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## Introduction

The Basic Protocol was first published in 1999. It is intended to protect all dental health care personnel (DHCP) and patients within the settings of the Dental Service, Department of Health.

The contents of the Protocol is based on the concept of 'Standard Precautions' which, as defined by the US Centers for Disease Control & Prevention, are a set of safety measures designed to prevent transmission of bloodborne infectious agents, human immunodeficiency virus (HIV) and hepatitis B virus (HBV) for instance, among the parties involved. Diseases that have other modes of transmission, like airborne spread in active open tuberculosis, may require additional precautions ranging from simple rescheduling of treatment to the employment of extra protective gears as recommended by medical experts in the hospital isolation wards.

The standard precautions involve the use of physical barriers including gloves, gowns, masks and protective eyewear, which can reduce the risk of exposure of the DHCP's skin or mucous membranes to potentially infectious materials.

Proper safety measures should also be taken to prevent sharps injuries by needles, scalpels, and other pointed instruments or devices. To prevent transmission of bloodborne pathogens among patients, used or contaminated instruments must be appropriately processed and sterilized. Single-use items should be properly disposed of after use.

This manual is divided into two sections. Section ONE outlines the basic principles of infection control. Section TWO depicts infection control in practice.

It is essential to bear in mind that there is more than one way to achieve the desirable outcomes. The rationales of our recommendations must be understood and suitable adjustments be carried out to fit different scenarios. Sound knowledge in the epidemiology, natural history, modes of transmission, clinical presentations, and prevention of common bloodborne pathogens certainly facilitates the appreciation of the recommendations in the *Basic Protocol*.

To keep abreast of the latest developments, the *Basic Protocol* will be revised from time to time.

# 1. The Basic Principles

Transmission of infectious diseases has aroused concerns from both the general public and health care workers in the past few decades because of the emergence of potentially lethal infections such as HIV and HBV infections. The last outbreak of severe acute respiratory syndrome (SARS) in 2003 and the threat posed by the H5N1 virus (Bird flu) have made the importance of proper infection control even more noticeable in the community, clinic and personal levels. Dentistry, in particular, deals with the oral cavity which is inhabited with commensal oral flora. DHCP are at an increased risk of being infected because of the potential presence of bloodborne pathogens in the saliva and blood, and the increased chances of needle-stick injury (Porter et al., 1990; Cleveland et al., 1995).

## 1.1 Disease Transmission

The general routes for disease transmission in dentistry involve:

- a. Direct contact with a lesion, infected body fluids (blood, saliva, etc.) or tissue debris during intraoral procedures; including inoculation injury like needle-stick injury, and splatters of blood, saliva, or nasopharyngeal secretions onto breached or intact skin/mucosa.
- b. Indirect contact via contaminated dental instruments, equipment or materials.
- c. Inhalation of infectious aerosols, from tooth preparation with high-speed handpiece or ultrasonic scaling for examples, that can remain suspended in the air for some time.

It must be emphasized that the simple presence of a microbe does not necessarily warrant an infection, the following must also be present (CDC, 2003a):

- ❖ a pathogenic organism of sufficient virulence and in adequate number to cause disease;
- ❖ a reservoir or source that allows the pathogen to survive and multiply (e.g. blood);
- ❖ a mode of transmission from the source to the host;
- ❖ a portal of entry through which the pathogen can enter the host; and
- ❖ a susceptible host (i.e. one who is not immune).

## 1.2 Cross-infection

Cross-infection is the transmission of infectious agents between patients and health care workers in a clinical environment (Figure 1).

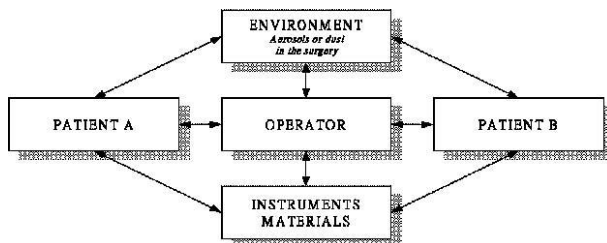


Figure 1: Simplified schematic illustration on the concept of cross-infection

## 1.3 Infection Control

Infection control is a multifaceted discipline (Figure 2). **The goal of infection control is to break the chain of disease transmission.**

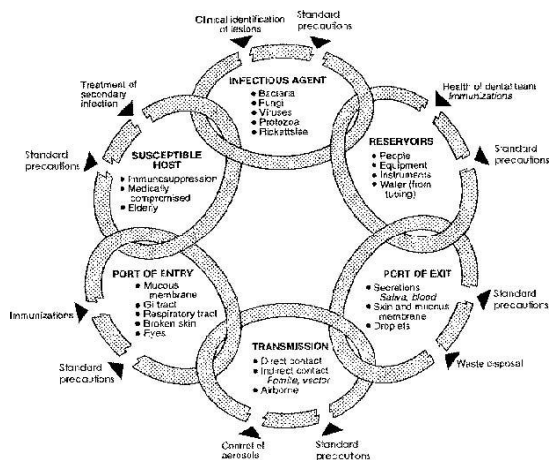


Figure 2: Interventions to break the chain of disease transmission. A break in the chain of six major links is required for the spread of an infectious agent. Standard precautions are applied to interrupt the chain (Modified from Wilkins EM (1994). Clinical Practice of the Dental Hygienist, 7th edition. Baltimore: Williams & Wilkins, p.76.)

## 1.4 Standard Precautions

In the past, infection control in dentistry involved the identification of the 'high risk' (potentially infectious) patients who were then treated with extra precautions (Garner & Simmons, 1983).

However, some patients may be unaware of their infected status, for the reason that they are asymptomatic carriers or the disease has long incubation period. More importantly, some patients are unwilling to tell the dentists their disease status (Perry et al., 1993; McCarthy et al., 1995). These subjects can unknowingly transmit the disease to others.

It was the US Centers for Disease Control & Prevention (CDC), in 1985, that first coined the phrase 'Universal blood and body-fluid precautions' to overcome the many problems related to the 'Identification-and-Isolation' approach. **All patients are considered potentially infectious for bloodborne diseases and, therefore, the same precautions should be applied on everyone.** The approach was then widely known as the 'Universal Precautions' (CDC, 1987).

Universal precautions did not apply to faeces, nasal secretions, sputum, sweat, tears, urine or vomitus unless they contained visible blood. In 1996, CDC revised the 'Universal Precautions' and expanded it further as the 'Standard Precautions' (Garner & HICPAC, 1996).

'Standard Precautions' are applicable to contact with (1) blood; (2) body fluids, secretions and excretions (except sweat) regardless of whether they contain blood; (3) nonintact skin; and (4) mucous membranes. As saliva has always been considered potentially infectious in dental infection control, no actual operational difference exists between the 'Universal Precautions' and 'Standard Precautions' (Bjerke, 2002; CDC, 2003a).

(Please refer to Appendix I for additional precautions, further than the 'Standard Precautions', to guard against disease transmission in health care facilities by patients known or suspected to be infected with epidemiologically important pathogens that are not bloodborne.)

## 1.5 The Basic Protocol

The *Basic Protocol* describes a common-sense approach to control infection in the clinical settings service-wide in the Government Dental Service. The dental surgery is not a risk free environment. **Our emphasis is to minimize contamination and to ensure a safe operational environment.**

The Protocol has its focus on:

### **Vaccination:**

*For all personnel at risk to transmittable diseases* (Section 2.1)

### **Personal barriers:**

*For patient related treatment and management, including chair-side assistance, surface disinfection, pouring impression, sorting laundry and handling waste*

Hand Hygiene and Gloving (Section 2.2)

Face Mask (Section 2.3)

Eye Protection (Section 2.4)

Protective Clothing (Section 2.5)

### **Disinfection, sterilization, and waste disposal:**

Surface asepsis (Section 2.6)

Processing of critical and semi-critical instruments (Section 2.7)

Sharps handling and clinical waste disposal (Section 2.8)

Maintenance of the dental unit waterlines (Section 2.9)

Management of occupational exposure to infectious materials (Section 2.10)

## 2. Infection Control in Practice

### 2.1 Vaccination

Protection against some infectious diseases can be achieved through vaccinations.

According to the Guidelines on Infection Control Practice (December 2006, Revised), Department of Health, **all health care workers should be immunized against hepatitis B, influenza, measles, rubella**; and chicken pox (varicella) as well for those who have contact with immunocompromised patients, pregnant women and paediatric patients.

In Hong Kong, most of the native born have had immunization against hepatitis B, mumps, measles, tetanus, rubella, poliomyelitis, whooping cough and tuberculosis.

In-service colleagues, including staff of the Workman grade, who are not sure of their immune status against hepatitis B, could make use of the Special Preventive Programme, Department of Health. (Do note that advance booking is required.)

HBV vaccination  
Viral Hepatitis Prevention Service:  
Integrated Treatment Centre  
8/F Kowloon Bay Health Centre  
9 Kai Yan Street, Kowloon Bay  
Tel: 2116 2888

Rubella vaccination for female staff can be received at the Maternal and Child Health (MCH) centres.

Please always refer to the most recent Departmental circulars for the latest arrangement on ascertainment of immunity and vaccination.

Though vaccine induced antibody titre declines gradually with time, the safeguard against clinical disease or detectable viral infection is maintained. Booster dose of vaccine and periodic testing to monitor antibody concentration, after completion of vaccine series, are not necessary for vaccine responders (CDC, 2003a).

## 2.2 Hand Hygiene and Gloving

### 2.2.1 Hand Hygiene

Hand hygiene is considered as one of the most critical measures in reducing the risk of transmitting pathogens to patients and health care personnel.

Handwashing reduces bacterial load on hands, which will flourish under the warm and moist environment beneath gloves. The handwashing process may carry more weight than the handwashing agent used. Care should be taken to ensure that all parts of the hands are washed.

Hand jewelry should be removed and special attention should be paid to areas that could be easily missed, such as the fingertips, nails, thumb, and the dominant hand. When short-sleeved uniforms are worn, the exposed forearms must be included in the handwashing process.

For routine dental procedures, handwashing with plain soap is adequate. For surgical procedures, an antimicrobial (surgical) handscrub, such as Hibiscrub which contains 4% chlorhexidine gluconate w/v, should be used. Skin irritation can come about with frequent use of chlorhexidine gluconate though true allergic reactions are uncommon. Alternative handwashing agents like iodophors can be used for those who are sensitive to chlorhexidine.

**At the beginning and the end of each clinical session, a 15-second handwashing is recommended.** For invasive surgical procedures, 2 to 6 minutes scrub of the hands and forearms is necessary. The proper hand hygiene regime should also be complied with after each patient treatment.

If the hands are not visibly soiled, an alcohol-based hand rub is considered adequate because of its rapid action and accessibility (CDC, 2003a). The drying effect of alcohol can be reduced or eliminated by adding glycerol (1% to 3%) or other skin-conditioning agents (Rotter et al., 1991). Alcohol-based gels containing emollients have been found to cause less skin irritation and dryness relative to soaps or antimicrobial detergents (Boyce et al., 2000).

Studies have shown that hand rubbing with an alcohol-based solution can actually achieve a greater reduction in bacterial contamination than conventional handwashing with medicated soap (Girou et al., 2002).



Damaged skins, cuts and wounds should be covered by dressings to guard against bacterial invasion.

Skin loses moisture and chaps easily with frequent handwashing. Regular use of moisturizing hand cream helps to prevent dry skin. Petroleum-based lotions, however, can weaken latex gloves and increase permeability.

When sensitivity is apparent, change to another handwashing agent and seek medical advice as soon as possible.

### 2.2.2 Gloving

The hands should be dried properly with paper towels before donning gloves because moisture trapped under gloves enhances bacterial growth and skin sensitivity. It must be stressed that gloving does not replace handwashing; they are not mutually exclusive.

Glove serves as a barrier between the patient and operator. Its effectiveness is related to its quality and the way it is used.

**Disposable latex (patient examination) gloves can be used for routine operative procedures.** Sterile gloves should be used when surgical asepsis is desirable, e.g. in minor oral surgery. As for simple dental extraction, the operator may use either disposable latex or sterile gloves. It has been shown that the use of sterile gloves does not offer an advantage over clean gloves in minimizing infection following dental extraction (Cheung et al., 2001). Non-latex gloves should be used if either the operator or the patient is sensitive to latex.

**A new pair of gloves must be worn for every patient.** Washing latex gloves with plain soap, chlorhexidine gluconate, or alcohol will produce micropunctures, which can then allow penetration of liquids (wicking) and subsequent hand contamination (Adams et al., 1992; Martin et al., 1988).

Gloves should be changed if their integrity is compromised or when they are grossly contaminated.

## 2.3 Face Masks

Face masks are designed to guard against splatters and aerosols from getting into contact with the mucous membranes of the nose and mouth. (Aerosols are unnoticeable tiny droplets suspended in the air. Splatters are much bigger droplets, 100 microns or more in diameter, which are visible to the naked eyes).

Paper masks without filters are inappropriate for patient treatment. **Surgical masks**, with >95% bacterial filtration efficiency, **should be used routinely** in patient treatment and management.

**N-95 respirators**, particulate-filter respirators certified by the US National Institute for Occupational Safety and Health (NIOSH), are able to filter 1  $\mu$ m particles in the unloaded state, with a filter efficiency of >95% at a flow rate of <50L/min. A properly fitted N-95 respirator protects health care providers from inhaling respiratory pathogens, when treating patients with active TB and SARS. **It is a must always to FIRST read and understand the users' instructions before use.**

**Face masks should be changed at least once every session or when contaminated.** The frequency of change depends much on the room humidity and the procedure carried out.

When a mask gets 'wet', from exhaled moist air, the resistance to airflow through the mask will increase, causing more air to pass round the edges. A 'wet' mask will also be aspirated against the nose and mouth, which can be hazardous if it is soaked with pathogens. With procedures of long duration, or which generate lots of splatters or aerosols, a more frequent change of mask is justified (even in mid-course of a procedure).

Do not place hands over a worn mask which should be considered as a contaminated object. A used mask should be immediately disposed of after use.

## 2.4 Eye Protection

**Protective eyewear or face shields should be worn at all times during patient contact** when there is a possibility that a patient's body fluids may splash or spray onto the face/eyes (WHO, 2003a).

Proper protective eyewear should have solid top and side shields. Plain spectacles which commonly lack solid top and side shields are ineffective protective eyewear. Protective eyewear suitable for eyeglasses user is also available.

Face shields offer effective protection against splatters. They cannot, however, safeguard aerosols from entering the nose and must be used in conjunction with face masks.

Face shields and protective eyewear should be cleaned, after use, with water and Hibiscrub, or alcohol. If there is clear blood contamination, they should be disinfected with intermediate-level disinfectants; all traces of disinfectant must then be rinsed off thoroughly to avoid eye irritation.

## 2.5 Protective Clothing

Protective clothing (uniforms or disposable gowns) prevents contamination of street clothing and protects the skin of DHCP from exposure to blood and body substances (CDC, 2003a).

Care should be taken to minimize splashes and splatters when cleaning instruments and handling disinfectants. A disposable gown is always appropriate in these circumstances.

Disposable caps that completely cover the hair may be used when splashes of blood and body fluids are expected. They are also useful in keeping aerosols from lodging on the hair, which may then be transferred to family members or onto inanimate objects (WHO, 2003a).

**Cardigans or sweaters should be put on clean uniforms only and not be taken as protective tops.**

Protective clothing should be changed daily; or when contamination is obvious.

Soiled uniforms (and linens) should be gently handled by personnel fitted with proper personal protective gears including face masks, gloves and protective clothing.

## 2.6 Surface Asepsis

Surface asepsis is a set of procedures that prevent or remove contamination from surfaces (Miller, 1992). Uncovered surfaces within the confine of the dental operator are prone to be contaminated by splatters, aerosols, direct touch, etc. Eating, drinking and handling of contact lens are therefore not advisable in the operative areas.

The logical approach to realize infection control is

1. **to limit contamination** by proper zoning, suitable aseptic techniques, use of barriers, etc.
2. **to disinfect the contaminated surfaces.**

### 2.6.1 Limit contamination

#### Zoning

The area for cleaning and processing used instruments (**Dirty Zone**), and the area for holding sterilized and clean instruments (**Clean Zone**), along with the area for patient treatment (**Working Zone**) **must be clearly delineated** from each other. It is essential to **ensure a unidirectional flow of items from the Clean Zone to the Dirty Zone**.

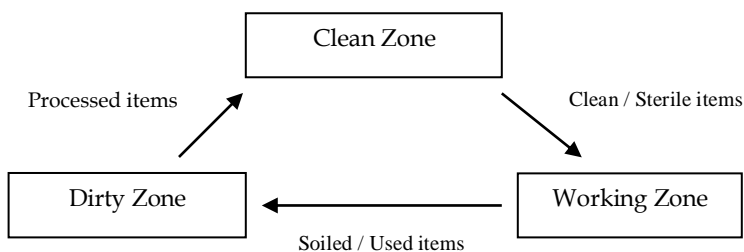


Figure 3: Unidirectional flow of instruments between zones.

Great care must be exercised to **avoid contamination when crossing zones**, as illustrated in the figure below.

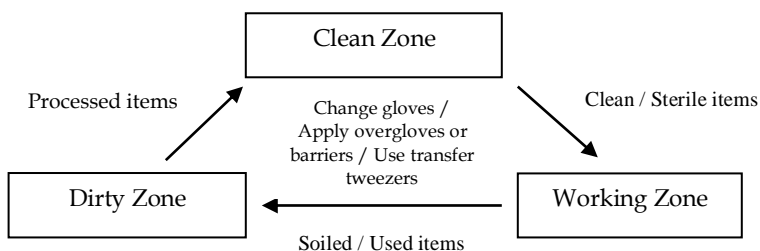


Figure 4: Zone crossing precautions.

### Keep out of contamination

**The number of items lying open on bench tops, bracket tables, and shelves should be kept to a minimum.** Bur stands, cotton roll and gauze dispensers, salivary ejectors, mixing glass slabs / pads should be kept in covered containers or drawers. Only the least amount of stock (inventory and stationery items alike) should be held inside the surgery. Foods and drinks should be separately kept away from dental materials or other potentially infectious materials (OPIM).

### Use of barriers

It is more reliable (and much easier) to **prevent contamination with the proper use of barriers** than to disinfect afterwards. Handpieces, 3-in-1 syringes, ultrasonic scalers and suction tubes must be enveloped in barrier sleeves. Disposable plastic covers should be placed on bracket tables, handpiece holders and suction tube holders. Plastic-backed paper bib should be used to cover patient's clothing.

To prevent contamination of equipment and office items, consider putting on a pair of clean gloves over the contaminated gloves (overgloving) when crossing zones in the middle of a treatment procedure.

Overgloves can be applied in adjusting chair / light position, holding light curing unit or suction, taking instrument out of the drawer, mixing dental material, or answering phone call.

Be sure of putting on the overgloves only when you are about to proceed and removing them straight afterwards. Overgloves are meant for interim use and hence can be let loosely fit. A plastic examination glove or simply a plastic bag can conveniently and adequately serve as an overglove.

### Limit contacts

It has been clearly demonstrated that contact and subsequent spread of a patient's oral fluid occurs frequently during dental procedures.

Adjustment of the dental light and bracket table should be completed before operation. Both operator and assistant should refrain from laying hands, inadvertently, on objects with contaminated gloves. High vigilance on differentiating 'clean' from 'unclean' is required and efforts should be paid to prevent contaminating the 'clean' by the 'unclean'.

Under the right circumstances, a DSA can change his/her position from being a 'chair-side nurse' to a 'scout nurse'. He/She then limits his/her role to instrument or material transfer to the operator. Good co-ordination between the dental officer and the DSA, together with proper workflow, is needed.

### Control aerosols and splatters

Aerosols and splatters are often generated during dental treatments (and instrument cleaning). High volume suction, positioned close to the mouth, significantly reduces the number of aerosolized particulates by as much as 90% (Jacks, 2002). Handpieces, ultrasonic scalers, etc. should be operated with an efficient high-volume suction.

Bacterial counts in aerosols can be greatly decreased if patients perform pre-treatment mouthrinsing or brushing. Even rinsing with water can cause a substantial reduction in bacterial counts (Fine, 1992). Rinsing with chlorhexidine gluconate (0.12% to 0.2%) is better for its residual action. Rubber Dam application effectively isolates the operating field and reduces the bacterial counts in aerosols significantly (Cochran et al., 1989; Samaranayake et al., 1989).

### Good work plan

It is a good practice to **do more in a single appointment** than to schedule multiple appointments. A good working plan avoids rush and hurry which are rivals to effective infection control. Prior set-up of instruments in a tray (**tray-system**) with necessary materials ready (**pre-dispensing**) for a treatment procedure reduces zone crossing and thus the chance of contamination.

## 2.6.2 Surface disinfection

Different instruments/equipment/surfaces require different disinfection regimes. In the dental operator, environmental surfaces can be divided into *clinical contact surfaces* and *housekeeping surfaces* (CDC, 2003a). (Please refer to Section 2.7 for the CDC/Spaulding classification of clinical items.) Because housekeeping surfaces, e.g. floors, walls and sinks, have limited risk of disease transmission, they can be decontaminated with less rigorous means than those used on patient-care items and clinical contact surfaces (CDC, 2003 a & b).

Surface disinfection can be achieved with either intermediate-level or low-level disinfectants. Intermediate-level disinfectants are those registered with the US Environmental Protection Agency (EPA) as "hospital disinfectants" with "tuberculocidal" activity. They include phenolics, iodophors, and chlorine-containing compounds. Low-level disinfectants are those registered with EPA as "hospital disinfectants" exclusive of "tuberculocidal" activity (e.g. alcohol, quaternary ammonium compounds).

Surface disinfection is a 2-step procedure. The first (pre-cleaning) step aims to reduce the organic loads which interfere with the action of disinfectants. The second step allows time for the disinfectant to take effect.

### When and what to disinfect

If waterproof surface barriers are used properly, and carefully removed and replaced, there is no need to disinfect protected surfaces in-between patients.

Intermediate-level disinfection should be applied on unprotected clinical contact surfaces or housekeeping surfaces with obvious blood/saliva contamination. A low-level disinfection of the clinical contact surfaces is, otherwise, sufficient once daily.

Utility gloves, protective eyewear, face mask, and protective clothing must be worn when handling disinfectants.

### How to disinfect

The soak-wipe-soak technique can generally be adopted in most situations. The first soak, and wipe, with disposable paper towels, is the pre-cleaning step that lowers the bioburden. Disinfection *per se* is brought about by the second soak. The “wetting” time of the second soak should follow the manufacturer's recommendations. For intermediate-level disinfection, 10 minutes are usually required. Residual disinfectant should then be removed with water (and paper towel).

Do not soak gauze or paper towel in disinfectant containing sodium hypochlorite beforehand, as its organic component will affect the activity of the disinfectant. Using the same agent for pre-cleaning and disinfection certainly will keep down the number of stock items.

### Choice of agents

**Household bleach (5-6% sodium hypochlorite) diluted to 10 parts is a generally accepted surface disinfectant for intermediate-level disinfection.** (Intermediate-level disinfectants differ from low-level disinfectants in that they are tuberculocidal and virucidal.) Ten-minute contact time is recommended. Its action on micro-organisms is well documented (Rutala & Weber, 1997). However, being unstable at this concentration, it has to be freshly prepared every day. Its corrosive effects on metals and bleaching effect on fabrics demand its use with caution. Do note that proper barrier application will greatly reduce the need for intermediate-level disinfection in-between patients.

**70% ethyl alcohol** is not accepted for intermediate-level surface disinfection because it vaporizes rapidly (and the contact time will thus be inadequate for effective surface disinfection). **It can only be used for low-level surface disinfection.** Other low-level disinfectants include 1:100 sodium hypochlorite, chlohexidine gluconate, etc.

(Please refer to Appendix II for the surface asepsis in dental radiography and Appendix III for the disinfection of impressions, prostheses and appliances.)



## 2.7 Instrument Sterilization and Disinfection

**Instruments or clinical items can be divided into 3 categories** according to CDC/ Spaulding classification (CDC, 2003a; Spaulding, 1968).

**Critical items** are those which are used to penetrate soft tissues or bone. The risk of disease transmission is high. They must be sterilized before and after use. These include forceps, surgical instruments and scalers.

**Semi-critical items** are those which come into contact with mucous membranes but are not be used to penetrate soft tissues or contact bone; mirrors, amalgam condensers and hand instruments for operative procedures for instance. The risk of disease transmission is intermediate. These items should be sterilized in the same way as critical items. For semi-critical items that are susceptible to heat damage, they should be subjected to high-level disinfection with agents registered with the US Food and Drug Administration (FDA) as chemical sterilant / high-level disinfectant.

**Non-critical items** are those that touch intact skin only. The risk of disease transmission is low. Intermediate-level disinfection should be applied after use, with or without the visible presence of blood or OPIM. As mentioned before (pg 14, 17), proper barrier application will greatly reduce the need for post-operative disinfection.

**Items not designed to be reused or cannot be satisfactorily sterilized should be disposed of after use.** Plastic saliva ejectors, paper cups, brushes and prophylaxis cups, scalpel blades, needles, LA cartridges, sutures, gloves and matrix bands all fall into this category.

### 2.7.1 The Sterilization Sequence

The entire management of used / soiled instruments is made up of several steps:

#### Pre-sterilization cleaning

This is the most important step that could easily be overlooked. It removes substantial number of microbes and organic remnants (blood, saliva, etc.) on instruments, which may otherwise inactivate disinfectants or insulate the microbes from heat.

Do note that it is more difficult to clean an instrument when contaminants are allowed to dry on it. If cleaning is delayed, it is advisable to keep soiled instruments in a holding solution which could simply be detergent in water, disinfectant, ultrasonic cleansing agent, or any proprietary product for precleaning.

**Ultrasonic cleaners must be used for pre-sterilization cleaning.** Such practice cuts down hand processing and minimizes the chance of getting injured by contaminated instruments or sharps. The manufacturer's instructions on operation should be followed. To avoid generating aerosols, **secure the lid before switching the cleaner on.** Proprietary ultrasonic cleansing agents usually contain ingredients effective in dissolving organic matters; but detergent-in-water is a low-cost and effective alternative. Cleansing agent should be changed once a day or when turned murky with use. The basket and tank of the ultrasonic cleaner should also be cleaned at the end of the day.

**Cleaned instruments should be rinsed** thoroughly in water to get rid of all remaining cleansing agent. They should **then be checked for residual debris and hand cleaned as necessary.** Do note that heavy duty utility gloves, protective eyewear, face mask and protective clothing should be worn in the process. Being more puncture resistant and less affected by chemicals, utility gloves provide better protection than latex gloves. Utility gloves should be cleaned at the end of the day and can be reused unless they are worn out.

(The pre-cleaning of handpieces warrants special attention and is addressed separately in Appendix IV.)

### Drying

**Instruments must be dried (and oiled if necessary) before sterilization.**

Most hand instruments can be towed dry. For hinged instruments or instruments with inaccessible small parts, they can be blown dry with compressed air. It is a misconception that sterilization by means of an autoclave is a wet process and thus instruments can be left wet in the sterilizers. The vaporization of water on wet instruments takes extra time. More importantly, water trapped in small spaces such as the hinges of instruments may be unable to vaporize completely. Effective sterilization may, thus, not be achieved within the set time. The chance of corrosion is also increased.

### Packaging

**Packaging should be done in the Dirty Zone. Critical items / instruments not for immediate use should be packaged to prevent recontamination after sterilization.** Operative hand instruments that are used time and again can be put in perforated aluminum trays with or without wrapping (tray-system). Handpieces can be packaged in pouches or perforated trays. **All packages should be dated** to facilitate recall when ineffective sterilization is presumed in the event of consecutive spore test failure.

### Sterilization

Moist-heat should be used for sterilizing instruments. **Autoclaves are the most reliable tools in instrument sterilization.** Effective sterilization can be achieved in relatively short time. The chamber of the autoclave should not be overloaded and regular monitoring (please refer to Section 2.7.2 for details) is necessary to ensure efficacy of the machine. All critical and semi-critical items should be autoclaved. It is important to operate and maintain the autoclaves in accordance with the users' manuals. Do not take short-cuts in any case.

The gravity displacement and the pre-vacuum (vacuum assisted) autoclaves are both available in the Government Dental Service. For the gravity displacement models, air is displaced by steam physically. Improper packaging and loading could prevent the escape of air, leading to ineffective sterilization. However, air is first drawn out (to create a vacuum) before the chamber is filled with steam for the pre-vacuum autoclaves. Effective steam penetration could be attained for different types of loads - solid, hollow and porous, pouched, single / double wrapped items (Joslyn, 2001).

## Storage

**Sterilized items should be properly stored to ensure sterility.**

Packaging simplifies storage. The storage condition is vital. The sterility of wrapped items can be maintained indefinitely unless an occurrence (e.g. torn or wet wrapping) causes contamination. (CDC, 2003a; Mayworm, 1984). Instruments in compromised wrappings should be re-cleaned, re-packaged and re-sterilized.

For unwrapped frequently used operative items, they should be stored in covered containers with no perforations, or cabinets with tight doors. Instruments autoclaved and kept in perforated trays should also be considered as unwrapped items. **Unwrapped items should be re-sterilized at least every 3 months, with the storage cabinets and containers, for such items, disinfected** with low-level disinfectant (or sterilized if applicable) at the same time.

### 2.7.2 Sterilization monitoring

There are a number of reasons for ineffective sterilization to occur (Miller, 2001), for instance:

- ❖ Overloading in a cycle.
- ❖ Improper equipment maintenance.
- ❖ Damaged door seal.
- ❖ Improper sterilization time.
- ❖ Inappropriate packaging (e.g. instruments in non-perforated trays).

Therefore, it is crucial to monitor the effectiveness of a sterilization process with the use of physical, chemical and biological indicators.

#### Physical indicators

The temperature and pressure finally attained and the time then elapsed should be noted. They should be in accord with the users' manual. Some autoclaves provide printouts with regard to the changes of the physical conditions during the cycle, which are certainly useful for documentation purpose.

#### Chemical indicators

Chemical indicators are heat-sensitive materials that display definite colour or physical change with temperature rise and/or contact with steam over time. They could be turned out as pads, cards, strips, vials and most commonly tapes.

A chemical indicator designed solely to indicate heat change in a sterilization cycle is known as a process indicator. The bands on an autoclave tape or the markers on a sterilization pouch are process indicators; they turn brown, in a given time, at a definite temperature. Process indicator, albeit being the most basic chemical indicator, can be conveniently used to differentiate the processed from the unprocessed items. To find out if heat penetrates throughout the load, **a chemical indicator should be put in the most inaccessible part of every load** (commonly the centre of an autoclave chamber).

### Biological indicators

Biological monitoring conclusively demonstrates that effective sterilization is achieved, though physical and chemical monitorings provide factual information on the sterilization conditions. The use of calibrated biological indicators (spore test) is the most important assurance (Miller, 2001; Molinari et al, 1996) on the sterilization process.

Biological indicators are live, nonpathogenic bacterial (*Geobacillus stearothermophilus*) spores that are highly resistant to heat, much more so than the viral, fungal and bacterial pathogens (including HIV, HBV and Coronavirus); and present in greater number than the common microbials found in contaminants on patient-care equipment. Therefore, if the spores are inactivated after a sterilization cycle, no other organism should survive and the related load is sterile.

**Spore test should be performed at least weekly.** Additional spore tests should be carried out for the first cycle after repair/of a new sterilizer. **The spore test results should be kept for a year at the clinic level.**

To conduct a spore test in the Dental Service, Department of Health,

- ❖ Pouch a vial (ensure that the glass ampule is intact) and place it in the most inaccessible area of a load, start the sterilization cycle as usual.
- ❖ At the end of the cycle, check if the process indicator on the pouch has changed colour. Check the integrity of the ampule again.
- ❖ Fill in the request form (DH2544).
- ❖ Pack and dispatch to Public Health Laboratory Centre (PHLC), Department of Health for incubation.

**If a spore test fails**, the following steps should be taken:

1. Stop using the autoclave in connection. Use other autoclaves in the clinic.
2. Review if any factor could account for the event, overloading for example. If the signs of all physical and chemical monitorings are normal, the 1st failure probably does not indicate that the autoclave has gone wrong.
3. **Carry out a 2nd spore test. Use the DH2544 (Red) Request Form and dispatch the vial to PHLC.**

4. Should the 2nd spore test fail, the autoclave must be examined by EMSD to have the cause revealed.
5. Though adverse effects have not been associated with the contrary, it will be prudent to recall (and reprocess), in so far as possible, items autoclaved since the last successful spore test.
6. The "failed" autoclave could only be used if a negative spore test is established again.

## 2.8 Waterlines / Suction Asepsis

### Waterline asepsis

Dental unit waterlines (DUWL) refer to the pipeline system that delivers water to handpieces, 3-in-1 syringe, and ultrasonic scaler. Studies have shown that DUWL promote both bacterial growth and the development of biofilm (CDC, 2003a). Oral debris of patients can also enter the DUWL even when the dental units are fitted with anti-retraction valves which may clog due to biofilm deposition and fatigue (Pankhurst et al, 1998). Although no epidemiologic evidence suggests that DUWL poses a public health concern, exposing patients and DHCP to water of uncertain microbiological quality is inconsistent with the infection control principle (CDC, 2003a).

While the appropriate DUWL treatment is being explored, it is prudent to **flush the waterlines at the beginning of a day and in-between patients**. Water must be allowed to discharge, first with the handpieces, air/water syringe tip removed, for 2-3 minutes at the beginning of each working day. On completion of treatment, the used handpieces, ultrasonic scalers, and air-water syringes must be run for 20 to 30 seconds.

**For surgical procedures, sterile saline or water should be used as coolant / irrigant.**

### Suction / Evacuation system

This is different from the dental unit waterlines in that contents along the suction system do not go back to a patient's mouth. Intermittent flushing with water during treatment and in-between patients can help to prevent the tubing from clogging. At the end of a working day, rinse the system with appropriate agent as recommended by the manufacturer, or a litre of water. The use of suction cleaning devices such as "Oro-cup" helps to create the necessary turbulence for more effective cleaning. The detachable suction filters and hoses should be cleaned with reference to the manufacturer's instructions.

## 2.9 Waste Disposal

Similar to the cleaning of used instruments and handling disinfectants, proper personal protective gears are required in handling wastes.

### Managing sharps

Ample evidence indicates that percutaneous injury with sharps is the most common mode of blood-borne pathogen transmission in health care settings. Gloves do not provide adequate protection against sharps injuries.

**All sharps and pointed instruments should be handled with extreme care.** Vigilance must be exercised when working with needles, scalpels, scaler inserts and even probes. Do not recap used needles with hands or other technique that involves directing the point of a needle toward any part of the body. Never bend or break needles before disposal (CDC, 2003a).

Used sharps and fragile items should be placed in a puncture-resistant sharps box, which should be located, securely, as close to the operating field as possible. Keep a sharps box about 3/4 full at most. **Sharps boxes must be tightly closed before disposal as clinical waste.**

### Clinical waste

Clinical waste including sharps box that contains used / contaminated needles and blades, dressing dribbling or caked with blood or containing free-flowing blood, etc. should not be kept for more than 3 months. **All clinical waste must be disposed of in red plastic bags conspicuously marked with 'Biohazard' symbol and labeled as 'Clinical Waste' in both Chinese and English on the outside.** A second red bag is indicated if leakage is suspected. The bags filled with clinical waste should be tied up using the "Swanneck" method of sealing (Appendix V). Special management by licensed clinical waste collectors is required (Environmental Protection Department, 2001).

### Non-clinical waste

All trash, other than clinical waste, could be disposed of as domestic waste in black plastic bags. Liquid waste, except chemical waste, can be emptied into the drain and flushed down with water.



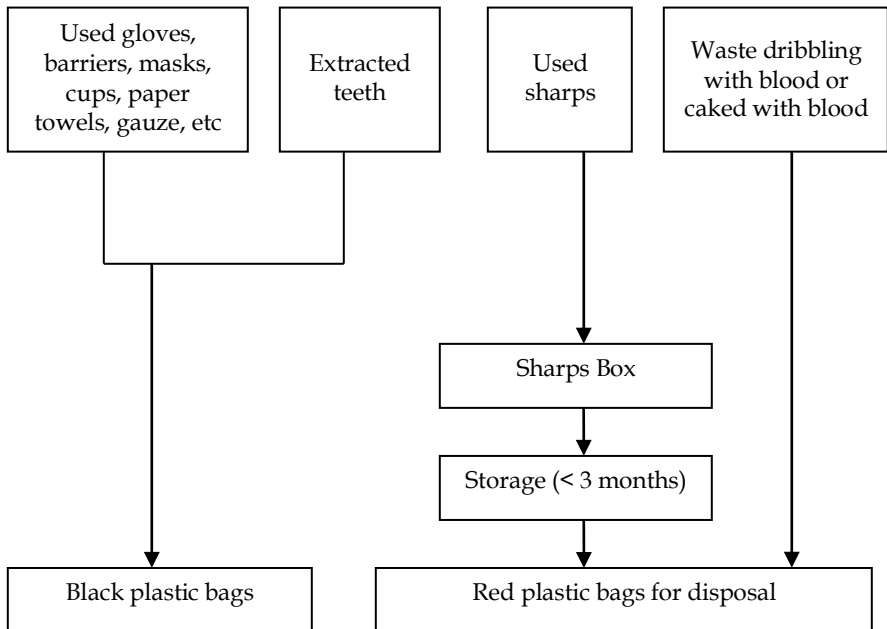


Figure 5: Outline of waste management

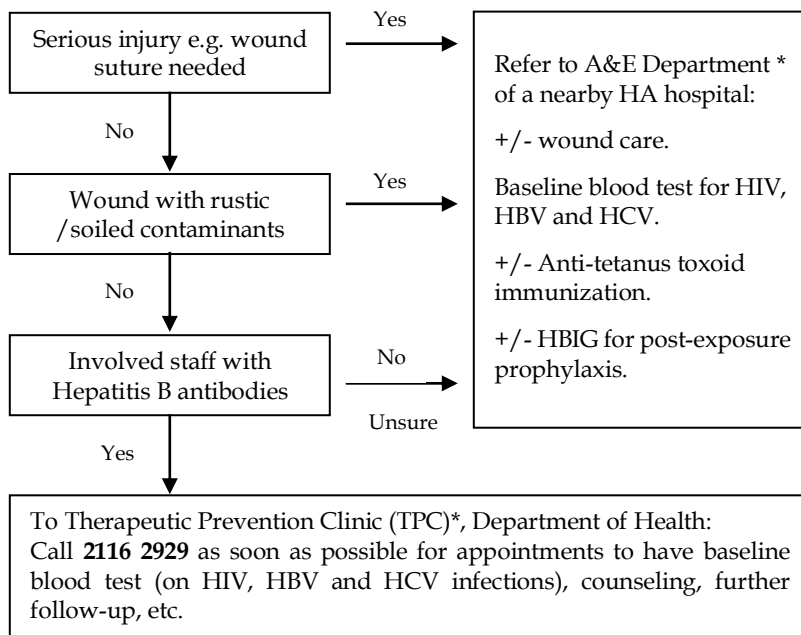
## 2.10 Occupational Exposure to Infectious Materials

Occupational Exposure is defined as the contact of nonintact skin, eye, mucous membrane or parenterally with blood or other potentially infectious materials (CDC, 2003a). The principle management, in our current setting, includes:

### 1. First aid

- Wash wounds with soap and water; flush mucous membrane with water.
- Dress wound if necessary.

## 2. Referral



\* Be sure to have a completed *Referral* (Appendix VI) when attending A&E or TPC.

## 3. Establish the serological status of source patient

If the source patient belongs to the "high-risk" groups, refer him/her (with informed consent) for blood test as the related dental instruments/needles normally contain too little source material for laboratory tests. This will facilitate arrangement for follow-ups. (Some hotlines are available to provide additional information on specific medical conditions, e.g. 2116 2888 for Hepatitis B, 2780 2211 for AIDS)

## 4. Reporting

Complete the *Surveillance Form for Sharps Injury or Mucocutaneous Exposure to Blood / Body Fluid* (Appendix VII) and report respectively to Infection Control Branch, Centre for Health Protection and Infection Control Standing Committee, Dental Service.

### TRANSMISSION-BASED PRECAUTIONS

Transmission-based Precautions can be categorized into:

- ❖ Airborne Precautions
- ❖ Droplet Precautions and
- ❖ Contact Precautions

The *Basic Protocol* has covered droplet and contact precautions in the previous chapters.

Airborne precautions should be considered for certain respiratory diseases, such as tuberculosis and SARS. It is fortunate that tuberculosis and SARS are not usually infectious before signs and symptoms appear (Chan et al., 2003; Molinari & Terezhalmay, 1996; WHO 2003b; Yu et al., 2004). Though SARS is transmitted by droplets, it is important to bear in mind that droplets could be aerosolized in aerosol-generating procedures.

Airborne precautions should be based on community risk assessment and performed appropriately for the risk level of disease transmission in the facility (CDC, 1994 & 2003a). They are based on a hierarchy of measures, including administrative controls, environmental (engineering) controls, and personal respiratory protection (CDC, 1994 & 2003a).

Administrative controls aim for early detection of a person with active disease and prompt isolation from susceptible persons to reduce the risk of transmission. Appropriate medical history taking and screening are important. For example, temperature check during the SARS epidemic has been considered a key measure to control the spread of SARS (WHO, 2003c). A suspected case should be referred for medical evaluation and care without delay. Elective dental treatment should be deferred until he / she is confirmed to be non-infectious. Urgent dental treatment should be performed, preferably, in special operatory with engineering controls on airflow, air filtration, etc. Special PPE such as properly fitted N95 respirator must be worn.

### TAKING AND PROCESSING DENTAL RADIOGRAPHS

Barrier application and surface disinfection should be extended to the taking and processing of radiographs. Use barriers to align the cone, set the control panels and start off film exposure. Gloves should be worn and additional personal protective gears such as mask, protective eyewear and gown should be used for possible blood/body fluid splatters.

#### *Film processing in clinics using darkrooms*

Remove any saliva/blood on the film pack with paper towel. Open the film pack (dirty) inside the dark room and let the exposed film drop onto a clean paper towel or surface barrier. **Be sure not to contaminate the film.** Put on a new pair of gloves and take the clean film for development.

#### *Film processing in clinics not using darkrooms*

The developing and processing of films in clinics not using darkrooms require extra attention to prevent cross-infection.

Wrap and seal the film pack with a barrier before exposure. Remove the barrier and let the clean film pack drop onto a clean surface afterward. Put on a new pair of gloves and take the film for development.

### DISINFECTION OF IMPRESSIONS, PROSTHESES AND APPLIANCES

Impressions and appliances (from patient's mouth) are contaminated items. They must be appropriately disinfected, before sending to the dental laboratories, with suitable disinfectant and disinfection time to ensure dimensional stability. Good communication with the dental laboratories should be maintained to avoid a skip or unnecessary duplication of disinfection procedures. In practice (ADA, 1996; CDC, 2003a; Merchant, 1996; OSAP, 1998),

- ❖ Remove, first of all, saliva, blood and organic debris by thorough rinsing (in water).
- ❖ **Dip & Store\* with 1:10 sodium hypochlorite for 10 minutes.** The corrosion of metal parts caused by sodium hypochlorite is a theoretical possibility that may not happen with the few disinfection cycles in the entire fabrication process (Merchant, 1996).
- ❖ Immersion in 75%-80% alcohol for 10 minutes is a viable alternative for ceramic and metal items.
- ❖ All disinfected items should be rinsed and dried, packed properly and transferred to the laboratories.

\* Dip & Store: The item is first dipped in disinfectant, then stored moist inside a covered container.

### STERILIZATION OF HANDPIECES

Most handpieces cannot withstand ultrasonic cleaning. Their inner recesses, however, have to be cleaned prior to sterilization because oral debris/microbes may be retracted into the turbine space and waterline. The general guidelines on handpiece processing are as follows:

1. Leave the handpiece attached after patient treatment. Remove visible debris from the handpiece. **Run, to flush the waterlines, for 20 to 30 seconds** into a container or absorbent material.
2. Remove it from the coupling and clean the outer surface thoroughly with water or disinfectant, rinse and dry. Do not soak unless recommended by the manufacturer.
3. Clean/lubricate the inner recesses as recommended by the manufacturer. Some handpieces require lubrication before, after, or before and after sterilization, or not at all. Check with the manufacturer's instruction. Use separate cans of lubricants for pre and post-sterilization lubrications.
4. Wipe residual lubricant away from the outer surface. For handpieces fitted with fibre optic, be sure not to leave any lubricant on the fiber optic contact.
5. Package in pouch, bag or container.
6. Follow the manufacturer's recommendations on sterilization.
7. If post-sterilization lubrication is required, handle the sterilized handpiece aseptically.

When clinical waste bags are filled to three-quarters capacity the "Swan-neck" method of sealling should be used



Seal plastic bag when no more than 75% full.



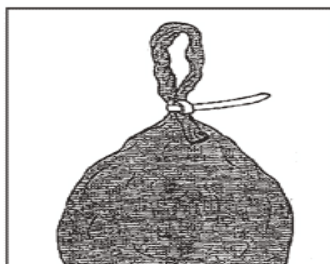
Twist firmly then double over



Hold the twist firmly



Pass the seal over the neck of the bag.



Tighten the seal manually to create an effective seal.

**ONLY** those bags which are securely sealed, using the above method, and in the designated area will be uplifted from the pickup points.

### SEALING AND TAGGING METHOD FOR CLINICAL WASTE BAGS

Source: Environmental Protection Department, the Government of the HKSAR

## Appendix VI

### Exposure to Blood / Body Fluid - Form 1 Referral to Therapeutic Prevention Clinic / A&E Department

#### Referral Chart

Serious injury e.g. sutures needed	Yes →	Attend A&E Department of a nearby HA hospital  (Take this referral, along with GF181)
No ↓		
Wound with rustic/soil contaminants	Yes →	
No ↓		
Involved staff with Hepatitis B antibodies	Unsure/No →	
Yes ↓		
<b>To Therapeutic Prevention Clinic (TPC), Department of Health</b> 1. Call 2116 2929 as soon as possible for appointment 2. Take this <b>referral, along with GF181</b> when attending TPC		

To: Therapeutic Prevention Clinic, DH / A&E Department (Delete as appropriate)

#### Request for Post-exposure Management / Follow-up

Name of the person: \_\_\_\_\_ Post: \_\_\_\_\_ HKID No: \_\_\_\_\_

Date of incident: \_\_\_\_\_ Dental clinic: \_\_\_\_\_

Cause of contact: ☐ LA needle ☐ Suture needle ☐ Irrigation needle ☐ Wire  
☐ Probe ☐ Bur ☐ Elevator ☐ Scalpel blade  
☐ Blood / Body fluid splatter (on mucosa)  
☐ Others, please specify: \_\_\_\_\_

Contact process: ☐ Recapping used needle ☐ Disposal of sharps  
☐ Tidying up bracket table, trays ☐ Pre-sterilization cleaning  
☐ During treatment, please specify: \_\_\_\_\_  
☐ Others, please specify: \_\_\_\_\_

First-Aid on site: ☐ Yes ☐ No

Other information: \_\_\_\_\_  
 \_\_\_\_\_

Referring Dental Officer's Signature: \_\_\_\_\_

Name: \_\_\_\_\_

Date: \_\_\_\_\_

ICSC/SF1(04)

Dental Service, Department of health, HKSAR Government (8/2004)



## Appendix VII

On completion of 1) First Aid & 2) Referral, please 3) complete this form and post it to Infection Control Standing Committee through Personal Secretary (PS) to Consultant Dental Surgeon (Ops) under *Confidential Cover*.  
You will receive an acknowledgement within 2 weeks (notify PS by phone if no reply is received).

<b>Exposure to Blood / Body Fluid -Form 2</b> <b>Record of Sharps Injury &amp; Mucosal Contact</b> (Applicable to all staff including Workman, Lab. Attendant, etc.)
--

Name of the person: \_\_\_\_\_ Date of incident: \_\_\_\_\_  
 HKID No: \_\_\_\_\_ Grade: \_\_\_\_\_ ☐ Permanent ☐ NCSC  
 Name of clinic /c: \_\_\_\_\_ Dental clinic: \_\_\_\_\_

<b>Cause of contact:</b> <input type="checkbox"/> LA needle <input type="checkbox"/> Suture needle <input type="checkbox"/> Irrigation needle <input type="checkbox"/> Wire <input type="checkbox"/> Probe <input type="checkbox"/> Bur <input type="checkbox"/> Elevator <input type="checkbox"/> Scalpel blade <input type="checkbox"/> Blood / Body fluid splatter (on mucosa) <input type="checkbox"/> Others, please specify: _____
<b>Contact process:</b> <input type="checkbox"/> Recapping used needle <input type="checkbox"/> Disposal of sharps <input type="checkbox"/> Tidying up bracket table, trays <input type="checkbox"/> Pre-sterilization cleaning <input type="checkbox"/> During treatment, please specify: _____ <input type="checkbox"/> Others, please specify: _____

<b>Source patient:</b> <input type="checkbox"/> Known <input type="checkbox"/> Unknown <b>Name:</b> _____ <b>Tel no:</b> _____ <b>HKID No:</b> _____ <b>Address:</b> _____ <b>Verbally questioned on history of HBV, HCV, HIV infections</b> <input type="checkbox"/> Yes <input type="checkbox"/> No <b>Referral for blood test:</b> <input type="checkbox"/> Yes <input type="checkbox"/> No
--

<b>Follow-up actions:</b>	
<b>First Aid on site:</b> <input type="checkbox"/> Wound care / Water Flush (splatter on mucosa) <input type="checkbox"/> No <b>Further action:</b> <input type="checkbox"/> Yes (please provide details below) <input type="checkbox"/> No, please state reason(s): _____	
<b>Attended:</b> <input type="checkbox"/> Therapeutic Prevention Unit <input type="checkbox"/> A&E <input type="checkbox"/> Others, please specify: _____	
<b>Actions taken:</b> <input type="checkbox"/> Baseline blood test (Injured staff) <input type="checkbox"/> Hepatitis B Immunoglobulin prophylaxis <input type="checkbox"/> Anti-tetanus toxoid (ATT) <input type="checkbox"/> Source patient blood test <input type="checkbox"/> Others, please specify: _____	
<b>Follow-up actions planned:</b> <input type="checkbox"/> Blood test to be repeated at <input type="checkbox"/> 3 months <input type="checkbox"/> 6 months <input type="checkbox"/> ATT booster <input type="checkbox"/> Others, please specify: _____	

ICSC/SP2(04)

Dental Service, Department of health, HKSAR Government (8/2004)

## Appendix VIII



### Surveillance Form for Sharps Injury or Mucocutaneous Exposure to Blood and Body Fluid



For Clinic Internal Use: Case No:

#### A. Particulars of Injured/Exposed Staff

##### (1) Discipline of the Injured/Exposed Staff (Please ✓ the appropriate box)

(a) <input type="checkbox"/> Doctor	(b) <input type="checkbox"/> Nurse	(c) <input type="checkbox"/> Inoculator	(d) <input type="checkbox"/> Paramedical (e.g. OT, PT, dietician, ST, Clin.Psy., Rad.)#
(e) <input type="checkbox"/> Dentist	(f) <input type="checkbox"/> Dental Therapist	(g) <input type="checkbox"/> DSA#	(h) <input type="checkbox"/> Medical Technologist
(i) <input type="checkbox"/> Workman	(j) <input type="checkbox"/> Others, please specify (e.g. Dental Hygienist, clerical / admin staff., etc) _____		

##### (2) Service/Division/Branch Where the Injury/Exposure Occurred (code) \_\_\_\_\_ (see Dept Code in Annex 1)

#### B. Particulars of the Injury/Exposure Event

##### (1) Date of Injury/Exposure \_\_\_\_/\_\_\_\_/\_\_\_\_ (dd/mm/yyyy) (2) Time of Exposure \_\_\_\_ : \_\_\_\_ am/pm (please circle the appropriate)

##### (3) Location Where Exposure Occurred (Please ✓ the appropriate box)

(a) <input type="checkbox"/> Autopsy / pathology laboratory	(b) <input type="checkbox"/> Clinical laboratory
(c) <input type="checkbox"/> Consultation room	(d) <input type="checkbox"/> Service / utility area (laundry, sluice room)
(e) <input type="checkbox"/> Treatment room	(f) <input type="checkbox"/> Waste disposal area / room
(g) <input type="checkbox"/> Others, please specify _____	

##### (4) Was the source patient identifiable? (a) ☐ Yes (b) ☐ No

##### (5) Nature of Event and Type of Exposure

##### (a) ☐ Percutaneous Contact (e.g. a needlestick or cut with a sharp object) (Please ✓ one of the following)

- (i) ☐ Superficial (e.g. scratch, no or little blood) (ii) ☐ Moderate (e.g. penetrated through skin, bleeding wound)  
(iii) ☐ Deep (e.g. intramuscular penetration) (iv) ☐ Not sure

##### (b) ☐ Mucosal contact (e.g. eye, nose, mouth)

##### (c) ☐ Non-intact Skin contact (e.g. uncovered wound)

##### (d) ☐ Human bite: skin surface broken (a) ☐ Yes (b) ☐ No

##### (e) ☐ Others, please specify \_\_\_\_\_

##### (6) Body Part Injured/Exposed

- (a) ☐ Arm (b) ☐ Back (c) ☐ Chest (d) ☐ Eye (e) ☐ Face  
(f) ☐ Fingers (g) ☐ Hand (h) ☐ Lower extremities (i) ☐ Mouth (j) ☐ Wrist  
(k) ☐ Other Site \_\_\_\_\_

#### C. Circumstances When the Injury or Exposure Event Occurred

For sharps injury: answer question 1-11 except 6  
For mucocutaneous exposure: answer questions 6-11

##### (1) Types of Sharps (Please ✓ the appropriate box)

(a) <input type="checkbox"/> Angiocath	(b) <input type="checkbox"/> Broken glass	(c) <input type="checkbox"/> Butterfly needle
(d) <input type="checkbox"/> Dental instrument e.g. probe	(e) <input type="checkbox"/> Hollow-bore needle	(f) <input type="checkbox"/> Lancet
(g) <input type="checkbox"/> Retractable needle	(h) <input type="checkbox"/> Scissors	(i) <input type="checkbox"/> Surgical blade
(j) <input type="checkbox"/> Suture needle	(k) <input type="checkbox"/> Others, please specify _____	

##### (2) Was the injury self inflicted? (a) ☐ Yes (b) ☐ No (c) ☐ Unknown

##### (3) Purpose of the Sharps Originally Used (Please ✓ one or more boxes if appropriate)

(a) <input type="checkbox"/> Autopsy	(b) <input type="checkbox"/> Blood taking
(c) <input type="checkbox"/> Containing specimen or pharmaceutical	(d) <input type="checkbox"/> Cutting
(e) <input type="checkbox"/> Drilling	(f) <input type="checkbox"/> Extraction
(g) <input type="checkbox"/> Fingersick / beetstick (e.g. Haemo stick)	(h) <input type="checkbox"/> Injection (IM/SC/IV/Intradermal) (Please circle one)
(i) <input type="checkbox"/> IV line related procedure	(j) <input type="checkbox"/> Obtaining body fluid or tissue sample
(k) <input type="checkbox"/> Suturing	(l) <input type="checkbox"/> Unknown
(m) <input type="checkbox"/> Others, please specify _____	

Version 2.1 (Jan 2009)

(4) Sharps Injury Occurred When (Please ✓ one or more boxes if appropriate)

(a) <input type="checkbox"/> Colliding with co-worker	(b) <input type="checkbox"/> Disassembling device or equipment
(c) <input type="checkbox"/> During use of sharp item	(d) <input type="checkbox"/> Injured by item left on or near disposal container
(e) <input type="checkbox"/> Patient movement / patient violence	(f) <input type="checkbox"/> Perforation of sharps container
(g) <input type="checkbox"/> Inappropriate placement of sharps (location where the sharps was placed). Please specify _____	(h) <input type="checkbox"/> Struck by item protruding from sharps container (e.g. sharps container too full)
(i) <input type="checkbox"/> Sharps protruding from trash	(j) <input type="checkbox"/> While recapping a needle
(k) <input type="checkbox"/> In preparation for reuse of reusable instrument	(l) <input type="checkbox"/> Withdrawing a needle from rubber or other resistant material (e.g. rubber stopper, IV port)
(m) <input type="checkbox"/> Others (Please specify) _____	

- (5) Did the device being used have engineered-sharps injury protection? (i) ☐ Yes (ii) ☐ No  
(For example: retractable needle, needle with blunt end) (iii) ☐ Unsure/Unknown (iv) ☐ Not applicable

(6) Mucosal and/or Non-intact Skin Exposure Occurred When (Blood and Body Fluid Exposure Only)

(a) <input type="checkbox"/> Direct patient contact	(b) <input type="checkbox"/> Feeding/ventilator/other tube separated/leaked
(c) <input type="checkbox"/> Human bite	(d) <input type="checkbox"/> IV tubing/bag/pump leaked/broke
(e) <input type="checkbox"/> Specimen container broke	(f) <input type="checkbox"/> Specimen container leaked/spilled
(g) <input type="checkbox"/> Splash of body fluid	(h) <input type="checkbox"/> Touched contaminated drapes/sheets/gowns, etc.
(i) <input type="checkbox"/> Touched contaminated equipment/surface	(j) <input type="checkbox"/> Unknown
(k) <input type="checkbox"/> Others (Please specify) _____	

(l) Please indicate, if there was an equipment failure \_\_\_\_\_

(7) Types of Blood or Body Fluids Exposed

- |  |   |   |
|--|---|---|
| (a) <input type="checkbox"/> Blood / blood products                    | (ii) <input type="checkbox"/> Cerebrospinal fluid     | (iii) <input type="checkbox"/> Pericardial fluid      |
| (b) <input type="checkbox"/> Deep body fluid                           | (v) <input type="checkbox"/> Pleural fluid            | (vi) <input type="checkbox"/> Semen/vaginal secretion |
| (i) <input type="checkbox"/> Amniotic fluid                            | (vii) <input type="checkbox"/> Others (specify) _____ |   |
| (iv) <input type="checkbox"/> Peritoneal fluid                         | (i) <input type="checkbox"/> Yes                      | (ii) <input type="checkbox"/> No                      |
| (vii) <input type="checkbox"/> Synovial fluid                          |   |   |
| (c) <input type="checkbox"/> Saliva (visibly contaminated with blood?) |   |   |
| (d) <input type="checkbox"/> Others, please specify _____              |   |   |

(8) Personal Protective Equipment When the Exposure Incident Occurred

- |   |                                      |   |                                     |
|---|--------------------------------------|---|-------------------------------------|
| (a) <input type="checkbox"/> Face shields | (b) <input type="checkbox"/> Goggles | (C) <input type="checkbox"/> Gown         | (d) <input type="checkbox"/> Gloves |
| (e) <input type="checkbox"/> Masks        | (f) <input type="checkbox"/> None    | (g) <input type="checkbox"/> Others _____ |                                     |

(9) First Aid Given on Site

- (a) ☐ Wound care / Water Flush (splatter on mucosa)  
(b) ☐

(10) Medical Consultation

- (a) ☐ Received (b) ☐ Arranged (C) ☐ Not arranged

(11) Is the event reported to the Departmental Administration Section (DAS) as for the Injury on Duty (IOD)?

- (a) ☐ Yes (b) ☐ No

Name of Person for Enquiry: \_\_\_\_\_ Contact Number: \_\_\_\_\_  
(Block Letter) (for data entry clarification only)

**Please fax the form (p.1 & 2) to OH/ICB at 35230741 or mail to Infection Control Branch, G/F, Centre for Health Protection, 147C Argyle Street, Kowloon, Hong Kong within 4 days. For enquiries, please contact OH/ICB at 2125 2915.**

Rev: 2006\_v1

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Code	Services / Division
1.	Child Assessment Service
2.	Chinese Medicine Division
3.	Clinics (Correctional Institutions)
4.	Clinical Genetic Service
5.	Dental Service
6.	Elderly Health Services
7.	Emergency Response and Information Branch
8.	Family Health Service
9.	Forensic Pathology Service
10.	Infection Control Branch
11.	Narcotics & Drug Administration
12.	Pharmaceutical Service
13.	Port Health Services
14.	Professional Development and Quality Assurance
15.	Programme Management and Professional Development Branch
16.	Public Health Laboratory Services Branch
17.	Radiation Health Unit
18.	Social Hygiene Service
19.	Special Preventive Programme
20.	Student Health Service
21.	Surveillance and Epidemiology Branch
22.	Tuberculosis and Chest Service
23.	Others, please specify: _____

**Remarks:**Occupational  
Exposure

A specific eye, mouth, other mucous membrane, or non-intact skin, or parenteral contact (e.g. sharps injury) with blood or body fluid or other potentially infectious materials that may result from the performance of an employee's duties (e.g. healthcare delivery, handling of specimen).

Sharps Injury

Percutaneous injury caused by any sharps objects including, but not limited to, hypodermal needles, suture needles, lancets, blades, any surgical / dental instruments and so forth, contaminated with blood or body fluid or other potentially infectious materials.

Mucocutaneous  
Exposure

Contacts with blood or body fluids of patients, or other potentially infectious materials through mucous membrane (such as eye, mouth) or non-intact skin.

Other Potentially  
Infectious  
Materials

- The following human body fluids: semen, vaginal secretions, cerebrospinal fluid, synovial fluid, plural fluid, pericardial fluid, peritoneal fluid, amniotic fluid, saliva in dental procedures, any body fluid that is visibly contaminated with blood, and all other body fluids in situations where it is difficult or impossible to differentiate
- Any unfixed tissue or organ (other than intact skin) from a human (living or dead)
- HIV-containing cell or tissue cultures, organ cultures, and HIV-, HBV-, or HCV-containing culture medium or other solutions; and blood, organs, or other tissues from experimental animals with HIV, HBV or HCV
- Feces, nasal secretions, sputa, tears, urine and vomitus are not implicated in the transmission of HIV, HBV, and HCV unless visibly contaminated with blood

Engineered Sharps

A physical attribute built into a needle device used for withdrawing body fluids, accessing a vein or artery, or administering medications or other fluids, which effectively reduces the risk of exposure incident by a mechanism such as barrier creation, blunting, encapsulation, withdrawal or other effective mechanisms. It is also a physical attribute built into any other part of needle device or into a non-needle sharp, which effectively reduces the risk of an exposure incident.

Footnote

Clin Psy:	Clinical Psychologist	PT:	Physiotherapist	OT:	Occupational Therapist
DSA:	Dental Surgery Assistant	Rad:	Radiologist	ST:	Speech Therapist

### **SPECIMEN COLLECTION, HANDLING AND TRANSPORTATION WITH STANDARD PRECAUTIONS** (reprint from Consultant Pathologist i/c, ref (21) in IP/C 23.10 dated 18 December 1998)

Having obtained consent from the patient, all specimens should be placed into a leakproof primary container with a secure closure. The laboratory should provide specifications for leakproof containers and evaluate performance prior to purchase. Full-circumference screw caps with a flexible liner produce efficient seals. Snap-top closures may produce a spray when opened and their use should be avoided. Care should be taken by the person collecting the specimen not to contaminate the outside of the primary container.

Before transferring to the laboratory the primary container should be placed into a secondary container which will contain the specimen if the primary container breaks or leaks in transit to the laboratory. Some specimens are regularly contaminated on the outside (e.g., hematocrit tubes). Any primary container actually or potentially contaminated on the outside should be placed into a sealed secondary container.

Secondary containers may consist of large receptacles into which primary containers are placed (e.g. racks containing filled evacuated tubes may be placed into square plastic basins for bulk transport). A plastic bag with a sealable, preferably leakproof, closure can also be used as the secondary container; metal closure or staples should not be used. Bags used to transport specimens should be discarded after use. Secondary containers must be labeled with the "biohazard" symbol.

For detailed recommendations, please refer to the most current edition of NCCLS documents GP16 - Routine Urinalysis and Collection, Transportation, and Preservation of Urine Specimens.

#### ***Preparation of Aliquots***

Serum, plasma, or blood used to prepare aliquots should be pipetted using a Pasteur type pipette. Aliquots should not be poured into tubes or sample cups since spillage is common.

#### ***Laboratory Requisition Slips***

Laboratory requisition slips should be protected from contamination, and separated from the primary container. Contaminated requisition slips should be discarded in the biohazard waste and replaced.

Disposable plastic bags with separate pockets for the laboratory slip and specimen are available to minimize contamination of the laboratory slips.

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