OIGT
Opleidingsinstituut
Internationale Gezondheidszorg en Tropengeneeskunde

Accidental Exposure to Blood or Body Fluids

during the Global Health Residency

September 2020

Introduction

The Global Health Residency completes the training in Global Health and Tropical Medicine (GH&TM) and offers a unique opportunity for every resident to consolidate the skills and knowledge gained during the clinical residencies and Netherlands Diploma Course on International Health and Tropical Medicine (NTC) in the Netherlands.

It has been designed such that residents develop important competencies in the fields of preventative medicine, infectious tropical diseases, the organisation and management of care, governance and advocacy and intercultural aspects of healthcare. The 6 months spent working under supervision in a low-resource setting aims to prepare residents for their future work at the crossroads of clinical care and public health, in an international setting, often for disadvantaged populations.

Scope and Rationale

The Global Health Residency (GHR) offers great learning opportunities for the residents, but can also pose many challenges that come with working in a low-resource setting. One of these challenges lies in working in an environment where there is a high prevalence of infectious diseases such as HIV, Hepatitis B (HBV) and Hepatitis C (HCV). In addition, outbreaks of infectious diseases such as Ebola or the current COVID-19 pandemic have emerged as global health threats. As such, the AIGT is at risk of being exposed to infectious diseases that can be transmitted through blood or body fluids. It is therefore important for the resident to know what to do in case of any accidental occupational exposure to common infectious diseases such as HIV, HBV and HCV.

Not every hospital has local protocols in place on how to manage these exposures. For this reason, this document has been created for the AIGT resident, to serve as a guideline for the necessary steps that need to be taken after exposure, and to advise on the use of post exposure prophylaxis (PEP).

This document was created using the protocol of Accidental Exposure to Blood or Body Fluids (AEB) and Post-Exposure Prophylaxis (PEP) of Médecins Sans Frontières (MSF) and the Dutch National Guideline on needlestick injuries.

Definition

Occupational exposure can occur through different mechanisms. Percutaneous injury, whereby the skin of the exposed is penetrated by a sharp object, accounts for 66-95% of occupational exposure to blood-borne pathogens[1]. Other forms of accidental exposure can occur via mucous membranes, involving exposures of blood or body fluids to the eyes, nose or mouth, and to non-intact skin.

Preventing accidental exposure to blood or body fluids (AEB)

First and foremost, all residents are required to adhere to safety regulations when working in their respective hospitals. Accidental exposures can occur during certain procedures such as surgery, putting in IV cannulas and handling IV drips and blood sample taking, or when dealing with blood or body fluids and/or contaminated medical devices/waste. Therefore, local protocols regarding safe handling and disposal of sharp instruments should be followed, as well as avoiding direct contact with blood or body fluids during all patient contacts.

Residents who have not yet been vaccinated or who have not received all vaccinations against hepatitis B, are strongly recommended to be fully vaccinated against hepatitis B whenever possible, and to check if the antibody titer control is sufficient after completing the last dose.

Risk of transmission

The following table lists the risk for transmission of HIV, HBV and HCV after occupational exposure to infected blood, as adapted from the MSF AEB protocol. It is important to note that there are many other infectious diseases that can be transmitted through blood, but they fall out of the scope of this protocol.

Table 1: Risk for transmission after occupational exposure to infected blood

Agents	Exposure mode	Risk of infection
HIV	Percutaneous	0.3%
HIV	Mucocutaneous contact	0.03-0.09%
HBV	Percutaneous exposure	10-30%
HCV	Percutaneous exposure	0-10%

Source: CDC, 2001[2]

Other body fluids such as cerebrospinal fluid, peritoneal fluid, pleural fluid, semen, vaginal secretions, amniotic fluid and breastmilk can also contain HIV, HBV or HCV, but the concentration of these viruses is usually lower in other fluids compared to blood. Saliva can possibly contain small amounts of HBV, but it

[1] Auta, A., Adewuyi, E. O., Tor-Anyiin, A., Aziz, D., Ogbole, E., Ogbonna, B. O., & Adeloye, D. (2017). Health-care workers' occupational exposures to body fluids in 21 countries in Africa: systematic review and meta-analysis. *Bulletin of the World Health Organization*, *95*(12), 831–841F. https://doi.org/10.2471/BLT.17.195735

[2] CDC/Centers for Disease Control and Prevention. Updated U.S. Public Health Service Guidelines for the Management of Occupational Exposures to HBV, HCV, and HIV and Recommendations for Postexposure Prophylaxis. MMWR 2001;50(RR-11):1-42.

is not clear whether this can lead to transmission. It is important to note that HIV, HBV or HCV cannot be transmitted through contact with sweat, urine or feces of a positive source.

STEPS TO FOLLOW AFTER AN ACCIDENTAL EXPOSURE TO BLOOD OR OTHER BODY FLUIDS (AEB)

If needed, prophylactic treatment after exposure should be started immediately, preferably within 4 hours but at most within 72 hours.

The following steps are to be undertaken after an AEB.

Step 0: First Aid Actions

In case of percutaneous exposure:

1. Let the wound bleed (DO NOT stop bleeding, DO NOT scrub or squeeze);
2. Clean the wound and surrounding skin with water, preferably under a running tap or alternatively with normal saline;
3. Disinfect the wound with 70% alcohol for 3 minutes OR povidone iodine 2.5% (Betadine) for 5 minutes OR a solution of chlorine 12° chlorometric (diluted to 1/10th = solution 0.4% of active chlorine) during 10 minutes.

Betadine = 1 part of 10% concentrate povidone iodine + 3 parts of clean water

In case of AEB on skin or mucous membranes (eyes, mouth):

1. Rinse directly with normal saline or water during 10 minutes. If exposure in the eye, ask someone to pour water or normal saline in the eye while you tilt your head backwards, while moving the eyelids up and down for thorough rinsing. Do not remove any contact lenses while rinsing the eye, because they form a protective barrier. After the eye has been cleaned, they can be safely removed and cleaned as usual, and are safe to be used again;
2. Use antiseptic eye drops after exposure if available;
3. If exposure is in the mouth, spit out the blood or body fluids and rinse thoroughly with water or normal saline and spit it out. Repeat several times;
4. DO NOT use soap and DO NOT use disinfection in mouth or eyes.

In case of a bite wound:

1. Follow the same steps as percutaneous exposure. Prophylactic antibiotics are indicated in case of a human bite wound, plus tetanus prophylaxis where necessary.

Step 1: Assessing risk of transmission of Hepatitis B (HBV), hepatitis C (HCV) and HIV based on accident

For this step, the exposed individual seeks medical help from a medical doctor or clinician immediately after an AEB. Each institution should have a designated person for this purpose. Residents are strongly advised to inform themselves beforehand on who to go to if an AEB occurs.

The Dutch Royal Institution of Public Health and Environment (RIVM) categorizes the risk of virus transmission per accident as no risk, low risk or high risk. In its national guideline on needlestick incidents, the RIVM uses these 3 categories, namely[3]:

1. A high risk accident that requires the exposed to take preventive measures against HIV, HBV or HCV;
2. A low risk accident that only requires preventive measures for HBV;
3. An accident that poses no risk for infection and does not require any measures.

These categories are made based on a) the amount of blood and b) the amount of virus particles that might be transferred from the source to the exposed in case of an accident. The guideline hereby looks at the instruments involved in the accident, such as type and size of needles, and the concentration of the virus in the source's blood, which is different per virus type and source.

Table 2: Risk of exposure, adapted from the RIVM national guideline on needlestick incidents

NO RISK EXPOSURE	LOW RISK EXPOSURE	HIGH RISK EXPOSURE
Blood splashes on intact skin	Blood splashes on non-intact skin (e.g. active eczema or fresh superficial wound)	Intensive blood contact involving open wounds (stab wounds, cut wounds)
Superficial skin wound on victim without visible blood (a scratch)	Contact between other possible infectious fluids (NOT blood or saliva) and mucous membranes	Contact between mucous membranes and blood OR fluids infected with blood OR saliva infected with blood
	Biting accident, if saliva of biter is present in fresh wound of the bitten person, without visible blood	Biting accident during a fight, whereby there is saliva and blood from the biter in the fresh wound of the bitten person
	Injury with subcutaneous used injection needle (insulin or heparin needle)	Biting accident whereby biter is at risk of having blood of the bitten person inside the mouth

[3] RIVM. Landelijke Richtlijn Prikaccidenten 2019, version april 2019.

	Injury with intramuscular used needle without visible blood from source	Injury with intramuscular used needle with visible blood from source
	Injury with intracutaneous or subcutaneous used suture needle without visible blood from source	Injury with a suture needle containing visible blood from source, or injury with any kind of suture needle that is not intracutaneous or subcutaneous
	Injury with a glucose needle (≥27 Gauge), used in glucometers for fingerprick	Injury with HOLLOW needle (<27 Gauge) or loose LANCET used for fingerprick
	Injury with needle used for anesthesia from a carpule syringe, such as those used in dentistry, without visible blood in carpule or on needle	Injury with needle used for anesthesia from a carpule syringe, such as those used in dentistry, with visible blood in carpule or on needle
		Percutaneous injury, other than previously stated, for example by IV needle, operation theatre instruments or instruments used in dentistry

NOTES ON TABLE 2

- Visible blood means blood can be seen on the needle, in the syringe or at the injection site of the source. IN CASE THERE IS DOUBT ABOUT BLOOD VISIBILITY IN DEVICE, CONSIDER THE ACCIDENT AS THAT OF ''WITH VISIBLE BLOOD''.
- Transmission of HIV, HBV and HCV through dried up blood is low but cannot be ruled out. Therefore incidents involving contaminated materials whereby dried blood entered the body of the exposed should be regarded as (high risk) accidents.

ACTIONS ACCORDING TO RISK:

- NO RISK: no need for further action
- LOW RISK: only measures against HBV are indicated in the Netherlands, but in places where HIV and HCV have a prevalence of > 1% in the general population, it is also recommended to take measures against HIV and HCV.
- HIGH RISK: take measures against HBV, HCV and HIV

Step 2: Assessing the injured and the source patient for hepatitis B, hepatitis C and HIV

IF POSSIBLE, SOURCE PATIENTS SHOULD ALWAYS BE TRACED, COUNSELED AND ASKED FOR CONSENT TO BE TESTED FOR HIV, HBV AND HCV.
AIGT residency hospitals abroad will most likely have a counseling and testing team as part of their HIV services, which could also be used for this purpose.

Hepatitis B

- If the source patient is negative for HBV, there is no need for further actions but the exposed should be advised to get preventive Hep B vaccinations (if not yet received).
- If the source is positive, assess if the injured individual has been fully vaccinated against Hepatitis B.
- If the individual never received the vaccinations, then the HBV vaccinations should be started as soon as possible.
- If the injured person has been vaccinated, check if the anti-HBs titer has ever been >10IU/l. Consider the injured to be fully protected ONLY if all 3 Hepatitis B vaccination received and anti-HBS >10IU/l. In this case, there is no need for further actions against HBV.
- In case anti-HBs titer is unknown or below 10 IU/L, there is an indication for a booster vaccination and follow up of antibody level 4-8 weeks after vaccination.
- If the injured is not vaccinated and he/she has suffered from hepatitis B (anti HBc positive) or currently has an active hepatitis B infection; there is no need to take further action for HBV.

HIV

- The exposed should always be tested for HIV after an AEB (to rule out any pre-existent HIV infection).
- If the source patient is HIV negative, it could be that the patient is still in the window period. In places where the HIV prevalence is high, residents are advised to start PEP regardless of the HIV status of the source. This is different in every setting and the decision to start PEP should be discussed with the local HIV coordinator, or any other person designated for AEB protocols. Once the decision is taken, it is advised to start PEP as soon as possible, even while waiting for the testing of the source or further decision making, because starting after more than 72 hours is not considered useful and, moreover, the PEP can always be stopped after initiation.
- If the source is HIV positive, the clinician/medical doctor has to gain information on whether the patient is on ART, if there is a detectable viral load (HIV RNA >200 copies/ml in the last 0-12 months), and if there are any signs of treatment failure and/or chance of being infected with a resistant HIV strain. In the latter case, there will be a need to deviate from the standard PEP regimens and therefore specialist consultation is advised.
- In case the HIV status of the source is unknown or the patient refuses to be tested, or HIV test kits are unavailable, a risk assessment (full history taking and physical examination) has to take place to assess whether the source patient is at risk of HIV infection. See ATTACHMENT 1: Risk assessment guide for the source patient as adapted from the MSF AEB protocol.

Below are the MSF recommendations on PEP after AEB.

Table 3: Recommendations for PEP after AEB (adapted from MSF AEB protocol, version november 2019)

	HIV Status of Source Patient		
Type of exposure	Positive (test+ or suggestive clinical exam)	Negative (test- and no clinical suspicion)	Unknown (e.g. not tested or undetermined clinical exam)
• Needlestick injury with a hollow needle used for arterial or venous access • Deep wound from material contaminated with blood.	**Prophylaxis Recommended**	**Prophylaxis NOT Recommended**	**Prophylaxis Recommended** (if in country with high HIV prevalence or if source is an IV drug user or practices unsafe sex)
• Needlestick injury with suture needle • Cut from a scalpel • Needlestick injury from needle used for intramuscular or subcutaneous injection • Damaged mucous membranes or skin in contact with a significant amount of blood	**Prophylaxis Recommended**	**Prophylaxis NOT Recommended**	**Prophylaxis sometimes Recommended*** (Generally always recommended in countries with high HIV prevalence, other situations to be discussed with local designated AEB coordinator)
• Bite, scratch, contact with blood on undamaged skin, contact of drops of blood on damaged mucous membranes or skin, contact with other body fluids not containing blood (e.g. saliva, urine), needlestick injury from a waste syringe	**Prophylaxis NOT Recommended** (unless contact lasts longer than 15 minutes)	**Prophylaxis NOT Recommended**	**Prophylaxis NOT Recommended**

*For AIGT residents who are abroad in a low-resource setting with high HIV prevalence (>1% in the general population), there is generally a low threshold to start PEP if the HIV status of the source is unknown or even if the source is considered a low risk patient.

In addition, if the source is a newly diagnosed HIV positive or they are known but not on treatment, proper counseling has to be done and ART and cotrimoxazole prophylaxis to be started as soon as possible by the source patient.

Hepatitis C

- The exposed should always be tested for HCV after an AEB (to rule out any pre-existent HCV infection).
- In case the source is HCV positive, or the status of the source is unknown, the exposed should be tested for HCV-RNA after 1 and 3 months regardless of the risk assessment. If HCV-RNA testing is not available, the exposed can instead be tested for anti-HCV 3 months and 6 months after exposure. There is no prophylaxis available against hepatitis C, but follow-up can allow for a timely diagnosis and initiation of treatment.
- If the source is HCV negative, there is no need for further action.

Step 3: Types of post-exposure prophylaxis (PEP)

PEP needs to be started as soon as possible, preferably within 4 hours after exposure, not later than 72 hours. PEP does not offer complete protection against HIV but it reduces the chance of HIV infection significantly by interfering with HIV replication.

Dosages (adapted from the RIVM National Guideline on needlestick accidents)

PEP for adults and children >12 years (or > 35kg):
4 weeks regimen of:
- Truvada® (=200 mg emtricitabine and 245 mg tenofovir) 1 tablet once daily every 24 hours
Together with
- Dolutegravir 50 mg 1 tablet once daily every 24 hours. Take tablets with food. Do not take together with iron tablets (ferrous sulphate).

PEP for children <12 years or <35kg:
4 weeks regimen of:
- Zidovudine 360-480mg/m2 twice daily, maximum 300mg twice daily. Zidovudine oral suspension 10mg/ml, 100mg capsules or tablets of 300mg can be used according to availability and practicality.
- Lamivudine 8mg/kg twice daily, maximum 150mg twice daily. Lamivudine oral suspension 10mg/ml or tablets of 100mg, 150mg or 300mg can be used.
- Kaletra (Lopinavir/Ritonavir) 600/150mg/m2/day divided in two doses over 24 hours, maximum twice daily 400/100mg. Kaletra oral suspension 80/20 mg/ml or tablets of 100/25mg or 200/50mg can be used.

NOTES

- The type of PEP might have to be adjusted if the source patient has a detectable viral load or shows other signs of treatment failure/ resistant strain. In this case it is advised to consult a HIV specialist.

- Truvada is contra-indicated in case of kidney failure (CrCl < 50ml/min). In that case give the following PEP regimen: Combivir® (=zidovudine 300 mg and lamivudine 150 mg) twice daily every 12 hours together with Dolutegravir 50 mg 1 tablet once daily every 24 hours
- Dolutegravir is contra-indicated in pregnancy. If the exposed is pregnant, give Truvada® (=200 mg emtricitabine en 245 mg tenofovir) 1 tablet once daily every 24 hours, together with Atazanavir 300 mg 1 tablet once daily every 24 hours and Ritonavir 100 mg 1 tablet once daily every 24 hours
- Atazanavir can cause elevated transaminases or hepatic decompensation, be cautious in patients with pre-existing liver conditions including HBV and HCV. Consult a HIV specialist.

If the exposed is using other medication, please verify for any drug interactions through www.hiv-druginteractions.org

SIDE EFFECTS
Most common side effects reported by patients who are on PEP:

- **Truvada® (emtricitabine/tenofovir):** headache, diarrhoea, nausea, vomiting, dizziness, elevated creatinine kinase, hypophosphatemia, kidney disfunction
- **Dolutegravir:** nausea, diarrhoea, headache
- **Combivir® (zidovudine/lamivudine):** headache, fatigue, nausea, anemia
- **Atazanavir/ritonavir:** headache, nausea, vomiting, diarrhoea, jaundice.
- **Lopinavir/Ritonavir:** diarrhoea, elevated triglycerides, elevated cholesterol and elevated liver enzymes

It is recommended to do a full blood count, creatinine and ALAT before commencing PEP as baseline measurement. It can be repeated after 10-15 days to check for tolerance. See also ATTACHMENT 2: timeline for laboratory tests. However, if these lab tests are not available, then good clinical monitoring is also considered sufficient.

Step 4: Information and prevention of further spread

The full follow-up period after an AEB is 6-months, see the necessary testing moments described in Step 2 and ATTACHMENT 2: timeline for laboratory tests, as adapted from the MSF protocol.

In cases where the exposed refuses to take PEP, he or she is still advised to follow medical check up as described in Step 2. All exposed individuals should be checked for any early signs that could indicate HIV infection, mostly appearing in the first 3 to 6 weeks, such as listed in the MSF protocol, including acute fever, generalised lymphadenopathy, cutaneous eruption, pharyngitis, non-specific flu symptoms, ulcers of the mouth or genital area. In case these symptoms occur, the exposed should be referred for specialised care.

As long as the exposed is not diagnosed with HBV, HCV or HIV at baseline measurements, there is strictly no need to take special precautions. However, in case of a high risk accident with a HIV positive source, the resident might consider a temporary change of work related activities, after discussing the matter with the local designated AEB clinician/medical doctor and/or the Training Institute for International Health and Tropical Medicine (OIGT).

In these high risk cases it is further advised to use a condom to prevent any possible transmission to sexual partners for the full follow-up period. Furthermore, pregnancy should be avoided during this period. Breastfeeding is contra-indicated for some PEP drugs including Dolutegravir, due to possible adverse effects in the infant. Moreover, the exposed needs to weigh the risk of possible HIV infection and transmission to the infant through breast milk. It is generally advised not to breastfeed during the follow-up period after a high risk AEB, however, alternatively, formula milk must be attainable and acceptable for the mother. The decision to continue or discontinue breastfeeding needs to be reviewed per individual case, and where necessary specialist advice should be sought.

In most low-income countries, HIV testing and counseling, PEP and HIV medicines are free of charge. If a fee is required for these or other laboratory investigations (mostly if the tests are conducted outside the hospital where the AIGT is working), the resident should contact his or her health insurance company for a possible refund.

Accidental exposures to blood and/or body fluids can cause stress and anxiety to the exposed and therefore the exposed should be followed up by a designated medical doctor or clinician. In case repatriation is indicated or requested for any reason, be it medically or psychologically, it should always be discussed with the local supervisor and the OIGT beforehand.

ATTACHMENTS

ATTACHMENT 1: RISK ASSESSMENT GUIDE FOR THE SOURCE PATIENT (taken from the MSF protocol)

The following points need to be covered when questioning and examining the patient. These will need to be adapted in line with local epidemiological, clinical and cultural conditions.

There is no such thing as a "score" in this regard; it is up to the doctor to interpret the results of the clinical assessment. It is important that questioning be conducted in a way that reveals relevant events that may have occurred several years ago.

1. Family history
• Have any family members recently been ill or died. What was the cause?

2. Recent personal history of primo-infection symptoms
Primo-infection symptoms generally appear 3 to 6 weeks after contamination:
• general lymphadenopathy, predominantly in the cervical and axillary areas;
• fever of unknown origin;
• muscular cramps, joint pain;
• skin rash, urticaria;
• oral and genital ulcers.

3. **Individual's personal "risk history" of HIV**

• Has the patient ever had a blood transfusion? If so, under which conditions?
• Has the patient been exposed to injections or surgical procedures (including any traditional scarification) with non-sterile material?
• Is the patient an intravenous drug user and does s/he possess injection material?
• Does the patient belong to a population group considered at risk? For example:
- sex worker
- truck driver;
- migrant worker;
- soldier.
• Is the patient involved in high-risk sexual activities?
- practising unsafe sex
- already treated or undergoing treatment for a sexually transmitted disease;
- the sexual partners of a person in any of the above categories.

4. **Suspicion or actual presence of symptoms and/or HIV infection within the previous six months or more**
• tuberculosis;
• continuous or intermittent fever;
• chronic diarrhoea;
• weight loss;
• chronic cough lasting longer than a month;
• skin infections (severe and/or recurrent)
• oral thrush;
• night sweats.

5. Clinical examination findings
• Cardinal signs:
- Kaposi sarcoma;
- Pneumocystis carinii pneumonia;
- cerebral toxoplasma;
- esophageal candidiasis;
- cytomegalovirus retinitis.

• Characteristic signs:
- oral thrush;
- hairy leukoplakia of the tongue;
- cryptococcal meningitis;
- pulmonary or extrapulmonary tuberculosis;
- herpes zoster, particularly multi-dermatomal;
- severe prurigo;
- high-grade B-cell extranodal lymphoma.

• Associated signs:
- weight loss (recent, unexplained) of more than 10% of initial body weight;
- fever (continuous or intermittent) for longer than a month;

- diarrhoea (continuous or intermittent) for longer than a month;
- ulcers (genital or perianal) for more than a month;
- cough lasting longer than a month;
- neurological complaints or findings;
- generalised lymphadenopathy (extra-inguinal lymphatic areas);
- reactions to drugs (not previously observed);
- skin infections (severe and/or recurrent): e.g. warts, dermatophytes, folliculitis.
- lymphopenia (known).

ATTACHMENT 2: Timeline for laboratory tests, as adapted from the MSF AEB protocol

Timing	**In persons taking PEP**	**In persons not taking PEP**
Baseline (as soon as possible after AEB)	HIV, HCV, HBV Hemoglobin Transaminases	HIV, HCV, HBV
Week 2- day 15	Hemoglobin Transaminases	
Month 1	Transaminases	HIV, HCV, HBV Transaminases
Month 3	HIV, HCV, HBV, FBC Transaminases	HIV, HCV, HBV Transaminases
Month 6	HIV, HCV, HBV, FBC Transaminases	HIV, HCV, HBV Transaminases

NOTE: Lab serves to detect side-effects. Abnormal transaminases could indicate hepatitis