

EXPOSURE TO BODY FLUIDS:

keeping the primary
healthcare team safe

Providing a safe working environment involves both minimising the risk of transmission of infectious pathogens and dealing with exposures after they have occurred. Exposure to body fluids is one of the major occupational hazards faced by healthcare workers. Effective use of standard precautions, including hand hygiene and personal protective equipment, is the best way to protect healthcare workers from these infectious pathogens. However, even strict adherence to standard precautions will only minimise the infection risk and dealing effectively with any potential exposures, e.g. needlestick injuries, if they occur is vital in protecting healthcare workers.

Prevention is better than cure: keeping the practice environment safe

Healthcare workers are likely to be exposed to a number of potentially infectious body fluids on a daily basis. All body fluids should be assumed to contain transmissible infectious pathogens. Reducing transmission of these pathogens, and dealing with exposures if they occur, is vital in protecting healthcare workers and complying with the Health and Safety in Employment Act 1992. A practice-wide staff health policy should be in place to achieve the safest working environment possible. This should include maintaining appropriate levels of vaccination, training and education in infection control and prevention procedures for all clinical and non-clinical workers. The most important principles for achieving a safe working environment are based on standard precautions, which are regarded as the minimum requirements for infection control and prevention. A number of easy-to-implement procedures can substantially reduce the rates of infectious disease transmission in general practice; promotion of effective hand hygiene is a good starting point.

Good hand hygiene procedures are the first step in preventing transmission

Hand hygiene is regarded as the single most important activity for preventing the spread of infection in the healthcare setting.² The Hand Hygiene New Zealand (HHNZ) programme, which is run by the Health Quality and Safety Commission of New Zealand, recommends following the World Health Organisation's "Five moments for hand hygiene".² These recommendations, although intended for people working in a hospital setting, provide a useful guide for when hand hygiene should be considered in the general practice setting.

Standard precautions – the backbone of good infection control and prevention

Standard precautions are a set of procedures which can be followed to achieve a minimum level of infection control and prevention. They help prevent the risk of transmission of infectious pathogens and protect both healthcare workers and patients.

Some of the basic standard precautions include:¹

- Hand hygiene
- Use of personal protective equipment
- Promotion of respiratory hygiene and cough etiquette
- Use of aseptic technique
- Appropriate sharps/waste management
- General cleaning of the practice environment
- Dealing with spills
- Appropriate reprocessing of reusable medical equipment



The five moments for hand hygiene are:³

- Before patient contact
- Before performing a procedure
- After a performing a procedure or a potential exposure to body fluids
- After patient contact
- After contact with patient surroundings. In a primary care setting this may be relevant when clinicians see patients in rest homes or perform home visits.

Alcohol-based hand rubs are recommended when hands are not visibly soiled

Alcohol-based hand rubs should almost always be preferred over hand washing with soap and water for hand hygiene in general practice, except when the hands are visibly soiled.² This is because alcohol-based hand rubs:²

- Have been shown to be more effective than soap and water against the majority of pathogens encountered in a healthcare setting (with the exception of *Clostridium difficile*). In a randomised study it was found that reductions in bacterial contamination were significantly higher after using an alcohol-based hand rub (83%) than after washing hands with an antibacterial soap containing chlorhexidine gluconate (58%).⁴
- Cause less irritation to the skin as they contain moisturising agents, are less associated with contact dermatitis and are less drying on the hands than soap and water.³
- Can be quickly and conveniently used at the point of care, e.g. placed on the clinician's desk, and carried on home visits.

It is recommended that hands are rubbed with the alcohol solution for 20 – 30 seconds.⁵ HHNZ recommends using products that have ethanol concentrations of at least 70% or isopropyl alcohol concentrations of at least 60%.³ Some alcohol-based hand rub preparations also include chlorhexidine to provide a more prolonged antibacterial effect after the alcohol dries; however, in primary care, the plain alcohol preparations are preferable as they result in less skin irritation. Alcohol remains the essential component of these formulations as it has the more potent antibacterial activity.³

Soap and water should be used when hands are visibly soiled

Hand washing with soap and water should be performed when hands are visibly soiled with blood or other body fluids, or after using the toilet.⁶ The duration of the entire hand washing procedure should be 40 – 60 seconds.⁷ For optimal effect it is important to ensure that hands are completely dry after hand washing. Hand washing with soap and water is also recommended following known or suspected exposure to *C. difficile* infection (or as a standard precaution after contact with a patient with diarrhoea or vomiting), as it has been shown to be more effective in removing *C. difficile* spores than alcohol-based hand rubs.^{8,9} Plain or antimicrobial soaps, e.g. containing chlorhexidine or triclosan, can be used for routine hand washing; antimicrobial soaps are not necessary for everyday use.¹⁰

 A poster on hand washing for the clinic is available from:

www.handhygiene.org.nz/images/stories/HHNZDOWNLOADS/promotionalMaterialsNEW/pdfs/How%20to%20handwash%20poster.pdf

Personal protective equipment should be used according to risk

The decision to use personal protective equipment, such as gloves, gowns, protective glasses and masks, should be based on a risk assessment of the probability of transmission of infectious pathogens. There are certain circumstances when additional precautions may be necessary (see: "What to do during a highly infectious pandemic", Page 23).

Gloves are not a substitute for hand hygiene

Pathogens can gain access to the hands via small defects in gloves or by contamination when removing gloves.² In general, gloves should be used when there is a risk of exposure to the patient's blood or body fluids or when there is contact with non-intact skin or mucous membranes. It is recommended that hand hygiene is performed before and after using gloves.² Gloves should ideally be put on last and removed first when used in combination with other protective equipment. Used gloves should be discarded in a yellow biohazard bag and not in a general purpose rubbish bin.

It is particularly important for clinical staff to wear gloves if they have broken skin on their hands and direct physical contact with a patient is likely.

N.B. Latex allergy can pose a problem for both clinicians and patients. An allergy to latex should be documented in the patient's notes and alternative latex-free gloves available for use.

Masks may sometimes be required

Although masks are not routinely used in general practice, there are a number of circumstances when it is important to consider their use to protect both practice staff and patients from airborne pathogens (see: "What to do during a highly infectious pandemic", Page 23). An example is when a patient presents with respiratory symptoms, e.g. coughing and sneezing, and there is an increased likelihood of airborne/droplet transmission. This is particularly important during outbreaks of respiratory-transmitted infections, e.g. measles and influenza. If this situation occurs, it may be appropriate to ask the patient to wear a mask and have them wait in a vacant area of the practice rather than in the waiting room. Reception staff should be aware of these procedures as they usually have first contact with the patient. Where possible, the patient should be asked to maintain at least a one metre gap between other patients and healthcare workers, although this is not always practical.¹⁰

Body fluid spills need to be dealt with quickly and effectively

When spills occur, all blood or body fluids (with the exception of sweat) need to be treated as potentially infectious and promptly dealt with by staff members wearing personal protective equipment appropriate to the situation, e.g. gloves, disposable aprons and masks. The exact management of the spill will depend on the type and volume of the body fluid spilt, the possible pathogens present and the type of surface or area where the spill has occurred, e.g. all blood spills on hard/vinyl surfaces should be disinfected using a diluted sodium hypochlorite solution. Ideally, practices will have fully-equipped spill kits available, i.e. containing protective equipment, waste bags and detergents, and have procedures in place to manage spills appropriately. In some circumstances, e.g. large spills or spills on carpeted areas, it may be necessary to use a commercial cleaning company. Ensure that the area containing the spill is isolated.

 An example of specific procedures for dealing with body fluid spillages is available from: www.cdhb.health.nz/Hospitals-Services/Health-Professionals/CDHB-Policies/Documents/4810-Volume-10-Decontamination-of-the-Environment.pdf

Safely dispose of medical waste and sharps

Collection and disposal of all medical waste should follow the New Zealand Standards for Management of Healthcare Waste (NZS 4304: 2002). All sharps including needles, scalpel blades, glass ampoules or any other objects with sharp points capable of causing penetrating injuries should be placed in a yellow sharps bin which is periodically collected and disposed of by an authorised medical waste service.¹ The bin should not be overfilled, as this increases the risk of an injury when disposing of a sharp. Ensuring that sharps are handled in a safe manner can also reduce the risk of injuries occurring, e.g. not recapping needles and not passing sharps from person to person.

Other hazardous clinical medical waste should be placed in yellow biohazard bags for disposal, including waste that contains blood or pus present in a large enough volume to be squeezed from absorbent material, and tissue not being sent for histology.¹⁰ Disposable equipment that has been used to examine a patient, e.g. spatulas and ear covers for otoscopes, should also be disposed of in yellow biohazard bags. Hair and nail clippings that are not contaminated can be placed in general purpose rubbish bags. Urine and faeces can be tipped down the toilet.

Keep the practice environment as hygienic as possible

All environmental surfaces in the practice need to be included in a regular cleaning schedule – surfaces that are used frequently and are likely to be contaminated need to be cleaned more often, e.g. door handles, reception counters and consultation desks. Linen also needs to be changed and washed on a regular basis, especially when it becomes visibly soiled or after contact with a patient with an infectious disease.

It is important to consider that some pathogens can remain viable on fomites (any inanimate object or substance capable of carrying infectious organisms) for prolonged periods. For example, the hepatitis B virus is comparatively stable in the environment and can remain viable on surfaces for several days.¹¹ A 2014 study that investigated the duration of hepatitis C viability on fomites reported that the virus remains viable for up to six weeks at room temperature, which is much longer than previously thought.¹²

Give disinfectants time to work

Disinfectants, e.g. hypochlorite and quaternary ammonium compounds, are antimicrobial agents that reduce the levels of infective pathogens on surfaces, although they do not necessarily kill all pathogens and have been shown to fail where prior cleaning has been non-existent or ineffective.¹⁰ Disinfectants need to be accurately diluted and usually require a contact time of five to 15 minutes to kill micro-organisms.¹³ When surfaces are wiped with disinfectants and dried immediately, the disinfectant does not have time to act and is simply being used as a cleaning agent.¹³

It is recommended that frequently touched surfaces are disinfected at least daily as well as when visibly soiled or after likely pathogen contamination.¹⁰ It is unrealistic to clean some frequently touched items after each use, e.g. pens, phones, computer keyboards and mouse. However, these items can be sources of indirect contact transmission and should be cleaned with alcohol wipes (or discarded where applicable) in situations where the risk of infection is increased, e.g. after contact with a patient who may have a highly infectious or significant infection such as influenza or methicillin-resistant *Staphylococcus aureus* (MRSA).

Alcohol-based wipes are recommended to clean stethoscopes and should ideally be used after the stethoscope has been in direct contact with a patient.¹⁴ Bacterial contamination on stethoscopes has been shown

to be substantial following a single physical examination, with rates comparable with those observed on the clinician's dominant non-gloved hand after patient contact.¹⁴ Products containing chlorhexidine, phenol, hypochlorite or quaternary ammonium compounds should not be used to clean medical devices as they can cause surface oxidation and denaturing of rubber seals.¹⁵

Ensure healthcare workers are up to date with vaccinations

Maintaining a high rate of immunity within general practice staff helps to reduce personal disease risk for healthcare workers and has the flow on effect of reducing transmission to patients, especially those at increased risk of developing complications following infections. The National Immunisation Advisory Centre has released a set of guidelines on vaccinations for clinical, non-clinical and cleaning staff in primary care, including hepatitis A and B, influenza, measles mumps and rubella (MMR), tetanus/diphtheria/pertussis and varicella, as well as advice on poliomyelitis and tuberculosis.¹⁹ These guidelines provide important recommendations about the vaccinations required for primary healthcare workers depending on their role and therefore risk of infection.



For additional information see:

www.immune.org.nz/sites/default/files/resources/NonprogrammeOccupationalPhc20121009V01Final.pdf

Toys in waiting rooms: teddy may have to go

Children toys, particularly "soft" toys, pose an infection risk for staff and patients as they can carry high levels of bacterial contamination. A New Zealand study that investigated bacterial contamination of children's toys in the waiting room of six general practices found that "hard" toys had lower levels of bacterial contamination, did not re-contaminate as quickly and were easier to clean than soft toys.¹⁶ The study reported that hard toys had lower rates of coliform contamination than soft toys (14% vs. 90%), and there were less instances of moderate-to-high bacterial contamination in hard toys compared to soft toys (27% vs. 90%).¹⁶

In the study it was found that hard toys were effectively cleaned after soaking in a hypochlorite solution (2.5 g/L) for one hour.¹⁶ To effectively reduce bacterial counts and

eliminate coliforms in the soft toys, they required a 30-minute soak in a hypochlorite solution followed by machine washing and drying.¹⁶ Frequent washing of toys is recommended as bacterial counts have been shown to return to pre-wash levels within a week for both soft and hard toys – with soft toys undergoing more rapid re-colonisation.¹⁶ Consideration should be given to removing all toys during an infectious disease outbreak.¹⁰

There appears to be no evidence that freezing soft toys reduces bacterial contamination, although this practice has been shown to reduce house dust mite concentrations.¹⁷

N.B. The covers of magazines from general practice waiting rooms have been shown to have low rates of bacterial contamination.¹⁸

What to do during a highly infectious pandemic

Pandemics occur when an infectious disease outbreak spreads throughout populations across a large region, e.g. multiple continents or worldwide. There have been a number of notable examples over the past few years including the H1N1 influenza (swine flu) pandemic in 2009 and the severe acute respiratory distress (SARS) pandemic in 2002 – 2003. Although the current outbreak of Ebola virus has not reached New Zealand, the Ministry of Health is releasing frequent updates with advice on infection control and prevention measures.

 For further information on Ebola virus see: www.health.govt.nz/our-work/diseases-and-conditions/ebola-update/ebola-information-health-professionals

During pandemics, it is important that primary healthcare workers are aware of strategies that can prevent the pandemic spreading. These strategies will depend on the nature of the pandemic illness, and can include:²⁰

- Using and promoting hand hygiene, cough and sneeze etiquette (e.g. covering nose and mouth when sneezing and using tissues) and distancing (one metre gaps where possible)
 - Asking patients if they have any infectious symptoms when they phone the practice for an appointment and discouraging all non-urgent visits. If patients do have symptoms, they can be asked to wear a mask when entering the practice (a box of masks can be placed at the practice entrance). Masks should be replaced when they become damp.
 - Having educational material about the pandemic on the entrance doorway of the practice and on the walls of the waiting room
 - Having alcohol-based hand rubs available in the waiting room and on the reception counter
 - Encouraging all practice staff to wear masks. Whether masks need to be worn at all times, or just when treating patients, will depend on the pandemic illness and the discretion of the healthcare worker.
- Wearing gloves at all times when dealing with patients
 - Ensuring the practice has adequate ventilation as some pathogens, e.g. influenza, spread more rapidly in confined environments
 - Having a separate triage area set up for patients with symptoms of the pandemic illness
 - Treating all waste that has been in contact with a patient as potentially infectious
 - Using additional protective equipment if necessary, e.g. it may be necessary to use full protective equipment, i.e. goggles, gowns, face shields, N95 respirators, if dealing with patients with suspected highly infectious, deadly diseases, e.g. SARS
 - Nominating a staff member to keep up to date with what is happening with the pandemic both globally and nationally



How to minimise risk after exposure – keeping healthcare workers safe

Despite following recommended precautions and prevention strategies, personal exposures to body fluids do sometimes occur. A number of different body fluids can be involved, e.g. blood, respiratory secretions and faecal matter. Blood-borne pathogens are present in larger quantities in blood than in other fluids and therefore exposure to blood is associated with the most significant risk of transmission.²¹ Needlestick injuries are generally regarded as posing the greatest risk of transmission of blood-borne pathogens, particularly after a skin penetration injury with a sharp hollow-bore needle that has recently been removed from an infected patient. Needlestick injuries are, however, relatively rare in general practice and a number of other exposures to body fluids, e.g. via mucosal surfaces or respiratory droplets, are more likely to be encountered on a day-to-day basis.

Different body fluids are associated with different pathogens

The risk of infection for the healthcare worker exposed to body fluids depends on the type of exposure, the body fluid involved and the infectious pathogen. In addition to blood, body fluids such as respiratory secretions, faecal matter and contact with a patient's contaminated skin or mucous membranes, potentially pose an infection risk. For example, influenza, conjunctivitis and *Campylobacter* can be transmitted via these methods. Although all body fluids should be considered potentially infectious, certain fluids are generally associated with lower risks of transmission, e.g. urine and vomitus.

 An example of management strategies for workers after potential body fluid exposure is available from: www.cdhb.health.nz/Hospitals-Services/Health-Professionals/CDHB-Policies/Infection-Prevention-Control-Manual/Documents/4816%20Volume%2010%20-%20Staff%20Health%20and%20management%20of%20work-related%20infection%20risks.pdf

Appropriate first aid can reduce the risk of transmission

First aid should be given immediately after the exposure occurs and the spill cleaned up appropriately (Page 21). In general, more extensive first aid is required when needlestick

or mucosal exposures to blood have occurred. Other exposures can usually be handled with a common sense approach, including thorough washing of the exposed area and removal of any soiled clothing.

Needlestick injuries: Immediately rinse the affected area of skin with warm running water and soap for at least three minutes.²² There is no evidence that encouraging the wound to bleed or applying an antiseptic to the wound reduces the rate of infection, but these actions are not contraindicated.²³ Caustic agents, such as hypochlorite, should not be used as they can compromise skin integrity.¹⁰ Injuries should be covered with an appropriate dressing. The tetanus status of the exposed individual should also be checked and a tetanus booster administered if required.

Mucous membrane exposures: Any mucous membranes, e.g. the eyes, that are exposed to body fluids should be rinsed out with a large amount of water or saline for at least three minutes.²²

Testing for HIV, hepatitis B and hepatitis C is recommended after needlestick injuries or mucosal exposure to blood

Although there are many infections which can be transmitted through body fluids the most consequential are generally considered to be HIV, hepatitis B and hepatitis C. The likelihood of transmission of these viruses after exposure to different body fluids varies and an understanding of the risks is pivotal when performing a risk assessment (Table 1). In general, testing for HIV, hepatitis B and hepatitis C should only be considered after needlestick injuries, or after mucosal or broken skin exposure. If it is decided that testing should be undertaken, blood tests for HIV, hepatitis B, hepatitis C for both the source individual and the exposed healthcare worker need to be **conducted within 24 hours and marked as urgent**. If consent is refused by either the exposed person or the source, document this, and the reasons for refusal.

Source individual: When known, the source individual should be asked for consent to test their blood for:²⁴

1. HIV antibody
2. Hepatitis B surface antigen
3. Hepatitis C antibody

Exposed individual: Blood from the exposed person should be tested for:²⁴

1. HIV antibody
2. Hepatitis B surface antigen
3. Hepatitis B surface antibody
4. Hepatitis C antibody

The exposed person should be reassured that the risk of infection after accidental exposures is low and advice and education should be provided that highlights the importance of:²⁴

- Having blood tests as soon as possible after exposure with follow-up testing at the appropriate times (Tables 2, 3 and 4)
- Not donating blood, avoiding pregnancy and practising safe sex until all final follow-up tests have been completed and results are available
- Reporting any glandular fever-like illness for the six months after exposure

Hepatitis B testing and prophylaxis

There are a number of serological markers used to test and monitor patients for hepatitis B. The following definitions are intended to assist clinicians in understanding what these

markers mean clinically to help when analysing test results (Table 2):²⁹

- HBsAg – persistent or acute infection
- Anti-HBs – immunity due to vaccination or past infection
- HBeAg – highly infectious disease
- HBV DNA – circulating virus
- Anti-HBc IgM – recent infection
- Anti-HBc IgG – past/current infection

Hepatitis C testing

Management of potential hepatitis C exposures (Table 3) can be problematic as there is no known effective prophylaxis and a high proportion of people (approximately 75%) are unaware they have the disease.²⁷

Most cases of hepatitis C in New Zealand are in people with a history of illicit IV substance use or a history of sexual contact with people with confirmed hepatitis C.²⁹ The prevalence rates of hepatitis C in illicit IV substance users in New Zealand have been reported to be as high as 70%.²⁹ There is also an increased risk of infection in people who underwent a blood transfusion prior to 1992, as this was when blood was first screened for hepatitis C.³⁰

Table 1: Transmission risks and incidences of HIV, hepatitis B and hepatitis C in New Zealand.^{21, 24 – 27}

	HIV	Hepatitis B	Hepatitis C
The number of people living with the disease in New Zealand	2000	90 000	50 000
The risk of transmission following exposure to a single needlestick or cut injury	0.3%	6 – 30%	1.8%
Fluids and tissues capable of transmitting blood borne infections			
Blood and fluids visibly contaminated with blood	Yes	Yes	Yes
Faeces, nasal secretions, sputum, sweat, tears, urine or vomit	No	No	No

N.B. Breast milk, inflammatory exudates, semen and vaginal fluids, pleural, amniotic, pericardial, peritoneal, synovial, and cerebrospinal fluids are all potentially capable of transmitting HIV, hepatitis B and hepatitis C but are less likely to be encountered in a primary care setting.

Table 2: Testing and prophylaxis for hepatitis B²⁴

Exposed individual		Source individual		Action for exposed individual
HBsAg	Anti-HBs	HBsAg	Anti-HBs	
-	-	-	-	Consider hepatitis B vaccination for future protection (vaccination not needed for this exposure)
-	-	-	+	
-	+	-	-	No action required as exposed person is immune
-	+	-	+	
-	+	+	-	
-	+	unknown	unknown	
-	past + now -	-	+/-	Booster dose of hepatitis B vaccine recommended
-	past + now -	+	-	
-	-	+	-	Recommend HBIG* 400 IU IM and hepatitis B vaccination schedule. Known non-responders to hepatitis B vaccination should have two doses of HBIG. Request HBsAg and HBsAb testing at 3, 6, and 12 months
-	-	unknown	unknown	Consider HBIG 400 IU IM and hepatitis B vaccination schedule. Request HBsAg and HBsAb testing at 3, 6, and 12 months

* HBIG = hepatitis B immune globulin; obtain from the New Zealand Blood Transfusion Service.

Table 3: Testing for hepatitis C antibody²⁴

Exposed individual	Source individual	Action for exposed individual
Negative or unknown	Negative or unknown	No action is usually required, but testing can be performed at 3, 6 and 12 months if there is concern the source may be incubating hepatitis C
	Positive	<ol style="list-style-type: none"> 1. Consider hepatitis C polymerase chain reaction (PCR) testing of the source, which will also determine how infectious they are 2. If the source individual's PCR test is positive, test the exposed individual (PCR) at 1 month 3. Test all exposed individuals (PCR) at 3, 6 and 12 months. 4. Test the exposed individual if they are exhibiting signs and/or symptoms of hepatitis C 5. No prophylaxis is available. If acute infection occurs the patient should be referred for initiation of antiviral treatment

HIV testing and prophylaxis

The risk of contracting HIV after exposure to HIV-infected blood is relatively low even for needlestick injuries (Table 1). Mucous membrane exposure, e.g. eye, nose or mouth, to HIV-infected blood carries an even lower risk of infection – reported to be approximately 0.1%.²¹ The transmission risk after skin exposure is lower again. A small amount of blood on intact skin is not likely to pose a risk, as no documented cases of HIV transmission have been reported after exposure to a small amount of blood on intact skin for a short period of time.²¹

Post-exposure prophylaxis is recommended if the source individual is known to be HIV positive (Table 4).

N.B. The rates of HIV infection in people who use illicit substances intravenously in New Zealand are very low and post-exposure prophylaxis is not routinely recommended after exposure to body fluids from these people, unless they are known to be HIV positive.^{11, 25}



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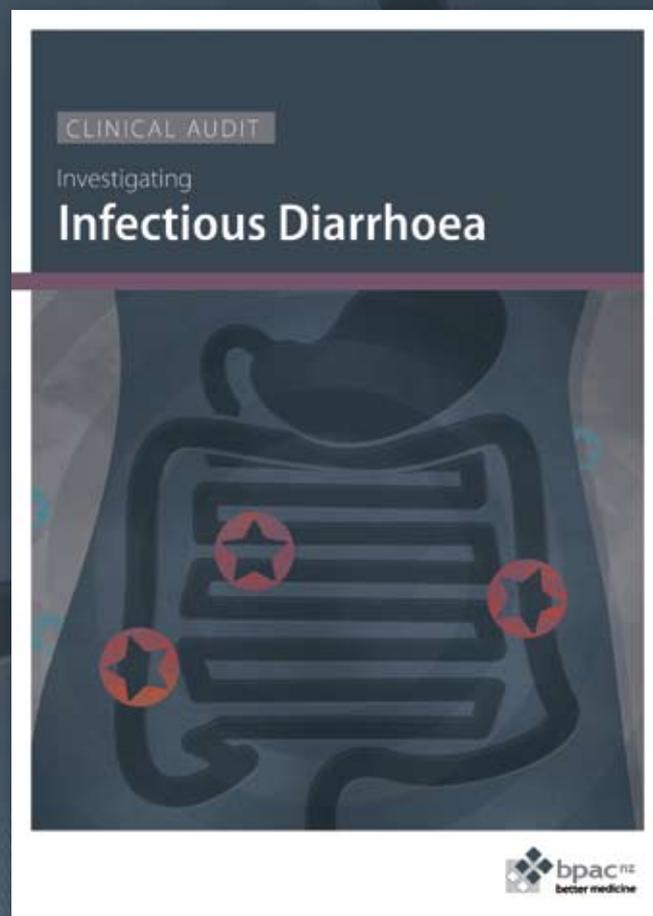
Table 4: Testing for HIV antibodies and prophylaxis²⁴

Exposed individual	Source individual	Action for exposed individual
Negative or unknown	Negative or unknown	No action is usually required, but testing can be performed at 3, 6 and 12 months if there is concern the source individual may be incubating HIV, e.g. if the source patient has undergone recent testing but it is too early to tell whether they have contracted the disease
	Positive	<ol style="list-style-type: none"> 1. It is recommended that, when appropriate, post-exposure prophylaxis is initiated within one to two hours of exposure. A clinical microbiologist or infectious diseases specialist should be contacted immediately to determine whether prophylaxis is required. 2. Repeat serology testing at 3, 6 and 12 months

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