Infection Control Guidelines for Ectoparasitic Infection

CHAPTER 1

- GENERAL GUIDELINES -

CLEANING AND DISINFECTION POLICY

1. The use of Chemical Disinfectants

Chemical disinfectants cannot be relied on to destroy all harmful microbes. When sterility is essential and where sterilization facilities exist, heat sterilization should be applied.

2. Guidelines for the use of Chemical Disinfectants

- 2.1 Never use a chemical if other more reliable methods are available.
- 2.2 Cleaning is the first and most important step in chemical disinfection.
- 2.3 The disinfection fluid must entirely cover and penetrate into all crevices in the article.
- 2.4 Use recommended strengths for specific purposes.
- 2.5 No chemical agent acts immediately. Note the recommended exposure time.
- 2.6 Equipment has to be rinsed after immersion in the chemical. It is very easy to recontaminate the equipment at this stage unless the rinsing water and all other apparatus are sterile.
- 2.7 Items must not be stored in chemical disinfectants but can be disinfected as follows:-

DEFINITIONS

Cleansing agent - Soap/detergant and water

Spirit/alcohol - Chlorhexidine in alcohol

Gluteraldehyde - e.g Cidex, Gluteral, Virogerm etc.

Hypochlorite - e.g Biocide D, Bacterex, Medisure etc.

ARTICLE	RECOMMENDATION
Ampoules, vials	Cleaning not necessary, do not contaminate
Antibacterial handwash dispensers (Refer to Handwashing policy)	Wash thoroughly and refill No topping up.
Anaesthetic Equipment (Refer to respiratory policy)	
i) Face masks	Return to CSSD. Pasteurize.
ii) Rebreathing bags	Return to CSSD. Pasteurize.
III) Airways disposable	Discard after use or clean and return to CSSD
Non-disposable	Return to CSSD.
iv) Endotracheal tubes disposable	Discard after use or clean and return to CSSD.
Aprons - plastic	Wash with cleansing agent and hot water. Wipe down with disinfectant.
Baths, Basins - washbasins	Scour with cleansing agent, rinse and dry.
Bath stool	Clean with cleansing agent and hot water, rinse and dry.
Bath mats - non-slip	Scrub with cleansing agent and hot water, rinse and dry. Store dry.
Bed blocks, bed cradles Bed elevators bed tables, bed stairs.	Wash with cleansing agent and hot water and dry.
Bedpans - potties	1. Place pan in bedpan washer and put through cycle 65° Store dry, inverted. Scour with cleansing agent daily. 2. If above not available, discard contents down sluice, wash with hot water and soap. Store dry. Scour and soak in Hypochlorite for 30 minutes on a daily basis.

Bedframes and cots	Wash with cleansing agent and hot water and dry.
Bottles - feeding	Wash with hot soapy water then autoclave.
Bottle brushes	Rinse under running water, shake well, store dry.
Bowls - washing	Clean with hot water and cleansing agent and dry. Store inverted. Scour daily.
Brushes	
Nail - wards	Not used routinely in clinical areas.
Nail - theatre	Sterile brushes supplied for single use.
Shaving	Not recommended.
Tooth	Rinse after use under running water, invert, store dry.
Toilet	Rinse in flushing water, shake in pan, store dry.
Toilet brush holder	Clean with cleansing agent and hot water daily, rinse and dry.
Buckets, containers, bins	Line with a disposable plastic bag to contain contents for disposal. Clean bucket with cleansing agent, hot water and dry. Scour daily.
Cradles	Wash with cleansing agent and hot water and dry.
Chairs	
- commode	
- easy	
- upright	
- wheel	Clean with cleansing agent and hot water rinse and dry.
Cotsides	Wash with cleansing agent and hot water and dry.

Crockery, cutlery	Dishwasher, or wash with cleansing agent and hot water and dry.
Crutches	Wash with cleansing agent, hot water and dry.
Cuffs (Blood pressure)	To launder if soiled (material) otherwise clean with cleansing agent and hot water. Dry.
Cubicle curtain rails	Clean with cleansing agent and hot water.
Defibrillator	
- Electrode pad	Remove all traces of electrode jelly by wiping with chlorhexidine/spirits/alcohol.
- Electrode internal	Must be sterilized by CSSD.
Denture container	Preferably disposable or wash with cleansing agent and hot water. Store dry.
Dispensers, e.g. cellotape	Dampdust, dry.
Drainage apparatus	
- Suction jars	Return to CSSD or rinse in cold water, wash with cleansing agent and hot water. Store dry.
- Suction tubing	Suction through. Return to CSSD.
- Under water seal drainage	Rinse in cold water, Return to CSSD for autoclaving.
- Bungs, tubing	Disposable.
Dusting, damp	Wipe surfaces with clean cloth and cleansing agent and hot water. Dry surfaces.

Ear pieces - Auroscopes	Wash with cleansing agent and hot - Hearing Aids water, dry. Wipe with chlorhexidine alcohol/spirits.
- Stethoscopes	
Earphones	Wipe with cleansing agents, hot water and dry.
Endoscopes	Wash. Immerse in Gluteraldehyde. Store dry. (refer to endoscope policy)
Environmental soiling of faeces,	Wearing unsterile, disposable gloves, remove the excreta immediately with paper. Discard into red plastic bag.
	Wash with Hypochlorite 10,000 ppm.
E.C.G. leads	Wipe with cleansing agent and hot water and dry.
Electric fans	Damp dust.
Floors	Clean with cleansing agent and hot water.
Floor mops	Wash thoroughly, soak in Hypochlorite for 10 minutes. Invert and store dry. Do not store in disinfectant solution.
Hands - of staff	See handwashing guidelines.
Hoists	Wash with cleansing agent and hot water daily
Humidifiers	Bottles must be changed on a daily basis. Stored dry when not in use. After use send to CSSD for sterilization. Refer to respiratory apparatus policy.
Incubators - infants	Wash with cleansing agent and hot water. Wipe down with alcohol/spirits. Change filter according to maker's instructions.

Instruments and any equipment CSSD	<ol style="list-style-type: none"> 1. Place in plastic bag after use and return to CSSD. 2. In clinics with no CSSD facility. Wearing gloves, wash with hot water and soap. Preferably sterilize by using a pressure cooker, if not available, disinfect by boiling for 10 minutes.
Insufflator ear	Clean with cleansing agent, hot water and dry.
Linen	
- Ordinary soiled	Place in laundry bag at bedside. Seal when bag is 3/4 full. Send to laundry.
- Foul and/or infected	Solid matter to be washed off under cold running water. Wet stain. Place in yellow plastic bag, seal when bag is 1/2 full.
- Special circumstances	See isolation guidelines.
Laryngoscopes	Wash with cleansing agent and hot water, and store dry.
Lockers	Damp dust daily. Terminal cleaning - wash inside and outside with cleansing agents and hot water and dry.
Mattresses	Clean covers with cleansing agent and hot water and dry.
- Ripple	Clean with cleansing agent, hot water and dry.
Nebulizers	Use for one patient only. Wash with soap and water. Store dry between use. Return to CSSD on daily basis.

Nappies

- Disposable

Place in red plastic bag for incineration.

- Non-disposable

Treat as foul/infected linen.

Oxygen - stands

Damp dust surfaces. Dry.

- tubes

Return to CSSD.

- masks

Return to CSSD.

Pillows

Clean plastic covers with cleansing agent and hot water and dry.

Proctoscopes

Wash with cleansing agent and hot water. Return to CSSD.

Razors

- Disposable

Discard after use.

- Electric (only single use)

Remove razor head, brush out recommended for bristles onto paper towel. Wash razor head. Disinfect head with 70% alcohol for 5 minutes. Dry and store dry.

- Non disposable

Wash well with cleansing agent and hot water. Return to CSSD.

Rectal washing equipment -

Wash with cleansing agent and hot funnel tubing, catheter water. Return to CSSD.

Room cleaning

Clean with cleansing agent and hot water. Dry surfaces.

Scales

Before and after use clean with cleansing agent and hot water, dry. Between weighing babies, spray with spirits/alcohol and renew paper sheets.

Scissors

- CSSD Return to CSSD in plastic bag.

- Nurses Wipe with spirits/alcohol between use.

Sheepskins After use by one patient, return to laundry.

Sinks

- hand Clean with cleansing agent, rinse and dry.

- sluice Clean with cleansing agent, rinse and dry.

Sigmoidoscopes Clean with cleansing agent and hot water, dry. Return to CSSD.

Syringes

- glass (injections only) Rinse and store dry. Return to CSSD.

- disposable Use only once. Discard according to hospital 'Sharps' disposal policy.

Space blankets If visibly soiled, discard. Otherwise wash with hot soapy water and dry.

Splints

- Plastic Remove any padding after use. Wash with cleansing agent and hot water and dry.

- Thomas Wash with cleansing agent and hot water and dry.

Sputum mugs Disposable.

Stomach washout equipment	Wash with cleansing agent and hot - funnel tubing water, dry and return to CSSD.
- stomach tube	
Suction machine	Wash exterior with cleansing agent and hot water. Store dry.
Telephones	Clean mouth and ear-pieces daily with cleansing agent and water.
Thermometers	Wash thermometers after use. Wipe with alcohol swab and store dry. Should be one for each patient.
Tooth mugs	Preferably disposable, otherwise wash with cleansing agent and hot water. Store dry.
Toilet pan	Clean pans daily and when required with cleansing agent and brush.
Toilet seat	Wash daily and when required with cleansing agent and hot water.
Tracheostomy tubes	
- disposable	Discard.
- non disposable (metal)	Clean, dry and return to OT or CSSD.
Trays	
- food	After each use wash with cleansing agent and hot water and dry.
Trolleys	
- dressing	Wash thoroughly with cleansing agent and hot water daily. Between dressings clean top shelf with spirits/alcohol and dry with paper towel.

- food	Wash daily with cleansing agent and hot water and dry.
- medicine	Wash inner and outer surfaces daily, and when required with cleansing agent and hot water and dry.
- patient transport	Wash daily and when required with cleansing agent and hot water. Dry.
- sluice	Wash daily with cleansing agent and hot water. Dry.
Tube feeding equipment	Wash in the kitchen with cleansing agent and hot water. Dry and store. Return to CSSD on a daily basis.
Urinals	As for bedpans.
Urine specimen glasses	Wash daily and when required with cleansing agent and hot water, invert and store dry.
Vaginal examination Cusco Sims	<ol style="list-style-type: none"> 1. Rinse and return to CSSD. 2. Clinics only with no CSSD. Wearing gloves, wash with hot water and soap. Preferably sterilize by using a pressure cooker, if not available, disinfect by boiling for 10 minutes.
Ventilators	Wash with cleansing agent and water and dry. Pasteurize or gas sterilize. Change bacterial filters every 48 hours.
Wall spot cleaning	Clean with cleansing agent and hot water.
Work surfaces	Wash with cleansing agent and hot water.
X-Ray machine	Wipe surfaces with cleansing agent and hot water. Dry.

CHAPTER 2

HAND HYGIENE

Handwashing remains central to the practice of Infection Control, the goal being to interrupt the route of transference of pathogenic organisms.

The idea is to inculcate in every health-care worker the knowledge, interest and alertness to practise safe 'Handling' at all times, and to supply such workers with the equipment and adequate opportunity to implement the practice at optimal level. Patients should also be educated to observe good hygiene of their own hands.

1. Handwashing

In practice, there are three types of handwashing - social, antiseptic, and surgical.

Social

- Before eating
- Before giving medicines
- After each bedmaking
- Before and after contact with any patient
- When hands are visibly dirty.

This wash does not usually take more than 15 seconds. Using the elbows to turn on the water, and liquid soap pumped from its container with the elbow, wash hands under running water. Lather hands and wrists vigorously, paying attention to fingertips and thumbs and between fingers. Rinse, turn off the tap (again with the elbow) and dry hands thoroughly on a paper towel. If the tap cannot be operated with an elbow, close off the water with the paper towel just used.

Antiseptic

- Before and after a shift on duty
- Before and after aseptic procedures (dressing, injections, etc.)
- After handling bedpans and other contaminated articles (even if using gloves. Hands must be washed before and after wearing gloves.)
- On entering and leaving high-risk areas.

Wash all surfaces of the hands, wrists and forearms with liquid soap. Rinse and dry hands well, following with an alcohol-based hand lotion rubbed into all surfaces of the hands.

Surgical

Before sterile surgical procedures as in Theatre.

1. Skin of hands and forearms must be intact (no open lesions or cracked skin).
2. All jewellery must be removed.
3. Length of scrub and procedure according to hospital policy, usually five minutes using a proven antimicrobial agent.
4. A sterile brush may be used for nails.
5. Initial wash to above the elbows and final wash ending below elbows.
6. Hands always kept higher than elbows during the procedure, and all steps begin with the hands.
7. Nothing unsterile to be touched during procedure, eg. tap.
8. Hands and arms dried with sterile towels before donning sterile gown and gloves.

2. Equipment

For adequate washing and hand hygiene should be effective and freely available when required.

Soap

- Bar (toilet) soap should be used for the patient's personal needs, each patient having his own bar. Such bars of soap to be stored dry (soap-dish that drains well).
- Liquid soap for the 'social' handwash (of staff and patients) should be available in a pump at each hand basin, and the containers NOT to be 'topped-up'. When replacing such liquid soap, the container and pump, if not discarded altogether, should at least be washed and allowed to dry thoroughly before re-use.
- Antibacterial soap, also, should be in a pump-container and not be 'topped-up'. Disposable sachets with pump attached are preferable. In addition to its antibacterial properties, this liquid should have a surfactant that allows plenty of lather and the antibacterial content should have a residual effect as well as not needing an excessively long wash for contact purposes.

Taps

Ideally foot-operated. If this is not possible, taps should be shut off with the paper towel on which the hands have just been dried.

- Taps should not be positioned over the basin outlet.

Washbasin

- Conveniently spaced - it should not require a long walk to wash hands.
- Plugs should not be used.
- The area around the basin should be kept clean, dry, and uncluttered.
- Only in-use equipment and supplies to be at hand - extra stock should remain in the stockroom.

Towels

- Only paper towels should be used by staff.
- Precut to prevent wastage, each towel should be large enough and absorbent enough to make using two unnecessary.
- The installation of warm-air hand towels is not advocated.

Water

- Hands must be washed under freely running water at a comfortable temperature.
- In country clinics where the water supply is problematical, the alternative is a chlorhexidine 0,5% in alcohol 70% hand-rub.

Bin

- The receptacle for the used paper towels must be emptied frequently to prevent overflow onto the floor.
- The lid should be pedal-operated to prevent re-contamination.

Wall and Floor

- The wall should be tiled over and beyond the splash area.
- The floor surface in the vicinity should also be non-porous and be non-slip as well.
- Both wall and floor must be kept clean and appealing to users as well as being disinfected and left dry on a regular basis.

Skin Care

- The chlorhexidine 0,5% in alcohol 70% hand-rub, properly applied, should be mandatory for use before and after any patient contact - in addition to the 'social' handwash. To prevent the skin cracking from frequent application of alcohol, 1% glycerine is added to the preparation.
- Where handcream is supplied for staff, it should be in tubes and NOT jars, to prevent contamination of the cream.

3. Gloves

- Gloves are not to be regarded as a substitute for washing the hands.
Hands should be washed before and after use of gloves:
 - micro-punctures may allow passage of pathogens, and
 - the skin in the warm environment of the glove will provide a breeding-ground for resident and/or transient germs.

4. Nails

- Should be kept short and clean.
- Nail varnish should not be allowed (cracks harbour germs).

5. Nailbrushes

- Should not be used for routine handwashing.
- In theatre, only sterile brushes should be used and then only on a one-use basis before re-sterilisation.

PROTECTIVE GEAR

This refers to all garb which is used to provide a protective barrier between staff and patient/s, whether it is for the benefit of the member of staff; all other members of staff; the patient; other patients who may be exposed to infection; members of the public who may be present in the hospital; or the community at large.

Gowns

Cotton gowns provide limited protection but are acceptable in some circumstances, such as reverse barrier nursing in the case of a severely burnt patient, when the gown should be sterile. Also, in cases where there is unlikely to be splashes of any fluid, cotton gowns will provide a degree of protection, but it must be noted that they may also provide a false sense of security.

Gowns made of water-repellant materials give better protection but may be uncomfortable in texture or hot to wear, and will certainly be expensive. There should therefore be a strong case for using them - and each case should be considered on individual merit. In Theatre, for instance, in operations where a considerable blood loss or bloody fluid leakage may be expected, the surgeon and his assistant should wear such gowns as well as plastic aprons underneath in case a tear should develop, or the material of which the gown is made (e.g. ventile or suitable non-woven materials) should be doubled in the sleeves and the front of the gown where most movement and friction takes place. Depending on the case and past experience, the scrub nurse will also need such a gown, but it is unlikely that others in the Theatre would. Polyester appears most cost-effective.

All gowns should be worn correctly, i.e. fastening to the back and not in front.

A gown worn to attend to one patient should not be used to attend to any other patients as this will simply transfer any infection, particularly on the sleeves and 'apron area'.

In most ward situations, plastic aprons provide a more satisfactory answer than gowns. In Theatre, plastic aprons should be worn under cotton gowns - but often are not, as they are uncomfortable.

Uses

Operating theatre

Strict isolation

Dispensers of Staph aureus eg. burns, eczema

Plastic Aprons

Disposable plastic aprons are inexpensive and the period of use can be extended by the front being sprayed and wiped with chlorhexidine 0,5% in alcohol 70% after contact with the patient. The apron should be left hanging in the isolation room (i.e. used for one patient only) and changed daily - or earlier if obviously soiled. The 'outside' of the apron should be marked in some way so that the same side is in contact with the member of staff when it is donned again.

Ideally disposable plastic aprons should :-

- be cool and comfortable to wear
- protect the chest and shoulders of the wearer - particularly in paediatric and geriatric departments where lifting and holding of the patients is required.

Uses

ICU

Isolation

Domestic cleaning

Aseptic technique if hospital policy

Paediatric wards

Accident and Emergency units

Obstetric units

Overboots

Cloth overboots ritually donned to enter Theatre - (theatre staff may wear special shoes and boots) serve one useful purpose - that of deadening sound.

Disadvantages - users' hands are contaminated in putting on or in removing them, scrupulous hand washing essential

- frequently supplies run out and incoming ward staff simply use the discarded soiled boots
- careless surgical staff in a hurry discard the boots on the stairs and in corridors
- They serve no useful purpose in preventing 'outside' contamination, as the wheels of the patient-trolleys are not decontaminated

Visors also vary in size, shape and usually have the advantage of providing a more comprehensive cover (for the whole face, perhaps) and do not fog up like goggles, but protect only from splashing. Also,

they are cumbersome to wear

circulating air carries germs

disposable visors are expensive, the others are awkward to clean and store, being bulky.

Some disposable visors come attached to masks (eg. Maskmate) but these are not recommended because of the cost and effectiveness due to poor fitting.

Uses

Labour wards

Operating theatre

Isolation

Dental surgery

Masks

Not often necessary in the ward situation, but if used at all, should be of the filter type.

Susceptible staff dealing with patients who have 'air-borne' illnesses should be aware of the limitations of most masks. For example, the Queen Charlotte type is effective for only about 30 seconds. One type of Surgene is effective for 30 minutes, while another will 'last' for about 2 hours.

Handling of Masks

No-one who has not been taught how to handle masks should be allowed to use them. This applies also to relatives visiting patients in isolation.

These are important considerations - if a mask has to be worn at all, it indicates that there is danger of infection and therefore the hands may not touch the mask or the wearer.

When removing a mask, touch only the tapes, and holding by the tapes, drop the mask into the pedalbin for waste.

A mask should NEVER:

* be worn pushed down off the face and left hanging around the neck

* be used a second time

* be left lying anywhere

A mask must go directly from the face into the waste bin, not into the pocket.

- they are misappropriated (by workshop staff to keep paint, etc. from their shoes; by other workers with sore feet - particularly on Night Duty, and so forth).
- "Bellowing" effect - spreads infections

Disposable overboots are of use in rare instances (e.g. in the VHF unit, to keep the shoes of staff members from becoming contaminated; and to prevent them from slipping on wet floors).

Uses

Operating theatre

Where splashing is likely to occur eg. labour ward

ICU

Visors and goggles

Staff attending patients who are generating those pathogens capable of penetrating mucous membranes should consider whether such germs are airborne (whether from the respiratory tract; by splashing; or mechanically induced aerosol dispersion). Protective eye-gear must be made available to all staff dealing with patients directly.

Ordinary spectacles provide some protection from direct splashing but not from pathogens circulating in the air.

Goggles come in a variety of makes but need to:

be comfortable in fit

be light in weight

be adjustable to head size

provide a clear field of vision - peripherally as well as the clarity of the 'lens'

be non-fogging

fit over ordinary spectacles

be re-usable, to cut costs, and therefore washable.

Indications for using masks Falls under Barrier/Isolation nursing

Uses

When nursing large open burns

Strict isolation

Mixing cytotoxic medication

Protective isolation - depending on the condition of the patient

Gloves

Disposable P.V.C. gloves (sterile) are not suitable.

Latex Examination Gloves, also disposable, and sterile or unsterile, as the case may require, have replaced P.V.C. gloves as safer to use.

Centres for disease control recommend universal precautions i.e. wearing gloves whenever exposure to blood or body fluids is likely - this includes touching any patient's mucous membranes; non-intact skin; handling items or surfaces contaminated by blood or body fluids; and doing IVI procedures, especially if the staff member is unskilled or the patient is unco-operative.

- use the right glove for the job
- use the best quality glove available when dealing with body fluid
- change gloves if any defect is noted
- wash hands after removing a pair of gloves & before donning another
- keep fingernails short to avoid punctures
- do not wear rings, bracelets, or other jewellery that might tear gloves.
- Gloves must be changed between patients.

Gloves may not be recycled.

1. Glove categories

Latex surgeons gloves sterile

- (a) for surgical procedures in operating theatres.

2. **Disposable latex examination gloves sterile**

- (a) Skin treatments, reverse barrier nursing
- (b) as well as the patient, protection of medical staff during lumbar punctures; aspiration/incision/drainage of abscesses, etc.

3. **Disposable latex examination gloves unsterile, clean**

For protection of the wearer when handling contaminated articles, bedpans, urinals and damp-dusting in high-risk areas, when the wearer has a skin lesion on the hand (covered with an occlusive dressing).

4. **Long-sleeved plastic disposable gloves**

These are restricted to Kitchen/catering staff and are used only when handling food/dishing up, so that wrist watches /bracelets/ sleeves do not come into contact with food, either.

5. **Heavy duty rubber gloves (not disposable)**

Domestic workers should wear disposable gloves when working in a contaminated area and should be carefully supervised for their own safety. But for general cleaning, washable heavy duty gloves should be issued on an individual basis and be replaced old for new.

Laundry workers (particularly those operating sluicing machines) need heavy duty rubber gloves with a longer sleeve than usual. So does the Mortuary attendant.

6. **Reinforced gloves**

Special gloves for the use of workers who deal with bags of waste, whether collecting or incinerating should be resistant to puncture.

Groundsmen who deal with drains; plumbers; electricians; autoclave maintenance staff; staff who deal with cytotoxics; staff who deal with radio-active material - will all need gloves developed for their specific activities.

Tests in the United States of America recently showed that surgeons should double-glove for lengthy operations, as there was 45% blood penetration of the outer glove compared to 1 - 2% of the inner one.

Surgical staff will have to balance the greater safety of double gloving against possible discomfort and reduced sensitivity and dexterity. For those people who are allergic to latex, hypo- allergenic gloves are available.

Uses

All sterile and aseptic procedures

All surgical procedures

Mixing of cytotoxic drugs

Maternity units

Protective isolation depending on patient

Strict isolation

For treatment and investigations per rectum

Handling of contaminated equipment

When treating patients with conditions that are transmitted through infected blood products.

Headgear

Those in authority should ensure that staff wear head covers correctly. Unless ALL the hair is securely covered, there is little purpose in using mob-caps; hats; 'doeks'; caps; helmets; etc. In even the healthiest, cleanest head of hair there is always debris, and it is to prevent this debris falling into the wound that O.T. headgear is worn.

Where strict isolation requires headgear, it is to prevent pathogens from lodging in the hair (a natural trap for anything air-borne) so the same care should be taken, in self-defence, to cover the hair.

The ideal headcovering would be of light material that allows air, but not moisture or organisms through; soft, flexible, comfortable; a design that is easy to wear, to put on, leaving only the face exposed, and with a shoulder yoke that will cover the neck and overlap the collar of the gown; strong enough to stand up to tugging over hair that has been coiled.

Caps to cover the hair should also be worn when dealing with food.

Uses

Operating theatre

Maternity Units - labour ward

CHAPTER 4

THE CARE OF WOUNDS

The purpose of wound care is to promote conditions for rapid healing without serious complications. The procedure used and the dressing applied must therefore contribute to the production and maintenance of an environment as close to the optimum as possible.

The Optimum Wound Dressing Should:

- Remove excess exudate and toxic components.
- Maintain a high humidity at the wound/dressing interface.
- Allow gaseous exchange.
- Provide thermal insulation.
- Be impermeable to micro-organisms.
- Be free from particulate and toxic wound contaminants.
- Be removable without causing trauma at dressing change.

Inspection of Wound

There must be a sound reason to remove the dressing:-

- Removal of sutures or clips.
- Discharge.
- Unexplained temperature.
- Swelling or surrounding inflammation.
- Prolonged tenderness/pain.

If a doctor wishes to inspect a wound, the dressing is removed using the aseptic technique when the doctor is at the bedside. If this is not practical then immediately before the doctor's morning round. Dressings must not be taken down and wounds covered in anticipation of the doctor's round.

Dressing of Wounds

Sterility and expiry dates of packs and other equipment to be checked before commencing dressing.

Aseptic technique should be used to prevent the transfer of micro-organisms into the wound.

Sterile gloves or forceps must be used to prevent unprotected hands from coming into contact with the wound surface.

There is evidence to show that gauze is not the most suitable dressing material, as the granulation tissue or epidermis grows into the interstices of the dressing fabrics.

The proteinaceous exudate which oozes into the wound surface within the first 24 hours, readily penetrates the fibres and surface irregularities of the dressing, dries and binds the dressing into the seal so that the dressing, scab and dermis become one.

Removal of an adherent dressing causes pain and damage to the wound. It ruptures some blood vessels and destroys some of the regenerating epidermis, thereby delaying healing.

As soon as exudate is visible on the outer surface, the dressing no longer presents a barrier to bacteria and must be renewed immediately and never repacked.

All wounds including sinuses should preferably be dressed dry.

Wet dressings encourage the growth of micro-organisms. Most antiseptics can damage tissue. The suture line must be dressed separately from the drain wound, this prevents seepage from the drain contaminating the wound.

Dressings should preferably not be opened within the first 48 hours post-operatively.

All dressings removed from the patient must be regarded as contaminated whether or not there is clinical evidence of infection. Dressing must be disposed of safely, and treated as hazardous waste.

To avoid the emergence of multiple resistant strains of bacteria, the application of topical antibiotics should be avoided.

The use of masks for aseptic ward procedures is not necessary.

Cleaning of Wounds

Wounds without discharge do not require cleaning. No attempt should be made to clean an operation wound to free it of dried blood. Crusts of blood act as a protective barrier.

Disinfectants and antiseptics harm the fibroblasts which produce collagen thereby delaying the healing process, therefore any advantage conferred by trying to eliminate bacteria from the wound are outweighed by the detrimental effect these substances have on the healing process.

If a wound needs to be cleaned, it must be swabbed from the clean to the dirty area and excess moisture dried before applying the dressings.

If a dressing is stuck to a wound it can be loosened with sterile normal saline.

Wound Drainage

A surgical procedure which requires drainage has a higher frequency of infection than one that does not have drainage. Drainage should therefore be used only when there is a definite indication for it. Drains act as retrograde conduits through which contaminants gain entrance to the wound. The presence of a drain itself impairs the resistance of the tissues to infection, this effect can be minimized by using a closed drainage system.

Drains should whenever possible be brought through a separate stab incision.

When a drain no longer performs the function for which it was intended it should be removed.

Drain sites should be dressed independently from the suture line.

Drain sites must never be repacked. They must be aseptically redressed when strike-through occurs.

Infected Wounds

The objective of local care of infected wounds is to prevent the spread of infection to other patients and to return the wound to a healing state.

Patients with known wound infections should have their dressings done last.

Dressings must be placed in impermeable bags at the bedside and be disposed of as hazardous waste.

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GUIDELINES FOR TREATMENT OF BURNS

1. **Indications for Admission to Hospital**

- a. Adults > 15%; Children > 8%.
- b. Respiratory burns.
- c. Burns to special areas - hands, face and feet.
- d. Adverse social conditions - out-patient treatment not possible.
- e. Requires skin grafting.
- f. Complications have set in.
- g. Electrical burns.
- h. Chemical burns.

2. **Assessment of Burns**

- a. Extent - % of body surface area (shading in burned areas on burns record chart). Area of the patient palm = 1% of body surface.
Use "Rule of 9".
- b. Depth - according to history and examination.

Flame burns

Prolonged hot contact burns nearly always

Electrical burns full thickness

Chemical burns

Still moist; unable to feel pin prick - probably full thickness.

Coagulated vessels in eschar are pathognomonic of full thickness.

Blisters formed; underlying burn skin pink and not blotchy - probably superficial.

Many burns are of mixed depth therefore must be treated according to what the majority of the burns look like.

DEPTH OF BURN IS CLASSIFIED AS:

Superficial - heals within one week; hardly a scar; no slough.

Deep dermal - heals within three weeks; some scarring; slough present.

Full thickness - will not heal without a skin graft; slough present.

3. Out-patient Dressings

Clean with antiseptic e.g. Savlon. Remove dead skin. Apply topical anti-bacterials (silver sulphadiazine, povidone iodine)

Dress with silver sulphadiazine gauze and "crepe" - twice weekly.

Small areas of burns may be treated with an occlusive dressing e.g. OPSITE, GRANUFLEX.

Change dressing sooner if:

- a) dressing falls off OR
- b) dressing becomes wet OR
- c) if burns become infected.

Out-patients - especially children - need substantial dressings.

N.B. Inadequate dressings are false economy.

If the burn has not healed within three weeks the patient should be admitted and referred for skin grafting.

4. **In-patient Dressing Regimen**

- a. **Superficial burns** silver sulphadiazine cream - twice weekly and where there is slough. Daily bath with
- b. **Deep dermal full thickness burns** excision of slough by nurses at every dressing. Dress with povidone iodine cream 5%.
- c. **Full thickness burns** Across hatching of the eschar should be done to allow penetration by the cream and loosening of the slough.

The eschar should be removed with a skin grafting knife after about 3 - 4 days.

Continue povidone iodine cream until ready for grafting.

- d. **Burns of the face** Wash frequently with diluted Savlon (1 in 100) or 1 in 2 000 aqueous chlorhexiding solution. Apply Neosporin ointment.
- e. **Burns of the eyelids** Massage chloramphenicol ophthalmic ointment 1% into eyelids and gently apply into eyes.

If eyes cannot close an **URGENT** eyelid contracture release must be performed by a Plastic Surgeon or exposure keratitis will ensue.

- f. **Burns of the hands** Superficial burns - silver sulphadiazine. Deep dermal to full thickness burns - povidone iodine cream 5%.

Each finger may be dressed separately with anti-bacterials and dressings.

The hand can be washed every day and a fresh polythene bag (e.g. Jiffy or freezer bag from supermarket) applied to allow movement.

The hand must be exercised during the day.

Splints may be applied over the bag at night.

Deep burns of the hands should be exercised and grafted **within** the **first** week.

- g. **Burns of the perineum** It is hard to keep dressings clean. The area should be cleaned after every bowel action or soiling.

Silver sulphadiazine or povidone iodine cream must be applied.

The wound is left open.

5. **Dressing After Grafting**

- a. Apply a layer of chlorhexidine tulle dressing and absorptive padded dressing over the graft. Remove the dressing after about 4 days.

b. **Donor site**

Small area - Dress with polyurethane film dressing e.g. "OPSITE".

Large area - Dress with chlorhexidine tulle dressing and absorptive padded dressing. Leave for 10 days unless infected - take off immediately. Alginate dressings e.g. KALTOSTAT may also be used to dress donor areas.

c. **If donor area fails to heal due to infection**

Clean and re-dress with chlorhexidine tulle dressing and silver sulphadiazine cream.

d. **Exposed skin grafts**

Cleanse twice a day. Spray with 1-2000 chlorhexidine solution aqueous.

e. **In case of infection after grafting**

Dress daily with paraffin gauze dressing and gauze soaked in 1 in 2 000 aqueous chlorhexidine solution.

f. **In case of overgranulation**

Apply steroid/neomycin ointment e.g. 1% Hydrocortisone with neomycin.

Leave exposed.

Caustic pencil may be applied to minor streaks of overgranulation.

Shine an angle poised lamp.

6. **If Silver Sulphadiazine/Povidone Iodine become Unobtainable**

Superficial burns:

Dress with paraffin gauze and gauze soaked in 1 in 2 2000 aqueous chlorhexidine solution.

Change dressing twice a week.

7. **Storage of Skin Graft**

Spread skin, keratin side down, onto paraffin gauze dressing.

Cut paraffin gauze dressing around skin, fold on itself, raw surface to raw surface, and wrap in gauze soaked in normal saline.

This should be kept in a dry, sterile container - refrigerate @4°. (DO NOT FREEZE).

This will keep for 3 weeks.

8. **Bathing Patients**

Bathing in chlorhexidine/cetrimide or saline is not necessary.

Warm bath water may be used to maintain relative sterility of the bath water.

After each patient, the bath must be cleaned with chlorhexidine/cetrimide.

9. **Dressing Materials : Burn Patients**

a. **Requirements**

Dressings should :- be comfortable
be non-adherent to wound
be absorbent
contain antiseptic
not come off
Paraffin gauze should not be used on its own but with an antiseptic. Bactigras is a paraffin gauze impregnated with chlorhexidine.

For absorption gauze is best. Ordinary gauze bandages should not be wound tightly around limbs for fear of causing constriction.

"Kerlex" should be used for circumferential dressings. However, this is only available for Plastic Surgery patients.

b. **For trunk dressings**

Gangee (a sandwich of cottonwool inside gauze) may be used and held in place with bandages.

c. **For application of burn cream**

A sheet of "Telfa" (or similar dressing - aerated plastic coated gauze) is spread on a sterile trolley top; apply cream to the above with a sterile spatula.

d. **For hands**

Individual bandaging of digits may be used.

Burn cream should be applied to the hand.

Use a fresh polythene bag every day. (Freezer bags are sterile).

Secure to the wrist with Micropore or Elastoplast.

Allow free range of movement of all fingers.

No other dressing should be applied within the bag.

10. **Antibiotics**

A single dose of long acting benzathine penicillin G should be given on admission to destroy haemolytic streptococci that the patients might be carrying.

No prophylactic antibiotic should be given thereafter, except for inhalation burn patients.

Only specific infections should be treated.

If the patient becomes toxic during the first two weeks, the chances are that it is a Gram positive infection, probably staphylococcus.

Thereafter the infection is probably Gram negative (Pseudomonas or Proteus).

Wound swabs should be taken weekly and antibiotics prescribed according to sensitivities. The present antibiotics used against Pseudomonas and Proteus are amikacin, ciprofloxacin, ceftazadime, and piperacillin.

11. **Nutrition**

A high calorie/high protein diet with iron and vitamin supplements should be given.

Patients with deep burns or more than 30% surface area should be given ENSURE by continuous nasogastric drip feed.

CARE OF ENDOSCOPES

In spite of the considerable increase in the use of fiberoptic endoscopes evidence of acquired infection associated with this technique is small. Where infections have been reported, the endoscopes have been inadequately cleaned or wrongly used. The main problem with endoscopes is that the time available between patients is often insufficient for effective disinfection or sterilization.

The handling, cleaning, sterilization, disinfection and storage of fiberoptic equipment should only be carried out by trained competent personnel. The relatively high cost of such equipment limits most hospitals to a restricted number of instruments for routine use and it is therefore essential to establish the following:

- (i) A method of routine cleaning of the equipment to avoid cross infection, to prevent channel blockage and the general deterioration of the instrument.
- (ii) Methods of disinfection to be used between patients.
- (iii) Methods of sterilization or disinfection to be used at the beginning and the end of each session.

The highest standard of sterilization or disinfection that is obtainable without damaging the instrument should be used.

1. Category A. Arthroscopes, Laparoscopes, Ventriculoscopes

Sterilization is essential in any procedure involving a break in skin and mucous membrane. Where the equipment is to be sterilized in an autoclave it is essential that the manufacturer's maximum temperature and pressure tolerances are not exceeded. Prior cleaning is essential before sterilization. See Category B for more details of cleaning procedure.

2. Category B Flexible Fiberoptic Endoscopes, Gastrosopes, Colonoscopes

Although 2% glutaraldehyde solution is expensive it has been shown that the rapid cleaning and disinfection cycle using this solution can bring about a substantial reduction in the numbers of bacteria without damaging the instrument. It must be remembered that the anti-bacterial activity of chemicals depends on a thorough cleaning of the instrument. If any organic matter is left on any part of the instrument it can act as a barrier between organisms and the chemical, preventing disinfection.

2.1 **Treatment**

- 2.1.1 Scrupulous cleaning of the insertion tube and channels with a brush to remove all organic material is essential. This cleaning should be done immediately after use to prevent drying of secretions and to lower the number of micro-organisms as a pre-requisite to any disinfection or sterilization procedure.
- 2.1.2 Inspection of equipment for damage is important at all stages of handling.
- 2.1.3 Disinfection of the insertion tube and channels using a 2% glutaraldehyde solution must be accomplished. Disinfecting solution must remain in the channels for the duration of the soaking period. (30 minutes).
- 2.1.4 Adequate rinsing must follow disinfection. This is necessary to prevent possible residual toxic effects of the disinfectant chemical. Sterile containers should be used for rinsing. Sterile gloves should be worn when removing the endoscope from the disinfecting solution.
- 2.1.5 Dry the endoscopes thoroughly because bacteria will multiply in a moist environment.
- 2.1.6 Endoscopes should be stored dry according to the manufacturer's recommendations.
- 2.1.7 Clean and disinfect accessories, forceps and brush.
- 2.1.8 The methods should be properly evaluated and retested if the disinfectant or procedure is to be changed.
- 2.1.9 If the endoscope has been used on a patient with tuberculosis, special treatment is required. It should be thoroughly washed with a detergent and glutaraldehyde solution (ensure that they are compatible) and if possible treated with ethylene oxide before re-use. If ethylene oxide is not available 2% glutaraldehyde solution for 10 hours should be effective. These patients should be put at the end of the operating lists.

2.2 Treatment Before and After Sessions

- 2.2.1 Endoscopes are always recleaned at the beginning and end of each session.
- 2.2.2 Accessories should be terminally sterilized by autoclaving.
- 2.2.3 Water bottles and their connections can be a reservoir for Gram - negative bacilli and should be sterilised and disinfected before and after a session. Store dry.

3. Category C. Rigid Fibreoptic Endoscopes - Cystoscopes

Cystoscopes present a special problem in that they are inserted into a normally sterile cavity and therefore sterilization by autoclaving is preferable to chemical disinfection. If chemical disinfection must be used, the cystoscope should be placed in the disinfectant in the vertical position to allow air bubbles to escape and the disinfectant to penetrate all parts of the instrument. 2% glutaraldehyde for 10 - 20 minutes. See Category B for detailed instructions.

PLEASE NOTE

- 1. Ethylene oxide sterilization, although effective, is impracticable because of the long aeration period.
- 2. Formalin is no longer recommended.
- 3. Automatic endoscope washing machines, if used, should be routinely cleaned and bacteriologically tested. Before purchasing this type of equipment, consideration should be given to literature which indicates the difficulties encountered in cleaning such machines.

DISPOSAL OF REFUSE WASTE AND SHARPS

Any waste material that has been in contact with human or animal sources is likely to contain moisture, protein or other organic materials which may be heavily contaminated with potentially pathogenic microbes.

The proper handling of waste material in the hospital is of vital importance in the prevention, containment and management of nosocomial infection. The objective is to keep the environment of the hospital and the community at large, safe and aesthetically acceptable.

Always bear in mind that the proper disposal of waste remains the responsibility of the producer of such waste, and can never be abdicated to a third person.

1. **Classification**

- 1.1 Domestic waste: paper, wrappings of disposable articles, plastic, glass bottles, tins.
- 1.2 Clinical waste: dressings, excretions, disposable materials used in isolation procedures.
- 1.3 Hazardous: Sharps, cytotoxic waste, pharmaceutical waste, human tissues, blood, body fluids, radio-active materials, laboratory waste.
- 1.4 High risk medical waste: Haemorrhagic fevers.
- 1.5 Fluid: Used water.
: Human excretion.
- 1.6 Food : Food waste.

2. **The Following Points must be Considered in the Disposal of Waste Material**

2.1 **Sorting**

Separation of wastes requiring different treatment IS essential. This should be carried out at the point where the waste is generated and the items discarded straight into the appropriately marked container. Colour coding is recommended.

2.2 **Departmental Storage of Waste Materials**

- 2.2.1 Containers appropriate for the type of waste concerned.

Containers should:

- be made of a material suitable to allow cleaning.
- be closed with adequately fitting lids:
preferably foot pedal operated.
- be impervious.
- be lined with a plastic bag.
- be strong enough to withstand handling and storage.
- not have their exteriors contaminated.

2.2.2 **Sharps**

Containers should:

- be rigid and the sides should be of sufficient thickness to prevent penetration by needles etc.
- be clearly identified.
- be seepage proof.
- be capable of being handled and moved while in use with a minimum danger of the contents spilling.
- have an aperture which under normal conditions inhibits the removal of contents that are destined for incineration.

2.2.3 **Food Waste**

Food waste requires solid impervious waterproof containers with well fitting lids.

Collection area must be separated from other refuse areas.

Frequent collection is essential.

Collection area must be thoroughly cleaned on a regular basis, kept free from flies, insects and rodents.

2.3 **Removal**

Since discarded waste is a nidus for multiplying microbes it should be removed from the patients' environment at regular intervals, at least twice every 24 hours.

2.4 **Transport to the Main Disposal Area**

2.4.1 Waste should be handled with care, since vigorous handling can split bags. Handle bags by the neck.

2.4.2 Check that the seal is unbroken when the container reaches its destination.

2.4.3 Know the procedure in case of accidental spillage.

2.5 **Storage Sites**

The sites should:-

- be properly constructed.

- be sited to avoid offence.

- be secured against access by unauthorized persons, cats, dogs, birds, rodents and other pests.

- be cleaned at regular intervals.

2.6 **Personnel Handling Refuse**

All staff who work with clinical waste including incinerator operators, should receive instruction in waste handling, sorting, colour coding of bags, storage and disposal procedures and where necessary the use of protective clothing.

All staff should be appropriately immunised.

2.7 **Disposal**

2.7.1 **Incineration** is the most satisfactory way to dispose of hospital waste. Furnace temperatures as high as 1000°C are necessary.

- 2.7.2 **Laboratory:** Waste from the laboratory is autoclaved before incineration.
- 2.7.3 **Cytotoxic Waste:** This is handled only by authorised staff, securely packaged in plastic lined rigid containers, marked biohazard and returned to authorised collection area for incineration under supervision.
- 2.7.4 **Hazardous Waste:** All human tissue, limbs, placenta etc. must be placed in plastic bags and incinerated under supervision as soon as possible.
- 2.7.5 **High Risk Medical Waste:** This requires special treatment before it is removed from the hospital premises. All waste should be incinerated. If this is not possible, waste should be autoclaved before removal from the premises.
- 2.7.6 **Radio-active Material:** This must be sequestered until activity has ceased.
- 2.7.7 **Fluid Waste/Sewage:** This should not be forgotten. Adequate processing should be a priority. Pipes and drains need regular inspection and maintenance. This should include toilets, showers, baths, guttering. In rural areas fluid waste is accommodated by the construction of septic tanks and french drains.
- 2.7.8 **Landfill:** The selection of sites is done by Public Health Inspectors to ensure protection of the subterranean water tables. Only solid waste is disposed of in the landfill site. Waste is spread, compacted and covered with lime and soil.
- 2.7.9 Rural clinics and hospitals which do not have facilities for incineration use fires for burning non-toxic waste.

"SHARPS" DISPOSAL

The prevention of accidental inoculation is accepted as one of the most important infection control measures in health care. Many diseases have been contracted in this way, HBV, HIV and VHF being a well-known few.

In addition, therefore, to supplying receptacles, protocols and tools, adequate training should be given to all personnel who might have to deal with sharps, including not only the medical, nursing, laboratory and other auxiliary staff but also the waste handlers, incinerator attendants, etc.

DEFINITION

"Sharps" is a general term for the potentially most hazardous element of clinical waste, and consists of used:

- needles - injection, suture, dental
- intravenous cannulae, 'butterflies', scalp vein sets
- blades - scalpel, razor, stitchcutters, lancets
- broken glass - ampoules, vials, bottles
- any other sharp-edged or pointed object or instrument

that is disposable. (Non-disposable sharp instruments should be handled with meticulous care when using, cleaning, disinfecting, storing).

OBJECTIVES

To reduce needlestick injuries, specific training should be included in all induction courses and reinforced regularly so that adequate precautions will be taken to prevent injury

- During the procedure
- During disposal of sharps
- When cleaning used instruments.

The end result should be greater protection of staff and patients from blood-borne infections, and protection of the community and the environment by safe final disposal.

If all members of staff are given training and the necessary tools, the onus is on every staff member to prevent injury and risk of infection, and the institution cannot then be held responsible for such injuries.

"SHARPS" Containers

1. Rigid, puncture-proof, water-proof, tamper-proof.
2. The aperture in the lid should be large enough to allow sharps to be dropped, not pushed. But said aperture should not be so large as to allow contents to spill if the container is accidentally knocked over. When sufficiently full, this aperture must be closed and sealed before removal from the ward/unit, in order to protect the workers who transport and finally dispose of this hazardous waste.
3. These containers are not re-usable and, when full, should preferably be incinerated and therefore must be made of material that will be so destroyed without creating toxic fumes, etc.
4. If the containers cannot be burned without damage to the incinerator or the environment, they could be autoclaved before disposal. If an autoclave is not available, concrete could be poured into the container, sealing in the contents and rendering them harmless before disposal in landfills.
5. The containers should be clearly labelled with the contents. To prevent needles and syringes falling into the wrong hands, the handling of used containers should be supervised by responsible staff.
6. The size of the container depends on the work unit where the sharps for disposal are generated:-
 - when needles are discarded still attached to the disposable syringes, a larger size container is required than would be the case where only vacutainers are used.
 - the same applies to the size of the ampoules discarded into the container.
 - the container should be able to hold one day's volume of discarded sharps", at the least, and three days' at the most. Prolonged use makes leakage and offensive odour more likely.

Handling

At source, eg, at the bedside, used sharps should be disposed of directly into containers that are specific for that purpose, so these containers should be located as close as possible to the area of use, eg, on the injection trolley.

Use only disposable syringes and needles. Leave the needle still attached to the syringe and discard into the sharps container as a unit. Do not attempt to resheath the needle.

Under no circumstances should "sharps" be discarded into garbage bags, so "sharps" containers should be readily available in the duty room, sluice room and the treatment room as well as on the trolley for IMI/IVI procedures and on the dressing trolley.

The container must be firmly sealed and replaced with an empty one before it becomes overfilled and dangerous to use/handle.

Syringes with exposed needles (in an emergency) should be carried in a receiver. Never leave used "sharps" lying around. Bending or breaking needles, lancets or other "sharps" is a dangerous and unacceptable practice. Do not cut off the tubing attached to vein sets, just drop the complete set into the "sharps" container.

Vacutainer System Only

As the barrels are reused, these needles are an exception to the rule of not resheathing disposable needles. However, the sheath should not be held in the hand but laid on a flat surface and the needlepoint introduced while the user keeps one hand behind his/her back. Once the needle is covered, the sheath may be handled to remove the needle from the barrel.

Various commercial sheath guards are available and some bought "sharps" containers have provision for removing these needles.

Forceps can be used to remove scalpel blades but are not slip-proof and care must be exercised.

Injuries

The term "needlestick" or "fingerprick" are generally used to describe all injuries caused by "sharps" as previously defined.

Health Care workers who sustain such injuries should immediately wash the area with soap and water, and, if necessary, apply a wound dressing before reporting the incident according to hospital protocol and the Provincial directive.

A register of all such injuries should be kept and the policy set out by Head Office relating to HIV and HBV from used needles must be adhered to.

LAUNDRY

1. Every person is a potential reservoir of infectious microbes, and every patient (and member of staff) is a susceptible host who can be easily infected.
2. Laundry managers, nursing and housekeeping staff are intimately involved in overall hospital infection control, whether they know it or not.
3. Used clothing and bedding is almost always heavily contaminated with living micro-organisms, generally from human beings, who not only harbour bacteria in skin but also shed them prodigiously.
4. These fabrics become inanimate transfer mechanisms for delivering microbes from person to person and place to place.
5. Improper linen handling is a prime contributing factor in airborne contamination. For instance, during a practical test, shaking a contaminated sheet near an elevator shaft in the basement generated a cloud of bacteria in the corridor five floors above in less than 5 minutes. Incorrect stripping of linen from a bed more than tripled the bacterial count in the area of the patient's room.
6. Initial removal of the contaminant is the first step towards preventing recontamination of linen.

Remember that patients cannot move out if they don't like the laundry service. We are responsible for ensuring that the patient receives the best that technology can provide, and only if we constantly insist on high standards will this be achieved and maintained.

Handling Linen

Clean linen must never come into contact with soiled linen. There must be a clean trolley or container set for bed change, and a container for soiled articles accompanying it, clean-linen trolleys should not have a soiled-linen container attached. Mops are available to clean up spillage. Linen should not be used for this purpose.

OBJECTIVES

1. Minimise the microbial contamination level of the environment by curtailing dissemination of such contaminance from soiled and used linen.

2. Minimise the probability of microbial transmission from reservoirs of infection to susceptible hosts, by destroying or removing microbes on used linen before it is reissued for use.

Handling of Clean Laundry

Clean articles should be bundled and wrapped. These bundles are then transported to the Central Linen Room where they are opened, checked and placed on the shelves. From the shelves they are counted out onto the Ward trolleys which should be covered. These trolleys should be cleaned frequently and the covers should also be removed and cleaned/changed daily.

These trolleys are designated for this sole purpose, and none of the equipment used to transport CLEAN linen should be used for transporting SOILED/USED linen.

In the wards, linen rooms for clean goods should never be used for any other purpose, they should not become catch-alls for personal belongings, cleaning compounds, bed guard-rails, or similar items because of the danger of cross infection. The linen room floor should be cleaned daily and the shelves washed weekly. The linen must be rotated from the back of the shelf to the front.

Handling of Dirty Laundry

Categories of (dirty) Laundry/Linen

Used linen can be divided into three categories:

- Soiled (dry)
- Soiled (wet)
- For patients in isolation the appropriate policy should be observed.

A) Soiled DRY Linen

This is laundry which is sent for washing after use, but which has not been fouled. At the bedside it is placed directly into the bag on the run-about. This bag is, when reasonably full, closed securely and removed according to hospital policy.

B) Soiled WET Linen

This is linen that has been fouled (urine, faeces, vomitus, etc.). Using gloves such solids as can be removed should be disposed of into the toilet pan or bedpan before placing the linen into the **YELLOW PLASTIC LAUNDRY BAG**. Add sufficient water to moisten the stain and secure as above. For patients in isolation refer to specific hospital policy. Under no circumstances may linen be soaked as this creates a further infection hazard.

Laundry Bags

The laundry bag system should convey contents from the patient to the laundry while protecting patients, nurses, domestics and laundry staff from the risks of cross-infection or contamination. Many organisms, including Staph. aureus, survive dry environmental conditions.

Laundry bags must be clean, durable, impermeable to micro-organisms, moisture-proof, and capable of being closed effectively. Bags must also go through the laundering process before being re-used. Plastic bags should be destroyed. Plastic bags should be tear-resistant and may be colour-coded to differentiate between linen (yellow) and garbage (black) content.

Use of Laundry Bags

All used linen that has been in contact with a patient should be handled as if contaminated.

- **NEVER THROW USED LINEN ON THE FLOOR OR ON FURNITURE**, place directly from patient into the appropriate laundry bag.
- **CUT DOWN ALL MOVEMENT OF LINEN TO A MINIMUM, never shake it.**
- **DO NOT CARRY USED LINEN IN YOUR ARMS**, avoid lice, scabies, etc.

If sluicing is done at ward level plastic aprons and gloves must be worn. When the linen is sluiced it must be bagged immediately.

NB:

1. It may be necessary to double the yellow plastic bags to avoid leakage, and bursting.

2. Do not overfill these bags. The weight of more than half a bag of wet linen will burst the bag.
3. Before placing linen in the bag (whether canvas or plastic) ensure that any debris, such as toilet paper, dressings, swabs, etc. has been removed from the linen. Be especially careful that no "sharps" are inadvertently included. All loose matter poses problems for the laundry - pipes become blocked, flooding follows (or a complete breakdown), and work is held up with consequent shortage of clean linen on the wards. It is also most unpleasant for Maintenance and Laundry staff.
4. Wards should ensure that they have sufficient stocks of bags to last until the next order is received.
5. **NEVER** use black plastic bags for linen.
6. Handle used plastic bags (containing linen or waste) gently - they may burst or create aerosols if dropped or kicked.
7. Reasons for use of plastic colour-coded disposable bags:-
 - To easily distinguish the contents of the bags.
 - To prevent bags of soiled linen from accidental incineration.
 - To separate infectious from non-infectious linen.
8. Torn linen must not be used.

Bedding

Mattresses

Every mattress in the hospital should be protected with a zip-up waterproof washable mattress cover. After discharge of the patient the mattress cover is washed with soap and water, and checked to ensure that the covering is intact and the zip undamaged.

Pillows

Every pillow should be stitched into a waterproof washable pillowslip cover (Sewingroom will do this on request). After discharge of each patient, the pillows should be washed with soap and water.

Blankets

As blankets can be a serious source of cross-infection, each one should be used by one patient only before being sent to the laundry, where they are washed in the same way as the other bed-linen. Blankets should preferably be made of cotton/cellular but if of wool, the Laundry will process them in a cooler cycle to minimise shrinkage.

The Laundry

An ideal layout would afford complete separation of clean and soiled areas. It is important that clean linen should not be recontaminated in storage or during transport to the wards.

Precautions should also be taken to prevent possible cross-infection arising from the movement of staff from dirty to clean areas. Ventilation should be adequate to remove heat and steam vapours generated by the washing and ironing processes.

There Must be Adequate Washing Facilities for Personnel

Sorting

Sorting of dirty linen is undesirable but unavoidable in practice. The quantity and variety of extraneous objects recovered from laundry bags is such that laundry managers feel that their capacity to damage linen, machinery and staff far out-weigh the infection risk.

Laundry staff may be exposed to the risk of infection if the handling systems employed are inadequate. Infected linen should be decontaminated before arrival at the main laundry or be put into the machine whilst enclosed in the plastic bag - no infected linen should be handled by the laundry staff.

During collection and washing there should be the minimum of disturbance to avoid dispersing infected dust or exposing staff to actual contact with infected material.

There must be no risk of infection from handling containers before the contents are placed in the washing machines, and the actual washing cycles should ensure that all infective agents are killed. Sealed impermeable bags may be carried through open wards or public corridors and transferred to the laundry with very little risk of infection, providing the outside of the bag has not been contaminated.

Sluicing Machines

These are special machines for sluicing linen as a preliminary to the ordinary laundering in washing machines. The sluicing area should be separate from the main laundry, and waste water from the sluicing machines should be discharged directly into a drain so that splashes and aerosols do not contaminate the laundry environment.

The operator should wear rubber boots, heavy duty rubber gloves with extended sleeves, overalls, and a plastic apron. A cap and mask should also be available, depending on the circumstances. It is essential that the operator clearly understands the use of the protective clothing supplied and the implications thereof.

The operator and his assistant/relief must be trained in the proper use of the machine. It should not be overloaded, as the circulating water will not reach the centre of a tightly-packed load, much less rinse it.

The operator is at some risk and should be offered immunisation against a disease such as Hepatitis B. As this is a responsible position, the calibre of the person appointed to the post is of importance.

The staff members who collect used linen from the wards or chute collection area, as well as those who sort and count the dirty linen prior to despatch for washing, should also wear protective clothing and be offered immunisation.

There should be adequate facilities for handwashing and ideally, also a shower and changeroom where the operator can change into a clean overall daily. He/she should change out of protective clothing before leaving the sluicing area for any purpose.

The sluicing machines should ideally be situated in an area adjoining, but not part of the sorting and counting area. Both areas should have floors that will stand up to frequent washing down with disinfectant - at least once daily. Drainage should be adequate and well maintained.

If the hospital wards do not have access to a laundry chute system, the bags of soiled/used linen should be removed from the wards on at least twice-daily collection rounds. The sorting and counting area adjacent to the sluicing area should therefore also be able to accommodate bags of "waiting" linen over weekends if the system is not run on a seven-day week.

Washing Machines

These must be used and maintained as per manufacturer's instructions. All linen should be disinfected by the washing process. Thermometers should be sited on machines and times and temperatures of the disinfectants process checked with every cycle.

Disinfecting

65° for 10 minutes

71° for 3 minutes

93° for 10 minutes (foul infected linen)

Hypochlorites and quaternary ammonium compounds are readily inactivated by organic material during the washing process but may be effective if added during the rinsing cycle.

Chutes

A chute is an excellent method of used linen transport, if the design of the hospital allows (however single floor and high rise hospitals do not lend themselves to this system).

Only bagged linen should be dropped down the chute. As soon as the canvas bag is full, the drawstring is tied, holding in the contents and the bag is immediately punched through the hatch into the chute, so avoiding an accumulation of dirty linen in the ward.

Laundry chutes should be maintained under slight negative pressure and terminate in a secured room on the ground floor or basement of the hospital. This room should give access only to laundry staff and provision should be made to accommodate trolleys or vans for the removal of the bags to the sorting area.

It is important to provide good ventilation to the room where the chute empties. The construction should also facilitate mopping and draining.

Equally important is the safety aspect - guards should be erected to prevent staff from straying "into the line of fire" as the bags descend with considerable force.

Yellow plastic bags containing the wet linen are adequately sealed, and gently handled, risk of bursting is minimal.

Occasionally a chute may become blocked:-

- If the receiving area is not cleared fast enough
- If too large a "bolus" is forced into the hatch (this may occur if a bundle of linen is not placed into the canvas bag, or if the bag is overflowing and not closed).

Odour is avoided by venting the shaft to the outer air and by regular maintenance.

Education

The quality of the service depends mostly on adequate staff selection and training. Ward Staff and Laundry staff should be trained in the following:

Ward Staff

Hospital hygiene and personal hygiene. Care, handling, storage and transport of linen. They must also be taught to remove all extraneous items before placing linen in the bags, and brought to realise the harmful effect such items may have on the health of the laundry staff.

Laundry Staff

Hospital hygiene and personal hygiene. Care, handling, storage and transport of linen. Wearing of protective clothing, how and why. Use and maintenance of machines and equipment.

Correct handling of linen, throughout the cycle from clean to dirty and back to clean, not only promotes the well being of patients and staff but cuts down considerably on cost.

NB: It is no longer considered necessary to soak linen.

**GUIDELINES FOR THE PREVENTION OF
INTRAVENOUS ASSOCIATED INFECTIONS**

1. Venepuncture is an invasive procedure which offers ample opportunity for the introduction of micro-organisms into the bloodstream.
2. Intravenous cannulae should only be inserted when clearly indicated by the patient's clinical requirements.
3. Intravenous therapy should not be used when oral therapy would suffice, nor should the vein be "kept open" for the convenience of medical staff.

GENERAL PRINCIPALS

1. Intravenous equipment and containers must be inspected for faults, leaks, hairline cracks, expiry date or any particulate contamination.
2. Always choose the smallest gauge needle possible to adequately deliver the desired intravenous therapy.
3. When selecting a suitable vein consider the following factors:-
 - location and condition of vein
 - purpose and duration of the therapy

Distal veins of the upper extremities should be used first, avoid areas of flexion.

The opposite side of a surgical procedure. Preferably not on a patient's dominant side.

4. Aseptic techniques must be used to ensure adequate reduction of micro-organisms on the patient's skin prior to the insertion of the intravenous cannula. A new cannula should be used for every insertion.
 - 4.1 Hands must be washed thoroughly prior to this procedure.
 - 4.2 A sterile pack must be used for the insertion of the cannula.
 - 4.3 An alcohol based solution must be used to clean the skin, clean using friction and allow to dry.
 - 4.4 The infusion site must not be palpated again after disinfection.

- 4.5 The cannula should be securely anchored to prevent friction or trauma.
- 4.6 The sterile dressing applied, should allow for easy observation of the insertion site and the surrounding tissue.
- 4.7 The date of insertion should be recorded for easy referral for site change.
5. The cannula and tubing should be changed every 72 hours.
6. The fluid container must not be in use for more than 24 hours.
7. The intravenous infusion site must be checked regularly for phlebitis, inflammation, infiltration and purulence. If any signs of infection are present the cannula must be removed immediately using Aseptic Technique.
8. Manipulation of intravenous lines should be meticulously carried out by people who are proficient in this intervention.
9. Changing of intravenous containers is an aseptic procedure.
 - 9.1 Hands must be washed thoroughly.
 - 9.2 The diaphragm of the container must be swabbed with an alcohol based solution and allowed to dry.
10. Conventional airways, not needles should be used to vent bottles. The airway has a cotton wool plug serving as a bacterial filter, this is only effective as long as it remains dry.
11. The use of stopcocks should be avoided wherever possible. Unprotected stopcock parts are a break in the sterile intravenous system and have been identified as a cause of contamination.
12. Discontinuation of intravenous therapy must be done as an aseptic procedure.
 - 12.1 Hands must be washed thoroughly.
 - 12.2 A sterile pack must be used.
 - 12.3 The site must be cleaned with an alcohol based solution and allowed to dry.
 - 12.4 A sterile dressing must be applied over the infusion site.

13. The application of anti-microbial agents is not recommended.
14. Following the administration of blood products the entire administration set should be replaced.
15. Intravenous lines must not be used for the collection of blood samples.
16. If the infusion is not running properly the cause must be found, the use of forceful methods to "get it going" are in-excusable, clots in or around the cannula may trap circulating micro-organisms and infected thrombi could be pushed into the bloodstream.
17. Interstitial infusions must be re-sited, using the aseptic technique, and the cannula must be replaced.
 - 17.1 If there is any time lapse between discontinuation and recommencement, the administration set and fluids must also be replaced.
18. It is recommended that partially used intravenous fluids be discarded.
19. The addition of medication to the intravenous containers should be avoided where possible because of the risk of contamination and incompatibilities.
 - 19.1 If necessary additives to infusion fluids should be done aseptically and ideally by the pharmacist.

Small single dose vials should be used. If multidose vials are used vigorous decontamination of the diaphragm should be done. Multidose vials should be dated, refrigerated and discarded after 24 - 48 hours.
 - 19.2 Medication must never be added to glucose solutions or nutrient solutions or into blood and blood products as they are excellent culture media for bacteria.
20. Insertion of central lines must take place under optimal aseptic conditions and should ideally take place in the operating theatre.
21. Whenever possible a percutaneous insertion should be attempted before resorting to a cutdown.

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**GUIDELINES ON MANAGEMENT OF
INTRAVENOUS LINES**

1. **Objectives**

- 1.1 To maintain a sterile intravenous line.
- 1.2 To prevent cross infection from:-
 - 1.2.1 Doctors and nurses hands (Exogenous Infection).
 - 1.2.2 Patients' skin commensals (Endogenous Infection).

2. **Equipments**

2.1 **Containers and contents**

- 2.1.2 Inspect the bottle for cracks.
- 2.1.3 Squeeze bag to detect holes.
- 2.1.4 Check the identity of fluid and expiry date.
- 2.1.5 Examine fluid against a dark background and in good light after inverting the container.

- if any defect or sign of contamination is noted e.g. particulate matter, bacterial growth or fungus. THE CONTAINER MUST NOT BE USED. NOTIFY PHARMACY DEPARTMENT and save the container for inspection.

- Remove all containers of the same batch to an area where they will not be used and note number.

2.2 **Administration Set**

- 2.2.1 The box must be unopened and undamaged IF NOT - DISCARD AS UNSTERILE.

2.2.2 Check that no foreign matter is present
IF SO - DISCARD AS UNSTERILE.

2.3 **Airway**

2.3.1 Check that cotton wool plug is present IF NOT - DISCARD
AS UNSTERILE.

2.3.2 The cotton wool plug must not become wet either when setting
up infusion, or during use. If it does CHANGE IT AT ONCE.

NB. Hypodermic needles must not be used as airways. They have
no bacterial filter and fluid will readily become contaminated
by air.

- In line BURETROLS must never be vented since air filters are
incorporated into the design. The filter must never be removed
to speed up drip rate.

2.4 **Cannula**

2.4.1 The cannula is double packed. The packing must be intact. IF
NOT - DISCARD AS UNSTERILE.

2.4.2 Check expiry date.

2.4.3 **Scalp Vein Needles** - Do not secure scalp vein needles with
plaster of paris. This hazardous practice conceals signs of
infiltration.

2.5 **Dressing**

Adhesive moisture vapour permeable transparent dressing
to secure cannula and seal puncture site when cannula has been
inserted. This will allow visual inspection of I.V. site without
interfering.

2.6 A pair of scissors to be provided.

3. **Insertion of Cannula into Vein**

3.1 **This is a Sterile Procedure**

A trolley with the above-mentioned requirements is prepared by
the nurse assisting the doctors.

- 3.2 Wash hands and wear sterile gloves.
- 3.3 Clean the site with alcohol 70%.
- 3.4 Handle cannula with care and avoid contamination of tip.
For detailed procedure - See Annexure attached.

4. **Recording**

- 4.1 The following details are recorded in the Drug Prescription form (Intake and Output Chart) for every container of infusion administered.
 - Date and time of setting infusion.
 - Intravenous fluids/blood given.
 - Drug additives : Dose and method of addition.
 - Signature of staff member putting up the infusion.

5. **Discarding of Infusion Tray**

- 5.1 The needle/Trocar is discarded immediately into a safe Sharps' container.
- 5.2 Used gloves and plastics are discarded as hazardous waste.

6. **Change of Infusion Bag/Vacolitre**

- 6.1 Prepare vacolitre.
- 6.2 Clamp off infusion line.
- 6.3 Remove empty vacolitre paying special attention not to contaminate the spike of the intravenous line.
- 6.4 Insert the spike into the bag, and record.

7. **Change of Infusion Lines**

- 7.1 Wash hands with soap and water.
- 7.2 Ideally change lines every 48 - 72 hours whether the drip is running well or not.

7.3 Change administration set if a change is made from blood to dextrose solution and vice versa.

7.4 Record the change of infusion lines.

8. **Change of Cannula**

Infusion cannula may be responsible for septicaemia if kept in situ for an indefinite period.

8.1 Change cannula every 48 - 72 hours, preferably every 48 hours and apply a dressing.

8.2 When I.V. fluid therapy is used in a patient with few available veins this guideline may need to be modified.

8.3 Any modification requires that doctors and nurses caring for that patient should be extra careful with their aseptic technique and frequent inspection of I.V. sites.

8.4 Record the change of cannula.

9. **Checking of Infusion Flow**

Check flow frequently immediately after insertion and $\frac{1}{4}$ hourly when required until satisfied that the fluid is running well.

PLEASE DO NOT SWITCH OFF I.V. THERAPY.

10. **Infusion Sites**

10.1 Inspect infusion sites at least three times a day and when required.

10.2 If signs of phlebitis or infection show, the cannula must be removed.

10.3 Take a swab for culture and sensitivity from the site and the tip of the cannula to be sent to the laboratory to check on the infective organism.

11. **Removal of Cannula**

11.1 **Prepare a Tray with the Following Equipment:-**

- Sterile gloves
- Sterile gauze swabs
- Alcohol 70% e.g. Webcol swabs
- Adhesive surgical tape e.g. Transpore
- A pair of scissors

11.2 **Technique for Removing Cannula**

11.2.1 Wash hand and wear gloves

11.2.2 Apply pressure with sterile dry swab over the insertion site when catheter is gently removed.
Apply pressure until bleeding stops.

11.2.3 Clean around the site to keep area dry.

11.2.4 Apply dressing and secure in position.

11.2.5 The elbow should NOT be bent upwards if site was the antecubital fossa. This causes bruising and haematoma.

11.2.6 Record the removal of cannula.

12. **Addition of Drugs (Implications and Indications)**

12.1 The addition of drugs to intravenous fluids has disadvantages and dangers.

The prescriber should realise this when deciding on its necessity.

12.2 If drugs are added into a vacolitre, some toxic or inactive products may be formed without any visual change in the solution.

12.3 Addition of drugs to intravenous fluids carries a risk of microbial contamination.

12.4 Dosage may be inaccurate if the rate of the infusion changes.

12.5 It is indicated when intermittent injection is dangerous or irritant or when constant blood levels are required.

12.6 Ideally drugs should not be added into vacolitres. An over ride set should be prepared if drugs are to be given intravenously.

12.7 Labelling of the bag is essential.

The dosage of the drug added should be clearly written.

12.8 Recording is done on the prescription chart.

12.9 If drugs are to be added in wards - Ask for guidelines for incompatibility of drugs from the pharmacist.

13. **Routine Maintenance of Patient**

I.V. Line should be avoided unless condition of patient requires it, because of risk of infection.

ANNEXURE A

PROCEDURES FOR INSERTION OF CANNULA INTO THE VEIN

1. A tray is prepared with equipment as shown in the guidelines.
2. Apply a tourniquet above the site.
3. Aseptic technique is used. In emergencies where this is not possible, resite the cannula at the earliest opportunity.
4. Preferably cannula should be sited in the upper limbs where possible.
5. The chosen site is cleaned thoroughly with sterile swabs and alcohol 70% or Webcol swabs. The cleaning is done with friction for two minutes, working from the centre of the area to the periphery.
6. The vein is not palpated again after the site has been cleaned.
7. With the bevel of the cannula upward, puncture the skin about 0.5 to 1.0 cm from the vein, enter the vein either from the side or from above.
8. Note blood return and advance the cannula through the needle.
9. Withdraw and remove needle and attach infusion tubing.
10. Release tourniquet and allow fluid to flow. Dry excess fluid around site.
11. The cannula is anchored in position in a "SLING" fashion. This prevents a "TO & FRO" movement and also avoids potential transport of microbes into the puncture wound.
12. Sterile transparent hydrocolloid dressing is applied over the site to seal the puncture wound.
13. The tubing is looped and taped onto the limb to prevent pulling.
14. A splint will be necessary only if the cannula was inserted into a vein in the ante-cubital fossa.
15. The rate of flow is adjusted.
16. Recording is done.

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CONTROL OF HOSPITAL INFECTION 2nd Edition - 1982

Chapman and Hall Ltd London

**INFECTION CONTROL GUIDELINES FOR
THE MANAGEMENT OF TOTAL
PARENTERAL NUTRITION**

INTRODUCTION

Infection risks associated with the administration of T.P.N. are reported to be between 6% - 7%. The risk of infection is particularly great because of the possible long period of treatment with a catheter in a central vein and the likelihood of bacterial or fungal growth in the fluid. Gram negative bacilli and especially yeasts are able to grow in T.P.N. fluid. This risk can be substantially reduced if infection control measures are practised.

1. **Objectives**

- 1.1 To maintain a sterile intravenous line.
- 1.2 To prevent contamination of total parenteral nutrition solution.

2. **General Principals**

In addition to suggested guidelines for intravenous therapy (see policy) the following guidelines are recommended for total parenteral nutrition.

3. **Specific Precautions**

Some of the possible sources of infection are:-

- 3.1 Contamination of the blood stream due to inadequate surgical asepsis at the time of insertion.
- 3.2 Introduction of an unsterile catheter.
- 3.3 Failure to change the infusion sets and dressings at recommended intervals.
- 3.4 Contamination of the nutritional fluids during preparation and use.

4. T.P.N. Solutions

- 4.1 Every effort should be made to minimize contamination of the solution.
- 4.2 The nutrient fluids, components and additives should be mixed or prepared by qualified staff under strict aseptic conditions, preferably pharmacy staff, under laminar flow if available.
- 4.3 Infusion should be completed within 24 hours of preparation.
- 4.4 If fluid is not used immediately after preparation it should be refrigerated.

5. Insertion of the Catheter

- 5.1 Insertion of the catheter is a surgical procedure and preparation for it is consistent with that for any other major invasive procedure.

Preferably insertion of a catheter should be done in the operating theatre.

- 5.2 Face masks are worn.
- 5.3 The doctor and assistants do a surgical scrub with an approved iodophor solution which has broad-spectrum antibacterial activity and some residual effect.
- 5.4 Sterile gowns and sterile gloves are worn throughout the procedure.
- 5.5 A povidone iodine or hibitane/alcohol solution is used to clean the skin for 2 minutes, after which the skin is allowed to dry.
- 5.6 If surgeon/physician who preps the skin is also responsible for the insertion of the catheter, sterile gloves are changed for a new sterile pair at this point.
- 5.7 After catheter insertion a sterile occlusive dressing is applied. The catheter should be secured to prevent to and fro movement within the vein which may lead to potential transportation of skin commensals to the puncture wound.
- 5.8 The dressing should allow easy observation of insertion site and surrounding tissue.

6. **Administration Of T.P.N. Solution**

- 6.1 The T.P.N. solution is administered only when the catheter position has been confirmed by X-Ray.
- 6.2 The T.P.N. solution is allowed to run for 24 hours i.e. 08H00 to 08H00. Discard any remaining solution at 08H00 to commence new day's infusion.
- 6.3 Check frequently to maintain a constant flow rate. Flow rate is not increased if fluids fall behind schedule.
- 6.4 Keep the line open with maintelyte or dextrose solution if T.P.N solution finishes.
- 6.5 Avoid using normal saline to keep the vein open (There is a danger of hypoglycaemia).
- 6.6 **DO NOT USE T.P.N. CATHETER FOR ANY OTHER PURPOSE OTHER THAN DELIVERY OF TOTAL Parenteral NUTRITION SOLUTION. NO I.V. SOLUTIONS OR MEDICATIONS ARE GIVEN THROUGH THIS ROUTE.**
- 6.7 Do not draw blood for sampling from this site, similarly blood or blood products are not administered via the T.P.N. route nor should the T.P.N. system be used to measure central venous pressure.

7. **Care of Giving Sets**

- 7.1 Change giving sets every twenty four hours.
- 7.2 **Clamp** extension set when changing giving set to prevent air embolus.
- 7.3 Use an aseptic technique when changing bottles and giving sets.
- 7.4 Do not put stop cocks or manometers in the system.
- 7.5 Good nursing prevents blocking of lines. If lines block and need flushing a strict aseptic technique is employed by competent staff.

8. **Change of Dressing**

- 8.1 Change of dressing is a sterile procedure. Strict adherence to aseptic technique is vital to the success of T.P.N. therapy.

- 8.2 The task of dressing changes is performed by the same team each time if at all possible. Comparative observations of changes in the skin appearance are easy to make. Report any change in the skin appearance.

9. **Change of Insertion Site and Catheters**

- 9.1 Use aseptic technique, insert a new sterile catheter at a different site if signs of inflammation are observed.
- 9.2 Report to doctor any signs of inflammation. Remove catheter immediately if signs of inflammation are observed. Cut 5 cm of the distal end of the catheter with a sterile scissors, place catheter tip in a sterile container and send to laboratory for semi quantitative culturing.
- 9.3 There is no specific assesment regarding the frequency with which the insertion site is changed. Catheter should be removed/replaced if any septic foci is present e.g. Urinary tract infection Respiratory tract infection, intra-abdominal sepsis.

10. **Nursing Responsibilities**

- 10.1 Maintain insertion site properly in order to protect it from infection.
- 10.2 Check for leaks in catheter line, keep dry.
- 10.3 Inspect catheter insertion site 4 hourly and p.r.n.
- 10.4 Clean catheter site (utilizing the same strict aseptic technique as at insertion) and apply a fresh sterile occlusive dressing when necessary.
- 10.5 REGULAR MOUTH WASH CARE : SPECIAL OBSERVATIONS FOR GLOSSITIS, PAROTITIS AND THRUSH.
- 10.6 Mobilize patient as much as possible.

11. **Observations**

- 11.1 **Weight** Daily if possible.
- 11.2 6 hourly vital signs.

- 11.3 Rise in temperature and ? catheter sepsis are reported immediately to the doctor.
- 11.4 Test urine 6 hourly for glucose and ketones.

OR

- 11.5 Dextrostix 6 hourly until stabilized.
- 11.6 Observe patient closely for signs and symptoms of complications.

MONITORING DATA	POSSIBLE SIGNS OF
- Blood glucose in excess of 200 mg/daily.	- Hyperglycaemia
- Urine glucose in excess of 1+ glucosuria.	- Hyperglycaemia osmotic diuresis
- Weight loss.	- Overall inadequacy of parenteral nutrition
- Increased pulse rate, blood pressure and sweating.	- Hypoglycaemia
- High temperature.	- Infection
- Swelling oedema over the puncture site.	- Infiltration of solution into surrounding tissues.
- Low serum electrolytes.	- Electrolyte imbalance
- Distended veins in neck, arms and hands.	- Fluid overload.

14. **Recording**

- Record all nursing care given e.g.:
- Insertion of T.P.N. by doctor.
- The type of T.P.N. solution put up and quantity administered.
- Change of T.P.N. solutions.
- Change of dressings.
- Change of insertion sites. Observation etc.
- Report any abnormalities to doctor.

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GENERAL GUIDELINES FOR THE MAINTENANCE AND USE OF RESPIRATORY EQUIPMENT

Hospital acquired or associated chest infection is often endogenous, occurring in patients with existing respiratory disease. Instrumentation is an important predisposing factor. Endotracheal tubes and Tracheostomies bypass the normal respiratory defence system. Organisms associated with instrumentation or mechanical ventilation are mainly Gram - negative bacilli. Essentials for the prevention of Gram - negative infection are :-

- Effective hand washing between patients
- Decontamination of equipment.

1. Tracheostomy

The patient who has a tracheostomy is at risk of acquiring an infection, because the tracheostomy establishes a direct line of communication between the environment and the broncho pulmonary tree, nasal passages and oropharynx that normally provide defence against invasion of the lower respiratory tract have been bypassed. Particular measures are now required to compensate for this.

- 1.1 Tracheostomy should be performed electively and aseptically in the operating theatre, I.C.U. or C.C.U.
- 1.2 All manipulations at the site should be carried out aseptically. Sterile gloves and drapes should be used when doing tracheostomy care. Dressings should be done at least daily and when required.
- 1.3 High humidity must be maintained in the tracheobronchial tree.
- 1.4 Equipment and medication used in the care of the tracheostomised patient must be sterile and reserved for the patient only.
- 1.5 Inner cannula must be changed 2 - 4 hourly. Sterile cannula should be used for each change, if this is not possible, washed, cleaned, soaked and rinsed in sterile water before being replaced.
- 1.6 After the tissue tract has been stabilized the trachy tube should be changed every 7 days.

2. Suctioning

Minimizing retained secretions is one of the most important aspects in controlling infection, since these are an excellent culture medium for the multiplication of potential pathogens.

- 2.1 Suctioning of secretions from the tracheo-bronchial tree should be carried out as often as necessary to avoid excessive accumulation of the secretion.
- 2.2 Suctioning should be performed gently, since excessive vigorous suctioning may interrupt the mucous barrier and produce local surface abrasions, increasing susceptibility to infection. Suction procedure should never last more than 10 seconds at a time.
- 2.3 Aseptic technique should be used for suctioning. The use of sterile gloves is essential.
- 2.4 Suction catheters should be transparent so that staff can observe secretions.
- 2.5 The use of a fresh sterile catheter for each single insertion and aspiration is recommended, then discard the catheter. Repeated withdrawal and re-insertion of the same catheter is not recommended.
- 2.6 The catheter should not be connected until required. It should however be readily available in an emergency.
- 2.7 Sterile saline or water and medication should be used for tracheal lavage if the secretions are tenacious. Unit dose or small multiple dose medication vials should be used. (10 mls)
- 2.8 Empty suction bottles every 12 hours. If the bottle is more than half full foaming is likely and may contaminate the environment.
- 2.9 Bottle and tubing should be changed every 24 hours. Disinfect by heat if possible.
- 2.10 When not in use the bottle should be kept dry.
- 2.11 In the absence of piped suction, a separate machine should be available for each patient and decontaminated before use by another patient.
- 2.12 Independent vacuum pumps must have a bacterial filter between reservoir bottle and the pump, to avoid the dispersal of bacteria from the pump effluent.
- 2.13 Filter changes should be done when the filter is wet or discoloured and following a known suspected patient. Guidance as to when to change dry or unstained filters should be available from the manufacturers.

3. **Humidifiers**

3.1 Humidifiers should be cleaned and stored dry between patient use. Disinfect by heat if possible. Hot water and soap.

3.2 Water should be replaced and not topped up.

4. **Nebulizers**

The purpose of aerolization is to instill a medication such as a bronchodilator, to prevent drying of the mucous membrane or to break up thick secretions and increase the effectiveness of the cilia. Unfortunately bacteria of the same size can be carried with the aerosol into the lungs, the potential for infection therefore exists.

4.1 Nebulizers must be changed every 24 hours.

4.2 Each patient must have his own.

4.3 A nebulizer must never be topped up. It should be completely emptied and refilled.

4.4 Stored clean and dry between use.

4.5 Unit dose of sterile water or saline used to fill nebulizer reservoirs should be dispensed aseptically. Unused portions must be discarded.

4.6 Unit dose or small multiple dose medication vials should be employed. Multiple dose vials are easily contaminated.

5. **Ventilators**

Patients on ventilators are more susceptible to respiratory tract infections for two reasons. Firstly they may be debilitated by extremes of age or compromised due to disease or treatment, secondly the cough reflex is a vital local defense against bacterial invasion of the lower respiratory tract. In the ventilated patient secretions and bacteria pass freely into the lower respiratory tract giving rise to infections.

5.1 Patient tubing, between ventilator and patient should be changed and autoclaved every 48 hours. This reduces the multiplication of potential pathogens and consequently the bacterial challenge to the patient's respiratory tract.

5.2 Incorporation of a moisture traps in the tubing is advisable, which must be readily removable, easily cleaned and able to withstand autoclaving.

Removing of fluid buildup in the corrugated tubing should be performed frequently.

- 5.3 Most methods of chemical disinfection suitable for ventilators will not work effectively in the presence of organic matter and none of these methods are entirely reliable. When chemical disinfection is chosen as a method of cleaning only glutaraldehyde is recommended for respiratory equipment. Discard dates must be carefully watched. Sterile water must be used for rinsing. This must be done aseptically to avoid recontamination of the equipment.

6. Anaesthetic Equipment

- 6.1 All anaesthetic equipment must be decontaminated.

Ideally each patient should be provided with a clean anaesthetic circuit. In these days of financial constraints this may not be possible and a reasonable alternative is:-

- (a) Endotracheal tubes and airways should be disposable or sterilized after every use.
- (b) Face masks, connectors and laryngoscope blades should be decontaminated by thorough washing and drying after every use.
- (c) Reservoir bags and tubing changed after every operating session or daily and after any known infection.
- (d) Equipment should ideally be processed in C.S.S.D. If heat processing is not possible the equipment can be washed thoroughly and immersed in a 2% glutaraldehyde for 1 hour. Rinsing must be done aseptically and thoroughly as glutaraldehyde can cause damage to the lungs.

7. Purchasing

When purchasing respiratory therapy equipment and materials one should take into account the selection of materials that allow for the most effective and practical methods of sterilization or disinfection, which in the order of effectiveness are:- steam autoclave, disposable, Ethylene oxide, pasteurization and chemical disinfection. The staff using the equipment and specialist in the field should have a say in the purchasing and ordering of equipment.

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PRINCIPLES OF URINARY CATHETERIZATION

Infection of the Urinary tract is the most common type of nosocomial infection representing 42% of hospital acquired infection. Catheterization is the main cause of hospital acquired urinary tract infection and the commonest predisposing factor in Gram - negative septicaemia, the risk to the patient is further increased when the indwelling urinary catheter is poorly managed. The incidence of urinary tract infection in patients on continuous drainage approaches 100% after 4 days.

There are Six Major Principles to Minimize the Risk of Urinary Tract Infection

1. Avoidance of unnecessary catheterization or re-catheterization.
2. Observance of strict aseptic technique.
3. Avoidance of trauma to the neck of the bladder and urethra.
4. Establishment and maintenance of a closed drainage system.
5. Maintenance of appropriate catheter toilet.
6. Education of the patient.

Each principle will now be considered individually.

1. Avoidance of Unnecessary Catheterization and Re-catheterization

1.1 Catheterization

Valid reasons for urethral catheterization are:-

- relief of acute or chronic urinary retention
- pre and post-operative bladder drainage
- bladder drainage in paralysed patients
- Accurate measurements of urinary output in the critically ill patient.

Urethral catheterization should not be used routinely to obtain a urine specimen for microbiological examination, nor should it be used simply as a means of preventing skin maceration in the incontinent patient.

A catheter should be removed as soon as possible because the prevalence of bacteria increases with the duration of catheterization.

1.2 **Re-catheterization**

Re-catheterization can be avoided by:-

1.2.1 **Using the Appropriate Catheter in the First Instance**

Catheters are made of various materials - latex rubber, polyvinylchloride and silicone rubber. These substances have different properties and the factor determining which one to use is the anticipated length of time that the patient will remain catheterized.

Latex rubber

- short term, that is up to 10 days

P.V.C.

- up to 6 weeks

Silicone

- Long term up to 6 months.

1.2.2 **Selecting the Correct Size**

Always use the smallest catheter possible as the urethral mucosa will tend to act adversely to the catheter, in proportion to the amount of distension it is causing.

1.2.3 **Inflating the Balloon with the Correct Amount of Sterile Water**

In general the 5 ml balloon is adequate to keep the catheter in place. Larger size balloons should not be used routinely for retention purposes, drainage is impaired because the eyes of the catheter are higher in the bladder, there is therefore always a residual urine. The indication for the use of a 15 - 30 ml balloon should be strictly limited to specific situations such as prostatectomy.

It is a common misconception that urine leaking out of the urethra around the catheter can be remedied by re-catheterization with a larger size catheter and plugging the orifice with a larger balloon. The correct approach is to treat the bladder spasm which is usually caused by the presence of the catheter. Anticholinergic drugs will usually reduce the muscle spasm.

Sterile water is the only inflation medium that should be used in case the balloon leaks fluid into the bladder.

2. **Observance of Strict Aseptic Technique**

Catheterization must be performed in a good light using the non-touch technique. Asepsis is the keyword. The use of sterile forceps and or gloves depends upon the procedure adopted by the hospital. The urethral orifice should be adequately cleaned prior to catheterization - washed with soap and water, an iodophor that is effective against Gram - positive and Gram - negative organisms and fungi is suggested as the prepping solution.

3. **Avoidance of Trauma to the Neck of the Bladder and Urethra**

The catheter must never be forced. The extent to which catheterization traumatizes the urethra is not generally appreciated. Pressure necrosis of the meatus can result from the use of too large a catheter. The right size of catheter for any patient is the smallest size capable of providing adequate drainage.

The catheter should be secured to limit movement in the urethra. Slack should be allowed to prevent traction.

When deflating the balloon a syringe should be used so as to ensure that all the water is withdrawn.

4. **Establishment and Maintenance of a Closed Drainage System**

A sterile continuously closed drainage system should be maintained.

4.1 **Changing of the Drainage Bag**

Changing of the drainage bag should not be done routinely. The only reasons to change the drainage bag are:

- leakage
- obstructed flow
- aesthetic reasons in patients on long term catheterization
- when the catheter is changed.

Aseptic techniques must be used when changing the urinary drainage bag.

4.2 **Emptying of the Drainage Bag**

Hands must be washed or sprayed before and after manipulation of the bag. Gloves must be worn and must be changed, washed or sprayed with chlorhexidine/alcohol handspray between patients. Clean the outlet tap with in chlorehexidine 0.05% in 70% alcohol before and after emptying the bag.

Never use the same container to collect urine from more than one drainage bag. Ideally each patient should have their own container, but if this is not possible, the container must be washed with hot soapy water between patients. The common container used for measuring and emptying urine drainage bags has been implicated in transmitting infection from patient to patient.

Care must be taken to avoid contact between the tap and the urine collection container.

If the tap is allowed to drag on the floor or is contaminated by handling, micro-organisms track back into the urine in the bag. This acts as a culture medium. The flutter valve does not prevent urine in the tubing from becoming contaminated.

4.3 **Catheter Specimen of Urine for Culture**

A catheter specimen of urine must be obtained by needle aspiration, using the aseptic technique through the sampling sleeve. A 21 guage needle inserted perpendicularly into the sampling sleeve and the urine aspirated. The specimen should be sent to the laboratory immediately or refrigerated untill collection.

4.4 **Prevention of Retrograde Flow of Urine to the Bladder**

It is important to prevent urine flowing back into the bladder. The drainage bag should have a non-return valve fitted to prevent reflux of urine - it must be mentioned that most of the so called non-return valves allow bacteria to ascend from the bag to the tubing above.

Non-obstructed downhill flow must be maintained at all times. Bags must be kept below the level of the bladder.

4.5 **Bladder Irrigation**

Irrigation of a closed system is generally discouraged, unless this becomes absolutely necessary due to the blockage by blood clots or after bladder surgery. A triple lumen catheter that permits continuous irrigation eliminates the necessity to disconnect and reduces the risk of infection. The intermittent use of disinfectant solutions for bladder irrigations is not generally believed to be of value in the treatment of urinary tract infections: thus breaking the closed drainage system for such a purpose cannot be justified. The safest way to irrigate the bladder is by increasing the patient's fluids if his intake of fluids is not restricted.

5. **Maintenance of Appropriate Catheter Toilet**

Catheter toilet is crucial for the prevention of infection. Because of the lack of normal micturition, natural secretions build up and encrust at the catheter entry point, forming a nidus for infection. Catheter toilet should be performed at least twice daily. Washing with soap and water and a clean "daily" cloth is adequate.

6. **Patient Education**

The patient should be educated about all the above principles and his/her individual needs.

7. **Antibiotics**

Indiscriminate use of antimicrobial agents to treat asymptomatic bacteruria associated with an indwelling catheter should be avoided.

Although therapy may eradicate the organisms temporarily, the eventual outcome is recolonization with highly resistant organisms. It is recommended that antimicrobial agents be reserved for instances of symptomatic infection or sepsis.

Intermittent Catheterization

Current literature recommends that aseptic technique be used for patients in hospitals who are being intermittently catheterized. In hospitals certain pathogens are present that would not be present in the patients home and therefore there is a greater risk that cross infection may occur.

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SPECIMEN COLLECTION

The chief function of a clinical medical microbiology laboratory is to assist clinicians in the diagnosis and treatment of patients. Good patient care must remain the prime focus, this can occur only if the correct specimen is submitted to the laboratory. The quality of the laboratory report and its clinical value are largely related to the quality of the specimen submitted.

Principles of Specimen Collection

1. Collection of an adequate specimen.
2. Avoidance of contamination.
3. Adequate and appropriate information supplied on the request form.
4. Correct transportation to the laboratory.

1. Collection of an Adequate Specimen

- 1.1 The specimen must be representative of the disease process. When doubt exists the laboratory should always be consulted so that the most suitable specimen and method of collection can be agreed and the needs of the patient and priorities of the laboratory can be taken into consideration.
- 1.2 Send enough specimen e.g. when pus or other body fluids are involved it is preferable to send as large a quantity as possible in a sterile container rather than a swab.
- 1.3 Use aseptic technique. This is mandatory when collecting specimens from sites which are normally sterile. Avoid contamination of specimens by commensal organisms e.g. Urine.
- 1.4 Specimens for culture should, if possible, be collected before the commencement of antimicrobial therapy.

1.5 Faulty technique during collection may result in inadequate, misleading or delayed laboratory results which may affect the patients treatment, including the management of infection.

1.6 SWABS - For optimal results use two swabs

- One for culture which is sent in transport medium
- Second swab is used for microscopy.

Technique

It is important to explain the procedure to the patient prior to collection.

1.5.1 Urine Specimens

Urine specimens should be examined within 2 hours of collection at room temperature or kept below 4°C.

Mid Stream Urine - Assess the patients capabilities, he/she may be able to carry out the procedure himself/herself. Wash penis or vulva with soap and water. Females keep labia open.

1st stage: pass urine into bedpan/toilet to lavage the urethra.

2nd stage: collect 15-20 ml's urine into sterile receptacle.

3rd stage: empty bladder into bedpan/toilet.

Catheter Specimen of Urine:-

The patient must never be catheterized for a catheter specimen of urine. If a catheter is in situ, urine can be aspirated from the sampling sleeve. Clean the sampling sleeve with Hibitane/ 70% alcohol, allow to dry, collect the specimen with a sterile syringe and needle, gently expel specimen into a sterile container. Specimens must never be taken from the urine bag.

1.5.2 Stool Specimens

Collect into a clean bedpan. Wearing gloves, the nurse takes a spatula and places a small amount into a sterile wide-mouthed container. Specimens to be examined for amoeba, giardia or cysts must be fresh and warm, delivered to the laboratory promptly.

1.5.3 Sputum Specimens

Sputum specimens must be collected early in the morning. The patient is asked to expectorate any phlegm into a sterile container. It is important to ensure that the specimen provided is sputum and not saliva. **Quick delivery to the laboratory is essential to avoid drying of the specimen and because bacterial pathogens in respiratory infections survive poorly in expectorated sputum e.g. (Streptococcus pneumoniae and Haemophilus influenzae).**

1.5.4 Nasal swabs

Nasal swabbing is uncomfortable for the patient and extra reassurance is usually required. The swab is inserted into the nostril and drawn along the floor of the nose with a gentle rotating motion. The swab is then withdrawn and placed into transport medium.

1.5.5 Throat Swabs

Prior to taking the swab, the patient should not gargle or take antiseptic lozenges for at least 6 hours. The tongue is held down with a tongue depressor and the swab is taken quickly and gently, rubbing against the infected site on the posterior pharyngeal wall. The swab should not touch the mouth or tongue, the swab is then placed into a transport medium.

1.5.6 Eye Swabs

Eye swabs are sometimes requested but are not always satisfactory because of the presence of lysozyme in the tears which rapidly destroys the causal organism. A swab is obtained by asking the patient to look up, the lower lid is pulled down, and a sterile cotton bud rolled over the conjunctival sac. The swab is then placed in transport medium.

1.5.7 Wound and Pus Swabs

The area around the wound is cleaned with normal saline to free the area of contaminants; Place the swabs deep into the wound. Place swab in a transport medium. With these specimens it is particularly important to specify on the request form the site from which the specimen was collected, as this may affect the tests that are carried out.

1.5.8 Vaginal/Cervical Swabs

Before the swab is taken the patient should be asked to empty her bladder. A sterile speculum is inserted with a gloved hand to separate the vaginal walls and the area is inspected with a good light source. A swab is taken from any obviously inflamed areas of the vaginal wall or from a cervical lesion. The swab is then placed in transport medium and the speculum is removed.

1.5.9 Blood Culture

Blood for culture should be collected during the pyrexial stage of the infection. At least 2 to 3 sets of blood cultures should be obtained at different times from different sites when investigating a pyrexia of unknown origin. Aseptic technique must be used to avoid contamination with skin flora. A thorough skin preparation is essential using Hibitane and Alcohol, or Iodine.

1.5.10 Nurses may also be directly involved in collecting other specimens e.g. biopsies, CSF, pleural aspiration, joint aspiration. These procedures all require strict aseptic technique. Do not use aqueous solution for skin disinfection, they may be contaminated.

2. Avoidance of Contamination

- 2.1 When collecting a specimen, the nurse must ensure that the patient does not become infected e.g. aseptic technique should be used for urine, blood, biopsies, CSF etc.
- 2.2 The nurse must protect herself from becoming infected through contamination of hands and clothing. Hands must be washed before and after specimen collection.
- 2.3 Do not contaminate the outside of the container, this is hazardous to both the transporting and laboratory staff.

3. **Adequate and Appropriate Information Supplied on the Request Form**

3.1 **Name and Number**

Both name and number must be included, because names are often the same and this can lead to mistakes.

3.2 **Ward**

This ensures that the reports are returned without delay and also enables infection control staff to detect outbreaks.

3.3 **Age of Patient**

Host susceptibility and disease vary with age.

3.4 **Relevant History**

The history indicates which microbiological tests are relevant.

3.5 **Nature of the Specimen**

This must be specified e.g. fluid in a container may be urine or aspirate.

3.6 **Site of Infection**

Different areas of the body tend to have their own flora and the same organisms elsewhere may have a pathogenic role.

3.7 **Antibiotic Therapy**

Failure to indicate details of antibiotic therapy may result in a misleading report. The antibiotic may inhibit growth of the causative organism.

3.8 **Date and Time of Collection**

Different organisms survive for varying periods and some grow well at room temperature. If normal flora are present, their survival and subsequent multiplication may make results hard to interpret.

3.9 Name and Signature of the Clinician

This enables laboratory staff to communicate quickly with medical staff, if there are any queries.

4. Correct Transportation to the Laboratory

4.1 The specimen should be sent to the laboratory as soon as possible - maximum of 2 hours, because delay may render the examination unsatisfactory due to the overgrowth of contaminants. Nurses must be aware of specimen collection locations and collection times.

4.2 Transport in the upright position.

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ISOLATION POLICY

The principles of isolation should be designed to prevent the spread of pathogens amongst patients, hospital personnel, visitors and the community.

The aim is to confine the organism and block its routes of spread, which does not necessarily mean isolating the whole person. The methods used to block the route of infection are simply an extension of hygienic measures used in general nursing care, but the precautions must be carried out meticulously by everyone who has contact with the patient - only one person need make a mistake to spread the infection.

The category of isolation depends on the virulence of the organism and its mode of spread:

1. Strict isolation
2. Source isolation
 - respiratory
 - wound/skin
 - enteric
 - blood
3. Protective isolation

Procedure

1. Decide on the category into which the infection falls.
2. Inform the Infection Control Nurse/Matron on duty.
3. Set up the isolation procedure and obtain the necessary equipment.
4. Doctor to notify Medical Officer of Health if the disease is notifiable.
5. Keeping a ward staff-contact-record is recommended.
6. All visitors to report to the Sister-in-charge for instruction prior to entering the isolation area.

General Measures

1. Room

If a single room is necessary, the door should be kept closed at all times. All unnecessary furniture should be removed. The room should be kept tidy to facilitate nursing and cleaning procedures.

2. Equipment

Disposable or autoclavable equipment should be used. Items such as sphygmomanometers, stethoscopes, glucometers, etc. should be left in the patient's room for the duration of the isolation period, used exclusively for this patient, and terminally disinfected.

3. **Aprons/Gowns**

Disposable yellow plastic aprons are recommended and may be used for a 24 hour period. The apron should be dated on the outside and left hanging in the room. The front of the apron may be disinfected by spraying and wiping with chlorhexidine 0,5 % in alcohol 70% (without glycerine) after contact with the patient. Disposable water-repellent gowns must be used for strict isolation.

4. **Masks**

These are really only necessary when caring for "high risk" cases, and then the filter type must be used. Experimental studies and trials have indicated that masks contribute little or nothing to the protection of patients and their routine use is therefore unnecessary.

5. **Gloves**

Conventional disposable unsterile latex examination gloves are adequate for the handling of infected sites or contaminated material.

6. **Hands**

Handwashing before and after contact with the patient is the most important measure in preventing the spread of infection.

7. **Needles and Syringes**

Disposable needles and syringes must be used and discarded into the "sharps" container in the patient area.

8. **Waste Disposal**

All rubbish/waste is to be discarded into a plastic-lined pedal-bin in the patient area. Seal the bag at the bedside and place it in a second (red plastic) bag for incineration.

9. **Thermometers**

The thermometer should be kept in the patient area for the exclusive use of that patient. Wash with soap and water after use; wipe with chlorhexidine 0,5 % in alcohol 70% (without glycerine) and store dry.

10. **Linen**

Avoid vigorous bedmaking. Soiled dry linen can be placed in a "soiled-linen" container and sent to the laundry. Visibly soiled/fouled/wet linen must be placed in the yellow plastic bag, water added to moisten the linen through, the bag is sealed in the patient area and then sent to the laundry.

11. **Mattress and Pillows**

These must be sealed into washable plastic covers.

12. **Crockery and Cutlery**

These need be treated no differently from those of other patients, but disposable crockery and cutlery should be used in strict isolation and for enteric precautions.

13. **Charts**

These should be kept outside the patient area so as to avoid an infection hazard.

14. **Laboratory Specimens**

All specimens should be regarded as biohazardous. Securely seal specimen container; place in plastic bag and label. Attach request form to the outside of the bag and send to the laboratory immediately.

15. **Special Investigations**

Patients should be sent to other departments for investigations (eg. x-ray) only if it is essential to do so. The department in question should be notified of the infection hazard in advance by attaching a BIOHAZARD label to the request form, so that they can make suitable arrangements to prevent possible spread of infection.

The trolley or wheelchair used to transport the patient must be disinfected after use.

16. **Visitors**

Visitors are allowed, but only two at a time and adults only. They must report to the sister-in-charge for instruction before entering the isolation area.

17. **Cleaning**

- **Concurrent Disinfection**

Cleaning equipment must be kept to a minimum; should be used in the isolation area only; and clearly marked for this area. Routine ward cleaning with hypochlorite/chlorine compound solution 250 p.p.m. available Cl_2 is adequate and a disposable cloth used for dusting.

Cleaning staff must be familiar with the correct use of protective clothing and the cleaning procedure, and be supervised.

The daily cleaning of this area should be done AFTER all other cleaning, except in the case of protective isolation, which must be done FIRST.

Strict hand hygiene needs to be observed.

- **Terminal Cleaning**

Patient to have a bedbath/shower and hair wash, and change into clean clothing. Soiled dry linen placed in soiled linen container and sent to the laundry. Visibly soiled/fouled wet linen to be placed in yellow plastic bag, add water to moisten linen, seal bag and send to the laundry.

All rubbish and disposable items are to be discarded into a red plastic bag and sealed for incineration.

All washable areas to be cleaned with hypochlorite/chlorine compound solution and a disposable cloth. Work from the outside towards the centre. It is unnecessary to wash the walls and ceilings unless visibly soiled.

The room may be occupied when dry but should preferably "air" for a few hours. Fogging is NEVER indicated.

RESPIRATORY PRECAUTIONS

Diseases : Meningococcal meningitis for the first 48 hours after starting effective treatment.

- : Measles
- : Mumps
- : Rubella
- : Chickenpox
- : Herpes Zoster (see also Skin and Wound Precautions)
- : Diphtheria
- : Tuberculosis for the first 48 hours after starting treatment
- : Pertussis
- : Legionnaire's Disease

Type of Room

Single preferred, with doors closed.

Aprons

Yellow plastic apron worn during patient contact.

Masks

For nursing personnel - filter type, for suctioning only. Optional for pulmonary tuberculosis patients.

Hands

Washed before and after patient contact; and apply chlorhexidine 0,5 % (with glycerine) in alcohol hand rub on leaving the room.

Gloves

Disposable latex examination gloves when handling secretions or suctioning.

Thermometer

For exclusive use of that patient. Disinfect after use and store dry.

Instruments

After use place in a clear plastic bag for return to C.S.S.D.

Crockery and Cutlery

No special precautions.

Urine and Faeces

No special precautions.

Bedpan/Urinal

Normal ward cleaning.

Linen

No special precautions.

Specimens

Careful handling. Disposable leakproof container; secure top well; label BIOHAZARD.

Sputum

Careful handling. Disposable leakproof container; discard into plastic-lined pedal-bin.

Disposable Articles

Standard procedure. Incinerate.

SKIN AND WOUND PRECAUTIONS

Diseases : Herpes Zoster (see also Respiratory Precautions)
: Burns
: Skin and Wound Infection (consult Infection Control Nurse)

Type of Room

Single desirable. Consult Infection Control Nurse.

Aprons

Yellow plastic apron worn during direct patient contact. Gowns are necessary when dressing extensive wounds.

Masks

Not required.

Hands

Washed before and after patient contact, and chlorhexidine 0,5 % in alcohol 70% hand rub on leaving the room.

Gloves

Disposable latex examination gloves when in direct contact with the infected area.

Thermometer

For exclusive use of that patient; disinfect after use and store dry.

Instruments

After use, place in clear plastic bag and return to C.S.S.D.

Crockery, Cutlery and Waste Food

No special precautions.

Urine and Faeces

No special precautions.

Bedpan/Urinal

Normal ward cleaning.

Linen

- Dry linen, no special precautions.
- Visibly soiled/contaminated/wet linen, wear gloves and place into yellow plastic bag.

Specimens

No special precautions.

Disposable Articles

Standard procedure. Incinerate.

ENTERIC PRECAUTIONS

Diseases : Cholera
: Shigellosis
: Salmonellosis
: Typhoid Fever
: Poliomyelitis
: Amoebic Dysentery
: Enteropathogenic *E. coli* Infection
: A.I.D.S. (if excreta is bloodstained, see Blood
Precautions also)
: Hepatitis A

Type of Room

Single if possible

Yellow plastic apron

Worn when in direct contact with patient and when handling excreta.

Masks

Not necessary.

Hands

Washed before and after patient contact, and chlorhexidine 0,5% in alcohol 70% hand rub on leaving the room.

Gloves

Disposable latex examination gloves worn when handling bedpan and excreta.

Thermometers

For the exclusive use of that patient; disinfect after use and store dry.

Instruments

After use place in clear plastic bag and return to C.S.S.D.

Crockery, Cutlery and Waste Food

Use disposables, discard into clear plastic bag; seal; for incineration.

Urine and Faeces

Discard down sluice immediately.

Bedpan/Urinal

Use bedpan disinfectant or wash with soap and hot water. Dry with a paper towel and store separately, keeping it for the specific use of that patient only.

Linen

- Dry linen: no special precautions.
- Visibly soiled/contaminated/wet linen: wear gloves, rinse off excreta, place linen in yellow plastic bag.

Specimens

Handle carefully. Use disposable leak-proof containers and secure the top well. Mark "danger of infection" on specimen container as well as on request form. Enclose the specimen in a plastic bag and attach the form to the outside of the bag.

Disposables

Standard procedure. Incinerate.

BLOOD PRECAUTIONS

- Diseases
- Typhoid for the first 10 days
 - Hepatitis B
 - Jaundice of unknown origin
 - A.I.D.S in non-haemorrhagic phase (if haemorrhagic phase, contact Infection Control Nurse. See Enteric Precautions also)

Type of Room

Single room not essential but may be preferred by patient.

Yellow Plastic Apron

Worn when handling items contaminated with blood or when taking blood samples.

Masks/Visors

Masks and eye protection visors are only necessary when splashing is likely.

Hands

Washed before and after patient contact, and use chlorhexidine 0,5% (with glycerine) in alcohol 70% hand rub on leaving the room or bedside.

Gloves

Disposable latex examination gloves are compulsory when handling blood, blood products, excretions, secretions and exudates. Wash hands after removal of gloves.

Thermometers

For the exclusive use of that patient; disinfect after use and store dry.

Instruments

After use, place in clear plastic bag. Label BIOHAZARD and return to C.S.S.D.

Crockery, Cutlery and Waste Food

No special precautions.

Urine and Faeces

Usually no special precautions, but treat as hazardous if blood-stained.

Bedpan/Urinal

Normal ward cleaning.

Linen

- Dry linen: no special precautions.
- Visibly soiled/contaminated/wet linen: wear gloves; place into yellow plastic bag and add hypochlorite/chlorine compound solution 250 p.p.m. available Cl₂

Specimens

Handle carefully. Secure top well. Place the specimen in a plastic bag. Attach request form to the outside of the bag. BIOHAZARD stickers attached to specimen bag and form.

Disposables.

Standard procedure. Incinerate.

Sharps

Do NOT disconnect used needle from syringe.

Do NOT resheath but dispose of immediately into "sharps" container in the patient's room, or at bedside.

PROTECTIVE ISOLATION PRECAUTIONS

(Previously known as Reverse Barrier Nursing)

- Diseases
- Immunocomprised patients (eg. on chemotherapy, transplants, etc.
 - Agranulocytosis
 - Extensive Burns*
 - Severe and Extensive Dermatitis

Type of Room

Single room preferred and doors closed. No entry for anyone with an infection or infected lesions.

Plastic Apron

Worn when in direct contact with the patient.

Masks, Filter Type

Preferred at times, depending on the condition of the patient.

Hands

Washed before and after patient contact. Use chlorhexidine 0,5% in alcohol 70% hand rub on leaving the room.

Gloves

Disposable latex examination gloves are worn for all aseptic procedures.

Thermometers

For the exclusive use of that patient, disinfect after use and store dry.

Instruments

Standard procedure for used instruments.

Crockery, Cutlery and Waste Food

No special precautions.

Linen

Fresh linen daily. No special precautions, *sterile linen may be required.

Specimens

No special precautions

Urine and Faeces

No special precautions

Bedpan/Urinal

Normal ward cleaning.

Disposable Articles

Standard procedure. Incinerate.

STRICT ISOLATION

(See special policies for these diseases)

- Diseases**
- Haemorrhagic Fevers (Lassa, Marburg, Ebola, Crimean-Congo, etc.)
 - A.I.D.S in the haemorrhagic phase

Type of Room

Single room essential and doors closed. No visitors.

Gowns/Aprons

Disposable water-repellent gowns compulsory.

Masks

Filter-type compulsory.

Hands

Wash before and after patient contact. Chlorhexidine 0,5%(with glycerine) in alcohol 70% hand rub outside room.

Gloves

Compulsory. Double glove. Wash hands after use.

Eye Protection

Goggles or adequate visors compulsory.

Caps

Balaclava-type compulsory.

Overshoes

Plastic overshoes compulsory (plastic bags may be used).

Thermometer

For exclusive use of that patient. Disinfect after use and store dry.

Equipment)

Urine and Faeces)

Bedpan/Urinal)See special high-risk disease policies

Linen)

Specimens)

GENERAL ISOLATION KIT

Yellow plastic bags (for linen)
Red plastic bags (for waste)
Clear plastic bags (pedal-bin)
Brown paper bags
Mop and colour-coded buckets
Toilet cleaning brush
Plastic pedal-bin
Black bin
Plastic specimen bags
Biohazard labels/stickers
Disposable needles and syringes
Sharps containers
Chlorine compound sachets
Hibiscrub/Bioscrub
Filter-type masks (if indicated)
Gloves
Yellow plastic aprons
Daylee cloths
Medicine glasses
Paper towels
Disposable Bedpan/Urinal covers
Box Kleenex tissues

Possibly also: Disposable razor, disposable toothmug, measuring jug,
disposable crockery and cutlery.

ACQUIRED IMMUNE DEFICIENCY SYNDROME

DEFINITION OF AIDS (Acquired Immune Deficiency Syndrome):

AIDS is "a syndrome of opportunistic diseases, infections and certain cancers occurring in people with acquired immune deficiency due to infection with the Human Immunodeficiency Virus. (H.I.V.)".

AIDS is the name given to the final stages of infection with H.I.V. A person does not die directly from AIDS. The damaged immune system leaves the body vulnerable to other diseases, infections and cancers which then result in death.

Isolation Of H.I.V.

The AIDS virus has been isolated in several body fluids:-

High Risk: Blood
 Semen
 Vaginal Cervical secretions

Low Risk: Saliva
 Urine
 Cerebro spinal fluid
 Breast milk
 Tears
 Peritoneal fluid
 Pleural fluid
 Pericardial fluid
 Synovial fluid
 Amniotic fluid
 Sweat

Transmission

Transmission Occurs in the Following Ways

1. Horizontal
 - 1.1. Unprotected sexual intercourse with an infected person.
 - 1.2. Introduction of infected blood or blood products. The route of occupational infection carrying the highest risk is percutaneous inoculation through a needlestick puncture/sharps injury.

2. Vertical - infected mother to her infant.

H.I.V Cannot be Transmitted By:

Casual contact
shaking hands
hugging
dry kissing
door handles

Sharing cups,
plates
using the same cutlery
telephone
sharing toilet facilities
travelling on public transport

Eating with others
being served by a waiter who is infected with H.I.V.
food prepared by a chef who is infected with H.I.V.

Water swimming pools
jacuzzis
baths

Insects or Vectors
mosquitoes
lice
bedbugs

Other contact
coughing
sneezing
spitting

Stages of the Disease

Stage 1: Asymptomatic Carrier State

This occurs when the H.I.V. has invaded the blood stream and the person becomes infected with the virus. These H.I.V. infected people are carriers of the virus.

Stage 2: Persistent Generalized Lymphadenopathy (P.G.L.)

P.G.L. is characterized by the prolonged presence of swollen lymph glands in two or more sites other than the groin (inguinal) for longer than three months. Some patients are healthy at this stage while others may show signs and symptoms of the disease - fatigue, weight loss, fever, night sweats and diarrhoea.

Stage 3: AIDS - Related Complex (ARC)

Advanced stage of H.I.V. infection. ARC patients have severe immune deficiency and may exhibit any of the following:

- skin rashes, marked weight loss, persistent diarrhoea, fever, night sweats, oral thrush and P.G.L.

Stage 4: Acquired Immune Deficiency Syndrome

AIDS is the end stage of H.I.V. infection, occurring when the immune system is so compromised that the patient develops other, often unusual diseases - the so called "opportunistic" conditions, including rare infections and cancers.

Universal Precautions

ANY PATIENT MAY BE INFECTED WITH H.I.V. EVEN WITH NO SYMPTOMS. IT TAKES 6 WEEKS TO 6 MONTHS AFTER EXPOSURE FOR A PERSON TO DEVELOP H.I.V. ANTIBODIES.

ALL HEALTH CARE WORKERS (H.C.W.'S) SHOULD ROUTINELY USE APPROPRIATE BARRIER PRECAUTIONS TO PREVENT SKIN AND MUCOUS MEMBRANE EXPOSURE WHEN CONTACT WITH BLOOD OR OTHER BODY FLUIDS IS ANTICIPATED, TO PROTECT THEMSELVES FROM EXPOSURE TO H.I.V. THESE PRECAUTIONS ALSO PROTECT AGAINST OTHER INFECTIOUS ORGANISMS.

Guidelines

1. Gloves should be worn for touching blood and body fluids, mucous membranes or non-intact skin, for handling items or surfaces soiled with blood or body fluids and for performing veni-puncture or other invasive procedures.
2. Masks and protective eyewear or face shields should be worn during procedures that are likely to generate droplets of blood or other body fluids in order to prevent exposure to mucous membranes.
3. Gowns or aprons should be worn during procedures that are likely to generate splashes containing body fluids.
4. Hands or other skin surfaces should be washed immediately and thoroughly if contaminated with blood or body fluids. Hands should routinely be washed after removing gloves as in 1 above and 9, 10, 11 below.
5. Used needles should never be re-capped, purposely bent or manipulated in any manner.
6. Disposable syringes and needles, scalpel blades and other "sharps" items should be placed in puncture-resistant containers for disposal.

7. Mouth pieces, resuscitation bags or other ventilation devices should be used in preference to mouth-to-mouth resuscitation.
8. H.C.W.'s who have exudative lesions or weeping dermatitis should refrain from direct patient care until they have sought and received medical advice. H.C.W.'s who have cuts or abrasions on the hands should cover them with waterproof dressings.
9. Linen soiled with blood or body fluid should be handled using gloves and treated as infected linen. (see laundry policy).
10. Dressings, sanitary towels (clinical waste) should be handled using gloves and treated as hazardous waste. (see waste disposal policy).
11. Blood spillage should be cleaned up promptly. Gloves should be donned, chlorine compound powder sprinkled over the area and the spillage removed using paper towels, which are immediately discarded into the appropriate bag for incineration/hazardous waste disposal. Sodium Hypochlorite or chlorine compound solution 10,000 ppm available Cl_2 should then be poured over the area and wiped up using paper towels. Dispose of paper and gloves as incineration/hazardous waste. Hands should then be washed.

Nursing Management

Existing hospital policy for caring for the Hepatitis B patient can be used for the H.I.V. infected patient. Blood and enteric precautions are all that are necessary for patients who are ambulant and caring for themselves. Patients may require a side ward depending on the stage of the disease. The nursing care plan must be complete and personalized.

Specimens

Blood and other specimens should be placed in a sturdy, leakproof container, and double bagged.

Cleaning/Disinfecting/Sterilizing

Disinfecting/Sterilizing: Moist heat (autoclaving), and dry heat (160°C for 1 hour).

H.I.V is a very sensitive virus and is easily destroyed by boiling for a least 5 minutes. It is also susceptible to a wide range of disinfectants. Thorough washing before sterilizing or disinfecting is essential for all equipment. Gloves and plastic aprons should be worn for this procedure.

Cadavers

Cadavers with open wounds or those soiled with blood must be handled by persons wearing unsterile disposable gloves and plastic aprons. Oozing areas and open wounds should be sealed with impermeable adhesive dressings. The body is then handled in the normal manner.

ROUTINE IMPLEMENTATION BY ALL MEMBERS OF THE HEALTH CARE TEAM OF THESE SIMPLE, LOGICAL MEASURES, WHICH ARE NOT TIME CONSUMING NOR SIGNIFICANTLY EXPENSIVE, SHOULD REDUCE THE RISK OF INFECTION OF H.C.W.'S BY PATIENTS, AND OF PATIENTS BY H.C.W.'S, TO VERY NEARLY ZERO. DISCIPLINED IMPLEMENTATION OF THESE PRECAUTIONS IN DEALING WITH ALL PATIENTS MAKES PRE-TREATMENT DETERMINATION OF A PATIENT'S H.I.V. STATUS IRRELEVANT IN TERMS OF H.C.W. SAFETY.

**GUIDELINES FOR THE STERILIZATION
OF B.C.G. TOOLS**

1. Use of B.C.G. Tools

- 1.1 Use on one patient/client only, then re-sterilize the tool.
- 1.2 Place used tool in a second container which has soapy water in it, this is to soak off any blood or serum adhering to the needles.
- 1.3 Rinse thoroughly with clean water.
- 1.4 Regularly check for:
 - Bent Needles.
 - Hooked Needles.
 - Rusted Needles.
 - If any are found, destroy the tool.
- 1.5 Re-sterilize the tools.

2. Method of Sterilization

RECOMMENDED METHOD

2.1 Autoclave or Pressure Cooker

2.1.1

Twenty minutes at 115°c (0,7 kg per cm).

OR

2.1.2

Fifteen minutes at 121° (1 kg per cm).

Care should be taken not to exceed these temperatures as this will melt the cylinders.

ALTERNATIVE METHOD

2.2 Boiling - Wet method.

2.2.1 Boil in a sterilizer for 10 minutes.

3. **To Clean Storage Container**

- 3.1 Wash sealable container thoroughly with hot soapy water.
- 3.2 Dry with a paper towel.
- 3.3 Store sterile B.C.G. tools in this container.

**GUIDELINES FOR THE
DISINFECTION OF EAR PIECES**

1. **Use of Ear Pieces**
 - 1.1 Use on one patient/client only, then clean and disinfect the apparatus.
 - 1.2 Place used ear piece in a container of warm soapy water, this is to soak off any pus or blood adhering to the ear piece. Rinse thoroughly with clean water.
 - 1.3 Disinfect as listed under No. 2

2. **Method of Disinfection** - Chlorine compound 10,000 ppm available Chlorine (Cl₂)
 - 2.1 Chlorine compound - 10 sachets of 6 grams diluted with 2,25 litres of water.

OR
 - 2.2 Chlorine compound - 20 sachets of 3 grams diluted with 2,25 litres of water.
 - . Soak the ear pieces for 10 minutes.
 - . Rinse well under running water.
 - . Shake off any remaining water and the ear piece is ready for re-use. (Dry with Carlton paper towel.)
 - . A fresh solution must be prepared daily.
 - . Ensure gloved hands are washed before removing the ear piece from the Chlorine compound as dirt can inactivate the solution.

CHAPTER 20

INFECTION CONTROL GUIDELINES FOR ECTOPARASITIC INFESTATIONS

Pediculosis and Scabies occasionally cause nosocomial outbreaks.

Report the case to Infection Control

1. **Scabies**

1.1 Scabies is an infestation of the skin caused by the *Sarcoptes Scabiei*.

The distribution of lesions is fairly classic :

- hands, particularly in the webs of the fingers
- anterior surfaces of the wrists, elbows, anterior axillary folds
- belt line
- male genital area and female breasts in adults
- lesions may be found on other parts of the body as well

1.2 **Transmission**

- direct close contact
- to a limited extent, clothing and bedding
- sexual contact

1.3 **Period of communicability**

Until mites and eggs are destroyed by treatment, usually after one treatment.

1.4 **Control Measures**

1.4.1 Protective clothing should be worn, gloves and yellow plastic aprons.

1.4.2 Carefully remove clothing and bedding and place in yellow plastic bag and seal.

1.4.3 Apply an acaricide e.g. 1% Gamma Benzene Hexachloride application (Quellada, Gambex), Benzyl Benzoate 25% application (Ascabiol) at night after a hot bath, from the neck down, particularly to infected areas, making sure the axillae, wrists, ankles and pubic areas are included. Allow to dry for 15 minutes and apply again. Wait 30 minutes before putting clothes on. Repeat the application 24 hours later, without bathing. Do not wash off for a further 24 hours, then bath/shower/wash to remove the lotion, and put on clean clothes and bedding. Wash all used clothes and bedding in hot water.

1.4.4 0 - 2 yrs, use quarter strength ie(1 in 4)
3 - 12 yrs, use half strength i.e. (1 in 2).
Adult and children over 12 years full strength.

1.4.5 Repeat treatment after one week. The reason for the week's delay is to allow any eggs that have not been killed by the first treatment to hatch.

1.4.6 No environmental control measures are necessary.

1.4.7 Arrangements must be made for all home contacts to be treated even if they are not symptomatic.

1.4.8 Prophylaxis - Monosulfiram soap, e.g. Tetmosol soap should be used by the patient for the duration of the hospital stay and by the Health Care Worker for handwashing after patient contact.

1.4.9 Health education on prevention of reinfestation should be given.

1.5 Overtreatment

Itching may persist for 1 - 2 weeks and should not be regarded as a sign of drug failure or reinfestation. Overtreatment is common and should be avoided because of the toxicity of some of the agents.

1.6 Secondary Infections

Secondary bacterial infections manifest as pustules, bullous impetigo, usually *Staph. aureus* or Group A streptococci.

2. Pediculosis

2.1 Lice may cause infestation as well as act as vectors of disease.

Three species of the family pediculedae are important causes of human disease.

2.1.1 *Pediculus humanus corporis* - body louse, found mainly on clothing but also on the body surface especially axillae and around the waist.

2.1.2 *Pediculus humanus capitis* - head louse, found mainly around the nape of the neck, behind the ears.

2.1.3 *Phthirus pubis* - pubic louse or "crabs".

2.2 Transmission

2.2.1 Head lice - close personal contact

- contact with fomites - hairbrushes and combs.

2.2.2 Body lice - close personal contact

- contact with fomites - clothing.

Principle vector of epidemic Typhus, Trench fever and Relapsing fever. Transmission occurs by deposition of louse faeces on injured skin.

2.2.3 Pubic lice - close personal contact

- sexual intercourse.

2.3 Control Measures

2.3.1 Protective clothing should be worn, gloves and yellow plastic aprons.

2.3.2 Carefully remove all clothing and bedding - place in yellow plastic bag and seal.

- 2.3.3 Head and pubic lice - treat the specific hairy areas of the host with an appropriate pediculocide, e.g. 1% Gamma Benzene Hexachloride application (Quellada, Gambex) Benzyl Benzoate 25% application (Ascabiol). Directions for use of pediculocide should be followed carefully.
- 2.3.4 Hairbrushes and combs to be thoroughly washed with hot water and soap.
- 2.3.5 Repeat treatment after 7 - 10 days.
- 2.3.6 No environmental control measures are necessary.
- 2.3.7 All household members should be checked and if infested, treated.
- 2.3.8 Patients with body lice do not require specific treatment but must be bathed. Body lice are capable of surviving for a limited time in stored clothing.
- 2.3.9 Health education on prevention of reinfestation should be given.

3. FLEAS

- 3.1 Fleas transmit 2 important human diseases :
Bubonic plague and endemic Typhus.
Fleas associated with humans are mainly in 3 categories :
Human flea - *Pulex irritans*
Cat and dog flea - *Ctenocephalides sp canis, felix*.
Rat and mouse flea - *Xenopsylla cheopis*
- 3.2 Control Measures
 - 3.2.1 Identify the flea and if possible, treat or remove the host.
 - 3.2.2 Remove all clothing and bedding, place in yellow plastic bag, spray with aerosol insecticide and seal.

3.2.3 Vacuum clean floors, carpets etc.

3.2.4 Environmental control - contact pest control services to spray with residual insecticide.

3.2.5 Health education on prevention of reinfestation should be given.

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