



Department of Health  
Republic of South Africa



# HIV/Aids Training

## Module 5:

Prevention of HIV transmission  
June 2008



Adapted from and thanks to:

*Foundation for Professional Development; Ashraf Grimwood; GF Jooste meetings; Prof Gary Maartens lectures; PATA conference; MIC and Department of Pharmacology UCT*

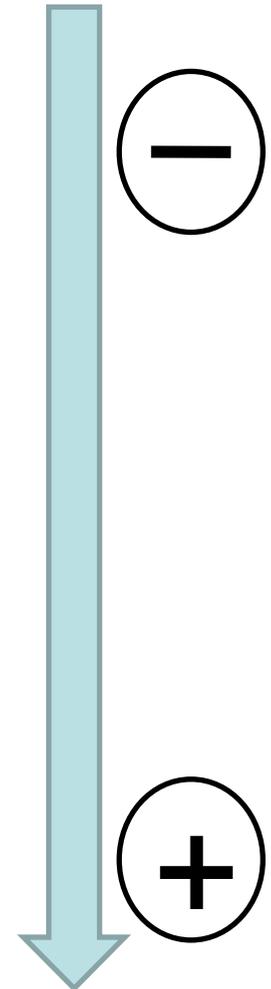


# Basic premise

To prevent a person ( who is presumed previously to be HIV negative ) from *sero-converting* after accidental exposure to HIV virus

*PEP* = *Post-exposure prophylaxis*

# Prevention of HIV transmission: PEP



Aim : To minimise the risk of sero-converting

# Which Body Fluids are infectious?

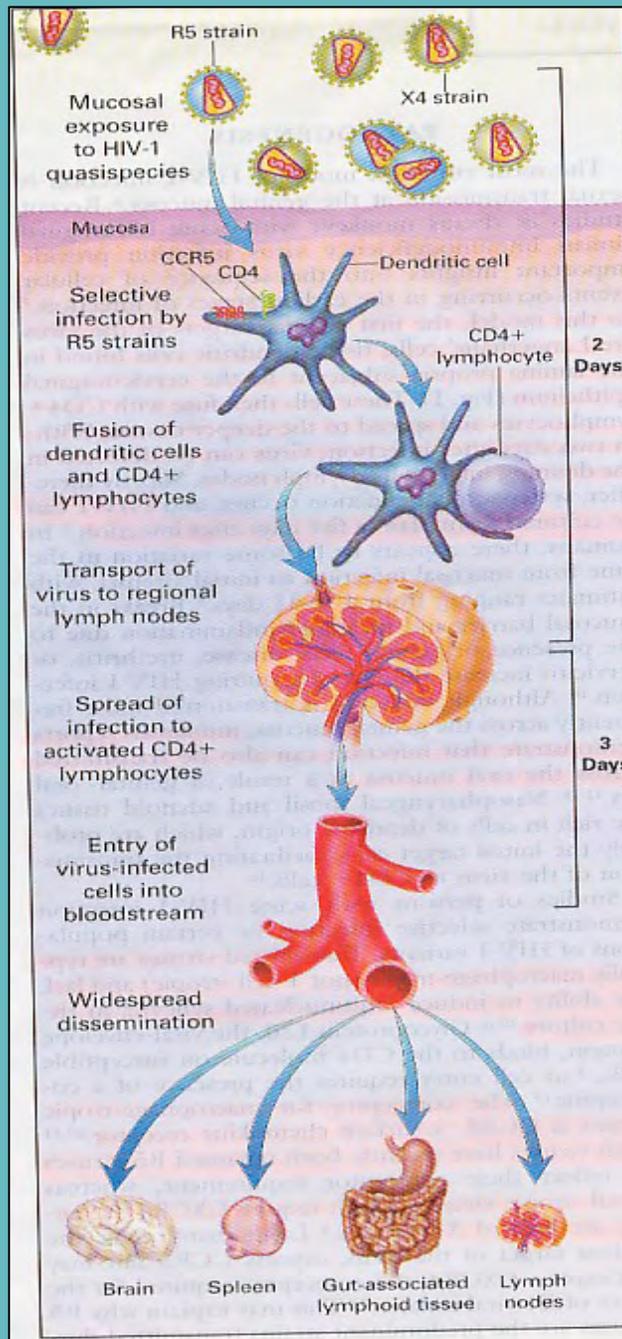
Infectious Body Fluids	Non Infectious Body Fluids
ALL body fluids containing BLOOD	Tears*
Vaginal Secretions	Sweat*
Semen	Saliva*
Pericardial Fluid	Nasal Secretions
Peritoneal Fluid	Vomit
Pleural Fluid	Faeces
Cerebrospinal Fluid	Urine*
Amniotic Fluid	
Synovial Fluid	

\* *Blood-stained* are infectious

# ASSESSING THE RISK OF HIV TRANSMISSION

- Blood transfusion 100 in 100
- MTCT 20 - 40 in 100
- Needle sharing 1 in 100
- Anal sex 1 in 100
- Vaginal sex 1 in 1000
- Needle stick injury 3 in 1000

The risk of contracting hepatitis B virus (HBV) from a single percutaneous needle stick injury is 6 - 30% as opposed to 0.3% for HIV.



## Early Events in Transmucosal Infection with the HIV-1 virus.

Kahn JO, Walker BD

N Engl J Med 1998; 339:33-39

Comment:

The arrows indicate the path of the virus. The viral envelope protein binds to the CD4 molecule on dendritic cells. Entry into the cells requires the presence of CCR5, a surface chemokine receptor. Dendritic cells, which express the viral co-receptors CD4 and CCR5, are selectively infected by R5 (macrophage tropic) strains. Within two days after exposure, virus can be detected in lymph nodes. Within another three days, it can be cultured from plasma.

# Prevention of HIV transmission

- ROUTES TO BE COVERED:

1. NEEDLE STICK INJURIES

- SURGERY, VENESECTION, IV FLUIDS

2. MOTHER TO CHILD TRANSMISSION

- PREGNANCY

3. SEX

- RAPE

( INTENTIONAL )

- CONDOM BREAKS

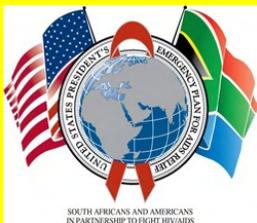
( ACCIDENTAL )



**USAID**  
FROM THE AMERICAN PEOPLE

# Needle Stick Injuries

- Risks enhanced by:
  - deep injury
  - visible blood on needle or instrument
  - needle used for venesection prior to injury
  - high viral load in source patient ( sero-conversion illness or terminal AIDS )



# OCCUPATIONAL EXPOSURE TO HIV

- Guidelines must be adhered to strictly in order to claim from I.O.D [ Injury on duty ]  
( Workman's Compensation )
- Protocol is laid out and a copy should be placed in each pharmacy and ARV site (in an emergency, health care workers will usually present at either of these places in event of an injury )

# Guidelines for deciding on ARV intervention

## National Department of Health

Exposure	HIV status of source patient		
	Unknown	Positive Low risk	Positive High risk
Intact skin	No PEP	No PEP	No PEP
Mucosal splash/Non-intact skin	Consider 2-drug regimen	Recommend 2-drug regimen	Recommend 2-drug regimen
Percutaneous (sharps)	Recommend 2-drug regimen	Recommend 2-drug regimen	Recommend 3-drug regimen
Percutaneous (needle in vessel or deep injury)	Recommend 2-drug regimen	Recommend 3-drug regimen	Recommend 3-drug regimen

# High vs. Low-Risk exposure

- exposure to large quantities of blood
- deep percutaneous sharps injury
- hollow needle that was used in an artery or vein
- visible blood on sharp instrument
- source patient terminal AIDS or high viral load

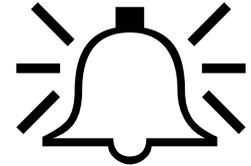


# Regimen

Drug	Dose	Frequency	Duration
Zidovudine(AZT) Lamivudine(3TC)	300mg/150mg	12 hourly	28 days
Add Lopinavir/ritonavir in cases of high risk exposure	400mg/100mg	12 hourly	28 days

# Procedure following injury

- Following injury, clean wound thoroughly with soap and large volumes of water (conjunctival splashes - thoroughly irrigated with saline).
- Counsel HCW, and following the guidelines above consider ARV prophylaxis.
- HIV baseline **LAB Antibody test** of HCW must be done prior to commencing therapy.
- Prophylactic treatment should commence as soon as possible after injury, preferably within 1-2 hours of exposure. (Animal studies suggest little to no efficacy after 48 hours and no efficacy whatsoever 72 hours post exposure.)
- Pre- and post-test counseling including use of condoms.
- Baseline HIV/FBC/HBV/HCV/VDRL from both source and HCW
- Repeat HIV test at 6 weeks, 3 months and 6 months.
- HCW on PEP should be regularly followed-up, and ongoing psychosocial support is imperative.



# Needle Stick injuries

- in the event of a needle stick injury, a blood sample *may not* be taken from the patient for the purposes of an HIV test without the patient's consent
- if however, an existing sample ( that had previously been taken from the patient for other purposes ) is available, the situation is different

# Needle Stick injuries

- the patient should be asked for their consent to have the existing sample tested for HIV
- if the patient refuses this consent, then the HCW should indicate that the sample will be *tested in any event* and should ask the pt. whether they would like to know the result (anonymous)
- the pt should be offered pre- and post-test counselling if they wish to be aware of the result

# Needle Stick injuries

- in the case where there is no available blood sample and the pt refuses to give consent, the HCW should assume the pt is HIV positive and commence PEP
- NOTE: Even if a sample of a patient's blood is legally and ethically obtained, and it is tested, the pt may be in the "window period ". Therefore, it is advisable for the HCW to regard the pt as HIV positive



# ALERT

## Preventing Needlestick Injuries in Health Care Settings



U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES  
Public Health Service  
Centers for Disease Control and Prevention  
National Institute for Occupational Safety and Health

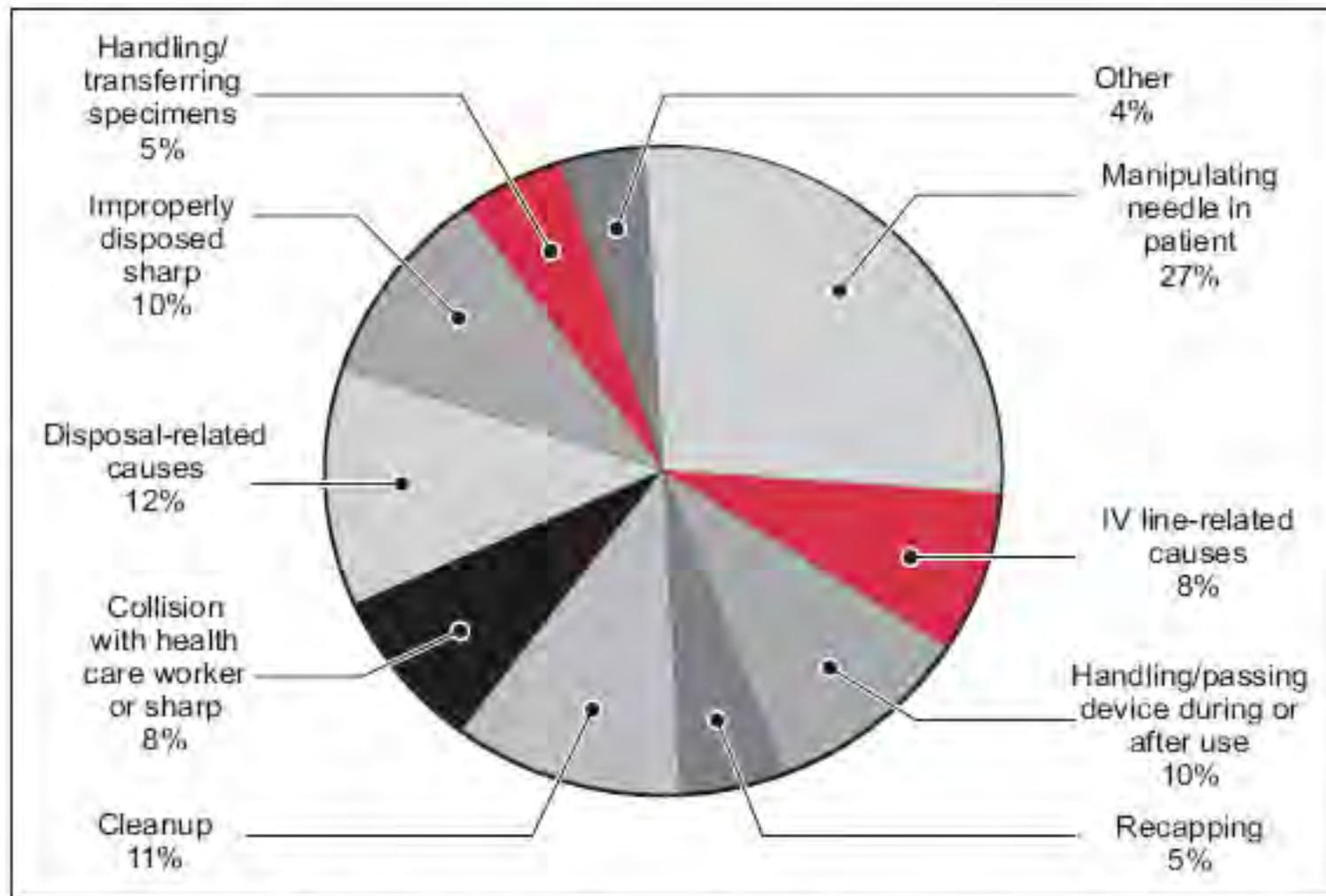


SOUTH AFRICANS AND AMERICANS  
IN PARTNERSHIP TO FIGHT HIV/AIDS

Publication from CDC 2000 - 108  
Nov 1999



**USAID**  
FROM THE AMERICAN PEOPLE



**Figure 2.** Causes of percutaneous injuries with hollow-bore needles in NaSH hospitals, by % total percutaneous injuries (n=3,057), June 1995–July 1999. (Source: CDC [1999].)



Sharps bin  
close at hand

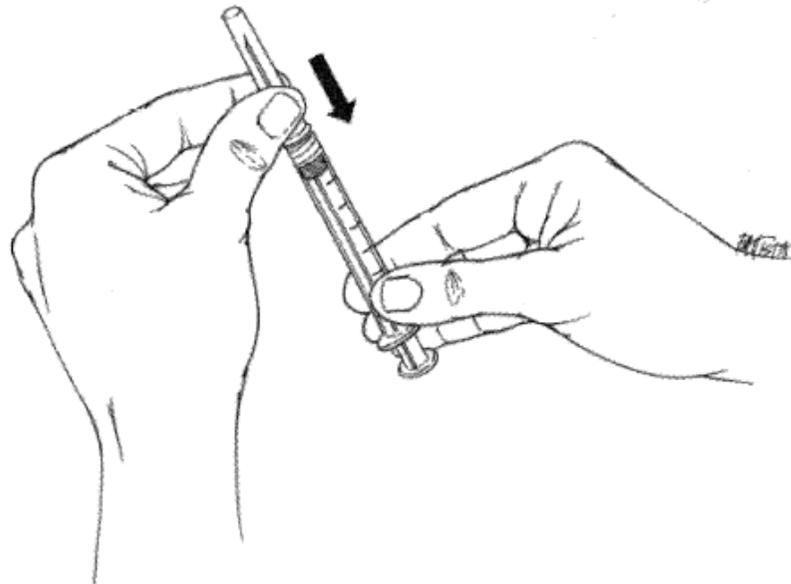
## Figure 8.1 One-handed recap method

**Step 1:** Scoop up the cap

Do not hold the  
plastic needle  
cap



**Step 2:** Push cap firmly down



**USAID**  
FROM THE AMERICAN PEOPLE

### Tips for careful handling of sharps

- Always point the sharp end away from yourself and others.
- Pass scalpels and other sharps with the sharp end pointing away from staff; or place the sharp on a table or other flat surface (a receiver) where it can then be picked up by the receiving person.
- Pick up sharps one at a time and do not pass handfuls of sharp instruments or needles.

-place sharp containers away from high traffic areas and as close as

-possible to where the sharps will be used, ideally within arm's reach

-never re-use or recycle sharp containers

-seal the containers when  $\frac{3}{4}$  full

-avoid shacking the container to settle its contents to make room for more sharps

# Venesection guidelines

- always follow *three* simple rules for formal venesection:
  - *you* must be comfortable – good light, sit down ( to steady your self ), lock the door to avoid interruptions
  - the *patient* must be comfortable – explain what you are going to do, lie the patient down, tell them when you are about to prick them (allay all anxiety )
  - *do not rush*

Ask the infant's caregiver or parent to wait aside if you have assistance ( can be less traumatic for all concerned )

# HIV transmission in pregnancy

- rate of transmission in Africa: 25 – 40 % (without intervention)
- transmission occurs:
  - in utero
  - during labour or delivery
  - post-natally through breast feeding

570 000 children were infected with HIV in 2002 – 90%  
in sub –saharan Africa



# Care of the Pregnant HIV-infected Woman and her Baby

## Ante-partum Care:

- **History and examination**
- **Laboratory tests**
- **Counseling**
- **Medication**

**Average risk of MTCT is 30% ie one in three babies will be infected if nothing is done**

Watts DH. Management of HIV Infection in Pregnancy. N Engl J Med 2002; 346:1879-91

# Children and HIV / AIDS



- 2.1 million children globally younger than 15 years are HIV infected
- 90% of whom live in SSA
- in 2007 alone, 420 000 were newly infected ( mainly through MTCT ) of whom half will die without interventions
- many of the 290 000 children who died\* in 2007 never received an HIV diagnosis or HIV care

WHO & UNICEF  
June 2008

\* 30% die by 1 year and 50% by age 2 years without HIV drugs

# Factors affecting transmission

- maternal viral load in-utero
  - immune status - high viral load leads to an increased risk
  - anti-retroviral treatment decreases transmission
- obstetric factors
  - mode of delivery (Caesarina Section decreases risk by 50%)
  - prolonged rupture of membranes



# Factors affecting transmission

- Infant

- feeding practices: breast for

6/12 :	5 % risk
12/12:	9% risk
24/12:	14% risk

Either *exclusive breast* feeding until 4 months and then rapid weaning

Or *exclusive formula*: but stigma issues or increased risk of gastroenteritis, malnutrition and cost implications.

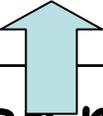
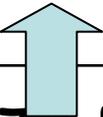
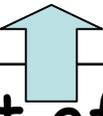
**Mixed feeding leads to reduction in stomach mucosa integrity and increased chance of viral transmission**

Note: Nationally, only about 12% of mothers breast-feed exclusively in the first few months of life, dropping to fewer than 2% after the baby is 4 months age.

# PMTCT Regimens

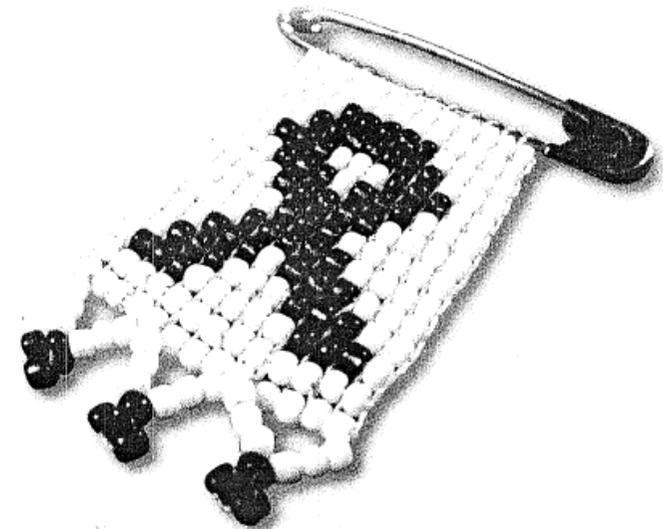
- A recent Thai study (NEJM 2004: 351;217-228) has shown low rates of transmission (1.9%) in mothers administered AZT from 28 weeks, and during labour, with a single dose of Nevirapine at the onset of labour. Babies were administered a single dose of Nevirapine (6mg po stat) within 48 to 72 hours of delivery, as well as 7 days of AZT. Mothers in this study did not breastfeed.
- The Western Cape government is currently utilising a similar regimen, but commencing AZT at 34 weeks

# Revision of pMTCT

Gold medal	Triple therapy 2008	< 2 % transmission risk
 Silver medal	Dual therapy 2004	5 - 6 %
 Bronze medal	sdNVP 2002	14 - 16 %
 "Out of the race" - no VCT or unbooked	Cannot offer ARVs	20 - 40%

# PMTCT PROTOCOL FEBRUARY 2008

- encourage mothers to test and have CD4
- HAART (AZT /3TC/NVP) for CD4 < 200
- mother CD4 count > 200 :
  - AZT 300mg bd from 28 weeks (since April 2007 was 34)
  - Labour: AZT 300mg 3 hourly + single dose of nevirapine 200mg
- Baby:
  - Nevirapine syrup stat within 72 hours
    - >2Kg – 0,6ml (6mg)
    - <2Kg – 0,2 ml (2mg)
  - Then
  - AZT syrup for 7 days
    - >2kg 1.2 ml b.d. (12mg b.d.)
    - <2kg 0.4 ml/kg bd (4mg/kg b.d.)



sdNVP = single dose nevirapine

*National Department of Health*

# Nevirapine Concerns

## Resistance:

- implications for subsequent treatment
- increased resistance in community
- some trials showing 20-60% resistance with cross resistance to efavirenz. Resistance seems to drop off between 6-12 months post exposure.
- nevirapine has a long half-life – still in the body for 4 weeks after single dose .... need to cover this tail with AZT and 3TC ?
- make sure patient in labour before giving

## – Hepatotoxicity:

- check ALT regularly



# My partner is HIV positive - How do we have a child?

- Discordant couples want to conceive
- HIV+ ♂ and HIV - ♀: 4 % ♀ became +  
**Unacceptable risk!**

Source: [www.i-base.info](http://www.i-base.info)

In Uganda, among sero-discordant heterosexual couples, the uninfected partner runs an estimated 8% chance of contracting HIV each year.

*Report on the global AIDS epidemic 2008, UNAIDS*

# Reproductive options

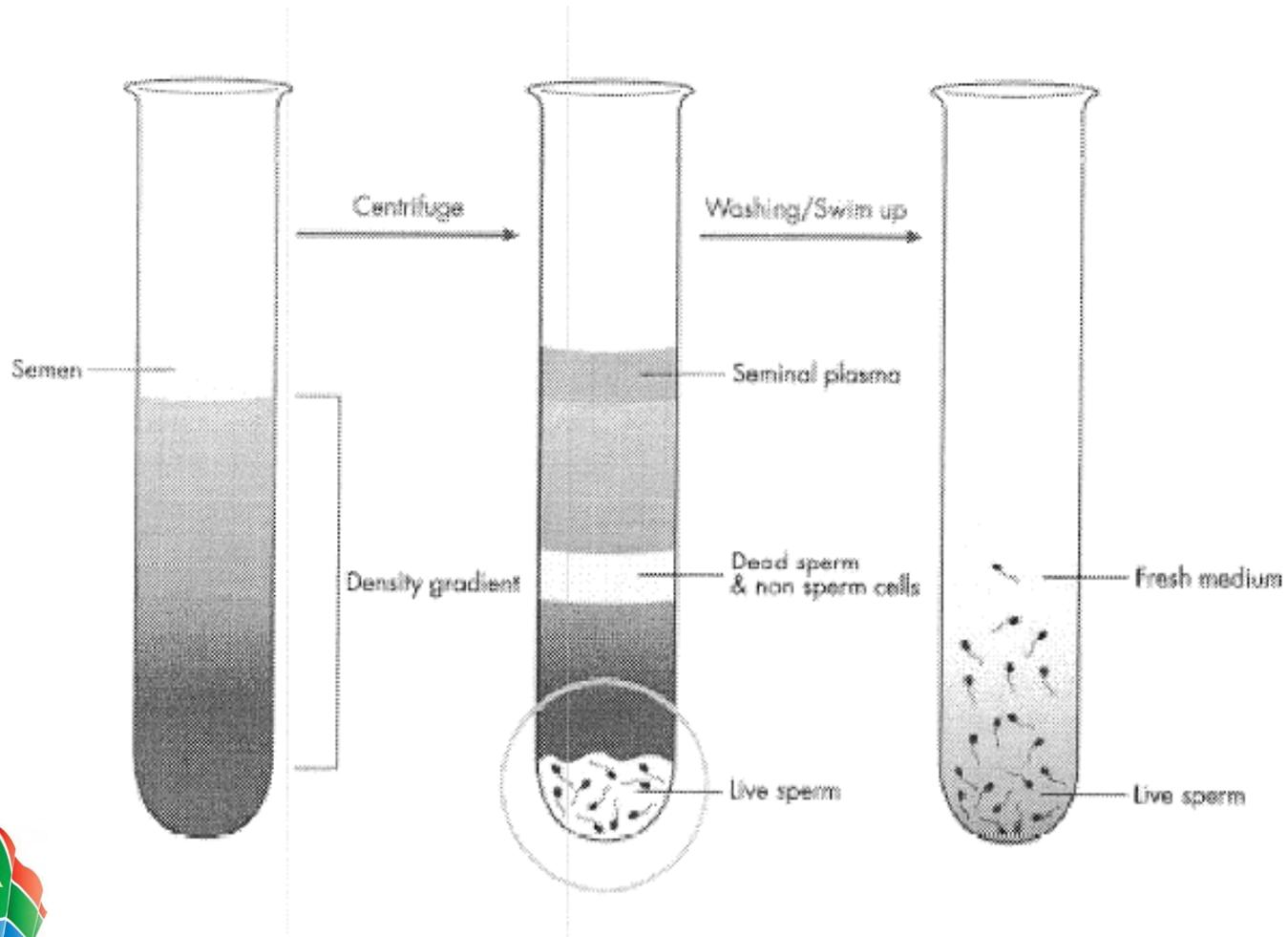
1. Timed “ conception attempt “ - unprotected intercourse 14 days prior to menses
2. for woman who is HIV positive it is much *simpler* Intrauterine insemination (IUI)
3. Using PCR technology, cell-associated HIV, and free virus can be eliminated from semen and then inserted by intrauterine insemination for ♂ HIV+ (partner HIV-) = R1500 - R2000

Source: CME December 2006

Journal of CPD – Prof. F Guidozi

CME February 2007 p.65

# Sperm washing

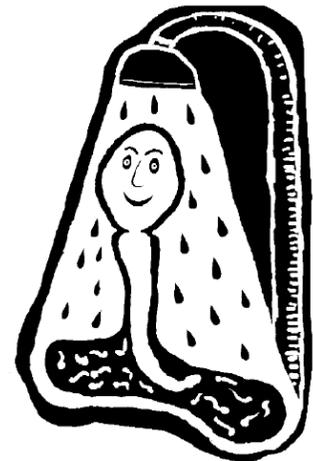


# Sperm washing

- HIV cannot attach itself to spermatozoa
- HIV found in surrounding fluid and cells
- semen centrifuged to separate out live sperm from surrounding fluid and cells
- then carry out a very sensitive test on washed sperm to check it is HIV negative
- successful pregnancy results
- similar to HIV negative individuals

[www.creathe.org](http://www.creathe.org)

[www.i-base.org](http://www.i-base.org)



# Reproductive options

4. Intra-cytoplasmic sperm injection – one mature spermatozoon is inserted into an oocyte obtained by ovulation induction. The oocyte is exposed to only one spermatozoon as opposed to millions when IUI is used. The fertilised ova are then transferred back to the uterus
5. For a man who is HIV+, can use donor sperm if partner HIV-
6. Adoption\*

\* WC = 27 500 maternal orphans, 125 000 paternal orphans, 13 900 double orphans

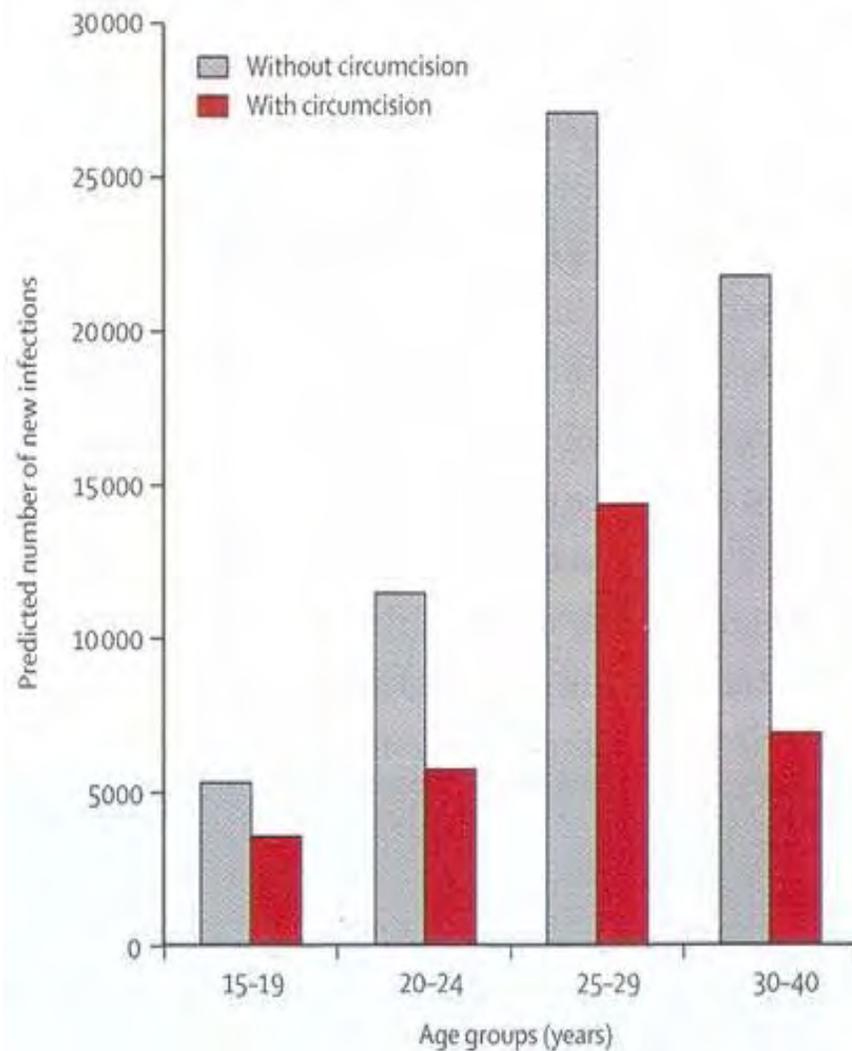
# Circumcision

- is it the silver bullet in the AIDS fight ?

Prof. Jonny Meyer, Dept. of Public Health, UCT & Alex Meyers, Honours student

- value of circumcision:
  - reduces the risk of  $\text{♂}$  infection because it removes the vulnerable tissue inside the foreskin, which contains Langerhans cells ( a type of cell which is particularly vulnerable to HIV infection )
  - the area under the foreskin is also vulnerable to trauma
  - area under the foreskin can retain bacteria acquired during sex, increasing the chance that an infection will become established

Newell M-L, Barnighausen T. Male circumcision to cut HIV risk in the general population. *Lancet* 2007.



**Figure. Predicted numbers of new HIV infections in KZN, 2007**

**Results of Circumcision Trials:**

**Kisumu, Kenya** - a 53% (unadjusted) reduction, 60% (as-treated) Reduction in relative risk

**Rakai, Uganda** – a 51% (unadjusted intention to treat), 55% (as treated) reduction.

**Orange Farm, South Africa** – 60% relative reduction in HIV risk

# WHO/UNAIDS Statement

## March 28, 2007

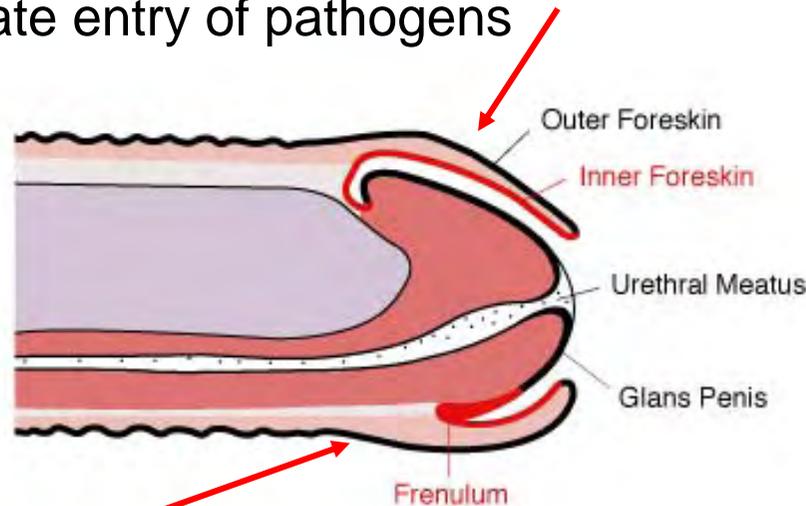
---

- “The efficacy of male circumcision in reducing female to male HIV transmission has now been proven beyond reasonable doubt. This is an important landmark in the history of HIV prevention.”
- “Scaling up male circumcision in (*certain*) countries will result in immediate benefits to individuals.”
- “Male circumcision should be considered as part of a comprehensive HIV prevention package.”
  - Including correct & consistent use of male or female condoms,
  - reductions in the number of sexual partners,
  - delaying the onset of sexual relations
  - and abstaining from penetrative sex

# How the foreskin increases risk of infection

## Thinly keratinized mucosal layer of inner foreskin

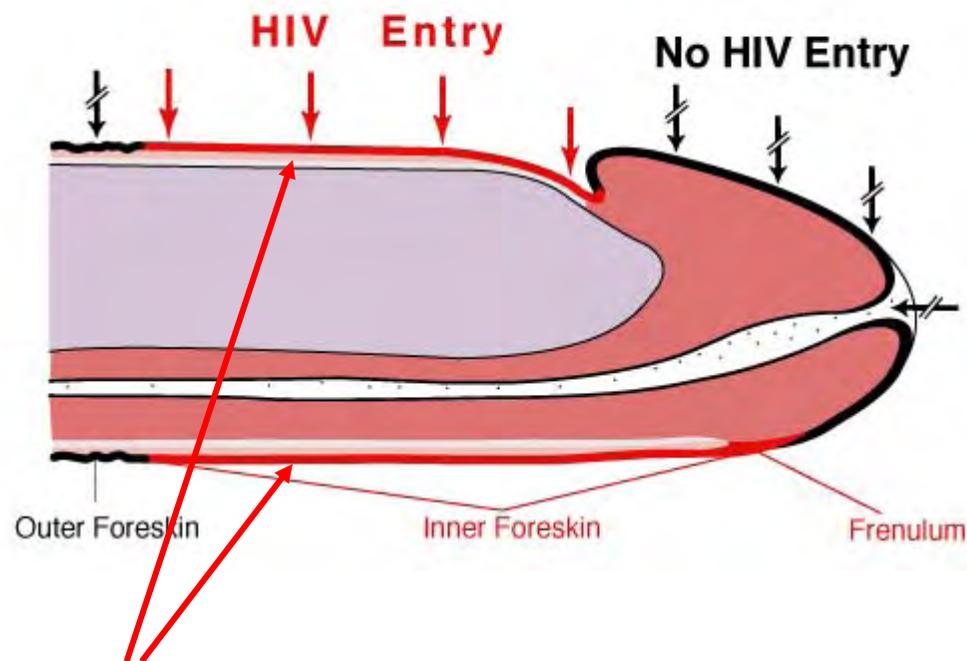
- susceptible to minor trauma and abrasion
- can facilitate entry of pathogens



Area under foreskin is warm, moist environment, suitable for pathogen replication

The HIV prevalence was greater in those with subpreputial penile wetness 126 of 190 (66.3%) compared with 90 of 196 (45.9%) with no penile wetness, crude prevalence odds ratio 2.32 (95% [CI], 1.54-3.50,  $p \leq 0.001$ ). [O'Farrell et al, JAIDS 2006 Sep;43(1):69-77]

# Schema of erect uncircumcised penis with foreskin retracted



Inner mucosal layer of inner foreskin is exposed

# Statistics

- 20 -30% of men worldwide are circumcised  
WHO ,March 2007
- 20% ♂ in southern Africa are circumcised
- 50 - 80% in East Africa and 80% for the rest of Africa
- Swaziland rarely circumcised but now groundswell of interest with blanket ♂ circumcision, also now interest in Botswana



# Circumcision prevalence

Africa	80%
West Africa ( Muslim-influenced )	95%
Kenya	85%
Uganda & Botswana	25%
Zambia, Lesotho, Rwanda & Zimbabwe	10 – 15%

Data gathered between 1967 and 2004, less known about variations within countries according to ethnic groups, CME, Oct 2006

# HIV and circumcision

- renewed interest now with published reports:
- RCT by Auvert in Public library of Sciences
- 2 recent trials in Kenya and Uganda
- SA Orange Farm Intervention Trial, *The Lancet*
  - Results: 50-60% reduction in HIV transmission in heterosexual population

# Debate?

- circum. ♂ will result in longer period of time and more sexual encounters before he becomes infected
- if people are lead to believe that circum. is “protective” → counter-productive and lead to behavioural disinhibition and abandonment of preventative methods
- NB to allow healing of scar prior to renewing sexual activity
- Impact on cultural behaviour

# Summary



- evidence for the preventive benefit of a mass circumcision campaign is rather modest and does not support its practice on a large scale
- ♂ circum. ↓ risk of HIV infection of males through ♀ to ♂ transmission, but reverse unproven

**Combination prevention must be the strategy for HIV prevention**

# Rape

- common in SA – often violent with increased trauma, therefore ↑ chance of transmission of virus
- extrapolate PEP protocols
- Standard treatment

AZT 300mg + 3TC 150mg bd for 28 days

- High Risk treatment
  - multiple perpetrators
  - anal penetration
  - obvious genital trauma
  - known HIV + status of perpetrator

AZT 300mg + 3TC 150mg bd + Kaletra 400mg/100mg bid for 28 days

# Alleged Sexual Offenders

- “the victim or interested person on behalf of the victim may apply to a magistrate for an order that the alleged offender be tested for HIV & the results thereof be disclosed to the victim or interested person and to the offender”
- “if the alleged offender has not been tested for HIV, the magistrate must order that the alleged be tested for HIV “

# Two out of five male pupils in SA raped, survey shows

Cape Times Aug '08

LONDON: Two out of five male South African pupils say they have been raped, according to a study suggesting sexual abuse of boys is endemic in the country's schools.

The survey, published in Bio-Med Central's International Journal for Equity in Health, showed that boys were most frequently assaulted by adult women, followed closely by other schoolchildren.

"This study uncovers endemic sexual abuse of male children that was suspected, but hitherto only poorly documented," Neil Andersson and Ari Ho-Foster of The Centre for

Tropical Disease Research in Johannesburg wrote.

The findings underscored the need to raise awareness about the rape of male children, and they urged further efforts to prevent sexual violence in South Africa, the researchers said.

Another problem is that the prevalence of rape is hampering efforts to combat Aids in a country at the epicentre of the global pandemic.

"There is increasing recognition of links between sexual abuse and high-risk attitudes to sexual violence and HIV risk," the researchers wrote. "Sexually abused children are also more

likely to engage in HIV high-risk behaviour."

The survey carried out in 1 200 schools across the country asked 127 000 boys aged between 10 and 19 if they had ever been sexually abused and, if so, by whom.

Forty-four percent of the 18-year-olds said they had been forced to have sex in their lives and half reported consensual sex.

About a third said they had been abused by males, 41% by females and 27% said they had been raped by both males and females.

Abuse by fellow males was

more common in rural areas, while attacks by women happened mainly in cities, the study found. There was also a big disparity between provinces, with Limpopo – among the poorest – showing the highest abuse rates and Western Cape the lowest.

This type of study, based entirely on the response of participants, has limitations because there are no ways to verify whether people exaggerate or withhold information, the researchers acknowledged.

Even so, they say the findings may actually understate the level of sexual violence. – Reuters

# National list of crimes of violence

- *reported* rape statistics for SA decreased by 7.9% this year
- 39 304 (2006) → 36 190 (2007)
- ± 100 per day
  
- W/C 4217 (2006) and 4000 ( 2007 )
- ± 11 per day



Cape Times 30/6/2008



## Simelela Centre for Rape Survivors, Khayelitsha

- disturbing pattern of violence in CPT township (mainly Site B)
- WC has the second highest prevalence of rape in SA, with 149.5 per 100 000 people raped every year
- opened in 2005, 442 rape survivors in first 6 months, youngest 1 year old and oldest 69 years ( most > 18 years )
- Police stats 55 114 reported rape in SA in 2005

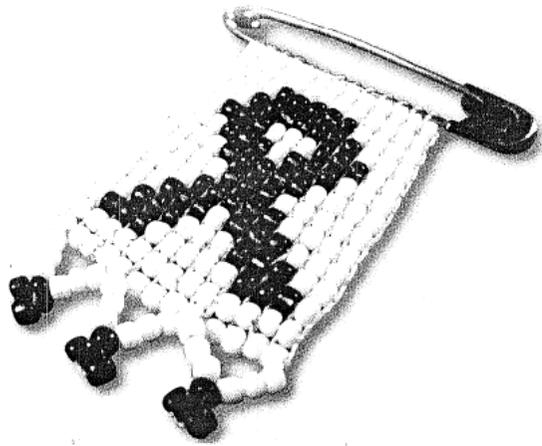
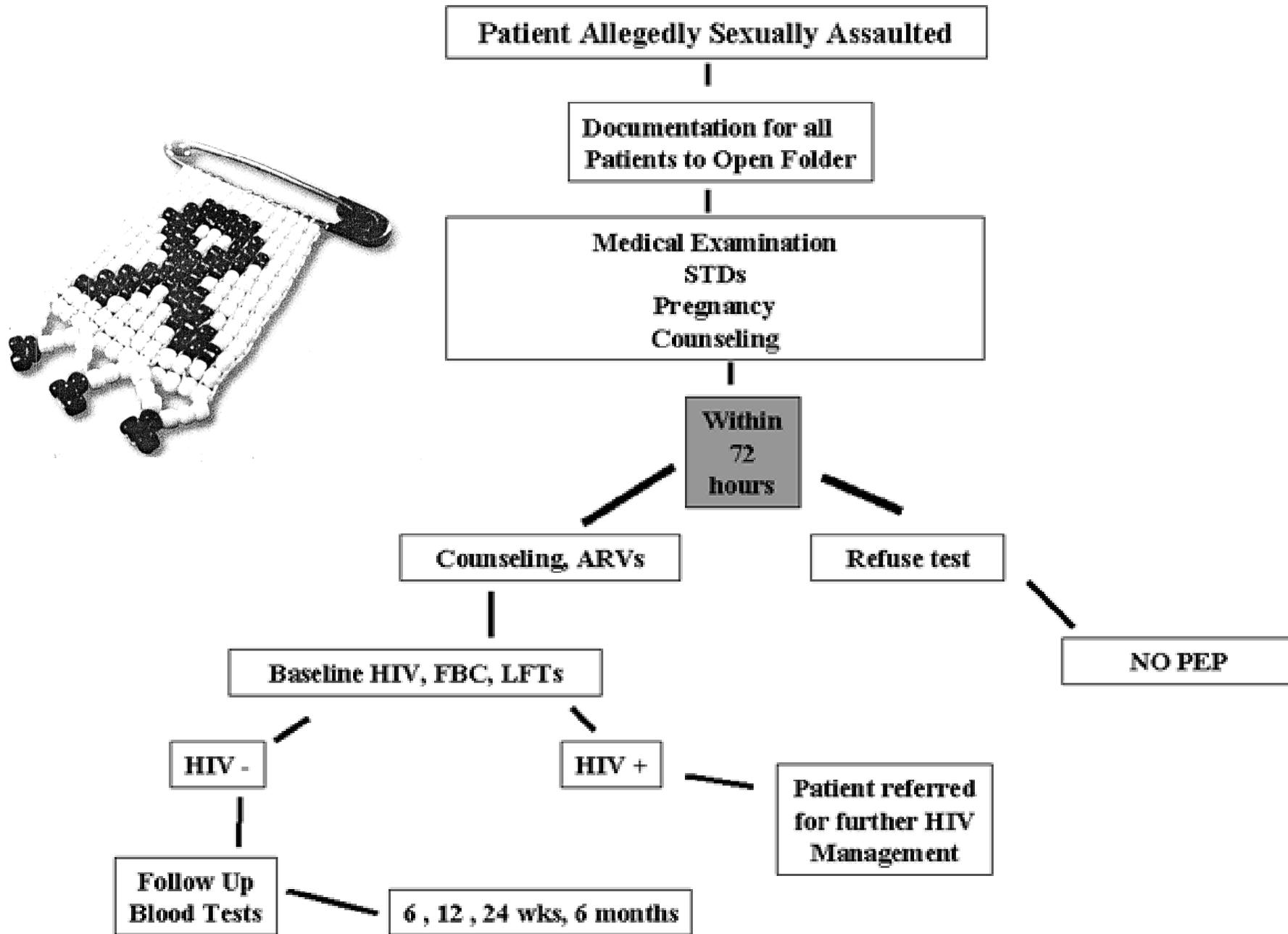
\*Thuthuzela Rape Centre established at G F Jooste

\* Rape Centre at Karl Bremer

Cape Times, 31 March 2006

# Rape - considerations

- traumatised yet needs HIV test
- multiple medications
  - emergency contraception
  - STI treatment
  - ARV's



# Golden rules

- Never use NVP for post-exposure prophylaxis [ people with high CD4 >250 ]- high risk for development of drug-induced hepatitis
- National Strategic Plan ( NSP )

# Books and References

- Southern African Journal of HIV Medicine  
– published every 3 to 4 month  
Tel: 011- 663 6300
- *The Clinical Practice of HIV Medicine* - by  
Dr D C Spencer 2005
- *Handbook of HIV Medicine* – Oxford Press  
2004  
SAMA Tel: 021-530 6527 / 51 R250

# Books and References

CME - The SA Journal of Continuing Professional Development  
(CPD)

" Antiretrovirals " May 2005

WHO website - [www.who.int](http://www.who.int) ( free ! )

1. Guidance for national TB programmes on the management of TB in children
2. WHO case definitions of HIV surveillance and revised clinical staging and immunological staging of HIV related disease in adults and children
3. ARV therapy of HIV infections in adults and children ( 2006 )

**Thank you  
for your  
attention...**



**ark**  
absolute return for kids



**Department of Health**  
*Republic of South Africa*



SOUTH AFRICANS AND AMERICANS  
IN PARTNERSHIP TO FIGHT HIV/AIDS



**USAID**  
FROM THE AMERICAN PEOPLE