

2 Safety of Health Care Workers and Management of Sharps Injuries

Introduction

Most Health Care Workers (HCW) are at risk of exposure to and possible transmission of infectious diseases by their contact with patients or infectious material from patients. Most of the risks could be minimized by observing safety rules. Those who are involved in the safety of the HCW have to draw up safety programmes to ensure the safety of the HCW. HCW themselves need to know about the risks to avoid transmission of infections through them. Working in a safe environment improves the quality of the service delivery.

Why a Clinical Practice Guideline?

A healthy work force is an asset to the service provider. There is also a responsibility on the part of the employer to safeguard the workers from undue exposures to work related risks. Workers attitudes to the service could be improved by providing them a safe working environment. Accidents due to lack of knowledge could be prevented with proper knowledge. This would save the expenditure state needs to spend on compensating the damages. This guideline has been prepared to help to formulate policies on safety measures at work place and to implement them to create a safe work place.

For whom is this guideline intended?

It is intended for those responsible for the safety of HCW and for the workers themselves to understand their own responsibilities in ensuring a safe work environment.

Although it is targeted for the institutions under the Ministry of Health, it is encouraged to be used in any private health facility.

Objectives

The objective of this guideline is to provide evidence based recommendations to all categories of health care workers, on work related infection risks and safety measures to be adopted to minimize such risks.

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Contents

Topic No	Topic	Page No
2.1	Personal health service scheme for health care workers in Infection Control (IC)	36
2.2	Immunization of HCW	38
2.3	Personal restriction	43
2.4	Post – Exposure Prophylaxis (PEP) against bacterial infections	44
2.5	Management of accidental exposure for blood and body fluids in health care setting	47
2.6	Special issues	55
2.7	References	57
2.8	Annexure	58

Safety of Health Care Workers (HCW) and Management of Sharps Injuries

This guideline addresses 6 topics important in ensuring the safety of HCW.

2.1 Personal health service scheme for health care workers in Infection Control (IC)

Establishment of a personal health service scheme is necessary to ensure safety of the HCW in the infection control programme. The following components are important in developing such a scheme.

2.1.1 Coordinated planning & administration

- A coordinated policy plan for personal health service needs to be developed. In this plan hospital administration, infection control services, various other hospital services and external agencies if necessary has to be included.
- A written policy should be developed. It should include the following.
 1. Infections in HCW that need work restrictions or exclusion.
 2. Clearance for work after infectious disease that required work restrictions.
 3. Work related infections and exposures.
 4. Results of outbreak investigations.

2.1.2 Placement evaluation

When staff members are placed on duty they should be evaluated on personal health issues. The following points are important in this evaluation.

- Conduct personal health evaluation **before** placement of staff members on specific jobs.
- Immunization / history of vaccine preventable diseases, history of any conditions that predispose to acquiring infectious diseases need to be noted.
- Physical and laboratory investigations should be included in this evaluation.

2.1.3 Education on personal health and safety

- Make written recommendations for control of infectious diseases in HCW
- Carry out regular in-service training & education on infection control practices

2.1.4 Job related illnesses and exposures

- Maintain records of HCW including information on medical evaluation, immunization, job related illnesses and exposures.
- Establish a mechanism for HCW to obtain advice about illnesses that they may acquire or transmit to patients.

- Develop protocols for the management of job related or community acquired infectious diseases and exposures.

2.2 Immunization of Health Care Workers

Immunization of health care workers (HCW) is an integral part of a general programme for control of infections in any health care organization. Ensuring that HCW are immune to vaccine-preventable diseases is an essential part of a successful personal health programme. Prevention of illness through personnel immunization is far more cost-effective than case management or outbreak control. To ensure that susceptible persons are vaccinated, immunization programmes should be carried out regularly to include both newly recruited and currently employed HCW.

Tests are available to determine the susceptibility of HCW to certain vaccine preventable diseases (i.e. Hepatitis B, Rubella). Such screening programmes are recommended to ensure accurate maintenance of immunization records of HCW and to track susceptible persons so that they can be appropriately vaccinated.

2.2.1 Recommendations

Recommendations for administration of vaccines to HCW are made under three broad disease categories:

- Those for which immunization is strongly recommended. eg. Hepatitis B (X), Influenza, Measles, Mumps, Rubella and Varicella
- Those for which active and /or passive immunization may be indicated under certain circumstances eg. Tuberculosis, Hepatitis A, Typhoid, Rabies, Meningococcal infection
- Those for which immunization of all adults is recommended eg. Tetanus, Diphtheria (X)

Considering the above factors recommendations for immunization of HCW are listed in **Table-1**.

Table-1. Immunizing agents and immunization schedules for health care workers

Agent	Primary schedule & booster (s)	Indication	Precautions & contraindications	Special considerations
Hepatitis B recombinant vaccine	2 IM doses, 4 weeks apart & 3 rd dose 5 months after 2 nd dose	All HCW at risk for exposure to blood or body fluids (X)	<ul style="list-style-type: none"> • No risk of adverse effects • Pregnancy is not a contraindication 	<ol style="list-style-type: none"> 1. Prevacination screening is not recommended. 2. Should be tested anti-HBs 1-2 months after completion of vaccination Booster doses not recommended.
MMR vaccine	One dose SC	Considered for all HCW who lack proof of immunity	<ol style="list-style-type: none"> 1. Pregnancy 2. Immuno-compromised persons 3. Recent administration of immunoglobulin 	

Table-1. Immunizing agents and immunization schedules for HCW - continued

Agent	I ^{ty} schedule & booster(s)	Indication	Precautions & contraindication	Special considerations
Influenza vaccine	Annual vaccination with current vaccine Administered IM	HCW who have contact with patients at high risk for influenza or its complications	Hypersensitivity to egg protein.	Recommended in 2 nd & 3 rd trimester of pregnancy
Varicella Vaccine	Two (0.5 ml) doses SC 4-8 weeks	HCW with no reliable history of C. pox or serologic	Pregnancy, *Immuno compromised	

	apart	evidence of immunity	persons.	
BCG vaccine	One ID dose (0.3ml) No boosters	Considered for all HCW in institutions designated to manage TB patients & where infection control have failed to prevent transmission of TB HCW handling samples from TB patients (X)	Pregnancy, *Immuno compromised persons.	
Hepatitis A vaccine	Two doses 6 months apart	Only for HCW in HAV research laboratories		
Typhoid vaccine	IM, SC or Oral according to recommended schedule of manufacture	HCW in microbiology laboratories who handle <i>Salmonella typhi</i> (X)		
Polio vaccine	OPV	Laboratory personnel handling wild Polio virus (X)	Pregnancy	Use only IPV for Immuno compromised persons
Rabies vaccine	According to recommended schedule of manufacturer	Personnel who work with Rabies virus or infected animals (X)		frequency of boosters depend on frequency of exposures

Tetanus & Diphtheria toxoid	IM 2 doses 4 weeks apart & 3 rd dose 6 months later	All adults (X)	Pregnancy- 1st trimester	As prophylaxis in wound Management
(Td vaccine Meningococcal vaccine	Booster every years 1 dose SC	Laboratory workers handling meningococci (X)	Hypersensitivity to any component	

Abbreviations: MMR – mumps, measles, rubella; SC- subcutaneous; HCW – health care workers
C. pox – chickenpox
BCG – Bacille Calmette Guerin
ID – Intra-dermal; TB – Tuberculosis
HAV – Hepatitis A virus; IM – Intra-muscular
HCW- Health care workers; OPV –Oral polio vaccine;
* refer to immunization of immuno-compromised HCW

Table-2. Recommendations for immunization of HCW with special conditions

Vaccine	Pregnancy	Severe immuno suppression	Asplenia	Renal failure	Diabetes	Alcoholic cirrhosis	HIV Infection
BCG	C	C	UI	UI	UI	UI	C
Hepatitis A	UI	UI	UI	UI	UI	R	UI
Hepatitis B	R	R	R	R	R	R	R
MMR	C	C	R	R	R	R	R*
OPV**	UI	C	UI	UI	UI	UI	C
IPV**	UI	UI	UI	UI	UI	UI	UI
Pneumococcus♦	UI	R	R	R	R	R	R
Rabies	UI	UI	UI	UI	UI	UI	UI
Tetanus/ Diphtheria♦	R	R	R	R	R	R	R
Typhoid (inactivated Vi vaccine)♦	UI	UI	UI	UI	UI	UI	UI
Typhoid (Ty21a vaccine)	UI	C	UI	UI	UI	UI	C
Varicella	C	C	R	R	R	R	C

UI – Use if indicated, C – Contraindicated, R - Recommended

* Contraindicated in those who have evidence of severe immuno-suppression

** For unvaccinated HCW having close contact with patients excreting wild Polio virus / handling samples from them, primary vaccination with IPV is recommended. HCW who already had primary OPV or IPV & directly involved with patients excreting wild polio viruses / handling samples from them may receive another dose of IPV or OPV

• Recommendation is based on the person's underlying condition rather than occupation

♦ Capsular polysaccharide parenteral vaccine

2.2.2 Immunization of immuno-compromised health care workers

Immuno-compromised HCW and their physicians should consider whether the benefits of the vaccination outweigh the risks of being exposed to a vaccine preventable disease and the risks of the vaccination taken together.

Recommendations concerning immunization of HCW with special conditions are given in Table-2.

2.2.3 Corticosteroid therapy

Persons who have received systemic corticosteroids in excess of 20mg daily or every other day for equal to, or more than 14 days should avoid vaccination with MMR, its components or Varicella for at least one month after cessation of steroid therapy.

2.2.4 Immunization records

An immunization record should be maintained for each HCW. This should contain pre-existing diseases and vaccination histories as well as immunizing agents administered during employment. At each immunization encounter the record should be updated.

2.3 Personal Restrictions

- Develop guidelines concerning contact of HCW with patients when they have potentially transmissible infections. It should cover,
 1. Personal responsibility of using health services and reporting illnesses
 2. Work restrictions.

3. Clearance for work after an illness that needed work restriction.

- Identify the persons who have the authority to relieve duty of a HCW if indicated.
- Educate & encourage HCW to report their condition and the importance of infection control practices.

2.4 Post-exposure Prophylaxis for Bacterial Infections

2.4.1 Diphtheria

- Obtain naso-pharyngeal secretions / swabs from exposed personnel for culture and monitor for signs and symptoms of diphtheria for 7 days from exposure.
- Administer antibiotic prophylaxis to personnel who had contact with respiratory droplets or cutaneous lesions of patients infected with diphtheria.
- Administer a dose of Td (combined vaccine for tetanus and diphtheria for adults) to previously immunized exposed personnel who have not been vaccinated within the last 5 years.
- If cultures were found to be positive treatment should be initiated.
- Two weeks after completion of antibiotic therapy repeat the nasopharyngeal culture in personnel found to have positive cultures. If cultures are positive, repeat the antibiotic treatment.

- Exclude exposed personnel and those identified as asymptomatic carriers from duty until antibiotic treatment is completed and results of two nasopharyngeal cultures obtained at least 24 hours apart are negative.
- If immunization status is unknown or if unimmunised, a vaccine can be given; but protectiveness of which is doubtful.

2.4.2 Gastroenteritis

- Pending their evaluation, exclude personnel with acute gastrointestinal illness (vomiting or diarrhoea, with or without nausea, fever or abdominal pain) from contact with patients and their environment or from food handling.
- Determine the aetiology of gastrointestinal illness among personnel who care for patients at high risk for severe disease.
- Allow personnel infected with enteric pathogens to return to work after their symptoms resolve.
- Ensure that personnel returning to work after a gastrointestinal illness adhere to good hygienic practices, especially hand-washing to reduce or eliminate the risk of transmission of infecting agents

2.4.3 Meningococcal Disease

- Immediately offer antimicrobial prophylaxis to personnel who without the use of proper

precautions had intensive close contact (eg: mouth-to-mouth resuscitation, endotracheal intubation, endotracheal tube management) with a patient with meningococcal disease before administration of antibiotics. Antimicrobial prophylaxis is not indicated for other HCW.

- Administer meningococcal vaccine to personnel likely to have contact with infected persons to control sero group C outbreaks after consultation with Public Health authorities (refer to Table 1).
- Exclude personnel with *N.meningitidis* infections from duty until they are cured of the infection.

2.4.4 Whooping cough

- Immediately offer antimicrobial prophylaxis against pertussis to personnel who have had unprotected (without use of proper precautions) intensive (close, face to face) contact with a patient who has a clinical syndrome highly suggestive of pertussis and whose cultures are pending. Discontinue prophylaxis if results of cultures or other tests are negative for pertussis and the clinical course is suggestive of an alternative diagnosis.
- Exclude personnel in whom symptoms develop (eg: cough >= 7 days, particularly if accompanied by paroxysms of coughing, inspiratory whoop or post-tussive vomiting) after known exposure to pertussis, from patient-care-areas until 5 days after the start of appropriate therapy.

2.4.5 Staphylococcal infections or carriage

- Obtain appropriate cultures and exclude personnel from patient-care or food handling if they have a draining lesion suspected to be caused by *Staphylococcus aureus*, until the infections have been ruled out or personnel have received therapy and their infections have resolved.

2.4.6 Group A Streptococcus infections

- Obtain appropriate cultures and exclude personnel from patient-care or food handling if they have draining lesions that are suspected to be caused by streptococci until the infections has been ruled out or personnel have received adequate therapy for 24 hours.

2.5 Management of Accidental Exposures to Blood and Body fluids in Health Care Setting

2.5.1 Introduction:

Accidental sharps injuries and other work place accidents can lead to exposure to blood or body fluids likely to contain blood-borne viruses such as Hepatitis B virus (HBV), Hepatitis C virus (HCV) and Human Immunodeficiency Virus (HIV).

- The risk can be minimized by observing infection control measures, safe practices when handling sharp instruments and proper disposal of used sharps.
- There is no vaccine or antiviral drug that is completely effective in preventing the infection following exposure. Therefore every effort should be made to avoid these accidental exposures.

A. Accidental exposures are defined as:

1. Percutaneous inoculation with needles or sharp instruments, bites, scratches.
2. Contamination of mucous membranes of mouth, eyes and other mucosal areas with splashes.
3. Swallowing of blood, secretions or body fluids.
4. Contamination of non-intact skin (open wounds, dermatitis or eczema).

B. Body fluids that has the same risk as blood in transmission of above infections are:

- amniotic fluid or synovial fluid.
- CSF.
- semen / vaginal secretions.
- any blood stained body fluid.
- peritoneal / plural / pericardial fluid.
- unfixed tissue / organs.
- breast milk.

C. Body fluids that has negligible risk of transmission:

- Urine, Faeces, Nasal discharge
- Saliva, Sweat, Tears, Vomitus

The member of the staff who received the exposure is the recipient and the patient is the source.

2.5.2 Procedures for preventing accidental exposures

A. General measures to prevent exposure

- Learn to avoid any action which directs a used sharp towards any person.
- Dispose all used sharps to sharps bin immediately.
- Do not carry the sharps to the sharps bin but bring the bin to the place where the sharps are being used.
- Avoid carrying used sharps from one place to another. However if it is essential, do so safely in a puncture proof container.
- Do not re-sheath or bend the needle.
- Follow the procedures given for safe handling of sharp instruments in operating theaters.
- Vacuum tubes can be used for collection of blood to minimize exposure.
- Sharps should be used for the intended purpose only.

B. Universal Precautions should be practised.

- Assume all patients are potentially infectious.
- Take precautions to avoid exposure to blood or body fluids. (refer to guideline on standard precautions)

2.5.3 Post-exposure Management**2.5.3.1 Reporting, wound care and investigations****A. Report all accidental exposures.**

- Should be done immediately to the supervisor and to the designated authority (eg. Infection Control Unit)
- The designated authority should report to NSACP on the form included in the Gen. Circular No. 02-36/2001 of March 2001

This will facilitate the investigation of the circumstances of the accident to prevent such incidents in the future.

B. Care of the wound / splash

- Wash the wound with soap and running water.
- Following a splash wash the eye or mouth with water.
- Do not apply caustic agents or inject antiseptics into the wound.

C. Investigation of the source

- Identify the source if possible.
- Get information about the source (known HIV / HBV patient, high risk patient)
- Collect 5 ml of blood for investigations for HBV, HCV & HIV serology from the source with consent.

D. Investigation of the recipient

- Collect 5 ml of blood from the recipient for baseline screening of HIV, Hepatitis B surface antigen (HBsAg) and if necessary for antibody to Hepatitis B surface antigen (anti-HBs) and HCV antibody.
- Take the Hepatitis B immunization history and anti-HBs status if known.
- Also consider other medical conditions, medication, pregnancy / breast feeding etc.

E. Risk assessment of injury

- Fill the risk assessment form.
- Decide whether exposure has taken place.

2.5.3.2 HBV post exposure management of the recipient**A. Investigations and vaccination**

- Check for HBs Antigen and anti-HBs from recipient's sample and HBs Antigen from source sample if the source is known.
- Prophylaxis with Hepatitis B vaccine (HB vaccine) and Hepatitis B specific

immunoglobulin (HBIG) is given depending on the Hepatitis B immunization and the antibody status of the recipient and the HBs Antigen status of the donor (Refer to table 3).

Note:

- Post Exposure Prophylaxis (PEP) with HBIG when indicated, it should be given as early as possible (preferably within 24 hours of exposure).
- First dose of vaccine is given with / with out immunoglobulin.
- Three dose vaccination schedule is 0, 1month & 6 months after the 1st dose.

B. Follow up of HCW

- Immunity is checked 1-2 months after the 3rd dose of vaccine by detecting anti-HBs levels (10 mUL /ml).
- In the event of the PEP not being protective, evidence of infection can be detected by the presence of HBsAg.

2.5.3.3 HCV post exposure management of the recipient**A. Investigations**

- Check for anti-HCV from source sample (especially from high risk patients). If positive consider doing HCV PCR.
- Check for anti-HCV of the recipient as a baseline investigation.

- There is no post-exposure prophylaxis for HCV but early recognition of a significant exposure may allow early treatment.

B. Follow up of HCW

- If the source is a known anti-HCV positive / at high risk for HCV
 - If facilities are available check recipient's blood for HCV RNA at 6 weeks and at 12 weeks.
 - Check recipient's blood for anti-HCV at 12 weeks, 24 weeks & at one year.

If HCW remains negative for anti-HCV at one year HCW is considered not infected.

- If the source HCV status is unknown / at low risk for HCV
 - Check blood of the HCW if symptoms & signs of liver disease develop.
- The following are important in counseling HCW exposed to HBV / HCV
 - No special precautions are recommended to prevent secondary transmission.
 - HCW does not need to modify sexual practices / refrain from getting pregnant / breast feeding.
 - No modification of recipient's patient care responsibilities are needed.

- HCW should refrain from donating blood / plasma/ organs / tissues / semen.

2.5.3.4 HIV post exposure management of the recipient

A. **Risk assessment**

- Risk of exposure should be assessed in accordance with the General circular No. 02-36/2001 of March 2001

B. **Evaluation of the source**

- If the source is known test source patient for HIV antibody (after informed consent)

C. **Evaluation of the recipient**

- If the source is HIV positive / high risk or unknown do baseline HIV testing after counseling.
- If the source is not infected baseline testing or further follow-up of HCW may not be necessary.

D. **Management**

- If the source is suspected to be infected, the exposed HCW should have a baseline HIV antibody test and should be counseled on the potential risk of transmission.
- If there has been a definite exposure to HIV, antiretroviral prophylaxis should be offered as early as possible.

- Counseling by a specialist in this field is desirable.

(Refer to General Circular No. 02-36/2001 of 12 March 2001)

E. **Follow up of HCW**

- Perform HIV serology for at least 6 months following exposure.
- Perform HIV serology if illness occurs and is compatible with an acute retroviral syndrome.
- Advise exposed HCW to use precautions to prevent secondary transmission during the follow up period.

2.6 Special Issues

2.6.1 Pregnancy

- Female HCW should not be routinely excluded from caring for patients with infections that have the potential to harm the foetus (HIV, Hepatitis, CMV, HSV, Parvo virus) only on the basis of their pregnancy.
- Those without evidence of immunity (antibodies or past clinical illness) to Rubella and Varicella should avoid caring for patients with such infections during pregnancy.

2.6.2 HCW linked to outbreaks of bacterial infections

- Cultures and typing of micro-organisms should be performed only on HCW personnel

linked to an outbreak / epidemic of a bacterial infection, which is caused by a pathogen associated with a carrier state (MRSA, *S. typhi*, *S. paratyphi*, Group A Streptococci). If culture results are positive, these personnel to be excluded from patient contact until the carrier state is eradicated or risk of disease transmission is eliminated.

- Do not perform routine surveillance cultures of HCW for bacteria or multi-drug resistant (MDR) organisms if they are not linked to an outbreak / epidemic of bacterial infections.
- Personnel who are colonized with bacteria or MDR organisms but not linked to an outbreak / epidemic of infections need not be excluded from duty. However if colonized with MRSA they should be excluded from working in high risk areas (eg. neurosurgical, orthopaedic and special care units)

2.7 References

1. Immunization of Health Care Workers. Recommendations of the Advisory Committee on Immunization Practices & the Hospital Infection Control Practices Advisory Committee. MMWR 1997 (46) RR - 18
2. Updated US public health service guidelines for management of occupational exposures to HBV, HCV & HIV and recommendations for post exposure prophylaxis. MMWR 2001 (50):RR -11
3. Guideline for Infection Control in Health Care Personnel. American journal of infection control 1998 (26) 289 – 354
4. Hospital Infection Control Manual, Sri Lanka College of Microbiologists 2005
5. General Circular No. 02-36/2001 of 12 March 2001

2.8 Annexure

1. Risk assessment form

Assessment of Exposure form:

Name of the recipient -----

Date of Birth: -----

Name of the donor -----

Date of Birth: -----

Date and time of injury: -----

Location: -----

Tick **Yes** or **No** to all questions in Section A:

Section A : Is this a high-risk accident?	Yes	No
a). A skin prick particularly with: (i). a hollow bore needle/cannula used on an artery or vein (ii). A deep penetrating injury (iii). From a sharp instrument visibly stained with high risk body fluid		
b). a human bite where blood is drawn		
c). Contamination of an abrasion with blood or other high-risk body fluid		
d). Spillage/splash of blood or other high-risk body fluid into mouth or onto other mucosal areas.		

Yes to any of the question in section A – indicates an inoculation injury. Therefore **complete section B.**

No to all questions in section A - needs no further action.

Section B : Is it a high-risk body fluid?	Yes	No
a) Blood		
b) Amniotic fluid		
c) Vaginal secretions		
d) Saliva (only during dentistry where it may be blood stained, otherwise saliva is a low risk)		
e) Breast milk		
f) Semen		
g) Cerebro-spinal fluid		
h) Peritoneal fluid		
i) Pleural fluid		
j) Pericardial fluid		
k) Synovial fluid		
l) Unfixed tissues or organs		
m) Exudate or other tissue fluid from burns or skin lesions		
n) Any other visibly blood stained body fluids		

Yes to any of the questions in section A and/or B may indicate a risk of contracting Hepatitis B or **Hepatitis C** and the **inoculation injury policy must be followed.**

Risk assessment carried out by: -----
----- (Print name)

Designation: -----

Signed ----- Date: -----

This form should be kept with the Infection Control Officer.