DETECTION OF PRIMARY OR EARLY HIV-1 INFECTIONS IN PRETORIA – (preliminary results)

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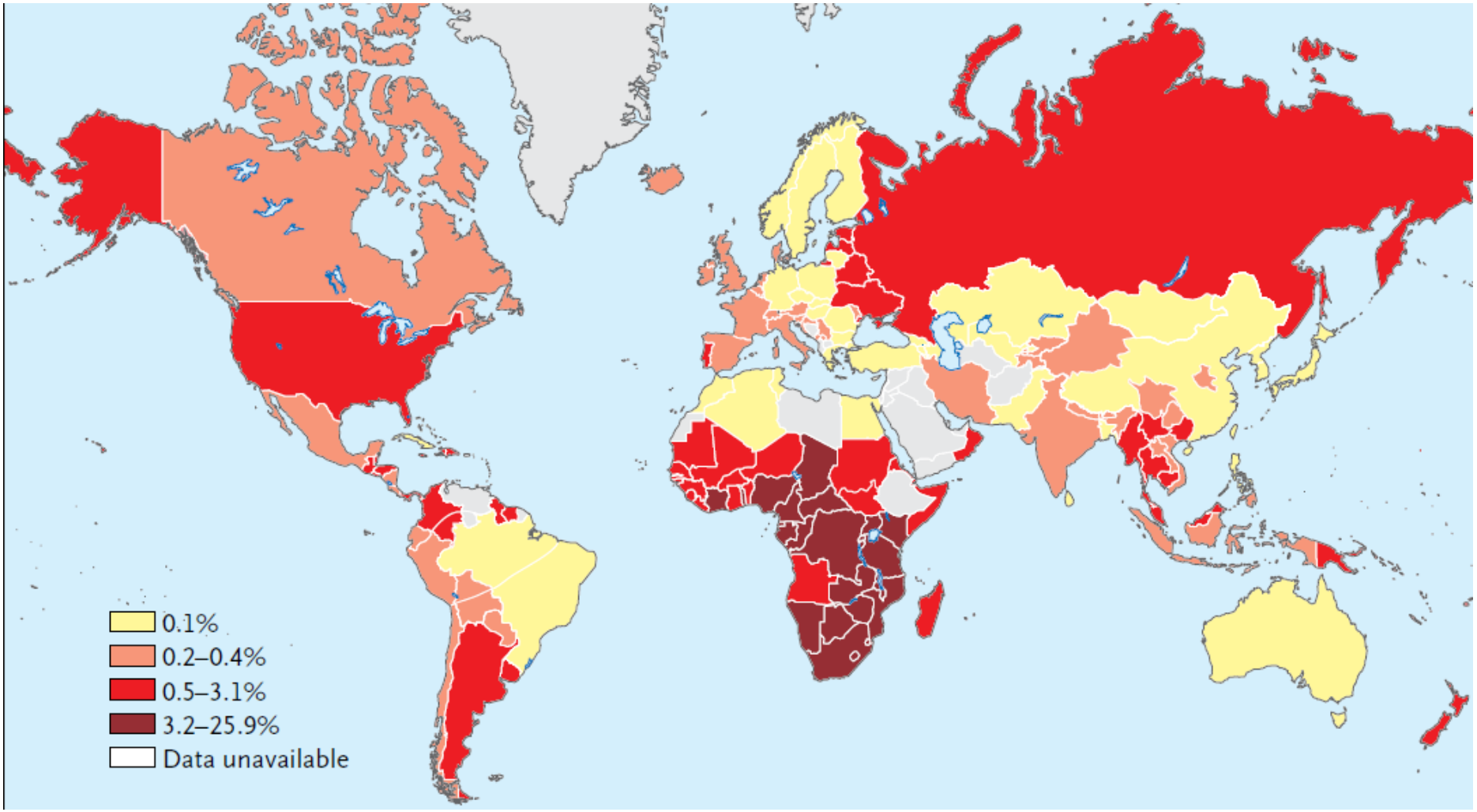
GLOBAL HIV Prevalence (Population Age 15 – 49, 2009)



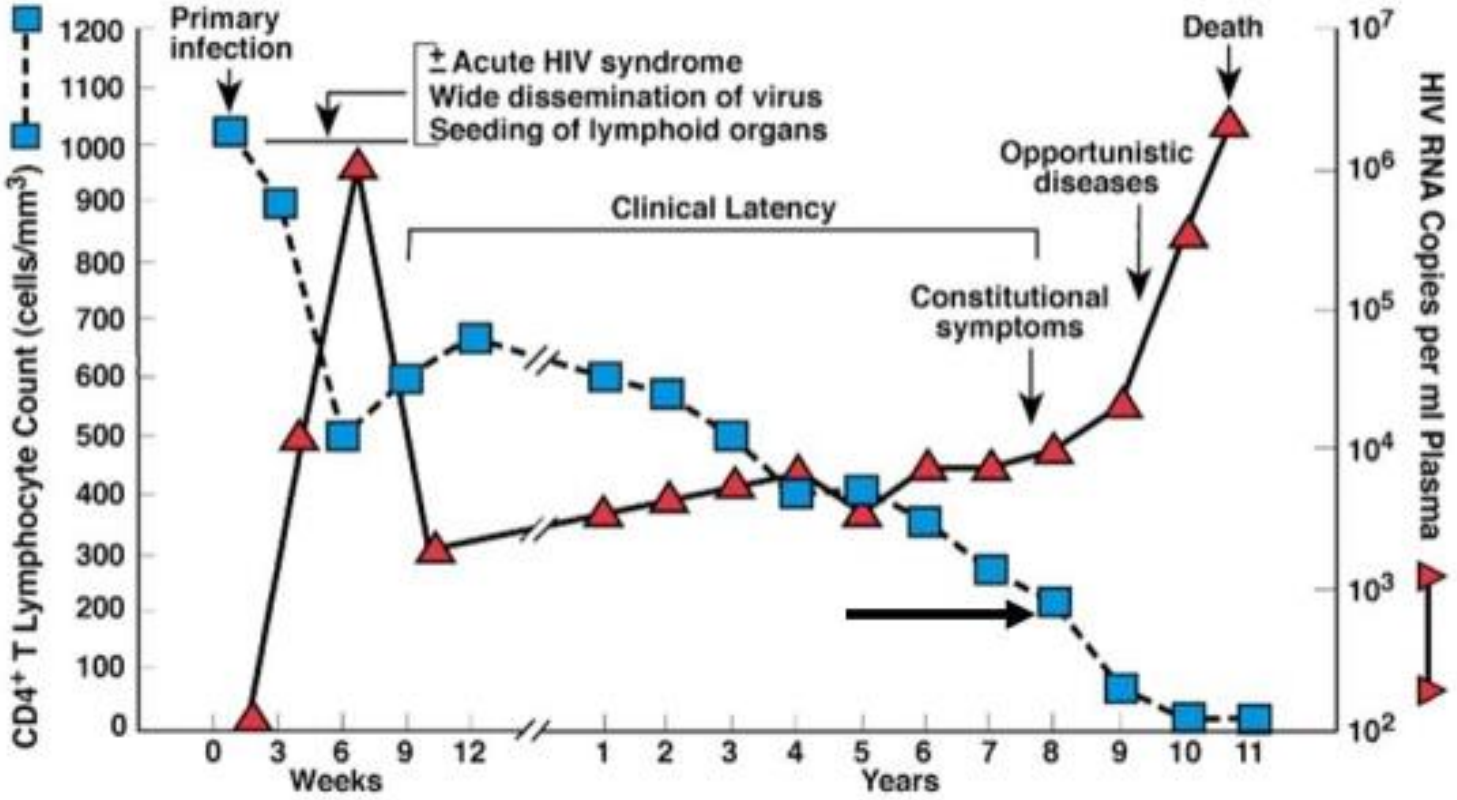
Kourtis AP, et al. N Engl J Med 2012; 366 (19)1749 – 52.

PRIMARY (ACUTE) HIV INFECTION

- Primary HIV infection (PHI)
  - is defined as the interval between the time of infection with HIV and that of detectable antibodies (~3 - 12 weeks)
  - extremely high levels of infectious virus are detectable in serum and genital secretions and persist for 10 – 12 weeks
  - the rate of transmission during PHI is ~26 times as high as that during established HIV infection
  - can account for 10%–50% of all new HIV infections, especially in the context of high sexual partner concurrency or high rates of partner change

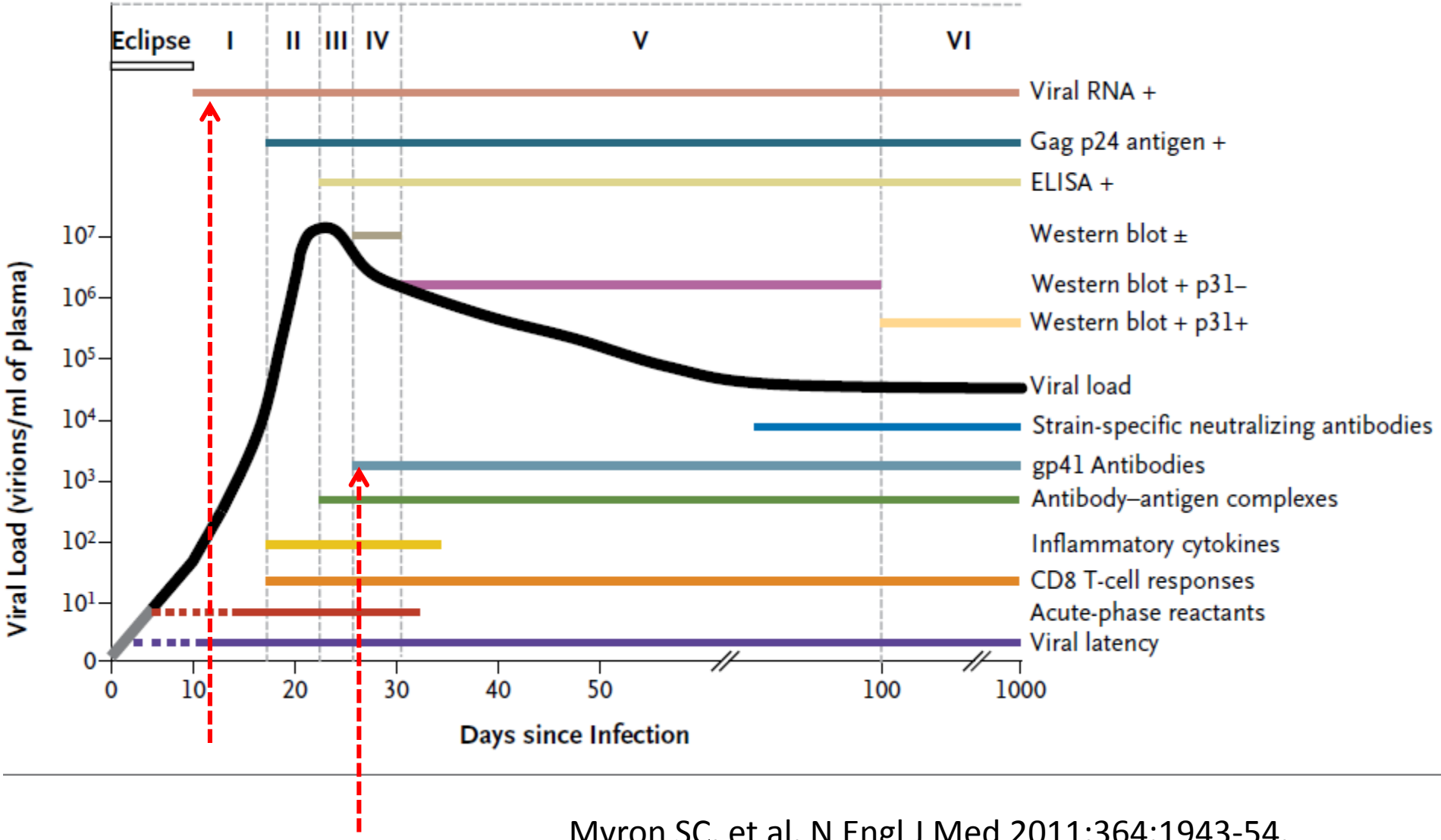
Branson BM. JAIDS 2010; 55: S102–S105.

Typical Course of HIV Infection



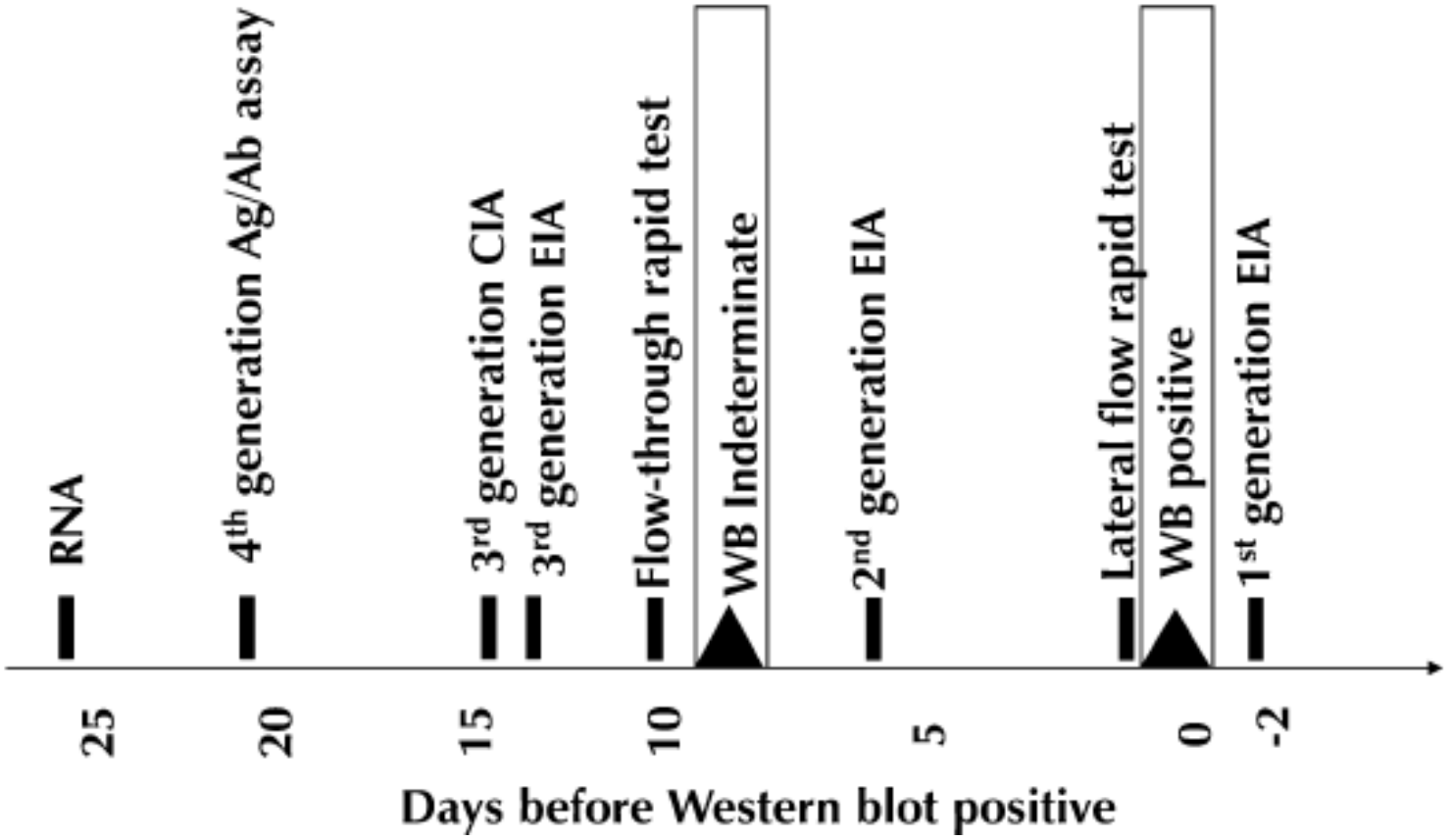
Modified From: Fauci, A.S., et al, *Ann. Intern. Med.*, 124:654, 1996

FIEBIG'S STAGING OF PHI



Myron SC, et al. N Engl J Med 2011;364:1943-54.

HIV ASSAYS vs WESTERN BLOT



Branson BM. JAIDS 2010; 55: S102–S105.

STUDY AIM

- To assess the burden of primary HIV infections in VCT clinics around Pretoria.

Objectives

- To use pooled nucleic acid testing (pNAT) to detect the presence of PHI in individuals who test negative on rapid HIV tests.
- To subtype detected PHIs and check their ARV resistance profile.
- To assess if a questionnaire tool that captures HIV risk behaviour can be used to predict PHIs

MATERIALS AND METHODS

Study design and sample size:

- This is a cross-sectional study that will enroll about 4000

Study duration:

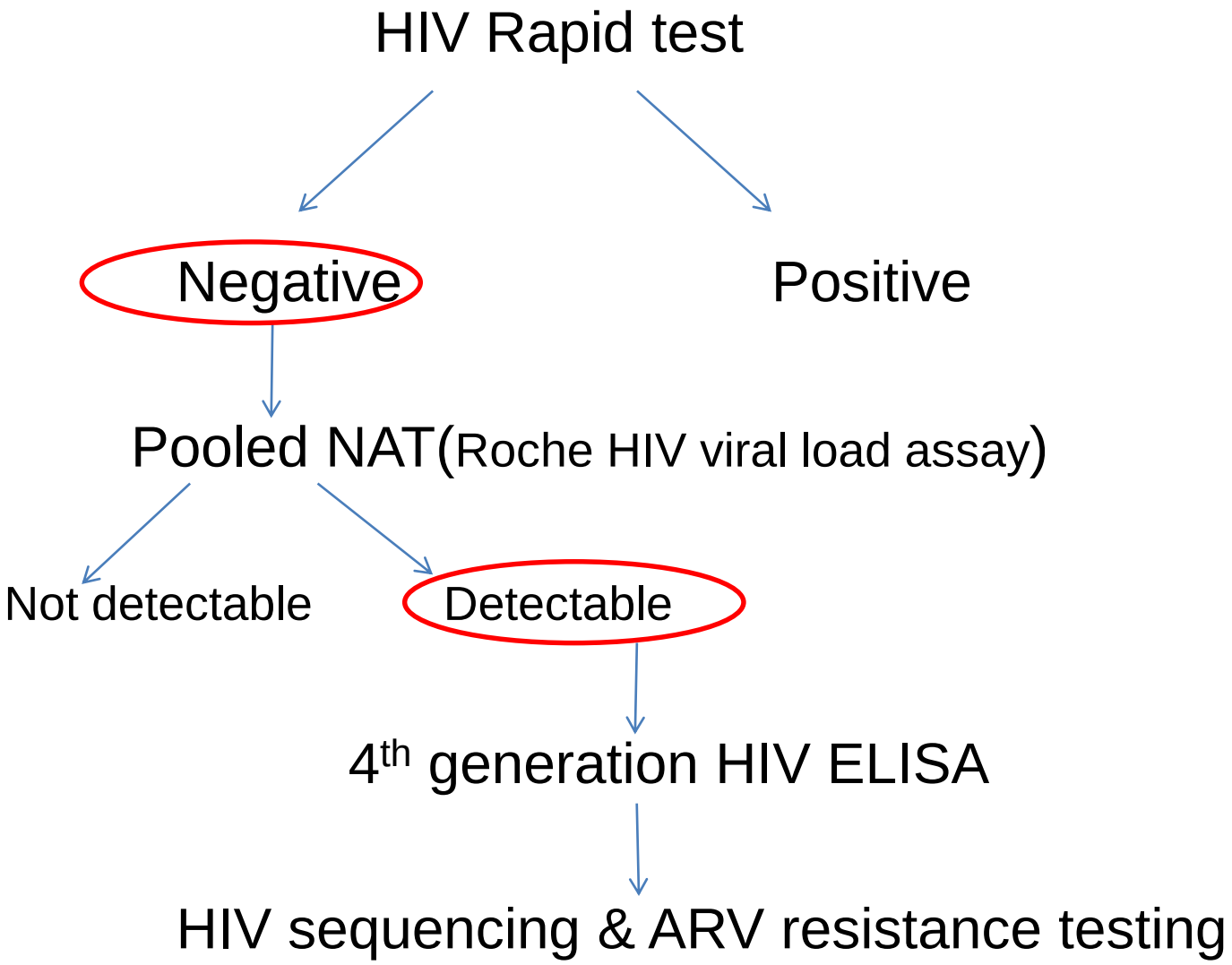
- This study is expected to last for a period o
  from 2012 – 2014).

Study sites:

- Tshwane district hospital VCT clinic
- FF Ribiero clinic
- Skinner clinic

Study documents:

- Consent form and questionnaire (HIV risk behaviour)


HIV Rapid test
Negative
Positive
Pooled NAT(Roche HIV viral load assay)
Not detectable
Detectable
4th generation HIV ELISA
HIV sequencing & ARV resistance testing

POOLED NUCLEIC ACID TESTING (pNAT)

200µl plasma from each tube

LOWER DETECTION LIMITS OF HIV MOLECULAR ASSAYS (in plasma) USED IN NHLS LABORATORIES IN **2012**

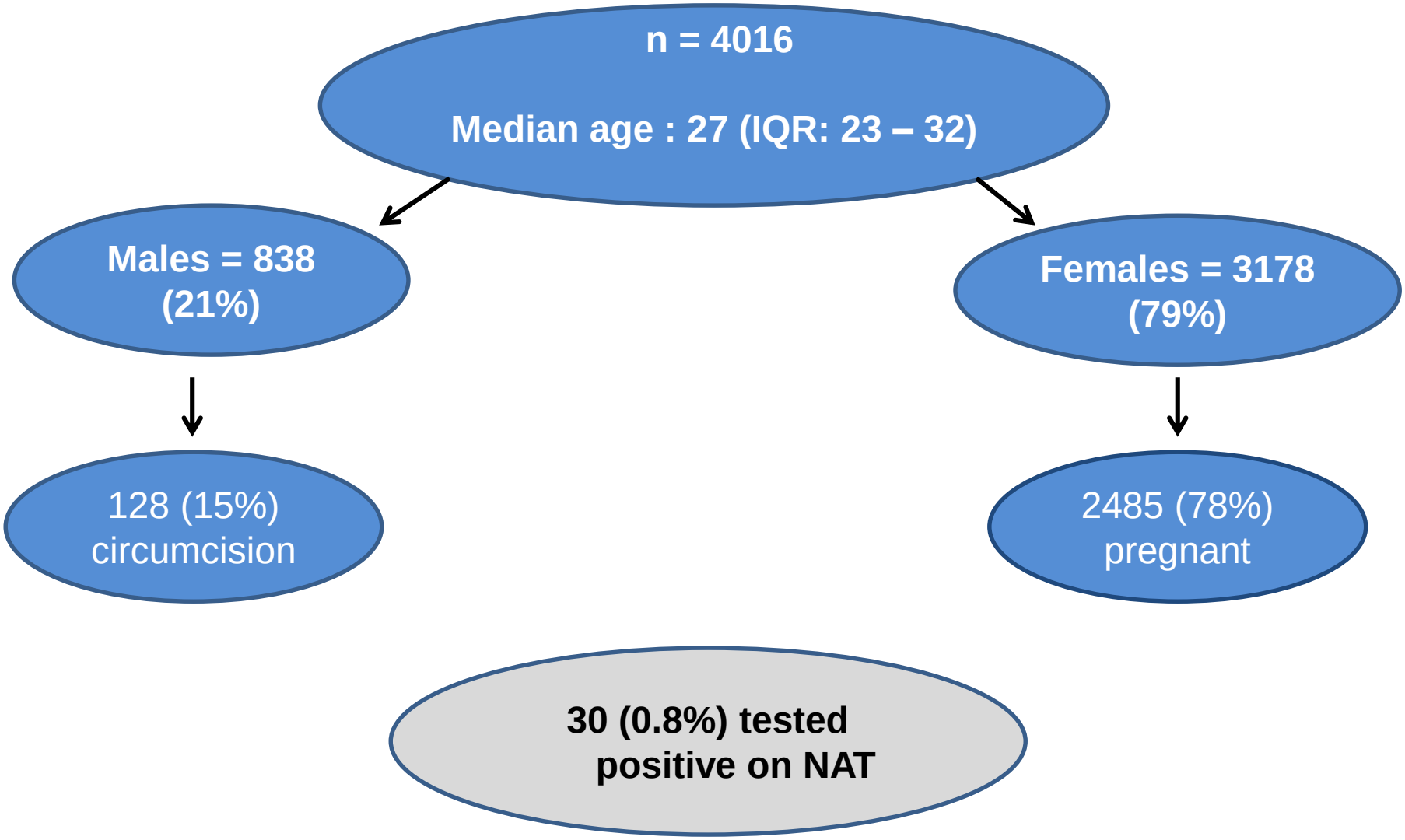
Qualitative HIV PCR (Roche CAP-CTM): 514 copies/mL

Abbott HIV viral load assay (m2000): 40 copies/mL

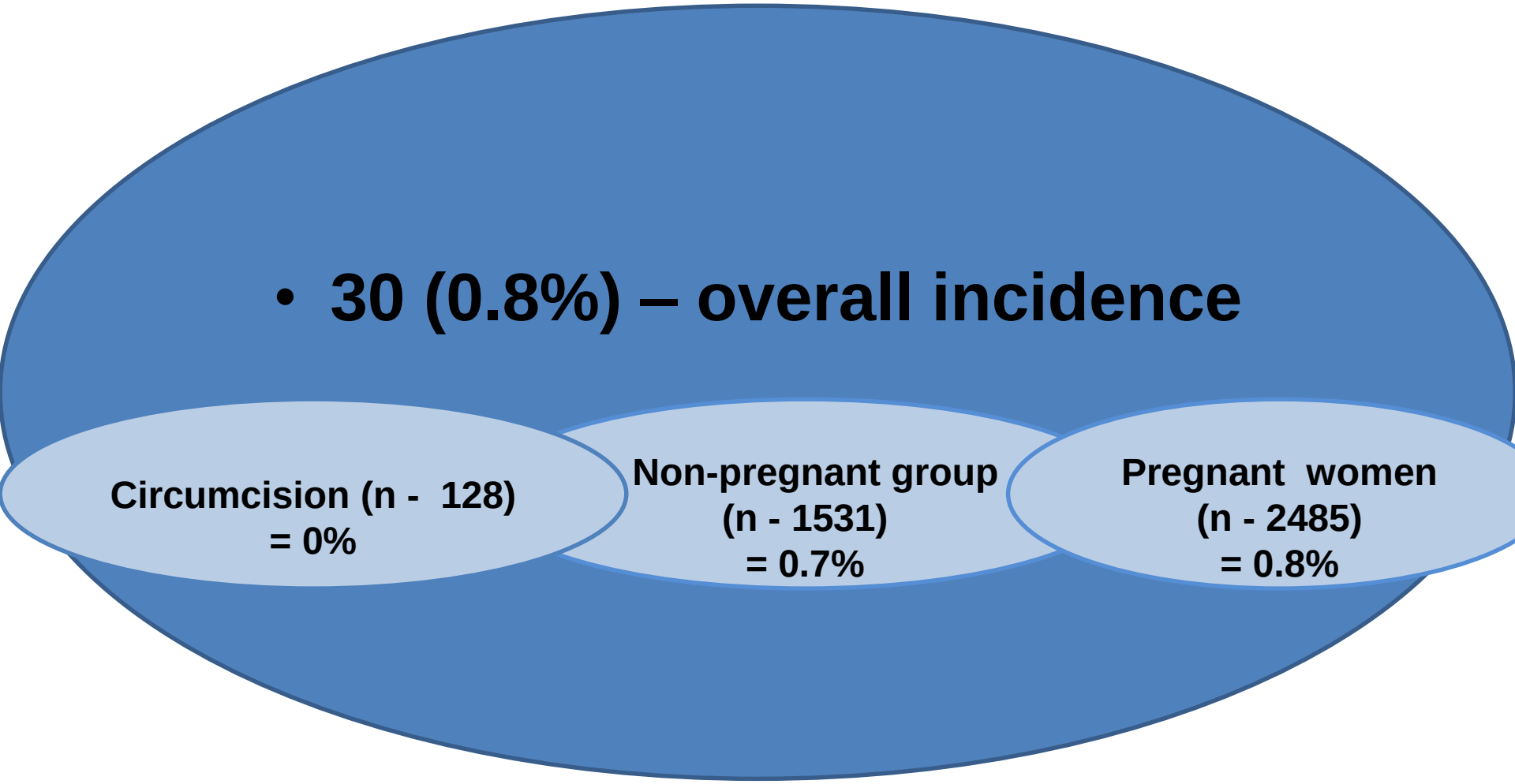
Roche HIV viral load assay (CAP-CTM v2): 20 copies/mL

1. Stevens W, et al. J Clin Microbiol 2008; 46 (12) 3941–3945.
2. Roche and Abbot HIV viral loads packages inserts.

PRELIMINARY RESULTS
(March 2012 – mid Sep 2014)



INCIDENT HIV INFECTIONS IN STUDY SUBGROUPS



SUMMARY OF POSITIVE PARTICIPANTS (n = 30)

- All participants had **negative HIV rapid tests** at enrolment

Pregnant women	Non-pregnant group
19	11 (7 females)

HIV viral load levels	$\leq 10^2$	10^3	10^4	10^5	10^6	$>10^7$
n	3	7	13	4	1	2

- 4th generation HIV ELISA performed – first 15 participants
  - all tested positive except for one
  - HIV antibody and p24 antigen will be tested separately later

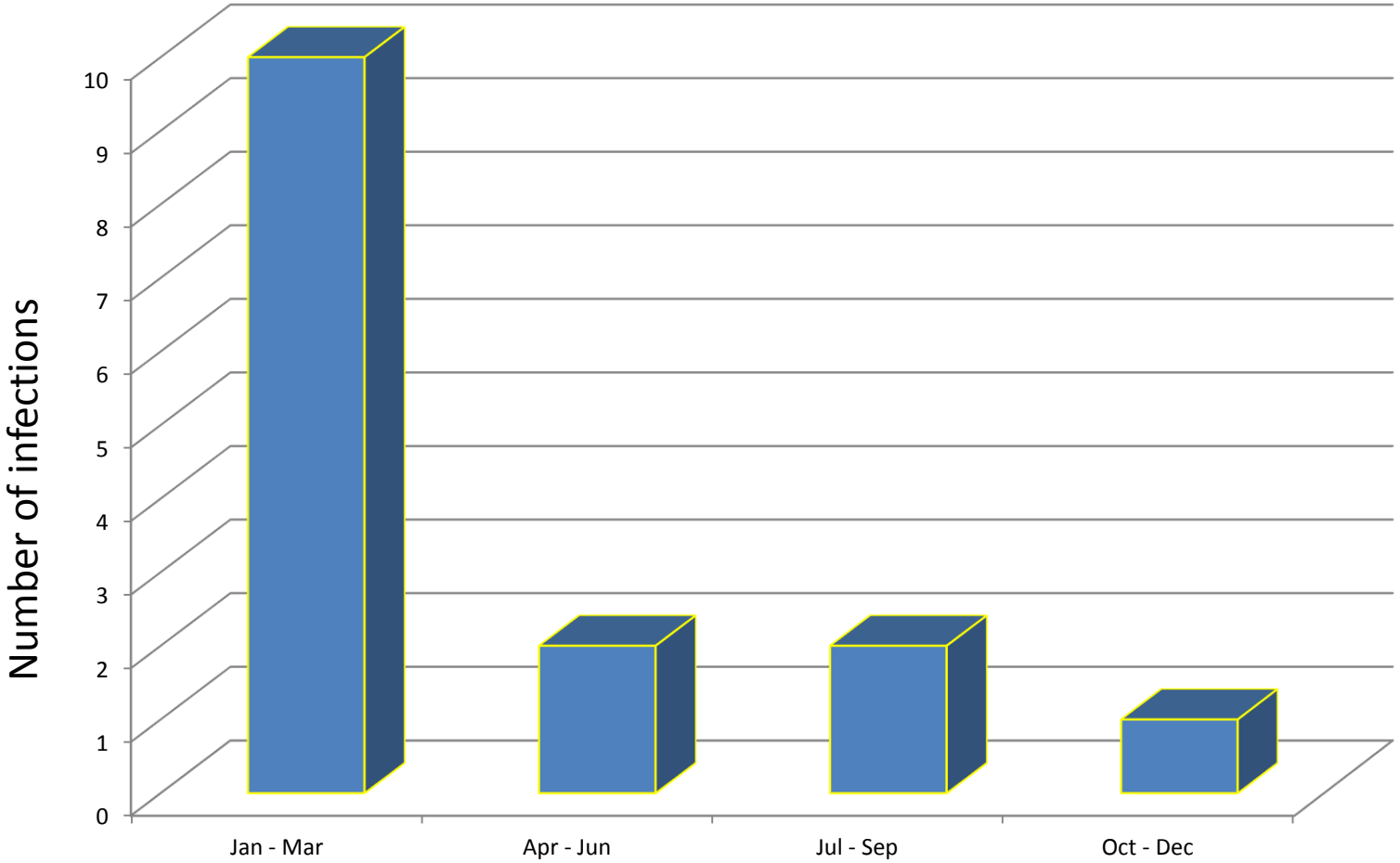
TIME INTERVAL TO POSITIVE RAPID TEST

- 21 participants had follow up rapid HIV test
  - all tested positive except for one

2 – 6 weeks	7 - 14 weeks
n = 15	n = 6*

* = 1 tested negative at 10 week follow up

SEASONS AND PHI INFECTIONS
(March 2012 - Feb 2014)



FREQUENCY OF CONDOM USE (n = 4014)

Never (n = 1857, 46%)	Sometimes (n = 1936, 48%)	Always (n = 221, 6%)
Gender: M – 353 F – 1504	M – 371 F – 1565	M – 114 F – 107
Marital status distribution		
S - 818 M - 1028 D – 11	S - 1690 M - 236 D – 10	S - 195 M - 19 D – 7
Incident HIV infections: 13	17	0

Marital status and infections:

Single: 23 **Married:** 6 **Divorced:** 1

PRIMARY HIV INFECTION INCIDENCE (measured by nucleic acid tests)

Publications	Country	Acute HIV incidence	Sample size (rapid HIV - negative)
Pilcher CD, et al. **2005** N Engl J Med;352:1873-83.	USA	0.02%	108667
Shepard CW, et al. **2008** MMWR; CDC.	USA	0.08%	21241
Stekler JD, et al. **2009** CID; 49:444–53.	USA	0.3%	13677

CONCLUSIONS

- Feasibility of incident HIV detection in SA through the use of pNAT
- Other options of detecting these infections are:
  - HIV ELISA
  - Repeat rapid test at 6 weeks later

- A questionnaire tool can be used for prediction of incident HIV infections
- Innovative ideas are needed for promotion of condom use in SA

- Detection of incident HIV infections missed by the rapid tests has a huge potential of reducing HIV spread and prevalence

I'm ~ 95% e ffective!!!

ACKNOWLEDGEMENTS

- Study participants
- NHLS Research Trust grant
- FIDSSA-GSK grant
- MRC-SIR grant
- University of Pretoria Research assistant grant
- Virology department staff – University of Pretoria

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