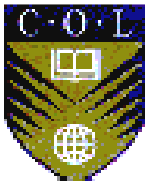
DIRECTORATE OF LEARNING SYSTEMS

DISTANCE EDUCATION PROGRAMME

INTEGRATED HIV/AIDS PREVENTION, TREATMENT AND CARE

Unit 9
Prevention of HIV



Allan and Nesta Ferguson Trust

Unit 9: Prevention of HIV

A distance learning course of the Directorate of Learning Systems (AMREF)

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Contents

Abbreviations and Acronyms

ART	Antiretroviral therapy
ARV	Antiretroviral
AIDS	Acquired immune deficiency syndrome
ANC	Antenatal care
BBs	Blood Banks
BTUs	Blood Transfusion Units
CR	Call Response Donors
C&T	Counselling and testing
HAART	Highly active antiretroviral therapy
HAV	Hepatitis A virus
HBV	Hepatitis B virus
HCW	Health care worker
HIV	Human immunodeficiency virus
HSV	Herpes simplex virus
IV	Intravenous
NBTC	National Blood Transfusion Centre
NGO	Non-governmental organization
NVP	Nevirapine
OI	Opportunistic infection
PEP	Post-exposure prophylaxis
PLHA	People living with HIV/AIDS
PMTCT	Prevention of mother-to-child transmission
QAS	Quality Assurance Schemes
RBTC	Regional Blood Transfusion Centre
STD	Sexually transmitted disease
STI	Sexually transmitted infection
TTI	Transfusion Transmitted Infection
WI	Walk-In Donors

Introduction to the Unit

Congratulations! You have so far covered 8 units in this course. I believe that by now, you are very knowledgeable about various topics on HIV and AIDs such as epidemiology, clinical and laboratory presentation, drugs used for management of patients infected with HIV/AIDS and so on. Welcome to Unit 9 on prevention of HIV. In the last unit we discussed nutrition in HIV. We discussed the interaction between HIV infection and nutrition and how HIV associated complications affect nutritional status. You also learnt about micronutrients, assessment of nutritional status and the nutritional care of children and adults with HIV/AIDS. We hope you found that unit interesting and enlightening.

In this unit we shall discuss the prevention of HIV. As you are now well aware, even though great strides have been made in anti-HIV treatment, HIV still does not yet have a cure. So the best prevention is that which is applied before a person becomes infected. Am sure you will agree with the popular saying that prevention is better than cure.

Our discussion on prevention of HIV will be divided into three sections. The first section will will look at issues of risk assessment, integrating HIV care in prevention. The second and third sections will tackle the issues of post exposure prophylaxis and strategies to reduce HIV infection through blood transfusion and blood safety.

Unit Objectives

By the end of this unit you should be able to:

- Discuss risk assessment and risk reduction strategies;
- Integrate HIV care in prevention;
- Describe the role of occupational exposure in HIV transmission
- Explain strategies to reduce occupational exposure to HIV and preventing HIV infection following occupational exposure;
- State the role of blood transfusion in HIV transmission
- Describe the rational use of blood and blood products
- Discuss strategies to ensure safe blood and blood products supply

Section 1: Risk Assessment and Integrating Prevention with Care

Introduction

Welcome to the first section of our unit on prevention of HIV. In this section we shall discuss how to assess vulnerability factors and integrate prevention of HIV with care. HIV prevention is more urgent than ever before especially because HIV positive persons are living longer and healthier lives with antiretroviral therapy. Sexual activity normalizes in HIV infected persons once health is restored. We therefore need to prepare them well to ensure that they do not continue transmitting the virus as well as prevent at-risk individuals from becoming HIV-infected. These prevention activities can easily be integrated into our clinical care settings. Let's now look at our objectives for this section.

Section Objectives

By the end of this section you should be able to:

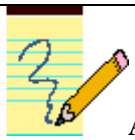
- Discuss factors that contribute to HIV transmission;
- Explain the key factors in heterosexual transmission;
- Describe the HIV prevention strategies;
- Outline the basic considerations for integrating HIV prevention with care;
- Describe your role in HIV transmission risk reduction.

Factors Contributing to HIV Transmission

As you learnt in Unit 1, there are a number of factors that contribute to HIV transmission. Can you remember them? We said that these factors can be divided into three broad categories, namely, biological, social and behavioural factors.

HIV is not simply a health issue. It is a social justice issue. From country to country, the people who are most vulnerable are those who are marginalized and often also living with poverty, dealing with abuse, and facing many other forms of oppression.

What does the term vulnerability mean? Start by putting your thoughts to paper in the following activity.

ACTIVITY

Write down your definition of the term vulnerability

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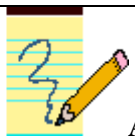
Well, I believe you mentioned that vulnerability means the degree to which an individual or a population has control over their risk of acquiring HIV, or the degree to which those people who are infected and affected by HIV are able to access appropriate care and support.

Vulnerability results from individual and societal factors that increase the risk of HIV infection. These factors include:

- poverty,
- unemployment,
- illiteracy,
- gender inequities,
- cultural practices,
- lack of information and services,
- and human rights abuses.

These factors greatly increase the vulnerability of certain groups in our communities, such as adolescent girls, women, sex workers, illegal immigrants, orphans and displaced persons. Young people are often more vulnerable because they lack financial independence and are in a stage of life where experimentation is common.

ACTIVITY

List down some examples of how vulnerability can be an issue for illiterate women, and orphaned girls?

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Well done! I believe your answer included the following examples of how vulnerability can be an issue for some of these groups.

- Illiterate women with limited skills, few job opportunities, and limited access to health information and services are more likely than other women, and the population as a whole, to engage in unprotected sex for money;
- Child prostitution and financial enticement of young girls by adult men increase girls' vulnerability to HIV/AIDS in many countries;
- Orphaned girls often have to give in to sexual advances from their teachers or other adult men in order to stay in school or to support their siblings.

In order to reduce vulnerability, we need to implement interventions that :

- Aim to change adverse policies, social norms, and harmful cultural practices;
- Create income generation schemes and social support programs for orphans and other vulnerable persons.

Role of Heterosexual Transmission of HIV

Worldwide, the majority of human immunodeficiency virus (HIV) infections result from heterosexual transmission. Indeed, heterosexual transmission is the most common mode of HIV transmission in resource-poor countries. In order to successfully prevent this mode of

transmission, we need to take into account the variables that fuel heterosexual transmission and ways of reducing this transmission.

Although HIV can also be transmitted through blood transfusion and mother to child, it is mainly a sexually transmitted infection. There are different types of sexual relations, each of which carries a different degree of risk to get infected. These are:

- Anal sex
- Vaginal sex
- Oral sex

Let's discuss each in turn.

Anal sex

Amongst sexual practices, anal sex (receptive) represents the highest risk for HIV infection if one of the partners is HIV infected. The partner may be male or female. Anal sex practice represents the biggest risk because the anal mucosa does not produce a natural lubrication, is fragile, wounds and bleeds very easily.

The penis can have micro-lesions, which permit the entrance of the virus.

Vaginal sex

The HIV can be found in large quantities in the semen, and to a lesser amount in vaginal secretions of infected persons. The risk of infection is still high, but less than with anal sex, because the vagina produces a natural lubrication, and is more elastic.

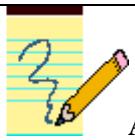
Vaginal sex represents a serious risk because the vaginal mucosa can still have micro-lesions during penetration, which permits the entry of the virus.

The HIV from the vaginal secretion can penetrate the penis through micro-lesions.

Oral sex

The term 'oral sex' means there is contact between the genitals and the mouth. Compared to anal and vaginal sex, oral sex represents the smallest risk for infection. However, very small wounds in the mouth can increase the risk of infection.

Let's now look at some of the key factors in heterosexual transmission of HIV. These factors are not new to you as they have been mentioned from time to time again through out this course. Start by listing them down in the following activity.

ACTIVITY

What are the key factors in heterosexual transmission of HIV?

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Well done! I believe your answer included the following factors:

- Frequent change of sexual partners;
- Unprotected sexual intercourse;
- Presence of STI and poor access to STI treatment;
- Lack of male circumcision;
- Social vulnerability of women and young people;
- Economic and political instability of the community;
- Lack of knowledge of serostatus.

How can we reduce heterosexual transmission of HIV?

There are many things that we can do to reduce heterosexual transmission of HIV in our clinical settings. These include:

- Better recognition of the symptoms of STI and improved behaviour in seeking treatment;

- Better management of STIs;
- Change of sexual practices by promoting sexual abstinence or delayed onset of sex, especially for adolescents;
- Behaviour change that includes reducing the number of sexual partners;
- Safer sex practices, including consistent, correct use of condoms;
- Supportive social environment to sustain behavioural change;
- Reduced stigma and discrimination against people with HIV;
- Promotion of male circumcision.
- Knowledge of serostatus: availability and acceptability of VCT

Interventions For Preventing Heterosexual Transmission

Although HIV/AIDS has continued to spread in our communities, several interventions have been tested and found to be successful in preventing heterosexual transmission. The mainstays of these programs has been:

- Behaviour change communication that includes messages about abstinence, fidelity and condom use,
- Improved access to condoms to reduce the risk of infection and to decrease vulnerability to HIV,
- Effective management of STI,
- Improved access to VCT,
- Change in social norms to support behaviour change,
- Safe blood transfusions through widespread testing of donors,
- Rigorous application of universal precautions (UP) and post exposure prophylaxis (PEP) in health care settings.

Let's look at some of these interventions in detail.

Behaviour change interventions aimed at decreasing the risk of infection

These are Interventions that aim at :

- reducing high-risk sexual behaviours such as frequent changes in sexual partners, unprotected sexual intercourse, and early sexual debut;

- changing situations that support high-risk sexual behaviour, such as poverty among young women, truck stop situations in communities where these women live, heavy alcohol use associated with sexual behaviour. High-risk groups are typically sex workers and their clients; people who are highly mobile, such as long distance truck drivers and migrant workers; the military; and police.

Behaviour change interventions and behaviour change communications can be targeted at the general population or at high-risk groups, and must be tailored accordingly.
Examples include:

- Community drama presentations to increase a community's awareness of risks for HIV transmission;
- Peer education unit s to teach skills in condom use and condom negotiation;
- Group discussions with youth about delaying sexual debut;
- Social marketing of condoms;
- Social norm changes to support risk reduction through drama, peer education and community meetings;
- Creating income-generation schemes and programs for orphans and other vulnerable children.

Effective management of Sexually Transmitted Infections (STIs)

STIs increase the transmission and acquisition of HIV. Worldwide, more than 300 million new cases of STIs occur each year, mostly in poor countries. The global distribution of STIs is similar to that of HIV.

Syndromic management of STIs that includes compliance with treatment, contact identification and treatment, condom education and counselling has had an effect in reducing the prevalence of STIs and therefore reducing the vulnerability to HIV/AIDS.

Voluntary counselling and testing (VCT)

There is a synergistic relationship between VCT and HIV care and treatment. Counselling and testing is not only an effective prevention, care and support intervention aimed at the public in general, it is an essential first step in the diagnostic process for people with suspected HIV-related illness. Counselling is an important component of testing. Counselling has a place at both pre and post-test points, and VCTs can be both an entry

point to care and an opportunity to reinforce prevention messages. This applies to those who test positive and to those who test negative. For those who are positive, this is an important opportunity to promote affirmative living.

A randomized control trial in Kenya, Tanzania and Trinidad showed that VCT significantly reduced high-risk sexual behaviour among individuals and couples [*Source: FHI Care and Treatment manual*]. Experiences in Kenya have shown that VCT clients who test negative and are effectively counselled, are motivated to remain negative.

Promotion of Male circumcision

An international expert consultation convened by UNAIDS and WHO in 2007, recommended that male circumcision be considered as an additional important intervention to reduce the risk of heterosexually acquired HIV infection in men. The team further recommended that male circumcision should be considered as part of a comprehensive HIV prevention package, which includes the provision of HIV testing and counseling services; treatment for sexually transmitted infections; the promotion of safer sex practices; and the provision of male and female condoms and promotion of their correct and consistent use. The recommendations were based on evidence presented to the team of experts and also from strong evidence gathered from three randomized controlled trials undertaken in Kisumu, Kenya, Rakai District, Uganda and Orange Farm, South Africa that male circumcision reduces the risk of heterosexually acquired HIV infection in men by approximately 60%. This evidence supports the findings of numerous observational studies that have also suggested that the geographical correlation long described between lower HIV prevalence and high rates of male circumcision in some countries in Africa, and more recently elsewhere, is, at least in part, a causal association. Currently, an estimated 665 million men, or 30 % of men worldwide, are estimated to be circumcised.

Care and treatment

Providing care and treatment enhances the prevention in several ways. Access to care and treatment:

- Helps encourages people to seek VCT and PMTCT services and receive counselling that promotes healthy living,
- May promote behaviour change,
- Provides additional opportunities for prevention education and counselling,

- Helps provide hope to those living with HIV/AIDS and their families, some of whom may change their behaviours,
- Helps restore dignity to PLHA and thereby reduce the stigma associated with HIV infection.

Providing hope and restoring dignity help to decrease stigma, thereby increasing the likelihood that there will be community dialogue about HIV, which is a prerequisite to prevention.

Having looked at factors that increase vulnerability to HIV and the role of heterosexual transmission of HIV, let us now discuss how to integrate HIV prevention with care.

Integrating HIV Prevention with Care

HIV prevention covers a wide range of services which are important for identifying people at-risk of HIV infection. These services also help to identify HIV infected persons in order to reduce the risk of transmission. Prevention services such as counseling and HIV education are compatible with those offered in our clinical care setting and may be integrated or closely linked with them.

The clinical care setting offers an opportunity to reach a large group of at-risk and HIV-infected persons. That's why prevention services for HIV-infected persons should be a standard of care in all clinical settings, such as health centres, sexually transmitted disease clinics, drug treatment facilities, and mental health settings. In order for these services to be effective and well integrated, health care providers need to be well trained and to have adequate time and resources to conduct effective HIV prevention counseling.

Why integrate HIV prevention with care?

There are very good reasons for integrating prevention with care. Top on the list is because sexual activity normalizes in HIV infected persons once their health is restored. With the

introduction of Highly Active Antiretroviral Therapy (HAART), HIV infected persons are living healthy and normal lives devoid of frequent attacks with opportunistic infections. Thus if they are not counseled and well informed they can spread the virus generously. The other reasons include the following:

- Care settings offer a good opportunity for behavioural counseling for risk reduction as well as partner and family counseling therapy;
- In many cases, we providers do not assess for sexual risk and substance abuse;
- There is lack of well established contact tracing or notification mechanisms;
- Discordance rates amongst long-term partners is significantly high.

Thus the basic considerations for integrating HIV prevention with care in our clinical settings are in order to achieve three main things:

- HIV prevention through: identification of factors influencing HIV transmission in Risk populations; obtaining a risk assessment and delivering risk reduction counseling; screening and treatment of STDs; partner notification; and Pre and post exposure prophylaxis for sero-discordant sexual or drug-using partners
- Screening of secondary diseases such as viral hepatitis, opportunistic infections; cancer in HIV infected patients; diabetes, lipid screening and cardio-vascular risk gynecological care, oral health care, and mental health care
- Health promotion and maintenance through healthy living, cessation of substance abuse; prevention and intervention in domestic/sexual violence, and so on.

HIV Prevention Services in Clinical Care

There are a number of Interventions that can reduce the risk of HIV transmission. These include:

- HIV education—individual or community;
- Risk reduction counseling;
- Partner notification programs;
- Partner counseling and referral;
- Pre- and perinatal HIV counseling and education;
- Pre- and post-test counseling;
- Antiretroviral therapy for preventing perinatal transmission;
- Intensive counseling (individual, couples, group);
- Peer support group or outreach services;

- Condoms;
- Needle and Syringe Exchange;
- Occupational post-exposure prophylaxis for HIV;
- Substance abuse treatment;
- Mental health services.

Role of Provider in Transmission Risk Reduction

You can greatly reduce the client's risk of transmission of HIV through provider-delivered counseling in the context of clinical encounter. This can be achieved through:

- Establishing dialogue and rapport;
- Addressing clients priority needs;
- Addressing high-risk in Stepwise manner;
- Improving clients skills.

In addition, to further reduce the risk of transmission, you should carry out the following activities as a clinical provider:

- screening for risky behaviors and STDs,
- providing general and tailored risk-reduction messages to patients,
- when indicated, referring patients for additional risk-reduction services and other services that may affect HIV risk reduction (e.g., substance abuse treatment), and
- ensuring that patients are provided partner counseling, testing and referral services.

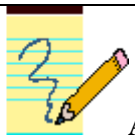
When assessing your clients, it is important to use a comprehensive "prevention checklist" to ensure that you have covered all the necessary areas. A sample of such as checklist is shown in the following box.

Comprehensive Prevention Checklist

- Assess patient's current level of sexual behavior and its potential relationship to current mental and physical health.
- Emphasize that undetectable plasma viral loads should not be equated with non-infectiousness.
- Assess current use of barrier methods (e.g., condoms), and discuss proper use and alternatives.

- Explain the relative risks of various sexual acts, emphasize that even "low-risk" acts may result in transmission.
- Conduct annual screening for STDs and more frequent screening if patients are at high risk for STD acquisition.
- Initiate a frank discussion about how the patient can assess partner(s) serostatus, and how patient meets partners.
- Recommend regular partner serostatus.
- Assess use of recreational drugs, including erection-sustaining drugs, and relation of drug use to sexual behavior.

Before you proceed do the following activity.

ACTIVITY

What barriers would prevent you from providing prevention counselling in a care setting?

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Now read through the following section and find out if the barriers you listed are mentioned.

The barriers to providing prevention counselling in primary care settings include the following:

- Time constraints;
- Discomfort discussing sex & drug use;
- Lack of training;

- Clinicians' perception that their efforts will not be successful or that their patients are not at risk;
- Clinicians' misunderstanding of their roles & responsibility.

Linking ART with Prevention

Providing ART requires integration of preventive interventions into care and treatment. Access to ART can reduce the fear, stigma and discrimination that surround HIV. This has been shown in projects in Africa, the Caribbean and elsewhere. Being able to provide ART makes it easier to talk with patients about HIV infection, how it is spread, and how they can prevent transmission. Providing ART requires also providing more prevention during your clinical encounters, not less!

Access to ART should also increase the use of HIV testing and counselling. It is very important that you advise patients to be tested and work with HIV positive patients to have their partners and family tested and to educate and counsel them before and after testing.

If we educate and support preventive efforts for HIV positive persons, ART can help them to change behaviour to avoid further transmission. This is important because if you don't educate people on ART properly, it could actually lead to myths about a weaker virus or that safer sex is no longer needed amongst patient on ART. This could lead to an increase in risky behaviour and more, not less, transmission. So we need to be active in our prevention efforts when we introduce ART.

Access to treatment also presents challenges and opportunities for prevention. Inaccurate and unrealistic ideas about the benefits of ART must not be allowed to undermine prevention efforts. Although ART can reduce the level of HIV virus, it does not eliminate the virus and transmission can still occur. Patients on ART need to understand that risk remains and that they need to continue working hard to prevent transmission. Make sure that they understand the following:

- There is risk of the patient being re-infected with another strain of the HIV virus. Even though they are already infected, they can be infected a second time with a different strain that can cause further problems for their immunity.
- The risk of infecting others still remains as before even if they are on ART;

- There is also the new risk that, if the patient has poor adherence to ART and has developed a resistant HIV virus, transmission of the resistant virus could occur, which is even more dangerous. Therefore we need to continue to emphasize safer sex.

Integrated prevention into HIV care and ART means that on every clinic visit, you need to reinforce prevention, by educating, checking up on key prevention interventions that apply for each patient, providing condoms, demonstrating condom use when needed, etc.

Preventing HIV through Family Planning

As you well know, family planning programs serve those who are sexually active. This group includes people who are at risk, exposed or already infected. Family planning (FP) is a vehicle for prevention and entry into HIV care. You will recall from Unit one that HIV/AIDS has been described to depict a woman's face. Over 50% of PLHA worldwide are women, whereas in Africa, 58% of people living with HIV/AIDS are women. Women are also the population at risk of unwanted pregnancy, abortions and other adverse pregnancy outcomes which overlap with the risk of HIV. Thus, FP programs help us not only to respond to unmet FP demands, but also give us an opportunity for HIV prevention and care.

How can we prevent HIV through Family Planning?

- By getting more comprehensive. You can for instance be creative and expand the prevention alphabets beyond A, B, C, to **D, T, F,** whereby:
    - "D" stands for Delay in sexual debut,
    - "T" stands for Treatment of STIS and with ARV drugs
    - "F" stands for Family Planning

  I believe you already know what **A B C** stands for, that is **A**bstinence, **B**eing faithful and **C**ondom use.
- Ensuring that our FP programmes offers more than FP choices. It could for instance offer pre and post test counseling, ARVs, condoms;
- Provide expertise on sexuality to both the youth and couples;
- Provide Prevention Mother To Child Transmission services ;
- Provide VCT services to women and their partners who visit the FP clinic.

Summary

Well, you have come to the end of the first section of this unit on prevention of HIV. In this section we discussed how to assess vulnerability factors, the main factors in heterosexual transmission of HIV and how they can be reduced, and the importance and strategies for integrating prevention with care. We hope you have found this section interesting and informative. In the next section we shall discuss how you can prevent occupational and non-occupations exposure to HIV.

Section 2: Post-Exposure Prophylaxis

Introduction

Welcome to the second section of our unit on prevention of HIV. In the last section we discussed assessment of vulnerability factors and how to integrate prevention with care. In this section we shall continue with our discussion on prevention. You shall learn about Post-exposure Prophylaxis (PEP) against HIV infection. From previous units, you have learned that HIV infection can occur through different routes mainly **heterosexual** and **homosexual** contacts. I believe you have also learned that infection may occur under different circumstances which may be **occupational** or **non occupational.**

Members of the health professions and paramedical staff who are in contact with patients and clinical materials face the risk of HIV infection through injury with sharps such as needles or exposure to body fluids. This is referred to as **occupational exposure** to HIV infection. On the other hand **non-occupational exposure** to HIV can be sexual such as during rape/assault, or contact with infected blood through sharing of needles among injecting drug users or in road traffic accidents. It is therefore imperative that all possible precautions must be taken to prevent transmission of HIV infection to exposed individuals in all settings that present a risk of infection.

Let us now look at our objectives for this section:

Section Objectives

By the end of this section, the learner will be able to:

- Describe the risk of transmission of HIV following occupational exposure and sexual assault.
- Discuss non-pharmacologic interventions that reduce the risk of transmission of HIV following occupational and sexual exposures.
- Describe the use of antiretroviral medicines to reduce the risk of transmission of HIV following occupational and sexual exposures.
- Describe the steps that should be taken during management of possible exposure to HIV through sexual assault or following known occupational exposure.

- Develop possible and feasible protocols for staff and patients who have been exposed to HIV;
- Educate fellow staff members on the **Antiretroviral medicines (ARVs)** used for PEP both in occupational and sexual exposure, the rationale for their use and the benefits of PEP

This section is divided into 4 subsections. First, we shall look at the risk of transmission or acquisition of HIV following exposure to HIV either occupationally and or non occupationally. We shall then move on to discuss non pharmacological interventions that can be employed to reduce risks of infection following occupational exposure. Thirdly we shall learn how Antiretroviral medicines can be used for PEP both in occupational and non occupational exposures. The 4th subsection will look at the steps taken in managing patients in the event of known occupational or non-occupational exposure to HIV.

Please note that, under non-occupational exposure we shall mainly concentrate on sexual assault.

In order for you to enjoy this section and to facilitate your understanding, it will be useful for you to regularly visit a HIV/AIDS clinic providing PEP services either at the health facility where you work or elsewhere. This will expose to you the practical aspects of PEP. Also refer to the references at the end of this section for further reading.

Let's start by finding out what post exposure prophylaxis is.

Post Exposure Prophylaxis (PEP)

What is PEP?

Post-exposure prophylaxis (PEP) is the use of ARVs for a short time to reduce the likelihood of HIV infection following exposure to HIV. This is a key part of a comprehensive universal precautions strategy for reducing staff exposure to infectious agents in the workplace.

Post exposure prophylaxis against infection with HIV follows the general principles of management of infectious diseases of public health concern which involves 2 main approaches:

1. Prevention through
    - avoiding exposure
    - prophylaxis
    - immunization
2. Treatment
    - Using medicines

Risk of HIV Transmission following Various Exposures

Imagine that a scenario whereby you accidentally get a needle prick while handling a HIV positive patient, or you are sexually assaulted by a stranger who is found to be HIV infected while walking home in the evening. Would this mean that you are definitely (100%) infected with HIV?

Given the stigma and fear that follows the mention of HIV, I can almost imagine what you must be thinking with regards to the question above. Many of us health workers and the indeed the general public believe that once a person is exposed, then they have contracted HIV. Well, this is not true!!

It is important to realize that the probability of an individual acquiring HIV after having been exposed either occupationally or sexually is not always 100%. The level of risk that one is exposed to and hence the probability of disease acquisition varies depending on the type and nature of exposure.

Table 9.1 below gives an indication of the probability of disease acquisition for each type of exposure. These estimates are based primarily on a case-controlled study of health care workers that evaluated the risk of transmission and identified specific risk factors for transmission.

***Table 9.1* : *Risk of Transmission* . *Source: Nascop, 2005 national ART training curriculum for health workers*.**

Risk of HIV transmission during occupational and non-occupational exposure	
Exposure	**Probability of disease acquisition (%)**
Needle stick injury	0.0032 (0.32)
Mucous membrane	0.09
Non-intact skin exposure	<0.09
Hepatitis B (infectious source)	21-32
Hepatitis B (carrier)	1-6
IVDU	0.0067 (0.67)
Insertive vaginal	0.0003 – 0.0009 (0.03 – 0.09)
Receptive anal intercourse	0.008 – 0.032 (0.8 – 3.2)
Receptive vaginal	0.0005 – 0.0015 (0.05 – 0.15)

From the table above, you can clearly see that we face different levels of risks depending on the nature of exposure and the material we are exposed to. Hence exposure to blood and other body fluids does not automatically mean that the exposed individual shall definitely acquire HIV.

As you can see from the table, the average risk of HIV transmission after a percutaneous exposure to HIV-infected blood has been estimated to be approximately 0.3%. Percutaneous exposures are exposures, such as needle stick injuries that break the skin).

What does this mean in simple terms? This means that 997 of 1000 needle stick injuries do not result in HIV transmission. The average risk after a mucous membrane exposure is approximately 0.09%.

It is however important to note that these figures are only indicative and not absolute figures of the average risk. Average risk may vary widely according to the set up of the exposed person, the disease burden in the population and how well the exposed person is managed.

Risk of HIV transmission from Occupational Exposure

As I mentioned earlier, occupational exposure to HIV infection occurs when health professions and paramedical staff come into contact with body fluids from infected persons or get pricked by sharps such as needles. We have also just established that if this happens it does not mean that you instantly become HIV positive. That then leads us to the next question. What are some of the factors that will determine whether or not one acquires HIV infection after an occupational exposure?

Several factors determine the extent of the risk that an individual is exposed to following occupational exposure. These factors include:

- Type of exposure;
- Disease status of the source patient;
- Type of body fluid;

Let's look at each factor in detail.

- ***Type of Exposure***

This determines the extent of injury and the volume of blood/body fluid that one is exposed to.

- *Hollow needle injury* means that one is exposed to a large amount of blood/body fluid hence a large amount of viruses. The risk of exposure is thus high;
- *Deep injury* similarly means high risk as opposed to superficial injury;
- *Presence of visible blood on needle/sharp object* is an indication that the injury is likely to be percutanious with exposure to large volumes of virus hence high risk.

- ***Disease status of the source patient***

You and I are at a higher risk if you get exposed to blood/body fluids of a patient with a high HIV viral load compared to a patient with a lower or even undetectable viral load. In the clinical setting where viral load detection may not be easy, the clinical condition of the patient is an equally good correlate. For example, a patient who is possibly hospitalized with end stage full blown AIDS (stage 4 disease) poses a higher risk compared to one who is clinically well (stage 1 disease).

However, note that Plasma viral load reflects only the level of cell-free virus in the peripheral blood and latently infected cells can transmit infection in the absence of viremia. Therefore, although a lower viral load (e.g., <1,500 RNA copies/mL) or one that is below the limits of detection probably indicates a lower titre exposure, it does not rule out the possibility of transmission.

Type of Body fluid:

The risk of infection following occupational exposure also varies with the type of body fluid that one is exposed to. Some fluids present a high risk because they carry large volumes of the virus. A good example is semen and vaginal secretions. Others fluids pose a lower risk due to the insignificant amounts of the virus that they contain for example saliva. Table 9.2 below gives a good summary of the risk of infection from different body fluids.

Table 9.2: Risk of infection from different body fluids

Body Fluids, Type and Risk of Exposure			
	Low Risk	**Medium Risk**	**High Risk**
Type of exposure	Intact skin	Mucous membrane (non-intact skin)	Percutaneous injury
Source	HIV negative	HIV status unknown – clinically well	HIV positive with advanced disease/acute seroconversion illness. (Consider treatment history)
Materials	Saliva, tears, sweat, faeces, urine, sputum, vomit	Semen, vaginal secretions, synovial, pleural, pericardial, peritoneal, amniotic fluids	Blood and bloody bodily fluids, CSF, viral cultures in labs

From the Table 9.2 above, it is clear that blood and other bloody fluids such as CSF present a much higher risk of HIV infection whereas fluids such as tears and sweat present an almost insignificant risk.

The HIV status of the source patient is also a vital determinant of the level of risk. Also the type of exposure is important, with percutaneous injury presenting the highest risk whereas exposure to intact skin poses a relatively low risk.

It's important to keep in mind that all these factors do not operate in isolation. It is possible to have a combination of factors varying the levels of risk. For example, one faces a higher risk of infection if they get percutaneous injury from a patient who is confirmed to be not only HIV infected, but also in end stage disease. The risk would be even higher if the fluid one is exposed to is blood.

Well, I am sure that so far you have learnt quite a lot and you now understand the relative risk we face by virtue of our profession. Please read through tables 9.1 and 9.2 again carefully to ensure that you understand the general risk of HIV transmission and the nature of risk presented by the various body fluids. Next we shall look at the risk of transmission from a sexual assault.

Risk of HIV Transmission from Sexual Assault

This is one of the most sensitive and risky modes of HIV acquisition especially due to the rising cases of sexual assault in our society today.

Once again, let us pause for a moment and ask ourselves another question. Does it automatically follow that if one is sexually assaulted one will acquire HIV infection?

The answer is NO!!!

So what are the chances that one will contract HIV after a rape incident?

Generally, the probability of acquiring HIV from an infected person following consensual sexual exposure is estimated at 0.1% to 3% per episode. However, the risk is significantly **higher** in rape because of the associated trauma due to lack of lubrication and forceful penetration by the rapists. Other factors that increase the risk of transmission include the

disease status of the rapist (risk increases with high viral load) and the presence of STIs in the rapist.

According to the National guidelines on Antiretroviral therapy in Kenya, in high HIV prevalence populations such as the sub sahara African region, 'rapists should be assumed to be HIV positive unless proven otherwise' in which case the assaulted patient is deemed to be at a high risk of acquiring HIV

Non-pharmacologic interventions that can reduce the risk of transmission of HIV.

Having understood the risks of HIV transmission from occupational and sexual exposure, as a health care worker am sure you are now thinking about the management of those who get exposed and even more importantly how the exposure can be minimized.

In this sub section, we shall learn about the various non-medicinal interventions that can be employed to reduce the chances of HIV acquisition before or once one is exposed especially in occupational settings.

As already stated in the introduction, the management of infectious diseases of public health concern such as HIV/AIDs involve two major approaches:

1) Prevention
    a. Avoiding exposure
    b. Prophylaxis
    c. Immunization
2) Treatment

As a first option therefore, every health provider like you and I and everyone who is at risk of exposure to HIV infection must think about ways of preventing transmission and not waiting for the transmission to occur in order to treat it. This is the principle behind pre and post exposure prophylaxis. Since there is no vaccine against HIV as yet, immunization is not one of the options in preventing HIV transmission today. However, exposure to HIV infection can be avoided or minimized and in the event that it occurs**, prophylaxis** used.

Non-pharmacological interventions to reduce the risk of HIV transmission are mainly through the application and practice of universal precautions against infectious diseases.

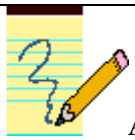
Universal Precautions against Infectious Diseases

What are universal precautions?

Universal precautions are simple infection control measures that reduce the risk of transmission of blood borne pathogens through exposure to blood or body fluids among patients and health care workers. Universal precautions are therefore guidelines that can be followed to help prevent the spread of infections. When followed, these guidelines can help you to protect yourself from infection if you are caring for someone with an infectious disease. Hospitals, all health care facilities, health care workers and other patient carers should practice universal precautions to protect themselves, other health care workers and patients from the spread of infectious diseases.

Under the "universal precautions" principle, all blood and body fluids from all persons should be considered as infected with HIV and Hepatitis B & C, regardless of whether the status of the person is known or unknown.

Before you proceed, do the following activity.

ACTIVITY

Why are universal precautions important? List down three reasons.

_____

_____

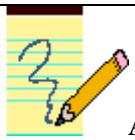
_____

Well, I believe your answers included some of the following reasons why universal precautions are important:

- Any percutaneous exposure to blood or body fluids represent a potential source of HIV infection. These include skin-piercing procedures with contaminated objects and exposures of broken skin, open wounds, cuts and mucosal membranes (mouth or eyes) to the blood or body fluid of an infected person.
- Although they account for a minority of HIV infections, health care procedures represent a highly preventable source of HIV infection. Among health care associated sources of infection, unsafe injections are of particular concern, accounting for an estimated 3.9% to 7.0% of new infections worldwide. In addition, unsafe practices in hemodialysis and plasmapheresis centres have been associated with HIV transmission.
- Health care worker protection is an essential component of any strategy to prevent discrimination against HIV infected patients by health care workers.
- If health care workers feel they can protect themselves from HIV infection, they can provide better care to patients who are already infected or exposed to infection.

What do universal precautions entail?

I would like us to jog our minds a little at this point. Please take out your notebook and complete the following short exercise.

ACTIVITY

i. Write down all the things that you normally do during a normal working day at your health facility to protect staff and patients from contracting HIV infection.

ii. Write down all the things that you do not practice but you would like implemented at your health facility to better protect yourself , fellow health workers, patients and other people visiting the facility from contracting HIV.

Well done! I suspect that your list is very long. You probably have some novel ideas that are not in my list below, which is very good. Universal precautions entail the following:

The Use of appropriate barriers

All health providers and other patient carers must always use appropriate barriers to protect themselves. Such barriers include gloves and protective clothing such as goggles, masks and gowns. Let us try and look at some of these protective barriers in detail:

Gloves:

Health providers must always wear latex medical gloves when:

- They touch the infected person's body fluids (such as blood, urine, drainage from a wound, saliva, or vomit), mucus membranes (nose, mouth, genital area, or rectum) or affected skin.
- They handle items (such as clothing, bed linens, or towels) or body surfaces soiled with blood or body fluids.
- They perform procedures involving treatment of open sores (such as changing a bandage) or giving medicine with a needle.
- They clean up around the area where they are caring for the patient.

You must put on new gloves each time you perform a procedure and remember gloves are not a substitute for hand washing

If a glove gets torn or damaged, take it off and wash your hands. If you have not finished caring for the patient, put on new gloves. ***Do not wash or recycle gloves***. Discard them after each use in a special container separate from other trash.

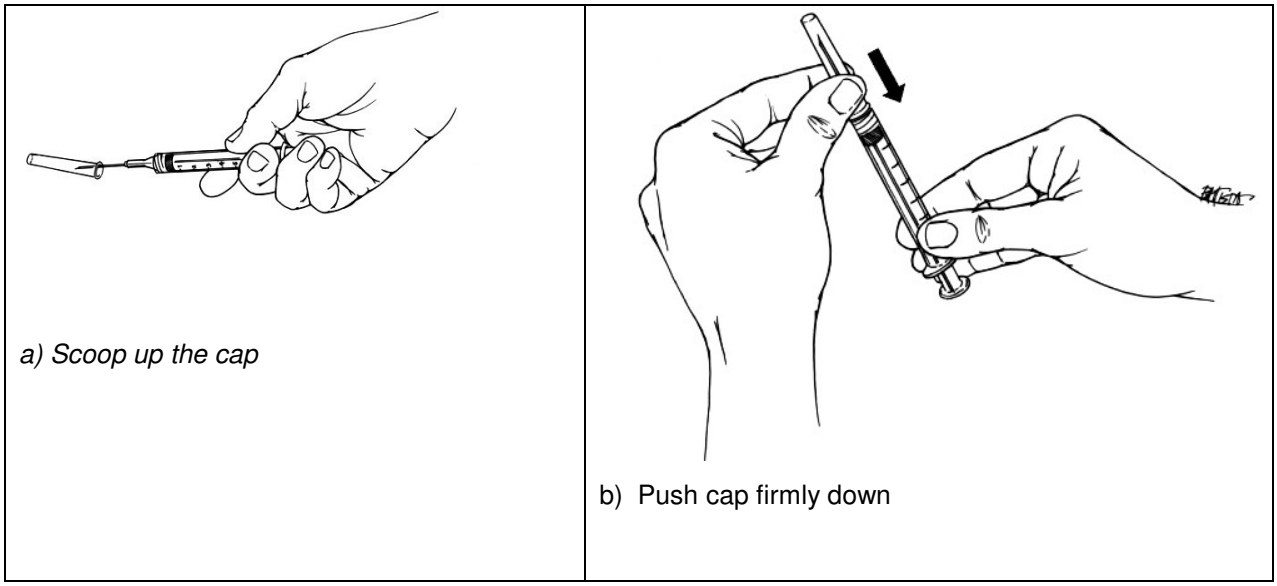
Protective clothing - gowns, goggles, masks etc

Health providers must always wear a surgical mask and eyewear (goggles) during any task that may expose them to blood or other body fluids. This can prevent exposure of your mouth, nose, and eyes to infection. They also must wear disposable gowns or aprons during any procedure where blood or body fluids may splash. If a cloth gown or apron is worn, it should be washed according to the instructions for washing linens soiled with blood (discussed later below.)

Care with Sharps

Safety precautions with needles should always be followed to the letter. Such precautions include the following:

- Always use new single use disposable needles for all injections;
- Do not recap or purposely bend needles. If recapping is necessary use a single-handed scoop technique.
- Safely dispose of used needles and other sharps immediately in the recommended way [i.e. in a puncture and liquid proof container which is closed and destroyed before it is completely full.] Health workers must desist from overfilling these containers. This should be practiced even in non-health care worker settings e.g. by patient carers and family at home; Collect used syringes and needles at the point of use in a sharps container that is puncture- and leak-proof and that can be sealed before completely full.
- Completely destroy or bury needles and syringes so that people cannot access them and so that groundwater contamination is prevented.
- Disinfect instruments and other contaminated equipment;
- If you accidentally stick yourself with a needle, rapidly employ the recommended procedures in management of the injured site as discussed later in this section and contact your health care provider for further assessment for Post exposure prophylaxis using antiretroviral medicines right away.



a) Scoop up the cap

b) Push cap firmly down

Figure 9.1: The one handed recap method

Minimize blind and unnecessary invasive procedures

All health care workers need to learn to avoid unnecessary blood transfusions (e.g., using volume replacement solutions), injections suturing (e.g. episiotomies) and other invasive procedures. Standard treatment guidelines at health facilities should encourage the use of oral medications whenever possible. Injectable medications should be discouraged where there is an appropriate oral alternative.

Hand washing

Health care providers and other patient carers should always wash hands with soap and water before and after procedures including immediately after they take their gloves off. If you get blood or body fluid on your hands or any other body surface, wash your hands and the exposed part of your body immediately and thoroughly. Wash your hands immediately before and after each contact with an infected person.

Hand washing with plain soap and water is one of the most effective methods for preventing transmission of blood borne pathogens and limiting the spread of infection.

Safe disposal of waste products and safe handling of soiled linens:

Soiled linen must be handled carefully at all times and should be handled as little as possible. Gloves and leak proof bags should be used whenever possible during the handling. Cleaning should occur outside patient areas, using ***detergent and hot water.***

Disposable items soiled with blood and other fluids should be discarded in plastic bags. It's recommended that you use two bags, with one put inside the other. Linens or clothing soiled with blood must be washed separately from other laundry using a detergent and germicide.

All precautions should be taken in conjunction with the public health department before pouring any liquids such as blood, suctioned fluids, excretions, and secretions carefully down a drain connected to a sanitary sewer.

Sterilization or disinfection

Chemical germicides in the recommended concentrations should be used for sterilization and/or disinfection.

Universal HBV vaccination.

Non-immune Health Care Workers and other at risk groups such as police, prison staff and rescue workers should be universally vaccinated against Hepatitis B which is also a blood borne virus.

How can you ensure that Universal precautions are put into practice?.

Well there are a number of measures that you can take to ensure that these precautions are put into daily practice and not only when visitors have promised to come. These are:

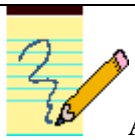
- ***Educating staff about universal precautions.*** This is critical to the implementation of the universal precautions in health facilities and home settings. Health care workers and other patient carers should be educated about occupational risks and should understand the need to practice universal precautions with all patients at all times, regardless of diagnosis. Institutions too ought to put in place Institutional guidelines for universal precautions. Regular in-service refresher training and on going continuing medical education should be provided for all medical and non-medical personnel in health care settings. In addition, pre-service training for all health care workers should address universal precautions.

- ***Ensuring availability of adequate supplies*** to comply with basic infection control standards, even in resource constrained settings. The necessary supplies such as oral medications, single use disposible needles and syringes, sharps containers, disinfectants and ARVs must be made available.
- Health care waste management may require the construction of adapted waste treatment options (such as incinerators and alternatives to incineration).
  Attention should also be paid to protective equipment like gloves, masks and water supplies. While running water may not be universally available, access to sufficient water supplies should be ensured.

Adoption of locally appropriate policies and guidelines is crucial. For example, the institution must discourage the use of sterilizable injection equipment. Waste management protocols should be developed as well. The proper use of supplies, staff education and supervision should be outlined clearly in institutional policies and guidelines. Regular supervision in health care settings can help to deter or reduce risk of occupational hazards in the workplace. In case of accidental injury or contamination resulting in exposure to HIV infected material, post exposure counselling, treatment, follow-up and care should be provided. Protocols on access to this services should be developed and widely disseminated to all medical and non medical staff within the institution so that all are aware of how and where to seek the services if need arises. These protocols should also be as clear and straight forward as possible.

I hope you now understand universal precautions and that you are able to take the necessary measures to implement them. Before moving on to the next subsection where we shall learn about the use of ARVs for PEP, I would like you to take a well deserved break and reflect on what we have learned so far regarding Universal precautions.

Then please take out your note book once again and do the following exercise.

ACTIVITY

Look at the two lists that you wrote earlier. That is, a list of things that you normally do during a normal working day to protect yourself, colleagues and patients and things that you do not practice but you would like implemented at your health facility. Compare your 2 lists with the material above and try to categorise your content as I have done i.e. do they fall under protective clothing, barriers sharps, etc? To help you assimilate the information better, ask yourself the following questions and write down the answers as they flash in your head.

- What have I learned that I had not thought about before?
- What have I learned that I normally practice correctly?
- What have I learned that I practice incorrectly and how will I correct it now that you know?
- What have I learned that I never practice and how can I ensure that I start practicing at

the health facility?

- Last but not least, do you have a strong suggestion that you think should be incorporated and adopted as a universal precaution? Please share it with me and I will inturn share it with other professionals and have a discussion on it.

Very good. We shall now proceed straight to our discussion on antiretroviral drugs to reduce occupational and non-occupational risk of HIV transmission.

Use of Antiretroviral Therapy in PEP

Having addressed how exposure can be minimized and/or avoided, we shall now move a step further to understand how we can reduce the risk of HIV transmission using ARVs in cases where one has been exposed to HIV either occupationally or sexually. As I mentioned earlier, the management of infectious diseases of public health concern involves several approaches mainly Prevention (avoiding exposure, prophylaxis and immunization) and Treatment. HIV is one such disease.

The rationale for using ARVs for PEP against HIV infection following occupational exposure, is the fact that ARVs have been used successfully both for pre and post exposure prophylaxis in other situations, where they have prevented infection from developing. For example, the use of ARVs in Prevention of Mother to Child Transmission of HIV (PMTCT). Zidovudine **(**AZT) monotherapy has been used in PMTCT and has been found to reduce the Mother To Child Transmission by 68%. An AZT trial conducted among health care workers also proved to be effective in reducing the risk of transmission by 81%. These principles are the same ones that are applied in post exposure prophylaxis against HIV transmission.

Its important to note however that the only study done on humans (health care workers) was with AZT alone, as it was the only drug available at the time of the study. There however, exists supportive data from animal studies justifying the use of ARVs in PEP.

The rationale for providing PEP after sexual exposure is an extension of the case for providing it in occupational settings. The argument is based on a comparison of per-exposure risks. HIV transmission rates in men receiving unprotected anal sex or a woman's

exposure during rape are comparable to transmission rates associated with most needle-stick injuries. This coupled with relative efficacy of ARVs used as prophylaxis in other situations such as PMTCT are the justification for use of ARVs for PEP following sexual assault.

Considerations prior to initiating PEP following occupational exposure.

Does everyone who is exposed to HIV infection occupationally qualify to be put on prophylaxis with ARVs??

I am sure you uttered a loud NO!

Prescription of ARV prophylaxis following an occupational exposure to HIV is based on the risk assessment. Various factors are considered including:

- ***HIV status of the exposed health worker.***

PEP should only be prescribed if the exposed health worker is **HIV negative.**

Why do you think PEP using ARVs is not indicated if the exposed health worker or patient carer is HIV positive?

PEP is not indicated when one is already HIV infected because the objective of providing PEP is to prevent the acquisition of the HIV virus. Thus if the person is already infected it defeats the whole purpose of PEP. Initiation of PEP in such a person will do more harm than good. It can for example lead to the development of resistance to the ARVs , which would further complicated the persons life.

So, how should we manage our colleagues who get exposed to HIV infection e.g. through a needle stick injury, yet upon testing they are found to be already HIV infected?

In such a case, the health worker or patient carer should be linked to an antiretroviral program either within your facility or elsewhere for further evaluation and regular follow up. Upon evaluation the person can be put on highly active antiretroviral treatment (HAART) as necessary.

- ***Type of exposure:***

According to the Kenya National Guidelines on Antiretroviral therapy and the World Health Organisation (WHO), PEP is recommended in medium and high risk exposures only.
An exposure is deemed high risk if the injury is percutaneous, medium risk if exposure is on mucous membranes or non intact skin and low risk if exposure is on intact skin. Please refer to Table 9.2.

- ***Characteristics of source patient;***

An exposure is deemed high risk if the source patient is HIV positive with advanced disease, medium risk if the HIV status of the source patient is unknown whether the patient is clinically well or unwell, and low risk if source patient is ascertained to be HIV negative. PEP is recommended in medium and high risk exposures only.

- ***Material to which the health worker is exposed***

An exposure is deemed high risk if the health care worker is exposed to blood and bloody bodily fluids such as cerebrospinal fluid and viral cultures in laboratories, medium risk if exposed to semen, vaginal secretions, synovial pleural, pericardial, peritoneal and amniotic fluids and low risk if exposed to saliva, tears, urine, sputum etc. PEP is recommended in medium and high risk exposures only.

National Recommendations for PEP in Occupational Exposure.

Remember, PEP is only recommended where the exposure is deemed to be medium or high risk but not low risk.

The choice of ARV regimens for PEP is mainly based on animal studies and studies on PMTCT. Current national recommendations for PEP regimens in Kenya are based on the following facts:

1) Either dual or triple regimens can be used for PEP. This is based on the relative efficacy of dual or triple therapy in the treatment of HIV infection (HAART) and in PMTCT compared to the use of monotherapy when used in the same circumstances.

2) There is no demonstrated incremental benefit of using triple, two class combination of drugs for PEP as is the case of HAART.

3) Rate of side effects and PEP discontinuation rates do not justify the initial use of a potentially less potent regimen. Hence, the current recommended regimen consists of potent and efficacious drug combinations.

4) Adherence should been taken into account when choosing the PEP regimen to encourage the exposed individuals to adhere to the full prescribed course. For example, you can use fixed dose combinations if available, to reduce pill burden and increase adherence

The following are the national recommendations for PEP in occupational exposure in Kenya.

- ***Dual nucleoside reverse transcriptase inhibitors*** as first line PEP in **medium risk** exposure. The Kenya national selected regimen are as follows:

Zidovudine 300mg + Lamivudine 150mg

Twice a day for 28 days

Or

Stavudine 30/40mg + Lamivudine 150mg

Twice a day for 28 days

a) ***Triple therapy with dual nucleoside reverse transcriptase inhibitors and a Protease Inhibitor*** as the third drug in exposures deemed to be high risk. This is for

example where a person is exposed to a large innoculum or where the source patient is confirmed to be HIV positive with end stage AIDS. The Kenya national selected regimen is as follows:

Zidovudine 300mg + Lamivudine 150mg + Lopinavir133mg/ritonavir33mg
Twice a day for 28 days

Or

Stavudine 30/40mg + Lamivudine 150mg + Lopinavir133mg/ritonavir33mg
Twice a day for 28 days

Considerations prior to initiating PEP following Sexual assault.

Once again, lets start with a question.

Does everyone who is exposed to HIV infection sexually qualify to be put on prophylaxis with ARVs?

I believe your answer again was NO. Just as is the case for occupational exposure, prescription of Antiretroviral prophylaxis following sexual assault is based on the risk assessment. The risk of HIV transmission is however deemed to be significantly higher in sexual assault compared to occupational exposure because of the trauma involved due to forceful penetration by the rapist and lack of lubrication by the victim.

According to the national guidelines for Antiretroviral therapy in Kenya, rapists should be assumed to be HIV positive unless proven otherwise

However, just as is the case in occupational exposure, the HIV status of the exposed person must be ascertained because *PEP should only be prescribed if the exposed person is HIV negative.* If HIV positive, PEP is not indicated. The argument is exactly the same as the case of occupational exposure. Tthe exposed person should be linked to an ARTI program for further assessment and regular follow up with possible initiation on HAART as necessary.

National Recommendations for PEP in sexual assault.

- Dual nucleoside reverse transcriptase inhibitors as first line PEP in medium risk exposure. The Kenya national selected regimen is as follows:

Zidovudine 300mg + Lamivudine 150mg

Twice a day for 28 days

Or

Stavudine 30/40mg + Lamivudine 150mg

Twice a day for 28 days

Children

- Children > 40 kg: treatment as in adults
- Children 20- 40 kg: (+/-syrup) AZT 200mg BD + 3TC 150mg BD
- Children 10-20 kg: syrup AZT 100mg TDS + syrup 3TC 75mg BD

Because of severe trauma often sustained by children following sexual defilement, a third drug namely Nelfinavir should be added to the above where possible. Nelfinavir 55mg/kg BD with food

.

- Triple therapy with dual nucleoside reverse transcriptase inhibitors and a Protease Inhibitor as the third drug in exposures deemed to be **high risk** e.g. where rapist is confirmed to be HIV positive with end stage AIDS and/or Sexually transmitted disease.

I hope you are now well understand how ART is used in PEP. In the next sub section we shall learn how to manage patients in the event of known occupational or non-occupational exposure. .

Managing Patients In The Event of Known Occupational and/or Sexual Exposure.

We shall start with the management of post exposure management of occupational exposure.

Post-Exposure Management of Occupational Exposure.

How we manage the exposure site is crucial to the outcome. You should take all possible measures to ensure that the exposed individual does not acquire infection.

In our health care setting, we should manage any colleague who gets exposed to HIV infection through contact with blood or body fluids (amniotic fluid, CSF, peritoneal fluid, secretions from genital tract) from HIV infected person through any of the following ways:

- Pricks by contaminated solid and hollow needles;
- Pricks and cuts by contaminated sharps e.g. blades, scalpels etc;
- Contact with contaminated blood and body fluids with non-intact skin, or with intact skin for durations in excess of 3 minutes over an extensive body surface area;
- Splash of such contaminated blood and body fluids to moco-cutaneous membranes (eyes, mouth and nose).

The following are basic steps to be taken incase of exposure to infection:

Step 1: provide immediate care to the exposure site by:

- *Encouraging bleeding.*

For percutaneous injuries (those that break the skin) where bleeding occurs, allow bleeding for a few seconds before washing. Do not squeeze the area. Avoid procedures that restrict bleeding such as trying the injured site. An injury site should not be squeezed or sucked.

- *Washing with soap and running water*

The injured site should be washed with soap and water and mucus membrane flushed with water. You should not use water in a container.

- *Do not scrub or cut the site*

This exposes a larger area to the infection by exposing more blood vessels.

Step 2: Determine the risk associated with the exposure.

The second step is to determine the risk associated with the exposure by:

- Evaluating the source patient and exposed health provider for potential risk of infection;
- Counseling both exposed person and source patient for HIV testing;
- Assessing risk of HIV infection for an unknown source.

Pre-test Counselling of Source patient

The following pertinent points should be part of the pre-test counselling of the source patient.

- That testing has cognizance beyond a mere offering of epidemiological data.
- That testing is done under confidential status.

In case the source patient is unwilling to be tested for HIV antibodies, the attending Medical Officer should consult the consultant in charge or any other senior administrator who may have over-riding powers to authorize HIV testing in such cases. These powers should be exercised where:

- The source patient objects to being HIV tested
- The source patient is confused or in coma.
- The source patient is a minor and a parent or guardian is not available.

Pretest counselling of exposed Health provider

The following pertinent points should be part of the pre-test counselling of the affected health care worker

- That testing has cognizance beyond a mere offering of epidemiological data;
- That testing is done under confidential status;
- That the possible chances of infection from accidental exposure (percutaneous inoculation from HIV positive source patient) is approximately 0.3% and muco-cutaneous exposure to blood is approximately 0.03%;
- That antiretroviral therapy is beneficial;
- That failure to take HIV test by the affected health provider will negatively affect the future proceedings, which require proper documentation.

In the event that a health provider objects to being tested, the attending Medical officer should ensure that:

- The consultant in charge or a senior administrator is informed;
- The health provider is aware that the hospital or health facility may not take responsibilities for any eventuality arising out of the accidental exposure;
- The source patient should still be tested for HIV antibodies but no antiretroviral prophylaxis recommended for the health provider who instead should be further counselled;
- If the source patient turns out to be HIV positive, the health provider should be further counselled and if he/she still objects to being tested, then he/she should not be commenced on antiretroviral prophylaxis.

Step 3: Offer prophylaxis as appropriate.

Considerations if PEP is indicated

Having given medical care to exposure site and determined the risk of exposure, you are now ready to initiate the exposed individual on ARVs. However, several other considerations must be put in place prior to initiation on the drugs.

- *Duration since risk episode*

PEP must be started as immediately after exposure as possible if indicated, but this must be within 72 hours following the exposure. It must however be discouraged after 72 hrs post exposure because of lack of efficacy. The initial doses should not be delayed by the baseline HIV test. However treatment should not be continued if status of exposed individual remains undetermined.

- *Willingness to undergo assessment for and treatment with ARVs.*

An individual should be willing and give consent to be assessed and initiated on ARVs. Initiating an individual who is unwilling may result in poor adherence to the medicines.

- If source patient is HIV positive, you should then consider his/her disease status and whether or not they are on HAARTS. You should assess your capacity to monitor for adherence and management of adverse drug effects resulting from the ARVs to minimize discontinuation rates. If possible arrange links with ART center for monitoring.

- *Administration of Anti-Retroviral prophylaxis*

If antiretroviral prophylaxis is recommended, i.e. where the source patient is HIV positive and the health provider is HIV negative, it should be initiated as soon as possible but must within 72 hours post exposure. If the spot test is not immediately available, the initial doses of ARVs should be given while the test is being sought. The test must be carried out within the following 24 hours or as soon as possible and treatment should not be continued if the status of the exposed individual remains unknown.

Prophylaxis should be discontinued if the source patient turns out to be HIV negative or the health provider turns out to be HIV positive in baseline tests.

Please note the following. HIV testing should always be done at baseline. The exposed health provider should not receive ARVs without being tested. However, administration of the first doses of the drugs should not be delayed where immediate testing is not possible. But, you should ensure that the test is carried out within the following 24 hours or as soon as possible. Treatment should not be continued if the status of the exposed individual remains unknown.

Remember, PEP is recommended for medium and high risk exposures only

Step 4: Provide follow up testing and counseling

You must be able to provide follow up testing and counseling following provision of PEP. Having done the HIV test at baseline, it should be repeated at 6 weeks, 3 months and 6 months with continued counseling and support. You should also administer Hepatitis B vaccination to all non-immune individuals. As a care provider and a health facility, you should routinely evaluate the exposure and determine whether preventive strategies could be improved to further minimize exposure risk.

Step 5: Documentation

Finally, proper documentation and reporting of the incidence is crucial.

Discarded needles and syringes should not be tested to determine HIV status of source patient.

Having looked at how to manage occupational exposure cases, let us now look at the management of sexual assault.

Post-Exposure Management of Sexual Assault

Once again, the outcome of a sexual assault may to some extent depend on how well you manage the patient upon presenting to the health facility.

You as the health provider should begin by swiftly providing the appropriate first aid and emotional support to the patient.

- Record any identification data, which should include the victim's marital status, number of children the victim has, record of any contraceptives currently being used and last menstrual period for female victims. The place and time the exposure took place, the identity of the informant and also that of the assailant (if possible) should be recorded;
- Evaluate of the sexual exposure in terms of the number of assailants involved, whether penetration and ejaculation was achieved and what the victim did immediately after exposure in order to minimize the risk (e.g. douche);
- Determine evidence of exposure (e.g. semen on the victims underwear, vaginal or anal tears. Determine the factors that could affect the degree of the risk of HIV transmission (e.g. visible ano-gentital ulcerations and inflammations);
- Take specimens for laboratory analysis for use in verification of exposure and determination of conditions that may modify other consequences of exposure e.g. whether the victim was already pregnant or already had STD at the time of exposure. Such laboratory specimens include HVS for MCS, HbsAg, etc. Obtain blood samples for other diseases that could be transmitted through the same exposure (such as syphilis, Hepatitis Band C);
- Provide pre-test counselling and obtain informed consent for HIV testing.
  The risk of HIV transmission per episode of receptive peno-anal sexual exposure is estimated at 0.1% to 0.2%. Other factors that increase the risk of transmission include:

victims with STDs and ano-gentital ulcers, multiple assailants and assailants unknown HIV status.

Apart from when the assailant is known to be HIV sero-negative, all sero-negative rape victims should be recommended for antiretroviral prophylaxis.

- PEP should then be offered as appropriate within 72 hours of the incidence and should be discouraged after 72 hours. Once again, the first doses should not be delayed by baseline HIV Testing and yet treatment should not be continued if status of patient remains undetermined

- Emergency contraception should be offered to all women at risk of pregnancy, that is, .women with reproductive potential (14 to 49 years of age.)

- All clinical evidence of assault such as swabs and forensic specimens should be handled carefully and documented as necessary;
- You should consider giving prophylaxis against common sexually transmitted infections;
- Offer Hepatitis B vaccination if indicated, that is, in non immune persons;
- Offer trauma counseling and Provide follow up HIV testing and counseling

You must be able to provide follow up testing and counseling after providing PEP. Having done the HIV test at baseline, it should be repeated at 6 weeks, 3 months and 6 months with continued counseling and support.

You should then alert authorities as appropriate and refer as appropriate for legal services

Considerations if PEP is indicated

These are similar to considerations prior to initiating the medicines in occupational exposure.

- ***Duration since risk episode:*** PEP must be started as immediately after exposure as possible if indicated, that is 72 hours following the exposure. It must however be discouraged after 72 hrs post exposure because of lack of efficacy. Just to emphasise

again that the Initial doses should not be delayed by the baseline HIV test. However treatment should not be continued if status of exposed individual remains undetermined.

- ***Willingness to undergo assessment for and treatment with ARVs.*** An individual should be willing and give consent to be assessed and initiated on ARVs. Initiating an individual may result in poor adherence to the medicines.

- ***Assess your capacity to monitor for adherence***. You should assess your capacity to monitor for adherence and management of adverse drug effects resulting from the ARVs to minimize discontinuation rates. If possible arrange links with ART center for monitoring.

Summary

We have come to the end of this section on post exposure prophylaxis. Congratulations. It is my sincere hope that you have enjoyed reading through this section.

In this section we have learned what post exposure prophylaxis is and looked at the general risk of HIV infection from either occupational exposure or sexual assault and the factors affecting these risks. We have seen that it's much more important to prevent infections especially HIV from occurring as it has no cure. We also looked at the principle of 'Universal precautions' and its importance in preventing infections especially in occupational set ups (mainly among health providers and all other people caring for HIV patients).

We then moved on to learn about the principles behind the use of ARVs for PEP following exposure to HIV both occupationally and sexually and the recommended ARV regimen for that purpose. Finally, we have learnt the different steps that should be followed in managing the exposed patients because it's not enough to only administer the ARVs prophylactically but the case management is equally important.

I believe this knowledge shall continue to be useful to you as you go about your daily duties as a health provider. I recommend that you do not stop here but instead check the references below and other authentic reading materials to ensure that you keep abreast with new developments because HIV management is still very dynamic.

Enjoy your learning as you move to the next unit and remember “The sky is the limit for those who are willing”. Once again, CONGRATULATIONS!!

References

1. National Guidelines on the Management of Rape/Sexual Violence
2. National guidelines for Antiretroviral therapy in Kenya
3. The risk of occupational human immunodeficiency virus in health care workers. Arch Int Med 1993;153:1451–8.
4. Medical Management of HIV Infection by Dr. Shaun Conway & John G. Bartlett.

Section 3: Blood Safety

Introduction

Welcome to the third section of the Unit on Prevention of HIV. As you are well aware, blood transfusion saves the lives of millions of people each year. However, the HIV/AIDS pandemic has brought particular attention to the inherent dangers of blood and the importance of preventing transfusion-transmitted infection. If we do not put measures in place to ensure that blood is safe, transfusion can put patients at risk from a wide range of blood-borne organisms including HIV. Although an HIV screening test has been available since 1985, an estimated 5-10% of all HIV infections worldwide are transmitted by transfusion of contaminated blood and blood products.

Prevention of transfusion-transmitted HIV infection is both achievable and cost effective. The supply of blood is dependent upon a chain of steps which have to be accomplished by trained staff, be they nurses, technicians, managers, accountants, blood donor organizer, secretaries, volunteers, auxiliary staff for example store keepers, drivers, and cleaners. If one member of the team is weak, inefficient, or negligent, serious consequences may ensue. In addition, blood is available only in human beings and numerous approaches and techniques are employed to get the donors, process the blood and transfuse to the recipient. As a result there are issues of blood safety that are encompassing and extend to involve the policy makers, the community as whole, the donor, the preparation process, and the transfusion process. Since there are bound to be subtle differences in the regions, populations and transfusion settings, there are safety issues that are universal, regional and even local to be considered. In this section, we shall discuss blood safety and explore various measures that need to be put in place to ensure safety of blood with specific reference to HIV.

Let us now look at the objectives of this section.

Section Objectives

By the end of this section, one should be able to know the;

- Explain the reasons for transfusing blood;
- Discuss the relevance of having blood transfusion service in an organized structure;
- Describe blood borne infection;
- Describe the different types of preferred blood donors;
- Explain how to conduct blood donors recruitment and deferrals;
- Describe strategies to ensure blood safety;
- Implement the concept of blood safety as an integral part of the safety in the environment, workplace, the blood recipients and the community as a whole.

Since we want to make sure that you understand the issues related to blood safety, we shall start by looking at some of the reasons why we need blood transfusion. After this, we shall look at the structure of blood transfusion service and its functions. These two are determinants of why the blood should be given and what should be done to eventually make the practice safe.

Why Give a Blood Transfusion?

Before you read on do the following activity. It should take you less than 2 minutes to complete.


ACTIVITY

Why do we give blood transfusion? List down the reasons below?

_____

_____

_____

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I believe your answers included some or all of the following main reasons why we give a blood transfusion. We give a blood transfusion in order to:

- **To restore or improve the oxygen carrying capacity**. Oxygen is carried by the haemoglobin which is the major component of the red blood cell. Therefore the transfusion of red cells (blood) is carried out to improve haemoglobin level. When the haemoglobin is low for the age and sex of the person, the condition is called anaemia. At present anaemia is the major reason for transfusion in most of Kenyas' Heath providing facilities. There are other conditions where blood loss can be anticipated such as surgery, childbirth, following trauma i.e. road traffic accident. All these conditions may require blood transfusion.

- **To replace a missing facto**r or blood product in the blood. Excessive bleeding or unnecessary clotting of blood does not occur in normal people. However, some people lack a necessary protein or factor that is needed to stop bleeding. Such people include haemophiliacs who lack sufficient concentration of plasma factor eight or factor nine or Von Willebrand's factor. Thus such people are at great risk of severe bleeding either spontaneously or following trivial trauma. In order to stop the bleedin, it is necessary to give blood which contain these factors.

- **To transfuse specialized corpuscles** called platelets or fluid part of blood called plasma. Doctors and medical personnel will suggest these when they make the diagnosis of a problem requiring them. Generally platelet is used when bleeding is due to problems related to their defect. Plasma may be used to improve blood volume or in persons who require specialized procedures such as surgery.

- **To transfuse whole blood** that is cells and plasma when the person has bled and lost all the components of blood. Here it is the doctor decides when this is necessary.

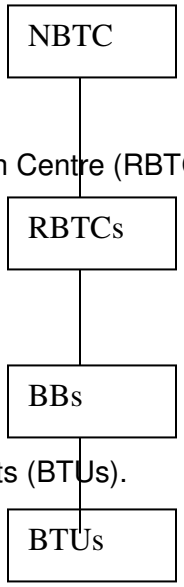
  Having looked at why we give a blood transfusion, let us now examine the organizational structure and functions of a national blood transfusion service (NBTS). NBTS aims at making sufficient and safe blood available for transfusions.

The National Blood Transfusion Service

The practice of blood transfusion is very unique in the provision of health services. It involves virtually every aspect of clinical medicine and also roles of the society in health services. Therefore its organizational structure provide for an encompassing scientific, medical and societal involvement.

This organizational structure of blood transfusion consists of the following; in sequence:

- National Blood Transfusion Centre (NBTC),
- Regional Blood Transfusion Centre (RBTC),
- Blood Banks (BB's)
- The Blood Transfusion Units (BTUs).



Let us briefly examine each level in the organizational structure in turn.

National Blood Transfusion Centre (NBTC)

The national blood transfusion centre is a policy formulating body. Its major role is to harmonize the national, regional and international codes of operation into a national blood transfusion service. It formulates and issues national guidelines on blood transfusion services, policies regarding blood donors' blood screening tests and banking, utilization, quality assurance, research and teaching. It makes policies regarding blood safety. It also formulates policies to harmonize and define the functions of and provide leadership for the lower levels (RBTCs, BBs and BTUs) of the structure.

Regional Blood Transfusion Centre (RBTC).

The main function of RBTC is in the blood donor system which includes; getting the blood donors, examining the potential donors, bleeding of donors, transporting the donor blood and retaining the donors. This clearly shows that there are bound to be differences as every region will have its unique features that should be marshaled towards obtaining the blood donors. The RBCs' staff should be versed in the regional, terrain, culture, customs, and work habits of the people they serve. This knowledge helps them to organize for blood donor sessions, inculcate donor care issues and serve the community donor system better. In addition, the staffs of the RBC are also charged with the responsibility of educating the surrounding community on blood donation and on blood safety. Are you conversant with blood transfusion activities going on in your area? If not, find out what takes place.

Blood Banks (BB's)

The main function of Blood Banks is to receive process, store and dispense the donor blood. BB requires technical, scientific and medical knowledge to be able to carry out these functions. Also blood is a precious product and whatever goes into the human body has to measure up to certain specifications or qualities. For example, only minimum volume levels of red cells, haemoglobins, and white cells factor contents should be expected. It is the work of the quality assurance schemes (QAS) unit within the blood banks to carry out quality assurance and research on specific aspects of blood transfusion such as reagents manufacturing, antisera preparations, and blood components and products production. Blood banks are a pillar to blood safety and are expected to adhere to good manufacturing practices.

The Blood Transfusion Units (BTUs)

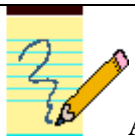
Blood Transfusion Units are usually situated within hospitals or health services providing institutions. BTUs are the direct clinical arm of the blood transfusion practice. They link the blood donor to the blood recipient and also carry out compatibility tests.

As we have learnt this far, the transfusion practice requires a highly organised flow of information and coordination so as to be meaningful to both the society and health providers. Although we have discussed the transfusion services as different establishments all the units can also be found under one roof. This means that RTBTs, BBs, and BTUs can

be found in one centre. A good example is the Kenyatta National Hospital. In all, the principle objective is to get adequate, safe and readily available blood that can be transfused when a patient needs it. There is need to have this type of organisation because there are key functions requiring administrative structuring, technical specialities, policy guidelines involvement of the citizens in their diversities, and also marshalling regional and international consensus areas.

Blood Borne Infections

I believe you are familiar with situations whereby blood could be the source of infections. Let us recapitulate and also remind ourselves of some of the infections commonly associated with blood transfusion. These are referred to as blood borne infections and when one contracts an infection following a blood transfusion we refer to the infection as transfusion transmitted infection (TTI). There are a number of well known and established blood borne infections. Before we move further attempt the following short exercise. It should take you less than 5 minutes to complete.

ACTIVITY

List down 4 blood borne infections that you know about.

_____

_____

_____

_____

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Now check your answer as you read the following section on blood borne infections.

There are a number of well known and established organisms that cause blood borne infections. These include the following:

- Human Immunodeficiency Virus HIV which causes AIDS;
- Hepatitis virus mainly; Hepatitis B, and Hepatitis C. These cause infections of the liver;
- Other viruses are Cytomegalovirus (CMV), Epstein Barr Virus (EBV), Human lympho - tropic virus; these affect other systems but mainly the liver;
- Types of treponema palladium organisms particularly Syphilis;
- Other bacteria and parasites.

Characteristics of virus that transmit infections

The main characteristic of viruses that transmit infection is that they create a persistent infection. They are categorized into three overlapping groups as shown in Table 9.3

Table 9.3. Classification of Viruses Producing Persistent Infections

Category	**Examples**
Slow	Scrapie Creutzfeldt-Jakob disease Subacute sclerosing panencephalitis Human T-lymphotropic virus type I and 11 Human Immunodeficiency Virus HIV
Chronic	Congenital rubella Congenital cytomegalovirus Hepatitis B Hepatitis C
Latent	Herpes simplex type 1 Herpes simplex type 2 Varicella-zoster virus Cytomegalovirus Epstein-Barr virus Human B-lymphotropic virus (?)

Let us look at each category of viruses in turn.

- **Slow virus** infections are those having incubation periods lasting for months or years, followed by progressive, debilitating usually lethal diseases. They have a chronic

component in that infectious virus can be recovered from the host during the incubating period and after the appearance of symptoms and signs.

- **Chronic infections** are characterized by the continuous production of infectious virus for long periods of time. This is the group of hepatitis B, C and cytomegalovirus. Most often the chronic infections are not clinically apparent with the result that susceptible contacts can be infected unknowingly.
- **Latent infections** are ones in which the virus persists in the host but not demonstrable. In latent infections, an acute primary infection which may be apparent or unapparent is followed by a period during which infectious virus is once again demonstrable.

Next, let us look at the common one. These are:

- Hepatitis B ,Hepatitis C and rarely Hepatitis A;
- Human Immunodeficiency Virus (HIV I & II);
- Herpes Simplex Viruses and Viricella-Zoster Virus;
- Cytomegalovirus.

Let's discuss each in turn.

Post transfusion Hepatitis (PTH)

One of the most well known and established infections following blood transfusion is hepatitis. Viral hepatitis is a hazard of blood transfusion and it still remains the most frequent serious complication of use of blood and products for the treatment. For many years hepatitis B was considered the major viral risk of post transfusion infections however there are several other viruses that can make blood transfusion unsafe. These include other hepatitis associated, non-A and non B varieties, the majority being hepatitis C virus, the Human Immune Deficiency Virus (HIV) and others.

Hepatitis A.

Many people get exposed to Hepatitis A but do not get the infection. This is because of the following reasons:

- many donors and recipients of blood have already had hepatitis A (HAV) and have developed immunity (protection) to HAV.
- there is a high probability that one or more units of blood contain anti-HAV antibodies in sufficient titer to protect the multi -transfused patient against exposure to HAV.

- Hepatitis A (HAV) infection takes place only for a short duration in the body and therefore most infected persons do not get associated with a chronic carrier state.
- The virus remains in the blood or body for a very short time and in low levels/ titer during acute infection.

Human Immunodeficiency Virus (HIV I & II)

The HIV background is by now fairly familiar to you. However certain aspects are still worth repeating. The HIV has caused a lot of untold suffering in its short history of just over two and a half decades. Transfusion of infected blood or blood products is a sure way of getting an infection. In fact the first AIDS reported in association with the cellular blood product transfusion was a 20-month old child who in 1982 developed severe cellular immunodeficiency and multiple opportunistic infections after receiving several blood component transfusions for erythroblastosis fetalis. Studies have estimated that the median incubation period to the development of AIDS is between 6.5 to more than 11 years. However this varies remarkably and initially the median time between transfusion and the onset of illness was 24.5 months (range 10 to 43 months). All products are capable of transmitting the virus from whole blood, red cells, plasma and plasma products and platelets transfusion.

Herpes simplex Viruses (HSV) and Varicella-Zoster Virus (HZV).

The transmission of HSV or HSV is rarely encountered. There are several reasons for this. Primary Infections with either virus are often asymptomatic. Also, prospective donors undergoing a asymptomatic primary infection are likely to be clinically ill and therefore not eligible for blood donation. Even if donors were able to transmit HSV, the majority of recipients have already been exposed to HSV and therefore are resistant to exogenous reinfection.

Cytomegalovirus (CMV).

A relatively small number of Post Transfusion Hepatitis (PTH) cases are attributed to cytomegalovirus (CMV) infection. CMV can be transmitted by blood donations. The resultant infections from transfusion can have adverse clinical consequences for blood recipient patients. One way of reducing the rates of infection is by decreasing and discontinuing the use of fresh blood.

The following people are at risk of active infection and serious complications due to CMV:

- Neonates (newborns);
- Massive transfusion support which is receiving equal to or more of the body's total blood volume in twenty four hours;
- AIDS patients;
- Oncology patients;
- Patients undergoing splenectomy.

As mentioned earlier, a part from viruses, a number of treponema organisms, bacteria and parasites can be transmitted through blood transfusion. Let us briefly look at each of them.

Treponemal Infections

Bacteria. Syphilis is still of concern as a potential for post transfusion infection Other bacteria that can cause infections are brucella organisms. However, any bacteria contaminated donor blood can infect the recipient.

Parasites: There are a number of parasites that can be transmitted through transfusion, such as microfilaria, African trypanosomiasis, toxoplasmosis, babesiosis and Chagas disease visceral leishmaniasis. However, malaria is the one that is of most concern in our environment. In Kenya, blood donated by persons living within the country is assumed to have malaria. Malaria is a serious threat if not considered during transfusion.

Next let us now look at the different types of blood donors.

Blood Donors

A blood donor is a person who gives the gift of his or her blood to be transfused to either themselves or some other persons. Blood donation in all circumstances **must be voluntary**. Financial profit must never be the motive for the donor or those collecting the donor blood. A blood donor is a very special person giving an invaluable gift and must be treated with all the respects possible. To attract, retain and get further participation of voluntary donors, it is essential that the condition surrounding blood donation be as pleasant, safe and as convenient as possible to the donors wherever blood is collected for transfusion. However

each blood donor system should have its own standard operating procedure (SOP) stating all the activities at all phases in the donor area. The procedures must meet the requirements of the national guidelines on blood transfusion practice and provide for safe blood.

Types of Blood Donors

There are several types of blood donors in the world as follows:

- Voluntary-non remunerated
- Autologous
- Replacement/Family donor
- Commercial donors
- Cadaver donor.

We shall discuss the first three as the commercial and cadaver donors are not recognized in Kenya.

Voluntary Donors

Blood donation should in all circumstances be a voluntary act. It should never be done for financial profit. This is the policy requirement in Kenya.

Blood donations are collected from a variety of centers, namely, blood banks, hospitals and collection centers organized by regional blood transfusion centers. The standard operating procedure in all these centers is expected to be nearly the same.
Most blood donors give blood at a particular blood blanks, hospitals and collection centers organized by regional blood transfusion centers and the standard operating procedure is expected to be nearly the same.

Health facilities particularly hospitals use a number of well recognised approaches and techniques to get blood donors. There are two distinct categories of voluntary donors:

- The first is the Walk-in (WI)
- Call response Donors (CR)

In the Walk-in (WI) donor situation, the donor visits the blood bank or bleeding center to give a gift of blood.

In the call response (CR) donor, the donor responds to a call to give blood. The CR may be called in by a sick relative or by the hospital. In such cases the relative or the hospital specifies the type of blood that is required for the patient. The CR donor category is emerging to be the major type of voluntary donor in hospital and blood banks and also in emergency situations in Kenya. Studies have found out that blood donation calls draw many first time donors. Furthermore, donors who feel compelled to donate when confronted with a desirable request may not have the same risk profiles as those who donate at other times. Experience shows that, large numbers of first time donors have been reported to test positive for transfusion transmitted viral infections (TTVI) after national disasters, thereby raising concern about the relative safety of donors giving blood in response to calls.

Table 2 below gives an example of a typical year's voluntary blood donation in a hospital in Kenya and gives the numbers of blood donors in two health providing facilities. In the period of one year, a total of 10,295 persons donated blood to two hospitals in Nairobi one a public and the other a private one.

Table 9.4: Distribution of the donors between the two hospitals

Hospital	- WI-		CR		Total
	Male No. (%)	Female No. (%)	Male No. (%)	Female No. (%)	No. (%)
National Referral	120 (4.4)	34 (0.4)	7356 (85.9)	1053 (12.3)	8563 (100)
Private	96 (5.5)	12 (0.7)	1261 (72.8)	363 (21.0)	1732 (100)
Total	216 (2.1)	46 (0.4)	8617 (83.7)	1416 (13.8)	10295 (100)

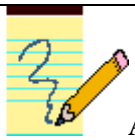
Table 9.5: Type of donors and the number positive in the screening for transfusion associated infections at the private hospital.

Donor type Serological test	WI (n=108) No. (%)	CR (n=1626) No. (%)	Total (n=1732) No. (%)
HIV	2 (1.9)	118 (7.3)	120 (6.9)
HBsAg	-	12 (0.7)	12 (6.9)
VDRL	-	1 (0.06)	1 (0.1)
HCV	-	4 (0.3)	4 (0.2)
Total Rejected	2 (1.9)	135 (8.3)	137 (7.9)

Table 9.6: Type of donors and the number in the screening for transfusion associated infections at the national hospital

	Donor type		
	WI (n=154) No. (%)	CR (n=8409) No. (%)	Total (n=8563) No. (%)
HIV	6 (3.9)	472 (5.6)	478 (5.6)
HBsAg	3 (1.9)	397 (4.7)	400 (4.7)
VDRL	1 (0.6)	122 (1.5)	123 (1.4)
Total infected	10 (6.5)	991 (11.8)	1001 (11.7)

It is evident from the data in these tables that the call responsive (CR) donors form the bulk of the donors since walk-in (WI) donors constituted less than 3% of all the donors in both hospitals.

ACTIVITY

What do you think are the implication of using either Walk-in or Call Response donors?

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Now read through the text below and see if your ideas are included. The following are some of the implications of using W.I. and C.R. Donors.:

C.R. blood donations

- The use of C.R. donors has a number of significant implications on the overall national blood transfusion programme and logistical issues. For instance, in order to cope with sometimes large numbers of CR donors, other staff may be drawn from elsewhere to assist in the donors blood processing. While such staffs may have the general knowledge, they can be said to be lay to the established system of providing a service like blood transfusion.
- C.R. donations tend to attract underage donors. The Kenya National Blood transfusion Services requires that a blood donor should not be less that 16 years or more than 65 years of age.
- The overall blood rejection result is twice as many in the CR compared to WI, mainly due to infections. Overall transfusion-associated infections appear commoner in the CR than W.I.

W.I. blood donations.

- WI donors theoretically and practically allow for organized routine collection, testing and issuing of blood;
- With WI blood donations, hospitals are able to plan effectively for cases such as elective surgery and scheduled transfusion. Even the most difficult scheduling for urgent or fresh blood transfusion can fit in conveniently;
- WI donors tend to be the safest with regard to transmissible infections.

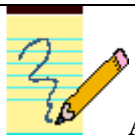
It is recommended that emphasis should be put on walk-in voluntary donors. In other countries, blood donors are considered a critical national resource and they really promote blood donations as a national service. We should try to do the same in our country. To maintain a constant flow of WI donors, there is need to ensure that the public and media are aware of the continuous need for blood and the importance of donating regularly in order to reduce the need for a call.

Having discussed voluntary donors, let us now look at another type of donor, known as autologous transfusion.

Autologous Donors

Autologous transfusion is the collection and re-infusion (transfusion) of the patient's own blood or blood products. It is an important component of the blood transfusion service.

Before you proceed, do the following exercise.

ACTIVITY

Write down benefits to the donor patient of using autologous blood transfusion

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Now read through the text below and see if your ideas are included.

Autologous blood transfusion has benefits for the donor-patient, blood donor center, the hospital transfusion and the national blood transfusion service. It is one of the safest form of blood transfusion.

- For the donor-patient it eliminates the following risks:
  - Transmission of infectious disease (AIDS, hepatitis, syphilis, cytomegalovirus or other viruses);
  - Alloimmunization to erythrocyte, leukocyte, platelet or protein antigens;
  - Haemolytic, febrile or allergic reactions due to alloantibody;
  - Graft-verses-host reactions.

- It also offers the following potential benefits:
  - Reduces the quantity of homologous blood used in a given procedure;
  - Affords peace of mind as one is using ones own blood.

- For blood center and transfusion service it has the following benefits:
  - It provides ready availability of blood for patients for whom compatible blood is not easily available;
  - It provides additional homologous blood supply, if autologous units are not used and cross over or transferred to other deserving recipients;
  - It reduces overall transfusion levels for patients involved;
  - It provides blood for surgical procedures in remote areas where blood supplies are unpredicatable;
  - It increases the donor base and possibly the community's blood supply.

From the foregoing, am sure you will agree that the use of autologous transfusion should be more strongly encouraged.

Procedure for Autologous blood donation

Since this is a very important aspect of making donor blood available let us say a little more about it. Autologous blood donors are bled in the usual manner, whereby one unit of blood is taken at weekly intervals. The sequence of blood donation is as presented in Table 9.7 below.

Table 9.7: Sequences of blood donation in Autologous method

No. of blood units required	Duration before planned surgery in weeks	Time interval of bleeding in days
1	1	0
2	1	0,7
3	2	0,7,14
4	3	0,7,14,21
5	4	0,7,14,21,28 (day of surgery)

There are 5 categories of Autologous blood types of transfusions. These are

- Pre-operative
- Intraoperative haemodiluton
- Intraoperative salvage
- Post operative salvage
- "Speculative" predeposit

Let us look at each in turn.

- ***Pre-operative blood donorations***. This one is drawn before a planned surgery and stored until needed.
- ***Intraoperative haemodilution***. Here blood is collected at the start of surgery (most often prior to a cardiopulmonary bypass procedure) stored for subsequent reinfusion (post-bypass).
- ***Intraoperative salvage.*** This one is salvaged from the surgical field and infused during or after the surgical procedure;
- ***Postoperative salvage.*** This is blood that is collected postoperatively by salvage of shed mediastinal blood.
- *"**Speculative" predeposit**.* This *refers* to long-term frozen storage of autologous blood without any defined medical need. Persons at risk of immunizations to high-incidence antigens absent from their red cells and persons with antibodies to multiple antigens may wish to donate blood for prolonged frozen storage even if no defined medical transfusion needs are foreseen.

Considerations for Autologous Donors

Candidates for autologous donation need not meet all the usual criteria for homologous blood donations. The following criteria are applied to Autologous donors:

- **Age**: there is no upper age limit. The lower age limit is determined by the capacity of the child to understand and cooperate.
- **Pregnancy**: Limited experience with preoperative phlebotomies. There may be some risk to the foetus during phlebotomy.

Phlebotomy means the letting of blood for transfusion

- **Haemoglobin:** Donor's haemoglobin concentration should be less than 110 g/dl (11 g/dl). This is the proportion of red blood cells and plasma.
- **Frequency of donation:** This is determined by the medical officer of the collecting facility in consultation with the patient's doctor. 72 hours is required for synthesis and mobilization of protein and return of plasma volume to normal, donations should be no more frequent than every 3 days, and the last phlebotomy should be at least 72 hours before an operation.
- **Iron supplementation:** Oral iron is as effective as (parenteral) iron given by injection in supporting intensive phlebotomy.

Having learnt about Autologous donors, next let us look at replacement/family donors.

Replacement/ Family Donors

This is the type of blood donation that is commonly practiced by many health facilities particularly those privately run or in rural areas. It is almost the same as the CR type; the only difference is that the relatives of the patient are directed to get blood for their patient. A family donor is warranted in situations where fresh blood for transfusion is required. However, although this type of donation plays an important role in transfusion services, it has a number of disadvantages. These are:

- The staffs who provide the information about the need for blood transfusion are not usually trained to give this information;
- The time chosen by the relatives to go for the donation is sometimes not the appropriate time for the donor unit activities;

- The urgent need for the blood results in the omission of some important screening requirements;
- Some relatives expect to be bled more frequently than the stipulated times;
- Relatives sometimes demand rapid processing of blood within hours of collection which is risky and unsafe;
- Relatives who test positive for HIV become an intricate issue for post-testing counselling.

In addition to these it is important to note some points about this type of blood donations. If the donation is from a husband to a wife who is expectant, then it should be discouraged.. This is to avoid alloimmunization that may occur in the wife against their unborn child. Donations from father to a child with haemolytic disease of the newborn should also be discouraged due to the effect on post transplant complications.

Donor Recruitment And Referral

Previously, we have discussed some forms of blood donors and blood donation. Now let us look at how the donors are recruited and deferred. This discussion refers to the Walk-in or calls responsive donors. Generally speaking without blood donors there would be no blood for transfusion. Therefore the recruitment of donors is actually key to the overall blood availability.


ACTIVITY

Before we proceed, please list at least 5 activities that should be undertaken in donor recruitment

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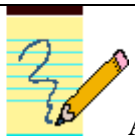
Now read through the following text and see if your ideas are included.

Donor recruitment is the process of getting people to give blood for transfusion. It is generally the function of the regional blood transfusion center, however at times the blood banks and blood transfusion units can receive and bleed donors. In order to succeed in donor recruitment, you need to apply a team approach to the planning, organization and implementation of a number of activities. These activities are:

- Campaigns and advertisement;
- Organizing blood donor sessions;
- Screening the potential donors;
- Bleeding of donors;
- Transportation of donations and staff involved;
- Retention of donors and overall blood donors care;
- Documentation, registration and co-coordinating donor recall.

Special skills are needed to recruit donors. Therefore some staff members are usually trained for it in any given facility.

ACTIVITY

Which members of your health facility would you co-opt into the donor recruitment team?

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Usually a well spoken member of staff would be the best person to do the job**.** The donor recruitment team may consist of doctors, nursing staff, technical staff versed in phlebotomy, drivers and auxiliary staff. The actual numbers should be directed by the person who organizes the donor session.

It is important to mention that these sessions can be held in places considered convenient to the donors. Sessions can be held in any type of health facility, from hospitals to heath centers and even any convenient place like the schools or camping facility.

A number of media can be used to publicize the blood donation campaign. These include:

- Mass media;
- *Baraza;*
- Emergency appeals;
- Targeted appeals: schools, forces recruits, college e.t.c.

Donor recruitment is the key to safe blood and is a very important function of the donor unit. It therefore requires not only good communication, public relations and counselling skills but also people who are well versed with the community from which recruitment is being done. You should educate the public about the importance of blood donation through targeted appeals and mass media. Take advantage of places where people gather like the market place or in church to talk to them. Remember, to find out any myths that exist in the community about donating blood and dispel them through public education.

It is also a good practice to give tokens to life long donors or donors who have made a number of donations over the years. You should also make special note of people with rare blood group combinations or people with special groups, for example blood group O who are also Rhesus negative.

Information to provide to the prospective donor

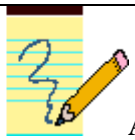
All blood donors should be well informed about blood donation. They should be given the following information:

- The risks of infectious diseases transmitted by transfusion and a list of activities that increases the risk of exposure to Hepatitis Virus and HIV;
- The tests to be done on the donated blood;
- Ask them to give you the name of people who may be notified of abnormal results;
- The possible reactions and suggestions for post-phlebotomy care, for example local reactions, lie swellings accompanied by pain due to swabs and strapping, and severe pain and swelling due to injury to the blood vessel ;

- This should be presented in a simple way and language that the donor will understand and be able to ask questions or respond without personal prejudice. In some locations, it may be necessary to have brochures in more than one language and it may be necessary to provide additional information if more extensive information is to be given to first time donors.

What You Need To Satisfactorily Organize A Donor Session

Before you read on, attempt the following activity. It should take you about 5 minutes to complete.

ACTIVITY

Write down the things you need to put in place in readiness for a donor session

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You should ensure that the following is in place for a successful donor session:

- Refreshment for the donors and donor staff;
- Equipment including blood bags, weighing machines, first aid devices etc;
- Deployment of staff including- fixing dates for donors' sessions;

In addition to the above, you should make arrangements for the following:

Bleeding donors. Your team should know which units will be used for the preparation of whole blood, plasma or red cell, and platelets. Proper handling of donations is important as a lot of wastage may occur due to poor bleeding techniques.

Transportation: this is important as the faster the blood is delivered to the center, the better for the components and products safety. Every container of blood should within six hours of donation be placed and thereafter continuously kept in an environment with temperature range of 2-10° C until it is issued or forwarded to a blood bank for processing. Components preparation requires that whole blood or component reach processing center within 6-8 hours of donation.

Donor Welfare. Donor welfare is one aspect that needs to be attended to keenly as the donor in all respect is special in society and he/she should be made to feel so. For life long donors and future donor, this cannot be overemphasized. Should any test performed on a blood donor sample yield a positive result which indicates that the donor needs further investigations or treatment, he or she should be notified in confidence. Such notification should be the responsibility of the medical officer in charge of the donor team or the blood bank.

Documentation: Follow-up, retention and recall can be achieved by proper documentation. So ensure that you have somebody whose responsibility is to record and store this information.

Hazards of Blood Donation

Many donors tolerate giving blood very well. However, occasionally, adverse reactions may occur. All personnel in attendance must be trained to recognize reactions and treat some of them. The most common hazards of blood donations are fainting and venous spasm. Fainting is especially common in young people and in those donating for the first time, nervous or apprehensive donors. Infection of a venipuncture site should be avoided by meticulous attention to skin cleansing and aseptic techniques.

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The acceptance of blood donor must be in respect of the donor's health and quality and standard of the final product obtained. The guidelines may be adjusted at the discretion of the officers attending the session with due regard to the donors and the recipients and the need to have blood and blood products. However, the basis includes a limited medical history and physical examination.

Clinical evaluation of blood donors

As careful donor selection contributes vitally to the safety of both donor and recipient, its important to conduct thorough clinical evaluation of potential blood donors. Should you have to defer or reject a prospective donor, use extreme caution and ensure that you do not leave the person with a negative feeling about themselves or about the system of blood transfusion services. Deferred donors should be given full explanation and be informed when and whether they can return.

A clinical evaluation of blood donors should consist of the following:

- ***Medical history***

  Before a person donates blood, you should interview them and ask specific questions to ensure that it is safe to donate blood. Sometimes, a brief clearly written information manual may be availed to potential donors. The interview should include aspects medical history taking enquiring about infections. Standard operating procedures with regard to the Acquired immune Deficiency Syndrome (AIDS), hepatitis and any other infectious disease must be strictly adhered to. Such may include asking direct questions about social behaviour including homosexuality, sexual partners, history of jaundice treatment, including surgery, receiving blood transfusion for instance; treatment for sexually transmitted diseases and communicable diseases for instance tuberculosis ,typhoid and even malaria. In uncertain circumstances, the head of the blood donation team on site should be consulted.

- ***Physical examination***

This follows the expectations of a usual medical examination but must include: general appearance, weight, temperature, blood pressure, haemoglobin determination and checks of skin lesions and other obvious marks. Before each donation, the prospective donor

should be interviewed verbally or in writing in order to establish his or her identity and that she/he is in normal health and has suffered or is not suffering from any serious illness.

- ***Check for Minor red cell abnormalities***

Donors with minor red cells abnormalities such as thelassaemia trait, sickle cell trait and hereditary spherocytosis are perfectly acceptable provided that the screening test excludes anaemia. However, Haemoglobin Sickle (HbS) containing red cell should not be transfused to newborn infants and patients with hypoxia or sickle cell disease.

- ***Measures to protect the donor***

Blood donors should be healthy persons over the age of 16 and below 65 years.
Volume of blood taken 450ml ± 45 ml blood mixed with 65 ml of anticoagulant. No more than 500ml of blood should be withdrawn on any given occasion. The ratio of anticoagulant to blood must be maintained at the optimal level 1:7 50kg so that underweight but healthy donors should not give full donations but may donate 250ml of blood into specially designed paedipacks containing the appropriate volume of anticoagulant.

- ***Haemoglobin (Hb) level***

Haemoglobin (Hb) level estimation: Hb level is necessary as a way of protecting a donor. A solution of Copper Sulphate ($CuSo_4$) specific gravity 1.055 approximates to a Hb level of 135g/l (std for male donors) the equivalent for females is 1.053 (Hb 125g/l). This method tends to underestimate the Hb volume and may lead to unnecessary rejection of donors. It may be necessary to use other additional methods of Hb determination for donors who fail the $CuSo_4$ test; however a relatively inexpensive, portable haemoglobinometer can reduce the number of unnecessary rejections by up to 30%.

- ***Donation intervals***

Donors are not bled more than thrice a year unless red cells are replaced.

Conditions For Blood Donor Deferrals

As mentioned earlier there are instances when you might have to turn down a potential blood. This is known a**s** donor deferral. The table below lists these conditions and suggests what you should do to the deferred person.

Table 9.8 Conditions for Donor Deferral

Condition	Suggested Action
Anaemia:	Consult doctor in cases of anaemia.
Bleeding disorders:	Defer with consultation to doctor
Previous blood transfusion:	Reasons for transfusion
Breast feeding	Defer till weaned
Catarrh –Acute	Defer till symptoms clear
Catarrh –Chronic	Acceptable if not on treatment
Colds	Defer till healed
Contraceptive pill	Acceptable
Dermatitis	Acceptable unless severe or patient is on systemic treatment. The veno puncture site must be healthy
Diabetis mellitus	Acceptable if on diet alone and otherwise fit. Not acceptable if on insulin or tablets treatment
Donation interval	Only at intervals of our months
Drug abuse	Defer permanently
Operations	Refer to doctor who should get details of the operation and defer for 12 months if transfused during operation.
Monthly periods	Accept if the patient passes the haemoglobin test.

Other conditions for donor deferral include the following:

- No donation should be accepted from those who have ever suffered from a malignant disease, cancer, epilepsy, angina, hypertension diabetes mellitus, and heart or kidney disease;
- Those with severe allergic disorder should not give blood because recipients may develop temporary hypersensitivity reactions due to passively transferred antibodies.

Strategies to Ensure Blood Safety

The National Blood Transfusion Services and National AIDS and Sexually transmitted organization Programs (NASCOP) have established committee charged with the national

blood safety. This committee advices the national public health laboratories on all aspects of blood safety as follows:

- ***Blood Handling***

Each blood transfusion handling establishment should maintain a detailed procedures manual in respect of its medical and laboratory procedures, which should be reviewed as found necessary by the Ministry of Health or The National blood transfusion service centre.

The medical service providers also should undertake adequate consultation in respect of the practice of blood transfusion therapy and the management of complications arising there from.

Strict confidentiality should be observed by all employees of an establishment with regard to all information pertaining both to blood donors and to patient in whose treatment the establishment is involved. This is necessary since the blood transfusion service has all cadres of staff some of whom may not be medically trained.

- ***Collection of blood***

Phlebotomy is done only by trained personnel working under the direction of a qualified doctor or blood transfusion technician. Blood collection must be by aseptic methods only using a sterile, closed system and a single venipuncture. The phlebotomist should wear gloves during the procedure. If more than one skin puncture is needed, a new container and donor set must be used for each additional venipuncture.

- ***Blood bags***

Blood must be collected into a national blood transfusion centre approved container that is pyroxene free and is sterile. The bags should be labelled with expiry dates and details of tests done on the.

- ***Blood and blood products Processing***

The container of donor blood is carried under conditions in accordance with the product and acceptable technique of asepsis. The blood bank should ascertain that the transport of containers of blood is correct and reached its destination within the temperature range of 2-10^{0}C. The container of blood may be kept at room temperature for a single period for about

sixty minutes while testing or for transfer purposes. Blood intended for processing into components and products should be separated and directed appropriately. Blood should not be frozen at any time except when fresh plasma is required.

All procedures, reagents used must have been tested in parallel with reference methods and reagents. Past records of a donor's ABO Rhesus group and types should not be used for labelling new units of blood from the donor but for verification of new results.

Every unit should undergo complete testing. The results of all tests must be recorded immediately after observations.

The recording system should enable tracing any single unit of blood, its subsequent components from its source to its disposition.

All records pertaining to an individual unit should be retrievable including all investigations of reported adverse experience.

Records should be retained also as long as is possible but not less than stipulated by the national blood transfusion services guidelines.
It is recommended that all donor blood be tested for unexpected antibodies. However, methods used for testing such antibodies must be those that are able to detect or demonstrate clinically significant antibodies.

Well labelled samples should be in the processing facility at 2-6^{0}C for at least 7-14 days after transfusion. All donor blood should have expiry date. Expiry date of whole blood or packed cell is labelled by the composition of the anticoagulant solution into which it is collected.

- For acid nitrate dextrose (ACD) the expiry date is 21 days after collection.
- For citrate phosphate dextrose (CPD) the expiry date is 28 days after collection.
- For citrate phosphate dextrose plus adenine (CPD-A1) the date is 35 days after collection.

- ***Requirements for the processing of blood and blood components***

Conditions under which blood or plasma may be processed should have well stipulated aseptic procedures. Only blood or blood components collected, stored and transported in accordance with the recommendations of safety monitoring unit should be used for processing into blood products. Such guidelines are available at the National Public health laboratories.

Only blood or blood components obtained from blood donors who at the time of withdrawal of blood were shown to have negative serological results for Hepatitis B, Hepatitis C, anti-HIV/ I & II and VDRL should be processed into blood products.

The first stage in the processing of blood into blood products, whereby the plasma is separated from the red blood cells or blood clot, should be completed not later than seven days after the expiry date of the blood.

A record from which it is possible to identify the donors should be kept by the establishment of detailed records of every container of blood or blood component received for processing.

- ***Screening for blood borne infections***

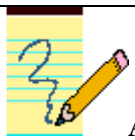
This is one of the most crucial steps in protecting the recipients of blood from receiving contaminated blood or blood products.

Transmission of different infectious agents by transfusion of blood products depends on the ability of the setting to:

- Screen for infection;
- The biology of the infective organisms;
- The methods of blood and components handling i.e. storage;
- The application of inactivating procedures for infective agents.

Both cellular and plasma blood products have been associated with the transmission of several infective agents.

At this juncture, take a few minutes and do the following activity.

ACTIVITY

List four infectious agents that are usually tested for in blood for transfusion

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In Kenya the following infections are checked before blood can be cross matched

- ***Viral:*** HIV I and II, Hepatitis A, Hepatitis B, Hepatitis C
- ***Treponemal*****:** syphilis
- ***Parasitic*** malaria, all recipients of red cell products is given anti-malaria upon starting the transfusion.

Before issuing a unit of blood, appropriate labelling must be ascertained. The following information should be recorded:

- proper name of component;
- the kind and amount of anticoagulant;
- the volume of the unit;
- the name and address of the collecting facility;
- if donor is autologous the expiry date and the unique donor number.

Protection of Both Donors And Recipient

The most important form of protection is donor screening. A careful donor selection goes a long way to ensure the safety of both donor and recipient. Protection can be achieved by:

- ***Reducing chances of transfusion acquired infection:*** Donor antibody screening, saline-washed blood, frozen deglycerolized blood, leukocyte filtration, blood storage and blood irradiation.

- ***Reducing transfusions:*** Blood should be used only when strictly indicated. Use of autologous transfusion, prevention of anaemia and prevention strategies for bleeders should be adopted.

- ***Rational use of blood and blood products.***

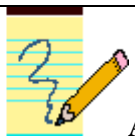
  All blood products to be transfused must be rationalized. Use of the appropriate product is the most rational way of using blood and avoids excessive use and helps in safety. The following are the guiding statements on the use of blood and blood products;
  - Use only the particular product.
  - Use only the minimum
  - Avoid emergencies.
  - Avoid pressure on Blood Banks staff
  - Consult specialist.

General Safety In The Work Place

There is growing concern over hazards in the workplace. The blood transfusion service settings are no exception. In most instances the blood transfusion settings are laboratories and these should establish a health and safety program in addition to other safety measures.

Accidents do not happen in the work place every day and the occurrence of work place induced diseases are infrequent. Unfortunately, this gives rise to a sense of complacency and except in the highly emotive areas of Hepatitis B and HIV, safety measures are often considered to be inconvenient and are often ignored.

The objectives of a health and safety program should be to provide settings that prevents injury or sickness in the workplace and for all personnel. Before we can continue let us pose to consider how these objective can be met.

ACTIVITY

List your ideas on how these safety objectives can be met.

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I believe your answer included the following ways of meeting safety objectives:

- Development of a healthy environment and safety programme and policy for all employees;
- Ensuring that personnel adhere to the policy once it has been defined;
- Every person in the blood transfusion setting must be convinced of the need for safety practices and appreciate that transgression from defined policy may result in hazard to health. Such hazards may affect: the transgressor, a colleague, a patient or some other third party. Therefore, safety in the service must never be relegated to a position of secondary importance.
- Reducing health and safety requirements to manageable units. This helps to reduce confusion of details, which ultimately stifles productive work and paradoxically undermines interests and efforts in developing safe practices.
- Reducing laboratory induced injuries and illness resulting from bad laboratory design, overcrowding, poorly maintained equipment, carelessness, thoughtlessness and inexperience.

Therefore, the management objectives should include:

- Improvement of personnel safety activities and skills;
- Development of a surveillance programme to identify hazards promptly;
- Formation of plans to remove new hazards;
- Co-ordination of laboratory safety into hospital safety programmes.

In addition to ensure safety, there are general national policy guidelines as follow:

- ***Common Law***: Every health worker owes a patient some duty of care and failure to observe this is considered negligence.
- ***Employer to employee:*** Employer should provide as far as is practicable, premises, environment, plant and work place practices which will ensure the health, safety and welfare of all employees. The use, handling, storage and transportation of articles and substances should as far as is reasonably practicable, be conducted in an environment that is safe and free from risk to health. There should also be sufficient information, training and supervision to ensure health and safety at work.

- ***Employees***: Whilst at work, take reasonable care not only of their personal but that of other persons who may be affected by any act of omission, co-operate in all matters affecting health and safety.

- ***Manufactured supplies:*** All must be designed and constructed to be safe and without risk to health. Supplies must be delivered with adequate information about its intended use and any conditions necessary to ensure safety.

- ***Staff***: All staff working in a laboratory are deemed at risk. Laboratory should have a safety officer trained in general laboratory safety and any specific hazards occurring in that laboratory.

- ***First aid:*** Some members of staff must be trained to render first aid in the event of an accident. A first-aid box must be provided with the following contents
  - Instruction sheet giving general guidance;
  - Individually wrapped sterile adhesive dressing in a variety of sizes;
  - Sterile eye pads with attachment.
  - Bandages:
    - Triangular bandages;
    - Sterile covering for serious wounds;
    - Safety pins;
    - Selection of sterile wound dressings.
  - Eye – equipment

- Antidotes to poisonous chemicals used in the lab.
- Protective clothing and safety equipment.

- ***Safety training:*** New staff should be inducted and periodic re-training and confirmation of competence conducted regularly. A common-sense approach to basic hygiene should be stressed. Smoking, eating and application of cosmetics within the laboratory must be expressly forbidden.

- ***Protective clothing***: Must be worn in the laboratory and must always be fasted.

- ***Safety at work practices***: Instructions on the correct use of centrifuges, electrical appliances, mechanical devices which might trap the operators fingers, clothing or hair must be given.

- ***Pipetting:*** This is a frequent procedure in a hospital laboratory. Mouth pipetting must be totally prohibited.

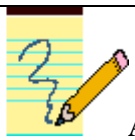
- ***Waste disposal:*** Written procedures must describe disposal of each type of waste. All staff must be trained in methods of waste disposal. Needles and other sharps must be placed in rigid containers before disposal.

Finally, there should be standard operating procedures in all units and these be clearly exposed for all to see.

Broad Approaches To Making Blood Safe

Measures to reduce infection in potential blood donors

In the previous discussion, we looked at the general aspects of safety. Now we will concentrate on broad approaches of blood transfusion safety. Perhaps what we are about to discuss is well known to you. Before you read on, take a few minutes to do the following activity.

ACTIVITY

List at least three measures that you consider useful in reducing HIV transmission by blood transfusion.

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Now compare what you wrote with the measures listed below:

- Selection of donors particularly of the low risk population;
- Laboratory testing of the donor blood;
- Inactivating viruses in products derived from blood particularly pooled plasma;
- Rational use of blood and reducing the extent to which donor blood is transfused.
- Applying internationally best practice of blood safety in blood supply and donor blood.

In all these aspects it is a basic requirement that each establishment should have its Standard Operating Procedure (SOP) stating activities at all phases in the operating area. The procedures must meet the requirements of the national guidelines on blood transfusion practice and provide for general safety measures.

Prevention of HIV Transmission By Blood Transfusion

There are a number of measures which if well implemented can reduce this mode of HIV transmission infection. These include:

- Selection of blood donors Low risk donors
- Laboratory donor blood testing;
- Inactivation of the donor blood;
- International best practice of safe blood supply and use;
- Rational use of blood.

Selection of blood donors - Low risk donors

Clearly it is far more cost effective to offer an efficient and safe blood transfusion service when you start with the selection of blood donor and at the blood donor policy level. We should have well established risk profiles so that people with risk factors are easily identified and advised to refrain from donation. You can achieve this by incorporating certain questions into the donor medical history, in order to identify AIDS related symptoms, such as involuntary weight loss, night sweats and so on; homosexual or bisexual with multiple partners; past and present abusers of IV drugs; patient with haemophilia and sexual partners of individuals at risk of AIDS.

Laboratory donor blood testing

This is a vital component in ensuring that the blood to be transfused is as far as the present science can enable free from transfusion borne infections. At the moment with regards to HIV, one of the tests commonly performed detects HIV antibodies. However antigen detection is also becoming a common practice and is being employed in many fourth generation testing techniques.

Inactivation of the donor blood

In this process special procedure are applied on the donor's blood to kill the virus. So far, it is possible to sterilize plasma and plasma products. However, whole blood and cellular components particularly the red blood cells are not yet amenable to many of the available methods. This technology is not yet available in Kenya and we are not in a position to carry out any form of donor blood virus inactivation.

Rational use of blood

This is described as transfusing only the required blood and blood product in the least amount possible. Blood should be transfused only when it cannot be avoided. Usually this involves clearly defining why the patient requires the transfusion and the product and the amount needed. For example, acute bleeding would require whole blood, while plasma would be transfused to those who have bleeding problems like haemophilia and liver disease. Other measures taken in the rational use of blood are *r*eduction of homologous blood transfusion. This aims to reduce the number of donors a blood recipient is exposed to. Transfusion should be based upon the physiological needs of each patient rather than on

some predefined for instance haemoglobin level. There are some measures that can be put in place to reduce the number of donor exposure such as the use of Autologous blood.

International best practice of safe blood supply and use

Since we do not want people coming to Kenya to doubt our standards, our practice is based on the best practice and schema of the international practice as shown in the following diagram.

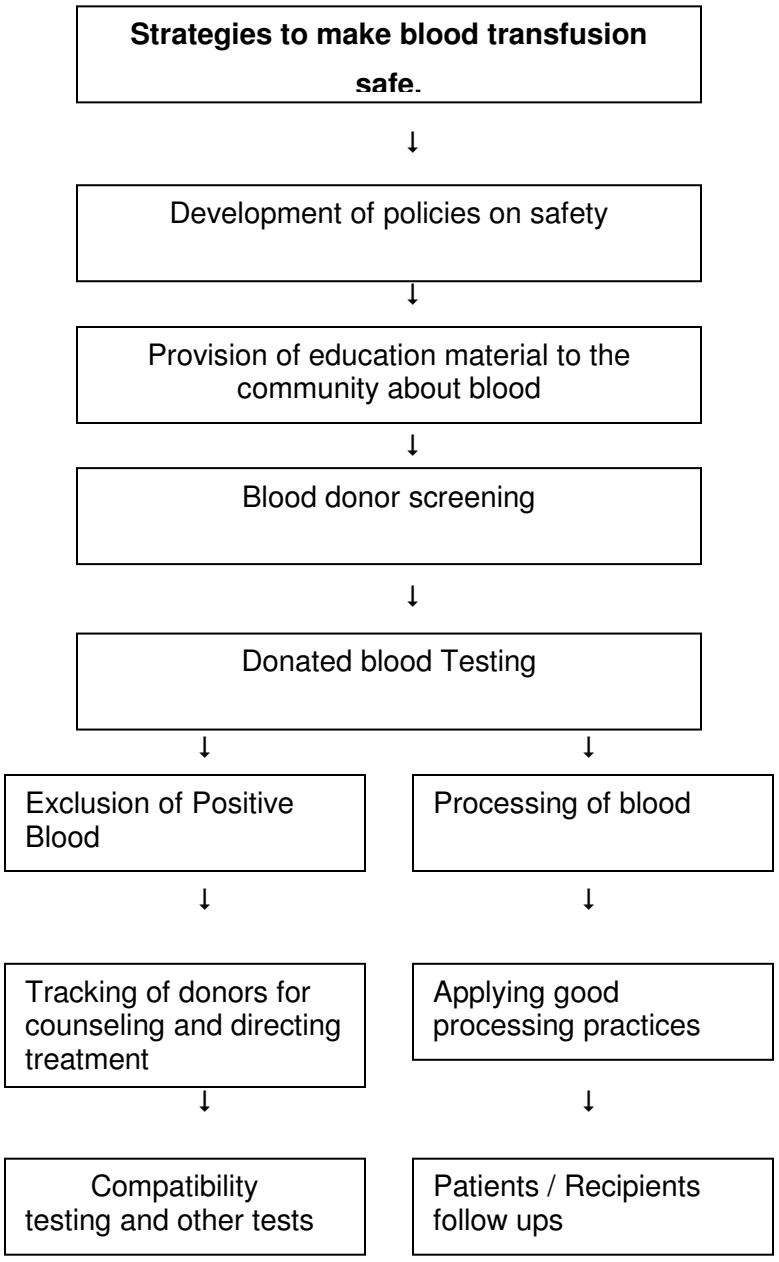

Figure 9.2 International Practice Framework on Safe Blood supply and use

The Directions On Prevention of HIV Transmission

It is important at this juncture to consider the way forward in this war against HIV infection. The AIDS epidemic has generated a high level of awareness and concern. This has been clearly expressed in public attitudes towards blood transfusion. Most individuals are now aware that the disease can be transmitted by transfusion. Somewhat more surprisingly, a significant proportion also believes, incorrectly, that AIDS can be acquired by the act of giving blood. We therefore need to sustain the efforts we have made in updating the population of new concepts and dispelling such myths.

The awareness of the risk of transfusion has prompted a more conservative attitude towards this procedure and there is increased focus on Autologous and directed donation and on the use of alternatives to transfusion. Similarly, during the AIDS crisis, there has been a decline on voluntary blood donors due partly to the fear of AIDS. We need to find ways and means to overcome this fear as without donors there will be no blood to save lives.

The real challenge for prevention of transfusion-transmitted HIV lies in the regions where explosive epidemics of HIV infection are occurring in the face of small healthcare budgets. For this all support should be marshalled to get funds to support blood safety activities.

Against this background there should also be recognition of the rights of the individuals. Issues of confidentiality of test results and donor deferral are paramount and policies need to be developed to deal with requests for third-party notification of test results. The mounting number of donors with false-positive test results is a matter of considerable concern, and needs lots of sensitivity on post test counselling. This entails considerable effort to maintain the confidence of the general public, blood recipients and even donors themselves. Donor counselling is a difficult task because the implications of a positive test are so serious. Counselling donors with indeterminate results, or false-positive ELISA tests is extremely difficult since, even if there is no evidence of infection, it is hard for most individuals to understand that they may be safe, yet their blood cannot be used in the future.

There is also the issue of directed donation. Directed donation is the term used when a patient selects the donors of blood to be used, generally in support of elective surgery. In Kenya this is not advised and one should be generally wary of this practice and discourage

it. The issue is complex, emotional and controversial. Over the years, however, the practice has become commonplace and some blood centers do engage in directed donation programs. Directed donations may be acceptable on the basis of medical needs and in special circumstances. At the same time, there may be clear contraindications for both ethical and safety reasons. An additional area of concern is the disposition of directed donations which are not needed by their intended recipient. Should they be crossed over into the voluntary supply or not? The underlying principle is based on the fact that donated blood should be used for the purpose for which it was initially intended. A better solution for individuals facing elective surgery is the use of Autologous (predeposit) donations along with intra-operative salvage of blood or haemodilution.

Recipient notification is another area of concern. When a number of frequent donors are found to be positive for antibodies to HIV, there arises concern that at least some prior donations from such individuals will have been positive and presumptively infectious. Should recipients of these earlier donations be informed? It is appropriate to advise the doctors responsible for the care of such recipients when there is significant risk that the blood product was infectious. This process identifies a numbers of individuals who had indeed been infected; such patients could thus receive early attention and perhaps, some secondary infections could be prevented.

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A good transfusion service has to be carefully planned to supply enough blood by attracting healthy donors. These donors are part of the service. The donor service has to recruit and retain sufficient voluntary non-remunerated blood donors to enable it meet blood components and products requirements.

Above all, medical personnel are also part of the community where they are offering services and should not transfuse patients unnecessarily; unneeded transfusion removes blood from the supply and also carries a substantial risk of transmitting disease. The blood safety relies heavily on availability of sufficient blood.

Summary

You have come to the end of this section. In this section we have discussed the importance of Blood safety in the HIV/AIDS era. We have seen that it is an integral part of all units and sections of blood transfusion services. Every section and sector in the provision of blood transfusion services has important roles to play with regards to blood safety and this involves:; policies on blood donation, donor recruitment and deferrals, blood and blood product processing, screening of blood borne infections, rational use of blood and institutionalization of quality assurance screens in safety and training of personnel.

Congratulations! You have also come to the end of this unit on prevention of HIV. In this unit we discussed how to assess vulnerability factors in HIV prevention, integration of HIV prevention with care, how to deal with occupational and non-occupational exposure to HIV, and lastly blood safety. We hope you have found it useful and interesting and that you can now play your role in the prevention of this pandemic with confidence.

You can now take a well deserved break before you complete the attached assignment. Good luck!

Further Reading

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4. Schiffer C.A., Patten E., Reilly J., Patel S. Effective leukocyte removal from platelet preparations by centrifugation in a new pooling bag. Transfusion 1987; 27:162-4.
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7. Wing El, Bruns F.J., Fraley DC, et al. Infectious complications with plasmapheresis in rapidly progressive glomerulonephritis. JAMA 1980; 244:2423-6.