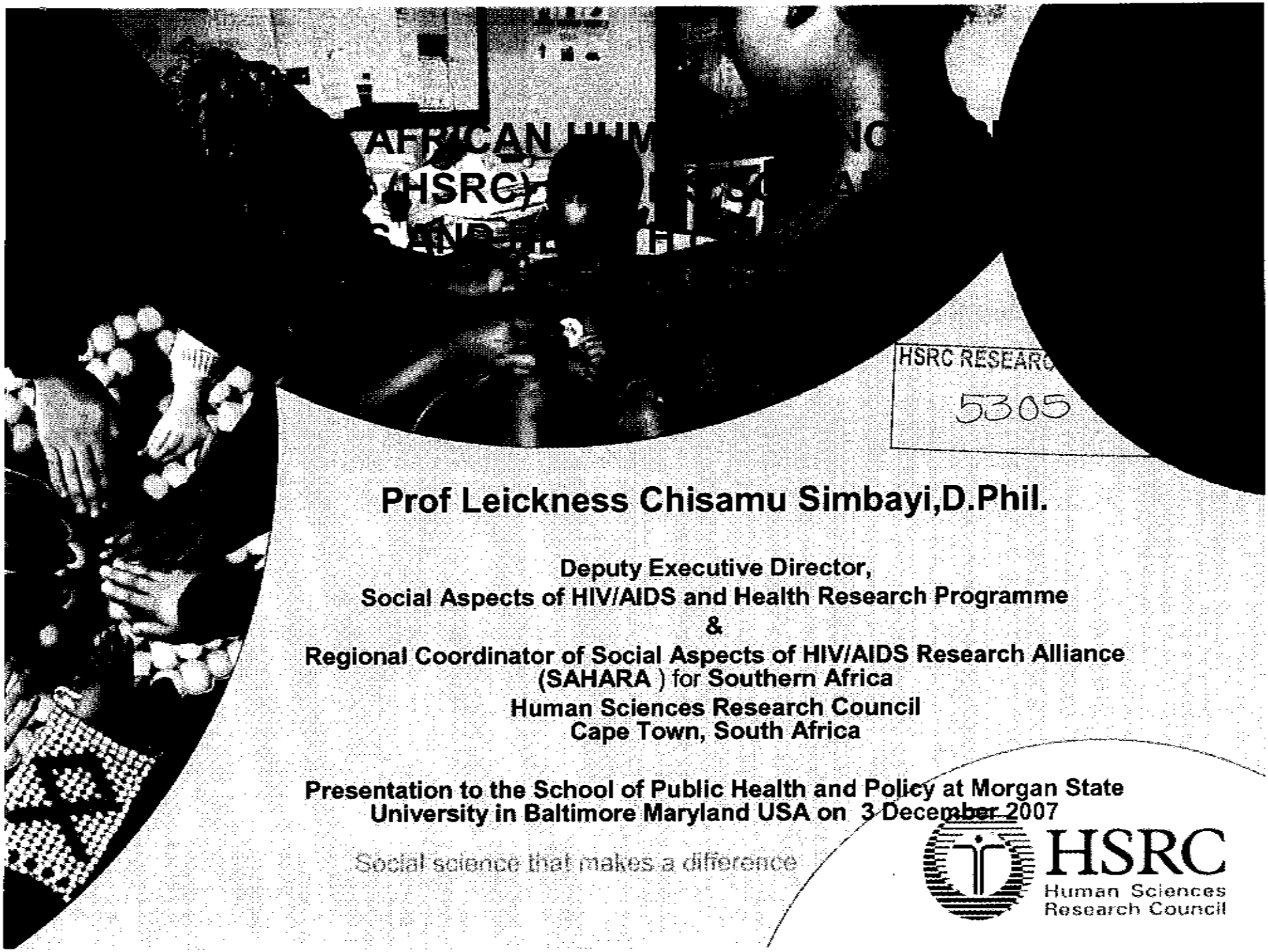

HSRC RESEARC
5305

Prof Leickness Chisamu Simbayi,D.Phil.

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Regional Coordinator of Social Aspects of HIV/AIDS Research Alliance (SAHARA) for Southern Africa
Human Sciences Research Council
Cape Town, South Africa

Presentation to the School of Public Health and Policy at Morgan State University in Baltimore Maryland USA on 3 December 2007

Social science that makes a difference

HSRC
Human Sciences
Research Council

What we do: vision and mission

- The HSRC intends to become
  - a human and social sciences research council serving as a knowledge hub
  - where public policy and discourse on current and future challenges for South Africa and the African continent are independently researched, analysed and informed, and
  - where research-based solutions to human and social problems are developed

What we do: vision and mission

- The HSRC is
  - a non-partisan organisation
  - that generates scientific knowledge through its research and analytical work in the social and human sciences,
  - to provide critical and independent information to different role players, whether in policy development, media analysis, advocacy or in debates so that they can make informed decisions

The HSRC Council

Prof. Jakes Gerwel
Chair

Dr Olive Shisana
CEO

Dr Pumla Gobodo-Madikizela

Mr Kimi Makwetu

Prof. Wally Morrow

Mr Enver Motala

Ms Phumelele Ntombela-Nzimande

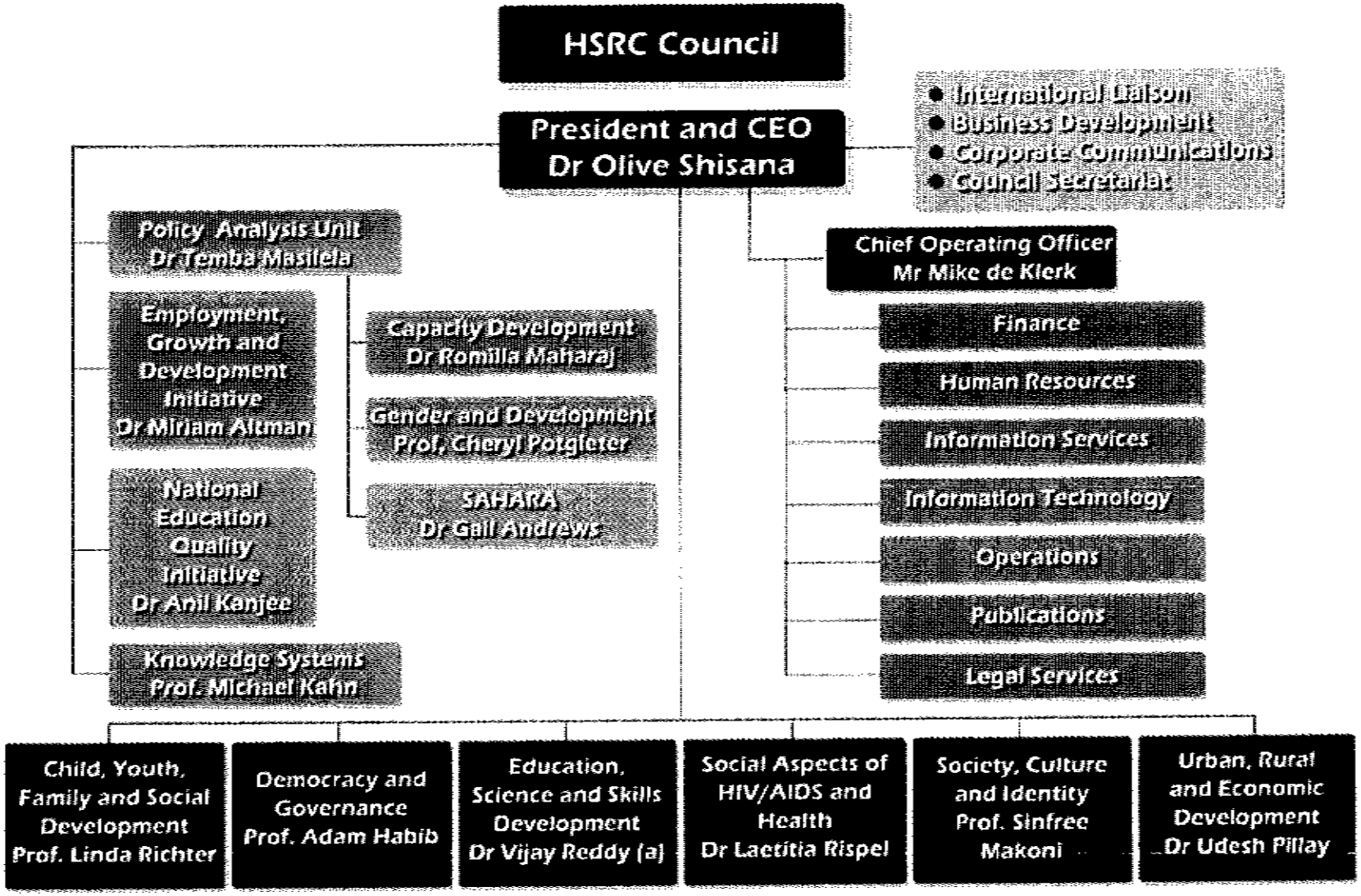
Mr Sipho Pityana

Mr Max Sisulu

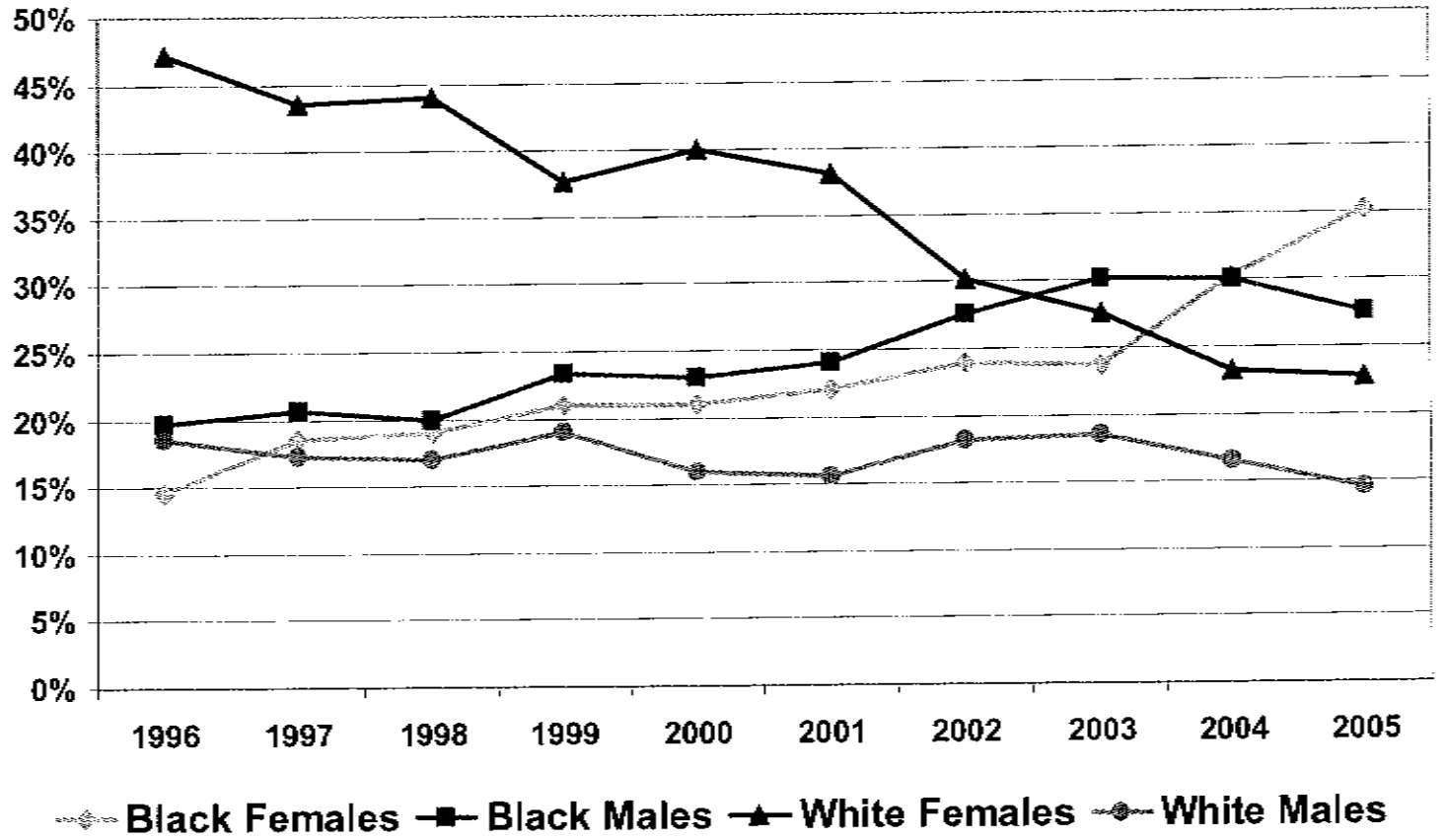
Dr Eddie Webster

Ms Nomboniso Gasa

The structure of the HSRC



HSRC broad representivity trends, 1996 to 2005



Thumbnail stats: HSRC 2005

- Staffing (63% Black, 58% female)
  - 129 researchers, mainly senior, 90% with Masters or PhD, spread across three centres,
  - 0.79 refereed journal articles per senior researcher
  - 25 interns, mostly doing Masters, some PhD
  - 136 administrative and technical support services staff

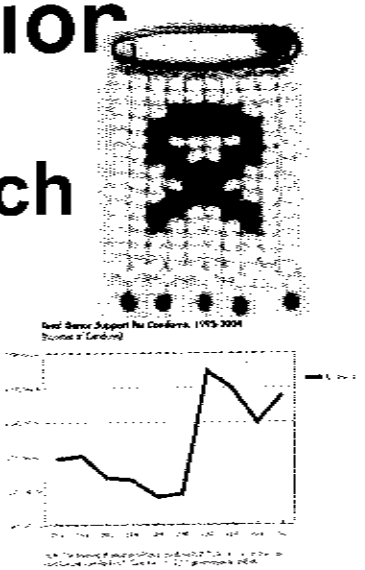
Thumbnail stats: HSRC 2005

- Earnings from foundation grants (half international) and tenders of R137m (US$22m) exceeded R79m (US$12m)Parliamentary grant
- Half of projects conducted collaboratively
- Project collaborations in some 30 other African countries
- "Blue chip" list of users especially in national, provincial and local government and public entities
- Some 350 outputs, many disseminated free on the web and widely publicised in the media; 144 journal articles

SOCIAL ASPECTS OF HIV/AIDS AND HEALTH (SAHA)

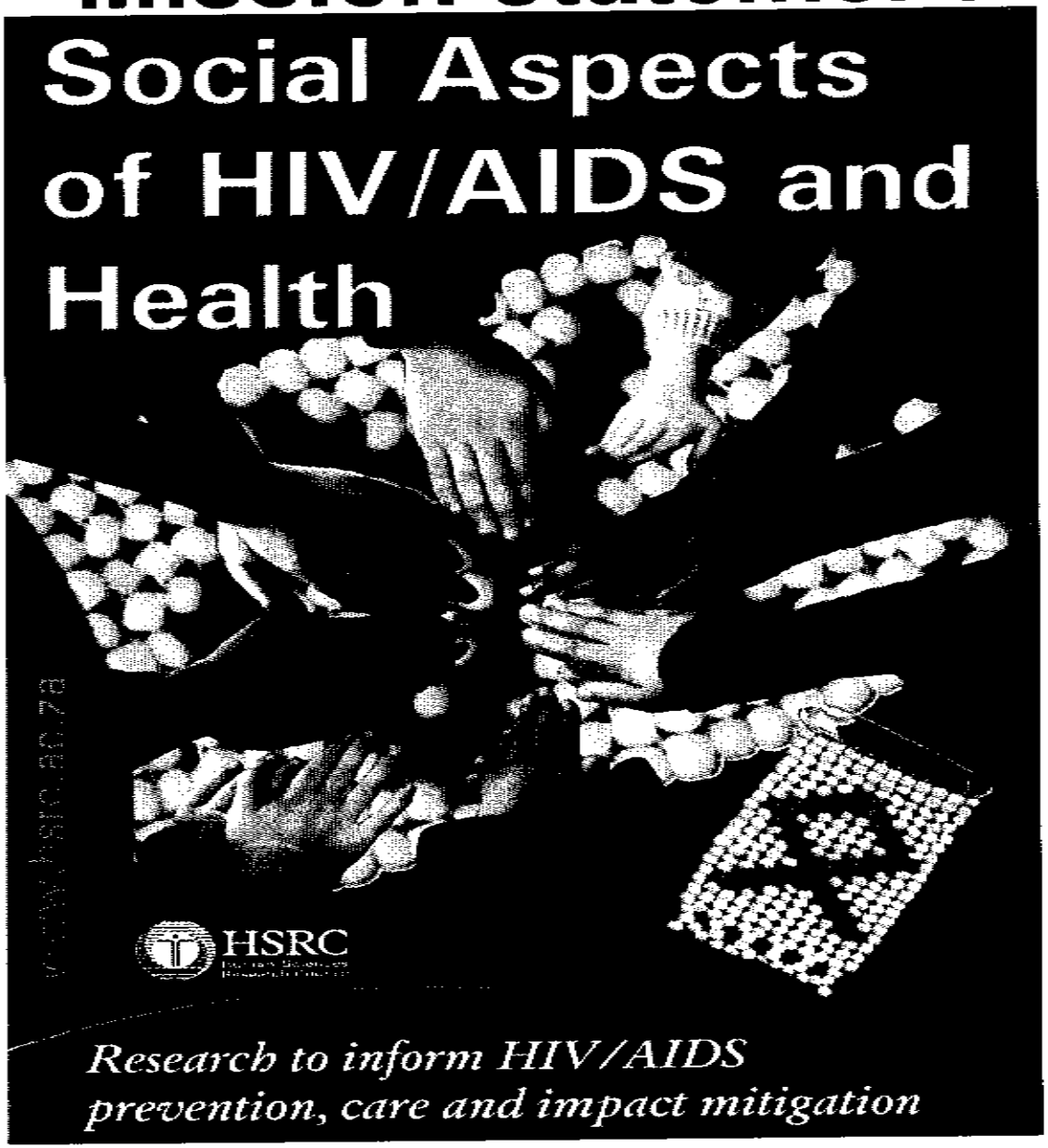
- What we do: vision and mission
- Focus areas
- Organogram of SAHA
- SAHA areas of expertise
- Staffing: Thumbnail statistics

What we do: vision and mission



- SAHA is a multi-disciplinary research programme
- Strives to undertake scientifically sound and innovative research
- Pioneered research on the social determinants of health
  - Best known for HIV/AIDS work
  - Also focus on public health in general and going beyond bio-medical paradigm

Mission statement



Focus areas

- **Behavioural and Social Aspects of HIV/AIDS**
  - Understanding social and behavioural factors driving the HIV/AIDS epidemic in South Africa as well as in other African countries as part of the SAHARA initiative.
- **Epidemiology, strategic and health policy research**
  - Infectious disease epidemiology with focus on HIV/AIDS survey methodology and epidemiological modelling
- **Health system research**
  - Research which facilitates or promotes evidence-based health care provision in both formal and traditional health sectors and examines social and demographic determinants of health

SAHA areas of expertise & networking

Expertise

- Programme evaluation
- Qualitative research (Ethnographic, focus-groups)
- Surveillance and analysis of epidemiologic trends

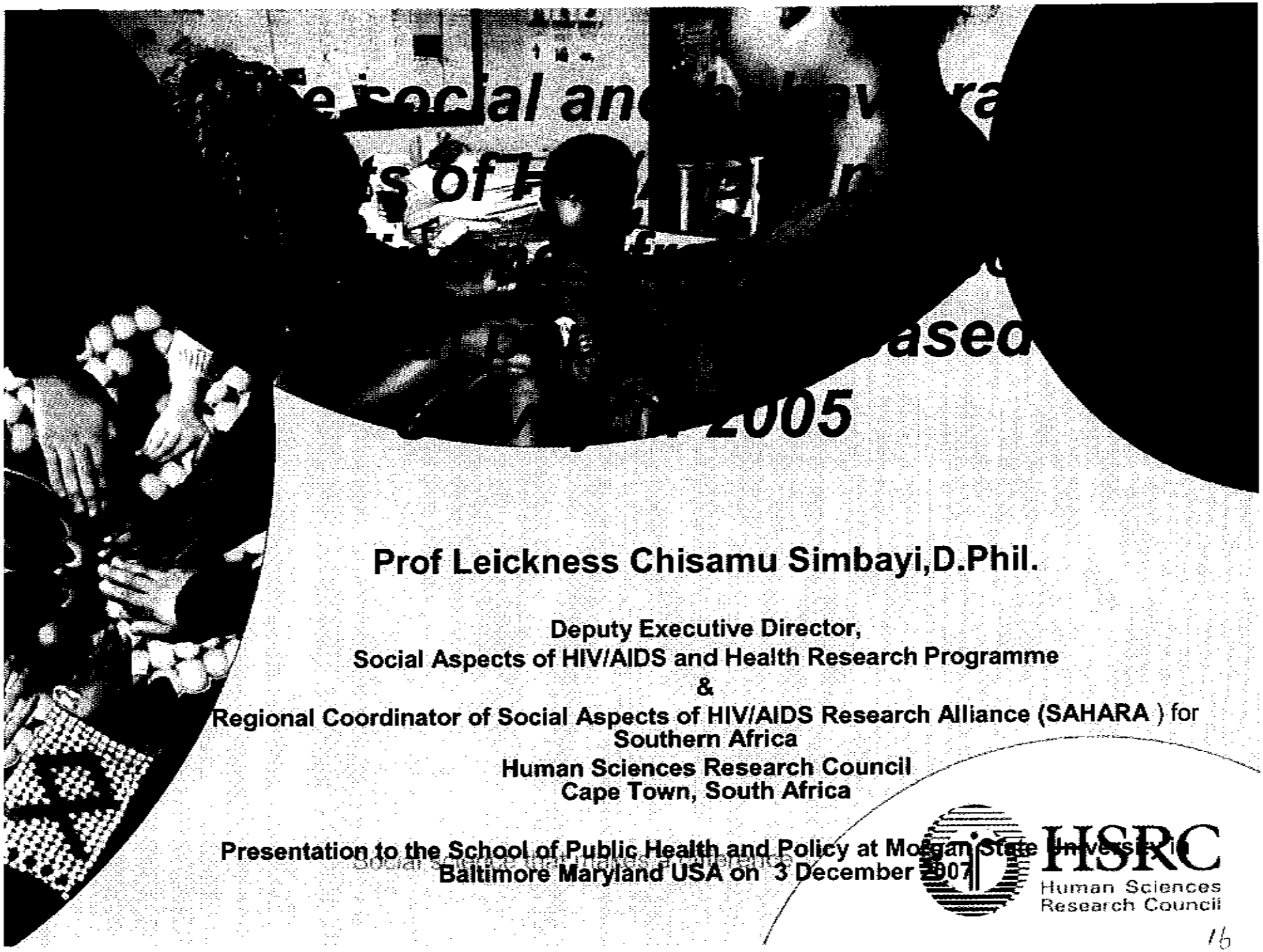
Networking

- Extensive networks
  - Nationally (researchers & other stakeholders)
  - Continental Africa (SAHARA)
  - Internationally (bilateral)

Staffing: Thumbnail statistics

- **At end of December 2006, 50 FTEs (both permanent and contract), but excluding fieldworkers**
- **86% Black (EEA)**
- **56% women**
- **8% admin**


THANK YOU



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HSRC
Human Sciences Research Council

Outline of presentation

- About South Africa
- Background to the study
- The HSRC's population based survey methodology
- Some key findings on HIV prevalence
- Some key findings on HIV incidence
- Some key findings on the associations between HIV prevalence, HIV incidence and some behavioural and social factors
- Conclusions
- Recommendations

About South Africa

- It is located at the southern tip of the African continent.
- It was the last country on the African continent to gain its independence or majority rule under the leadership of Mr Nelson Mandela.
- It is the most economically developed country in Africa with many natural resources such as platinum, gold, uranium and diamonds, fauna especially game animals and flora as well as rich in agriculture.
- The population consists of 48 million people - 87% Black (African, coloured & Indian) and 13% White.

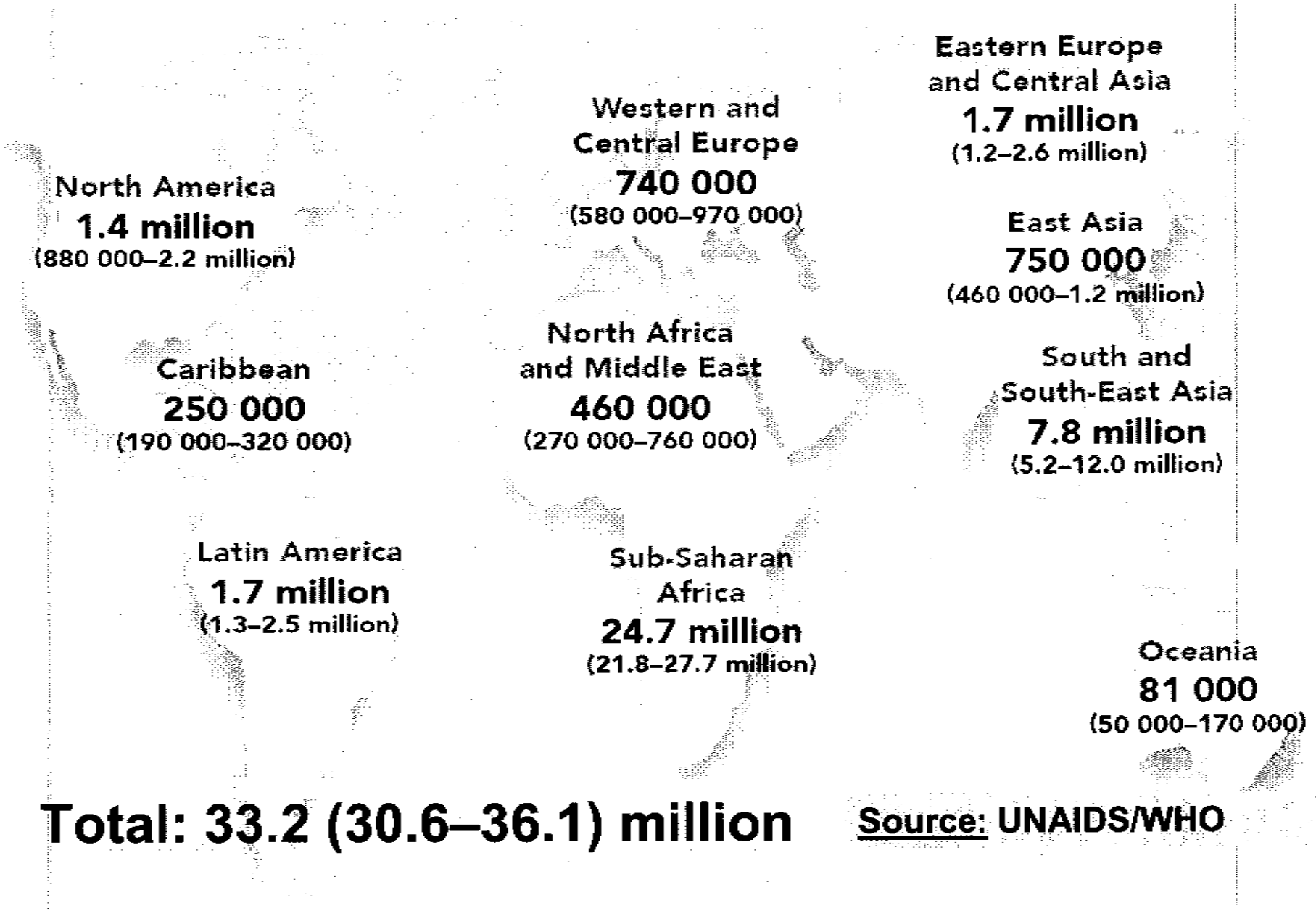
Background

- HIV is hyperendemic in South Africa with an estimated 5.7 million PLWHA - the largest number of PLWHA in a country in the world
  - This represents about 20% of the African total or
  - One out of every six PLWHA in the world

- It is therefore critically important to understand the magnitude of the epidemic and its determinants

- This information is useful for planning national responses including for the following:
  - treatment and care for PLWHA
  - interventions to prevent new infections and
  - mitigating the impact of the HIV/AIDS epidemic especially among families and children.

Global update on the numbers of adults and children estimated to be living with HIV in 2007



Total: 33.2 (30.6–36.1) million

Source: UNAIDS/WHO

Background to the study (contd)

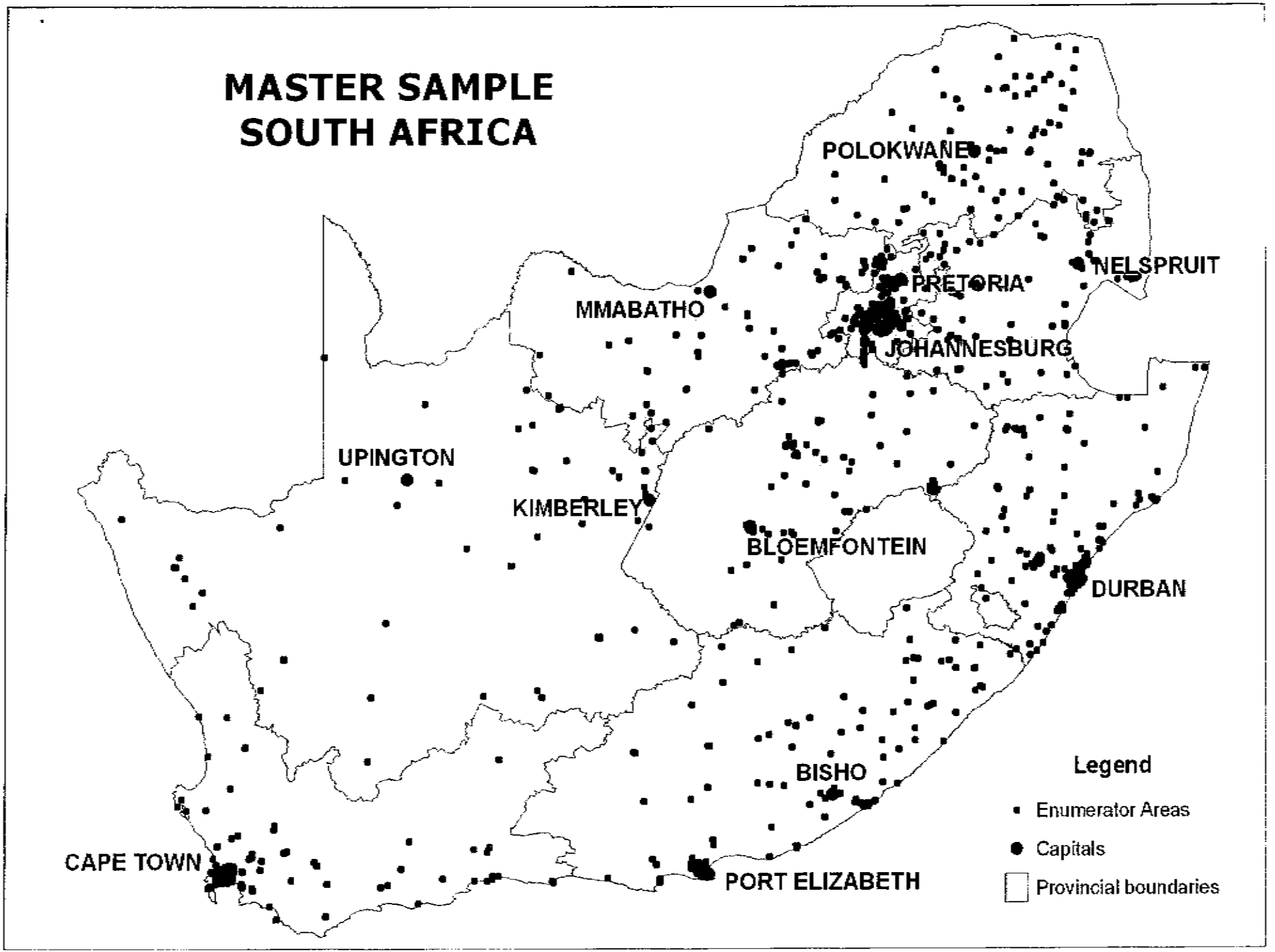
- The present study is a follow up to an original study conducted in 2002 using the same methodology
- This was the first national population based repeat survey anywhere in the world.
- This time series of surveys is now part of the national HIV/AIDS surveillance system and is used by UNAIDS to populate indicators for South Africa.

The HSRC's population-based survey methodology

- A cross sectional population based survey of the entire South African population aged 2 years and older living in households

- Sample included people living in hostels, but excluded prisoners, military and police barracks, university residences, patients in hospitals and children under 2 years of age

- Sampling is based on a master sample of households developed by the HSRC based on 1000 randomly selected EAs out of the 86000 used in the 2001 census in South Africa


MASTER SAMPLE
SOUTH AFRICA
POLOKWANE
NELSPRUIT
PRETORIA
MMABATHO
JOHANNESBURG
UPINGTON
KIMBERLEY
BLOEMFONTEIN
DURBAN
BISHO
CAPE TOWN
PORT ELIZABETH
Legend
Enumerator Areas
Capitals
Provincial boundaries

The HSRC's population-based survey methodology (contd)

- This sample is stratified by province and geotype of EA
- In 2002 an oral specimen collection device was used, whereas in 2005 dried blood spots (DBS) were taken through finger pricks
- DBS allowed for incidence testing
- Similar questionnaires used in both surveys
- The study uses the second generation surveillance approach recommended by UNAIDS/WHO

The HSRC's population-based survey methodology (contd)

- In each household one person is randomly selected from the following three age groups:
  - 2-14 years (children)
  - 15-24 (youth)
  - 25 and older (adults)

Summary of the sample realised:

- A nationally representative sample of 23275 participants of both sexes aged 2 years of older selected from 15000 households were interviewed directly or via proxy in the case of children aged 2-11 years

- 15851 of them also provided HIV specimens for both HIV status and incidence testing.

The HSRC's population based survey methodology (contd): Response rates in 2005 vs. 2002 HSRC Surveys

Aspect of the survey	2005	2002
Household level response	84.1%	71.1%
Individuals interviewed	96.0%	73.7%
Sample of respondents tested	15,851	8,428
Interviewed and tested for HIV	65.4%	62.3%
African interviewed and tested	69.8%	64.8%
White interviewed and tested	45.3%	46.4%
Coloured interviewed and tested	72.3%	68.0%
Indian interviewed and tested	51.3%	56.1%

Some key findings on HIV prevalence

Table 3.8: Overall HIV prevalence by sex, South Africa 2005

Sex	n	HIV+ %	95% CI
Male	6 342	8.2	7.1–9.6
Female	9 509	13.3	12.1–14.6
Total	15 851	10.8	9.9–11.6

Table 3.9: HIV prevalence by age group, South Africa 2005

Age	n	HIV+ %	95% CI
Children (2–14)	3 815	3.3	2.3–4.8
Youth (15–24)	4 120	10.3	8.7–12.0
Adults (= >25yrs)	7 912	15.6	14.2–17.1
Adults (= >50 yrs)	2 787	5.7	4.4–7.4
Age group 15–49	9 245	16.2	14.9–17.7

Figure 3.1: HIV prevalence by sex and age group, South Africa 2005

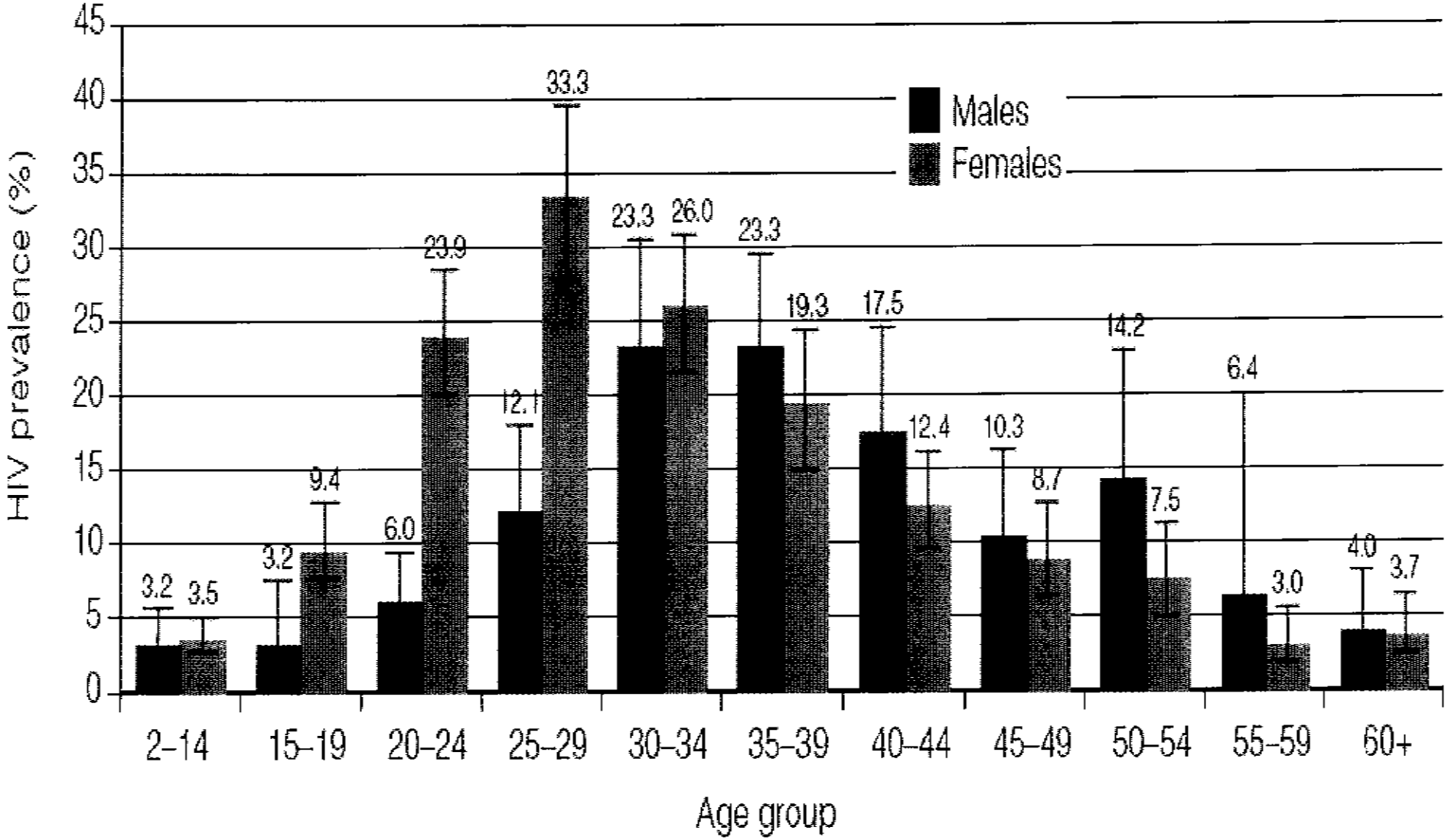


Figure 3.5: HIV prevalence among youth aged 15–24 years by sex, South Africa 2005

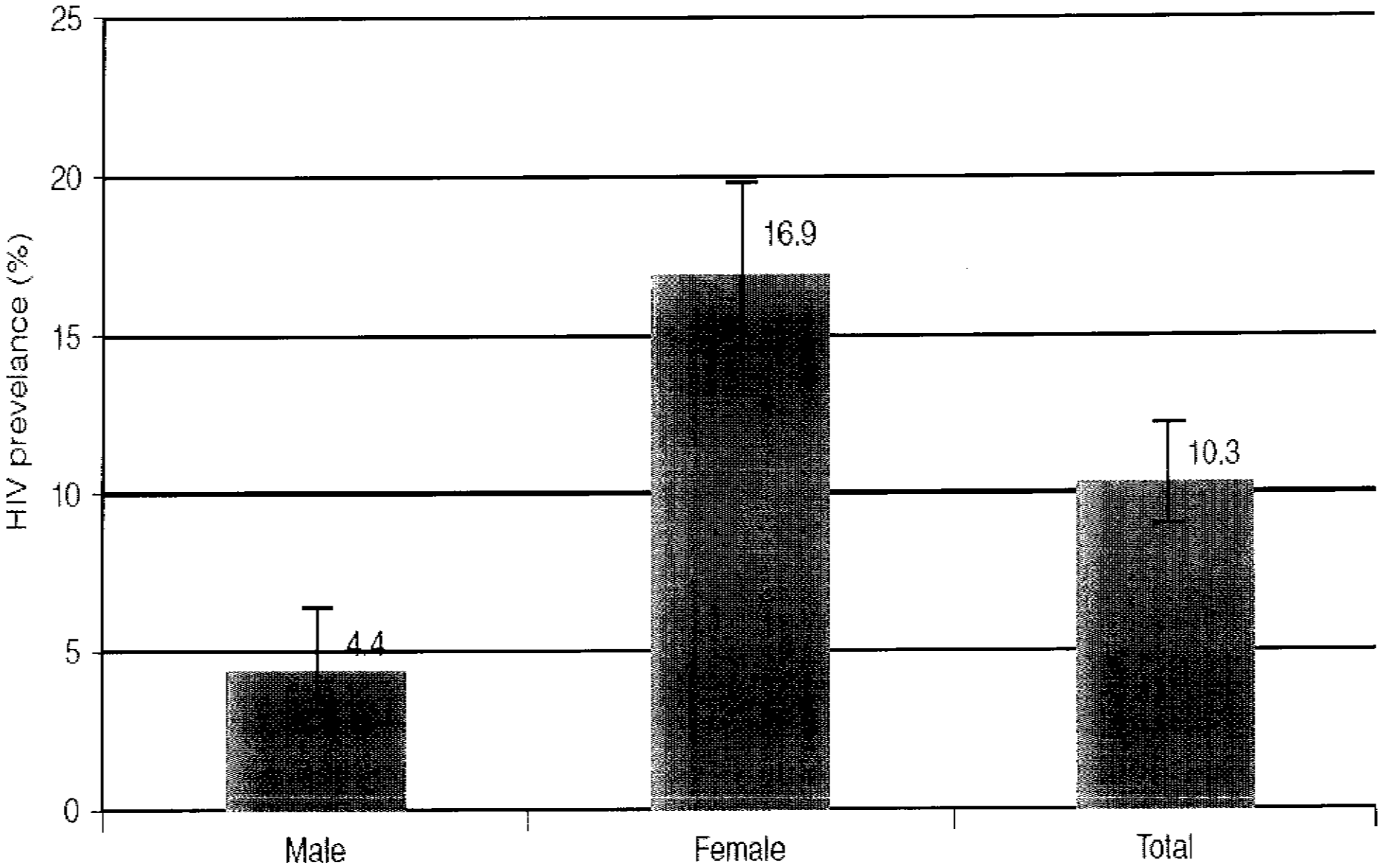


Table 3.11: HIV prevalence among youth aged 15–24 years by locality type, South Africa 2005

Locality type	n	HIV+ %	95% CI
Urban formal	2 147	6.9	5.3–8.9
Urban informal	490	17.8	13.7–22.9
Rural informal	1 088	11.1	8.5–14.3
Rural formal	395	16.7	9.3–28.1

Table 3.12: HIV prevalence among youth aged 15–24 years by race, South Africa 2005

Race	n	HIV+ %	95% CI
African	2 707	12.3	10.4–14.4
White	219	0.3	0.1–1.2
Coloured	867	1.7	0.9–2.9
Indian	321	0.8	0.2–3.0

Figure 3.7: HIV prevalence among adults aged 15–49 years by sex, South Africa 2005

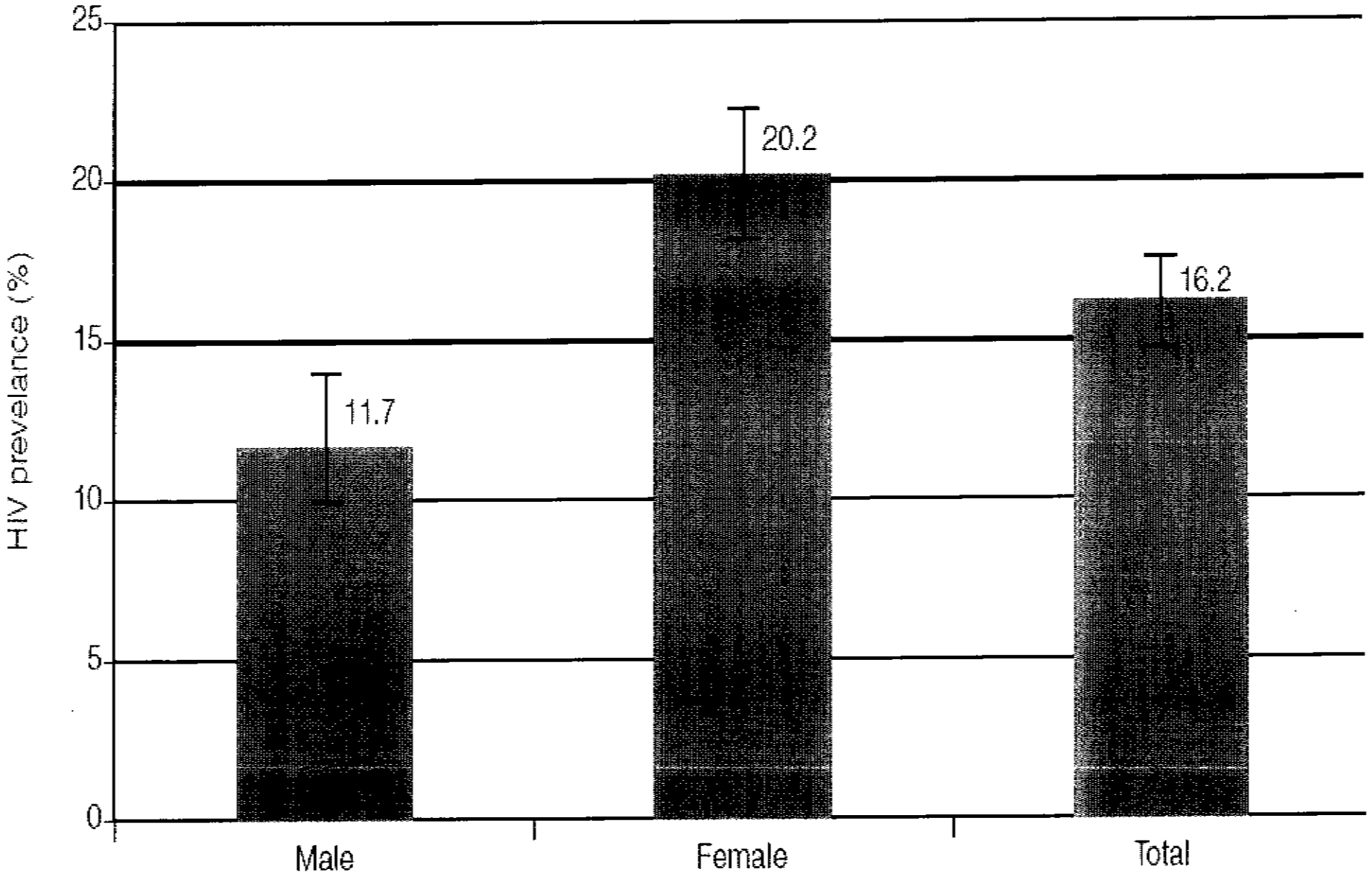


Figure 3.9: HIV prevalence among adults aged 15–49 years by locality type, South Africa 2005

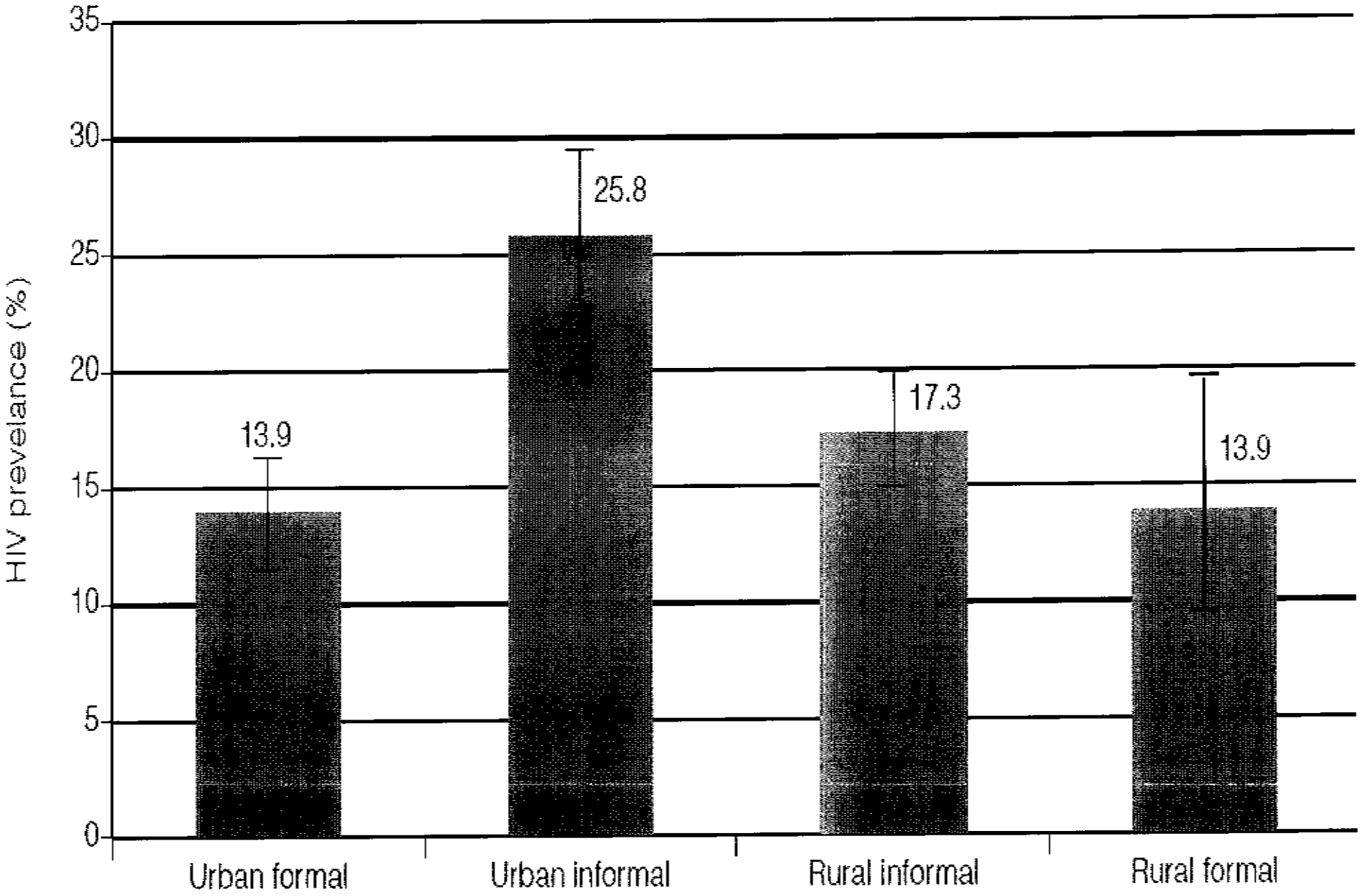
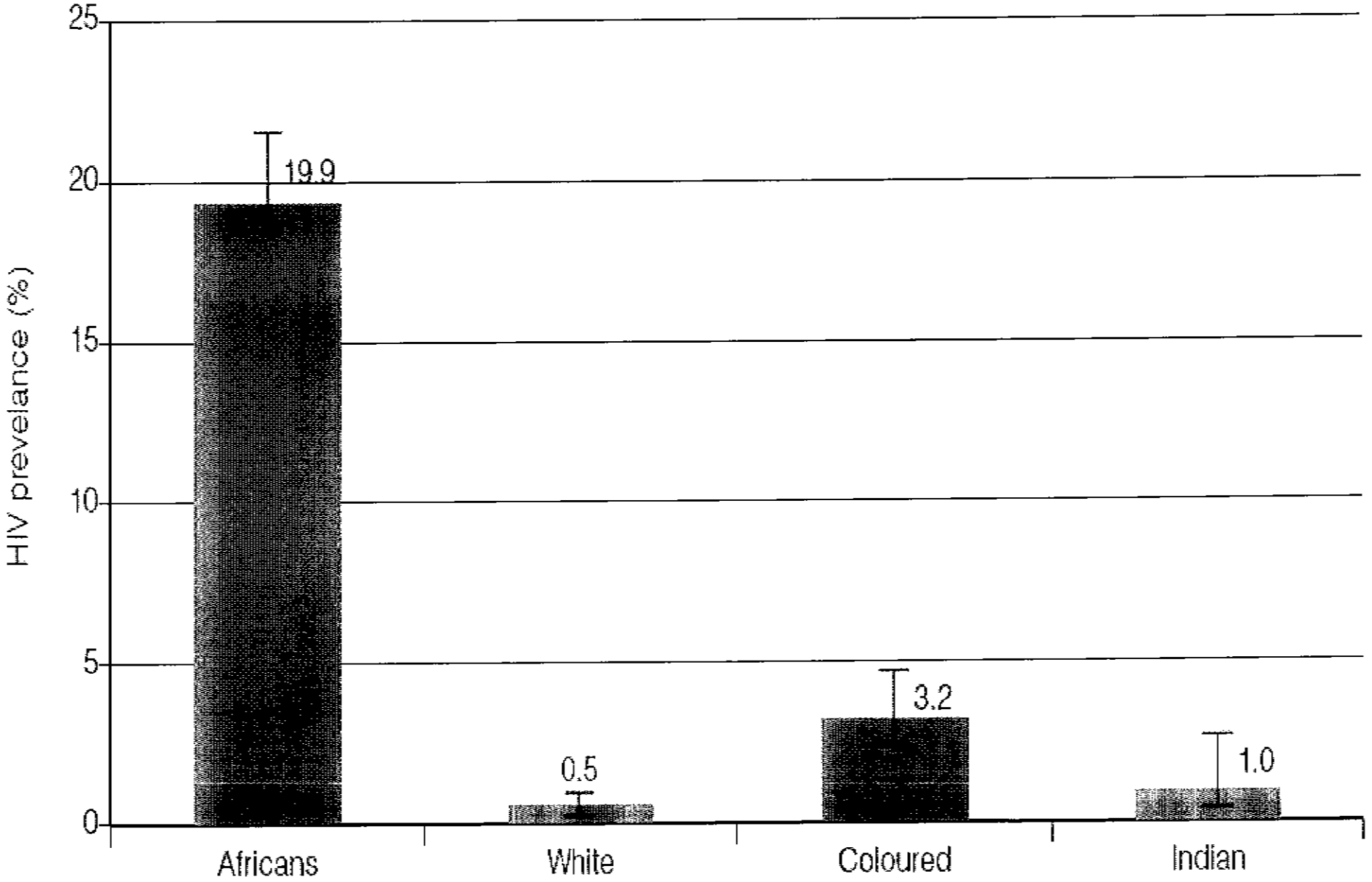


Figure 3.10: HIV prevalence among adults aged 15–49 years by race, South Africa 2005



HIV prevalence in Children aged 2-14 years

Age (Years)	n	HIV prevalence	95% CI
2-4	729	5.1	2.8-9.1
5-9	1341	4.4	3.0-6.6
10-14	1745	1.7	1.0-2.8

HIV prevalence among adults aged 50 years and older, South Africa 2005

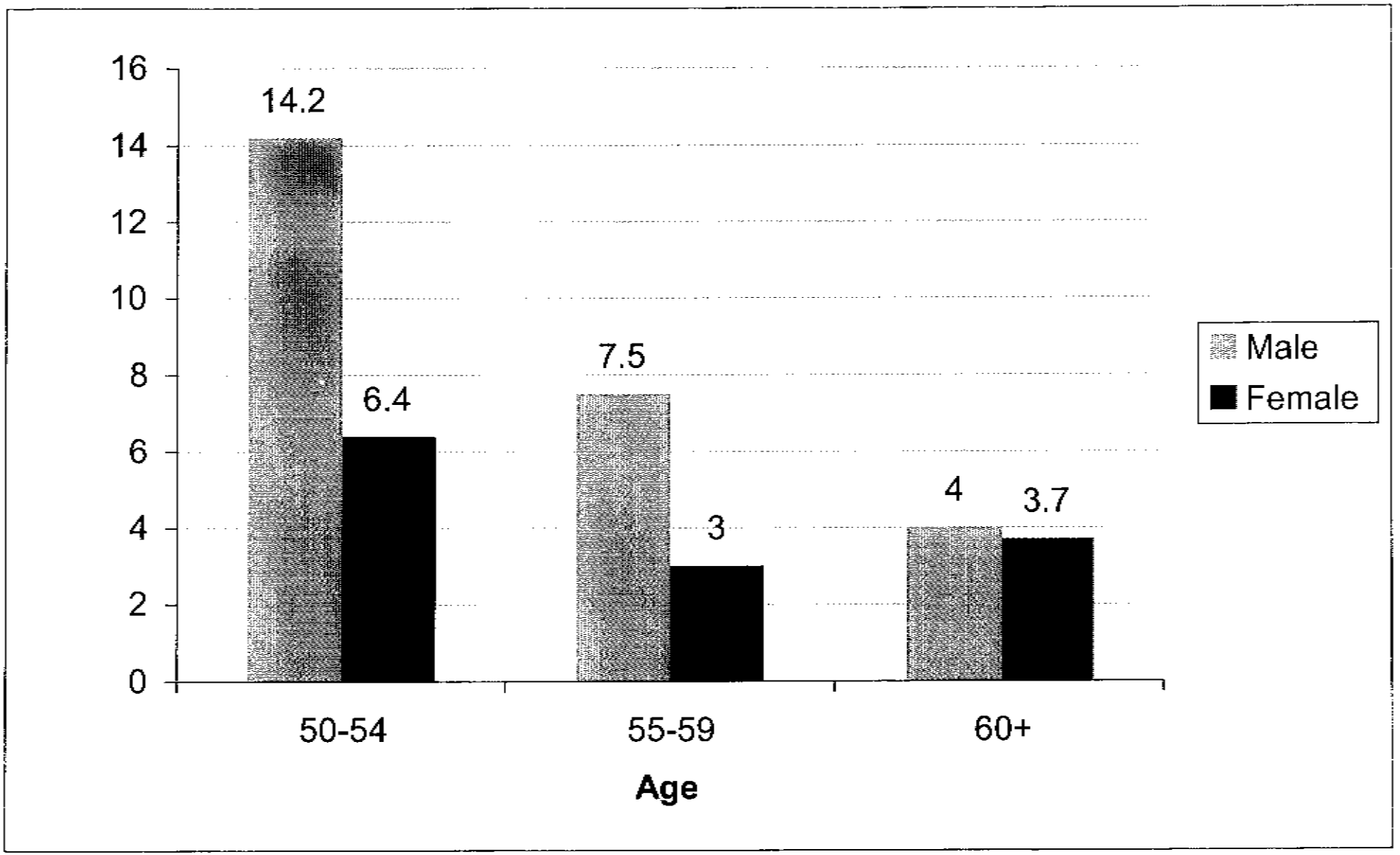
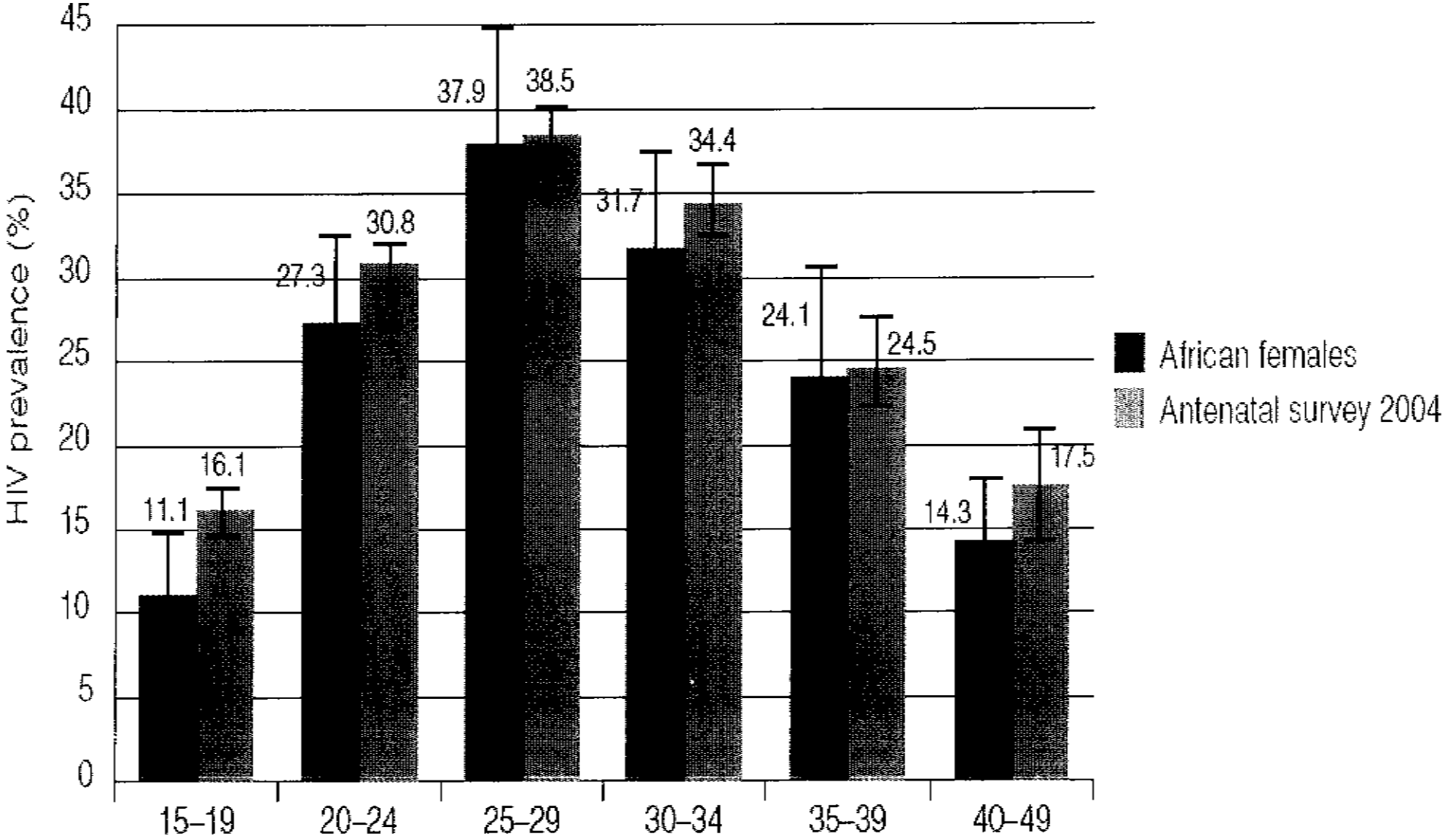


Figure 3.11: HIV prevalence among African females aged 15–49 years surveyed in the 2005 household survey compared to females surveyed in the 2004 antenatal survey



Some key findings on HIV Incidence

Estimation of HIV incidence

- New tests allow for identification of recent infection using blood samples (including from DBS specimens) – BED capture EIA
- Developed by USA's Centers for Disease Control and Prevention (CDC)
- Technology is still new and needs further validation
- Almost 16,000 specimens in survey allowed for identification of recent infection (i.e. acquired in the previous 180 days)
- 181 samples with recent infection identified

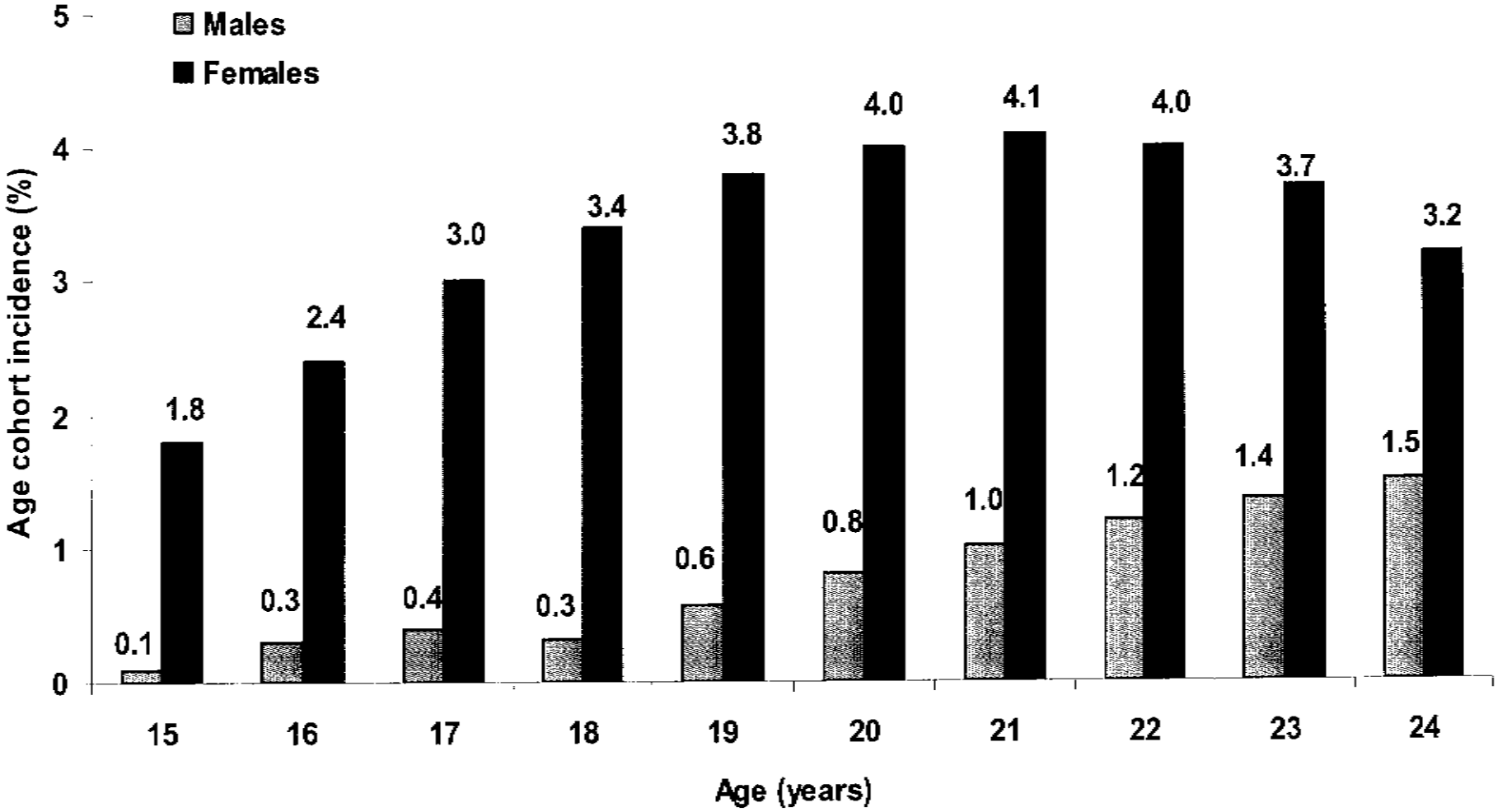
HIV incidence estimates : 2005

Age group	Number with recent HIV infection (past 6 months)	Estimate for annual HIV incidence in this group (weighted)
2 years and older	181	2.7%
Children (2-14)	11	0.9%
Youth (15-24)	70	3.3%
Males (15-24)	9	0.8%
Females (15-24)	61	6.5%
Adults (≥25)	100	3.6%
Male (≥25)	34	2.4%
Female (≥25)	130	6.3%

Comparison of adjusted HIV incidence estimates, South Africa 2005

	BED ODn=0.8	BED ODn=0.4	BED Hargrove	BED McDougal	ASSA 2003
Overall (≥2 years)	2.7	1.3	1.5	1.4	1.3
Male	1.5	0.7	0.5	0.5	1.2
Female	3.9	1.9	2.5	2.4	1.5
Youth (15-24 years)	3.3	1.9	2.3	2.2	2.9
Male	0.8	0.3	0.3	0.3	1.8
Female	6.5	3.8	4.9	4.6	4.1
Adult (15-49 years)	4.4	1.9	2.6	2.4	2.2
Male	2.4	1.1	1.1	1.0	1.9
Female	6.3	2.8	4.0	3.8	2.5

HIV incidence estimates by sex from single year age cohort prevalence in 15-24 year olds



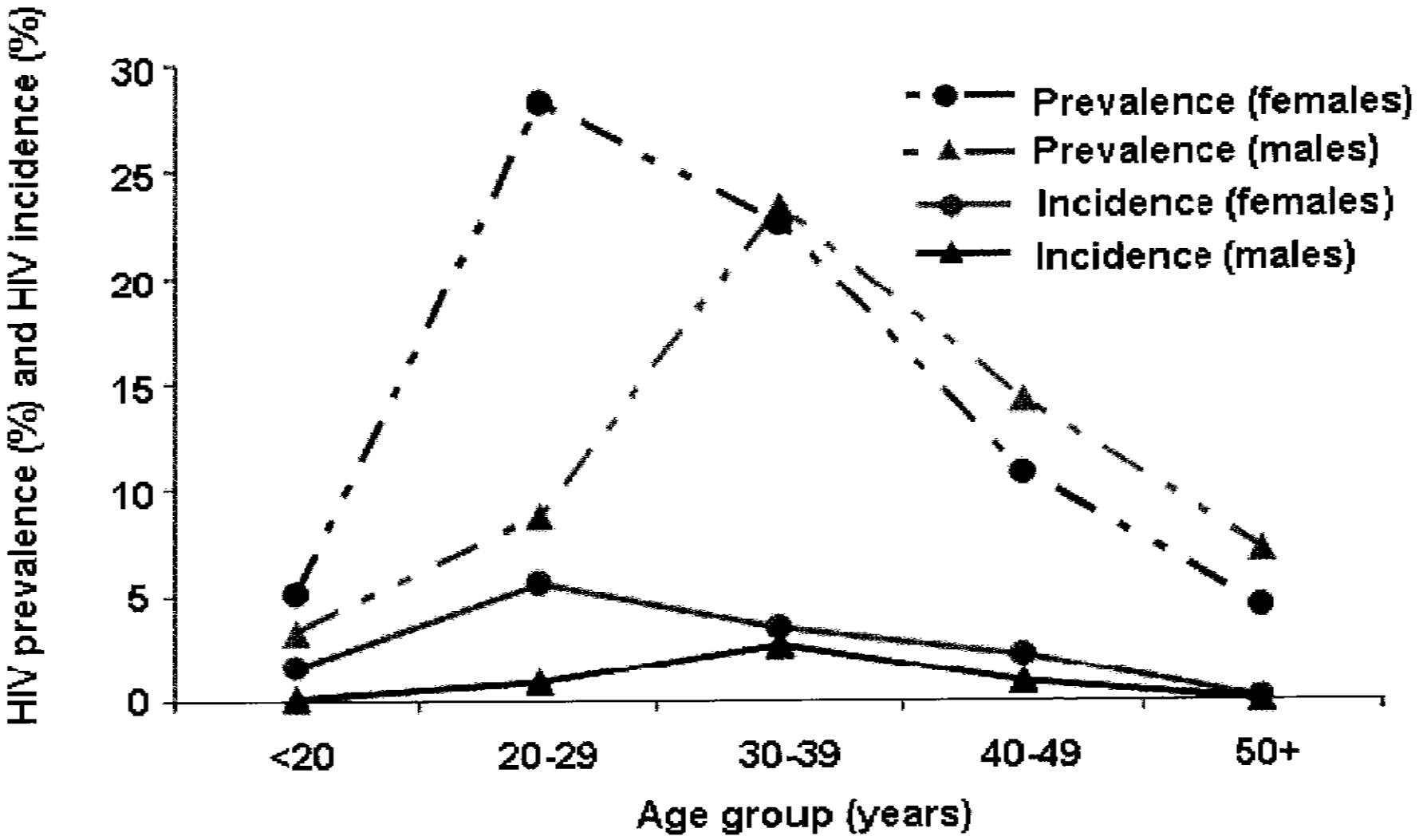
HIV incidence and number of new infections by age group, South Africa, 2005 (*Source: Rehle et al., 2007).*

Age group (yrs)	Weighted sample (N)	HIV incidence (%per year) (95% CI)	Estimated number of new infections per year (N)
> 2	44 513 000	1.4 (1.0 - 1.8)	571 000
2 - 14	13 253 000	0.5 (0.0 - 1.2)	69 000
15 - 24	9 616 000	2.2 (1.3 - 3.1)	192 000
> 25	21 645 000	1.7 (1.1 - 2.3)	310 000
15 - 49	24 572 000	2.4 (2.2 - 2.7)	500 000

HIV incidence and number of new infections by race, province and locality type (age ≥ 2 years), South Africa, 2005 (*Source: Rehle et al., 2007).*

Variable	Weighted sample (*N*)	HIV incidence (% per year) (95% CI)	Estimated number of new infections per year (*N*)
Race			
Black	35 113 000	1.8 (1.3 - 2.3)	557 000
Other	9 337 000	0.2 (0.0 - 0.3)	14 000
Province			
Mpumalanga	3 083 000	2.4 (0.9 - 3.8)	63 000
Free State	2 827 000	1.9 (0.4 - 3.4)	47 000
Gauteng	8 512 000	1.9 (0.8 - 3.0)	144 000
KwaZulu-Natal	9 213 000	1.7 (0.7 - 2.7)	134 000
Limpopo	5 207 000	1.6 (0.3 - 2.8)	76 000
North West	3 642 000	1.0 (0.2 - 1.8)	33 000
Western Cape	4 382 000	0.8 (0.2 - 1.5)	33 000
Eastern Cape	6 777 000	0.7 (0.1 - 1.2)	40 000
Northern Cape	871 000	0.2 (0.0 - 0.4)	1 000
Locality type			
Urban informal	3 878 000	5.1 (3.2 - 7.0)	166 000
Rural formal	3 577 000	1.6 (0.7 - 2.5)	52 000
Rural informal	16 495 000	1.4 (0.1 - 2.8)	211 000
Urban formal	20 563 000	0.8 (0.3 - 1.2)	142 000

HIV incidence and HIV prevalence by age and sex, South Africa, 2005 (Source: Rehle et al., 2007).



Some key findings on the associations between HIV prevalence, HIV incidence and some behavioural and social factors

Sexual debut

- Delayed onset of sexual activity (sexual debut) reduces incidence and prevalence of HIV in younger age groups
- Very few 12-14 year olds reported having had sex (<2%)
- Amongst 15 year olds surveyed, 11.7% of males and 7.9% of females had previously had sex
- Amongst 20 year olds surveyed, 74.8% of males and 80.0% of females had previously had sex
- Of those who had not had sex before, 71% said they were not ready, and 22.9% said they were not interested in sex
- The current trend identified is that the average age of first sex is becoming younger with each generation

Secondary abstinence

- Secondary abstinence refers to those individuals who have had sex before, but who have not had sex in the past year
- Secondary abstinence reduces HIV infection risk
- Secondary abstinence levels:
  - 23.0% of males vs. 20.0% of females aged 15-24 years
  - 9.8% of males vs. 21.3% of females aged 25-49 years
  - 30.3% of males vs. 71.3% of females aged ≥50 years

Multiple sexual partnerships over the past 12 months, South Africa 2005

Having frequent sexual partner turnover, even if one is faithful to one's partner, increases HIV risk

	MALES		FEMALES	
Age	N	>partner %	N	> One partner %
15-24 years	972	27.2	1397	6.0
25-49 years	2059	14.4	3195	1.8
50+	799	9.8	726	0.3

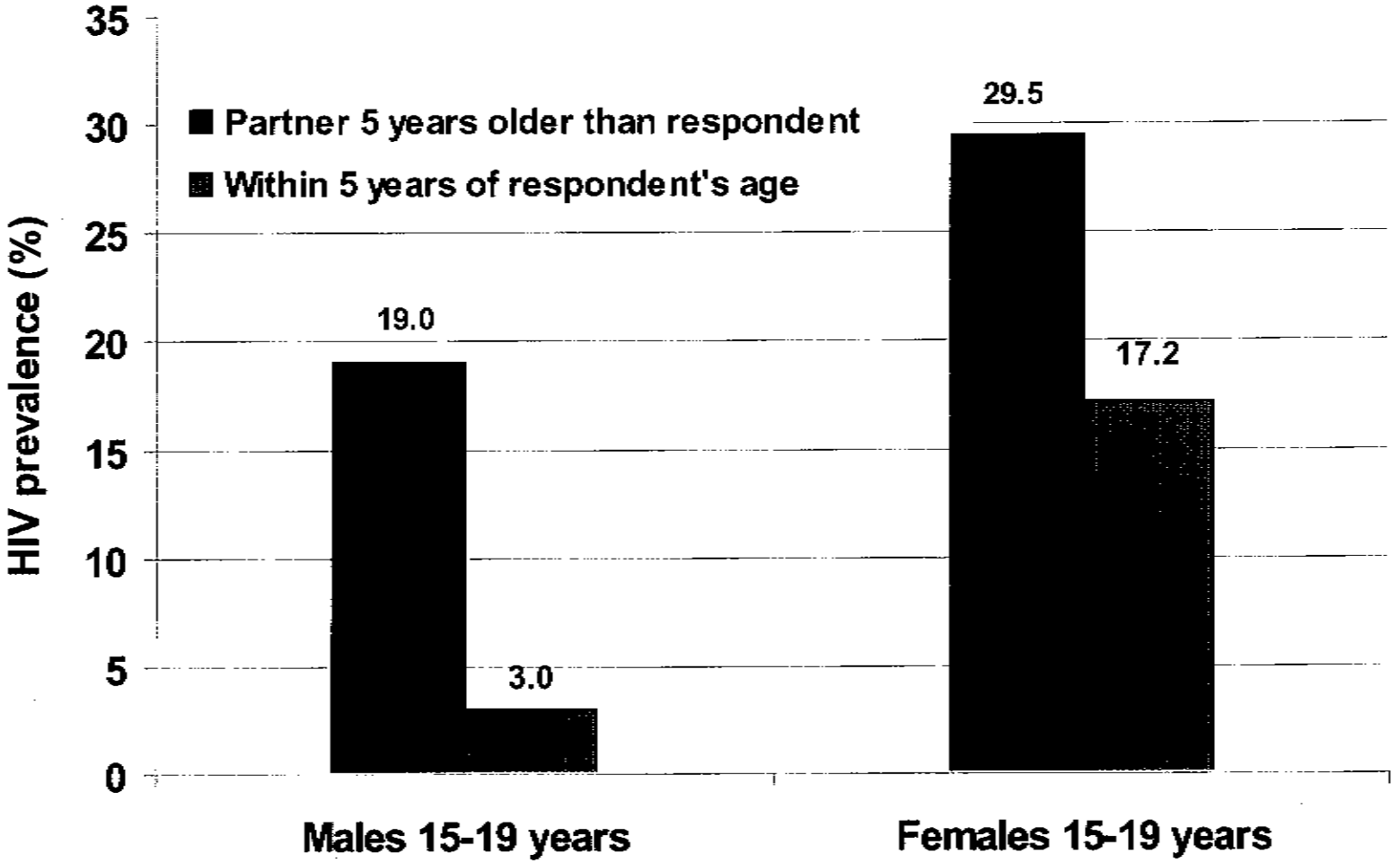
Multiple sexual partnerships (contd)

- Overall rates were higher for informal settlements
  - 20.0% for males vs. 3.5% for females
- HIV prevalence for those with more than 1 partner in past year was higher
  - 20.6% for >1 partner vs. 16.3% for 1 partner

Age mixing

- Having a partner 5 years older poses high HIV infection risk for youth, as it exposes them to a higher prevalence age group
  - Only 2.0% of sexually active males aged 15-19 had female partners 5 or more years older
  - 18.5% of sexually active females aged 15-19 had male partners 5 or more years older

HIV prevalence and age mixing in youth aged 15-19 years, South Africa



Condom use at last sex

- Consistent condom use protects against HIV infection
- Condom use at last sex is used to measure uptake and impact of condom promotion programmes
- Reported condom use at last sex is high in South Africa
  - 38% of males vs. 32.8% of females aged 15 years and older used a condom at last sex
  - 72.8% of males vs. 55.7% of females aged 15 24 years used a condom at last sex

Condom use at last sex

- Condom use rates are highest amongst Africans ≥15 years
  - 43.6% for males vs. 38.1% for females
- Rates for males were lowest amongst whites – 16.7%
- Rates were higher for those with >1 partner in last year – 62.3%
- Most interestingly, there is evidence in increase in positive prevention involving condom us among those who indicated they knew their HIV psitive status in the two past surveys- 2005 (60%) vs. 2002 (30%)

Perceived vulnerability to HIV infection

- 66% of respondents think they are at not at risk for HIV
- 20.8% of those who thought they were at high risk were found to be HIV positive
- 51% of HIV positive respondents thought they would probably or definitely not get infected with HIV

HIV testing

- Most people were aware of VCT services nearby (78.8%)
- Of those ever tested, over one third were tested in the past year
- Of those who have never been tested for HIV, 12.8% are HIV positive

HIV testing (contd)

- Only 4.6% of those tested in government facilities were neutral or unsatisfied with the service

- Most people were tested because they wanted to know their HIV status, but other reasons included applying for insurance, being pregnant, or feeling ill

- The main reason for not testing was a perception of low risk to HIV infection

HIV/AIDS knowledge and awareness

- Overall basic HIV/AIDS knowledge is high, and levels of condom use and VCT service uptake are also an indication of good awareness

- There are however a few gaps in knowledge such as:

  - Uncertainty about HIV causing AIDS
  - Uncertainty about a cure for AIDS
  - Uncertainty about condoms preventing HIV infection
  - Uncertainty about HIV transmission from mother to child

HIV/AIDS knowledge and awareness (contd)

- High degree of uncertainty that having fewer sexual partners reduces HIV risk
- Awareness of antiretroviral (ARV) drugs is high but beliefs that AIDS can be cured persist
- Knowledge of research on vaccines low

HIV/AIDS attitudes

- Overall, participants held positive perceptions towards people living with HIV/AIDS
  - 90.7% are willing to care for a family member with AIDS
  - 79.8% feel HIV+ children should *not* be kept separate from other children to prevent infection

HIV/AIDS attitudes (contd)

- 74.7% believe it is *not* a waste of money to train or promote an HIV+ person
- 46.5% say it is *not* foolish to marry a person with HIV/AIDS
- 35.3% would *not* have a problem having protected sex with an HIV+ person

HIV/AIDS Communication

- Overall access to mass media is high – but only 83% of households had a working radio and 70% had a working television

- Radio and television access a few days a week or more is high >60%

- Newspaper and magazine access is low <40%

HIV/AIDS Communication (contd)

- Internet access is very low
- Radio and television emphasised in relation to taking HIV/AIDS seriously
- Knowing people who have died of AIDS, talking to friends and AIDS statistics also stimulate sense of seriousness

Other sources of HIV/AIDS information

- Health facilities most important overall for all age ranges and locales
- Schools perceived as useful for youth audiences
- Friends and other family important
- Workplaces useful over half of employed persons

Other sources of HIV/AIDS information (contd)

- Parents important to around a third of youth age groups
- Faith based organisations important for more than a third of all age groups
- Traditional healers rated relatively low

HIV prevalence and incidence by self-reported socio-behavioural factors (age group 15 - 49 years) (*Source: Rehle et al., 2007*).

Variable	Survey sample (*N*)	HIV prevalence (%) (95% CI)	HIV incidence (% per year) (95% CI)
Marital status			
Single	5 306	16.6 (14.9 - 18.5)	3.0 (1.9 - 4.1)
Married	3 240	14.3 (12.3 - 16.6)	1.3 (0.5 - 2.1)
Widowed	227	34.0 (25.5 - 43.7)	5.8 (0.0 - 13.8)
Divorced	318	15.1 (9.5 - 23.0)	0.5 (0.0 - 1.6)
Sexual history			
Never had sex	1 747	4.3 (2.7 - 7.0)	1.5 (0.0 - 3.0)
No sex in the past 12 months	1 358	18.0 (14.9 - 21.5)	2.4 (0.8 - 4.1)
Sexually active in the past 12 months	5 803	18.7 (17.0 - 20.6)	2.4 (1.5 - 3.3)
Current pregnancy	215	37.0 (24.9 - 51.0)	5.2 (0.0 - 12.9)
Number of sexual partners			
One sex partner in the past 12 months	5 233	18.4 (16.7 - 20.4)	2.1 (1.3 - 3.0)
More than one sex partner in the past 12 months	468	21.3 (15.9 - 28.0)	3.1 (0.0 - 6.4)
Condom use at last sex			
15 - 24 years			
Yes	1 011	14.3 [(11.0 - 18.4)	2.9 (0.5 - 5.2)
No	392	20.8 (15.3 - 27.8)	6.1 (0.0 - 12.9)
25 - 49 years			
Yes	1 049	24.9 (21.1 - 29.1)	2.2 (0.4 - 4.0)
No	1 068	16.0 (12.3 - 20.6)	1.9 (0.0 - 3.7)

Educational attainment and HIV prevalence

Educational attainment	n	HIV pos %	95% CI
No school	1163	10.90%	8.6 - 13.8
Primary	2572	16.20%	13.9 - 18.7
Secondary	4707	15.20%	13.4 - 17.1
Matriculation	2409	14.40%	12.0 - 17.2
Tertiary	1024	5.50%	3.8 - 8.7

Employment Status and HIV prevalence

Employment Status	n	HIV+	95% CI
Housewife, homemaker, not looking for work	1073	9.20%	7.0 - 12.0
Housewife, homemaker, looking for work	634	17.90%	13.9 - 22.8
Unemployed, looking for work	2197	24.50%	21.8 - 27.5
Unemployed, not looking for work	560	21.40%	15.6 - 28.7
Work in informal sector, not looking for permanent work	68	19.30%	7.9 - 39.9
Old age pensioner	1004	3.00%	1.7 - 5.2
sick/disabled and unable to work	395	17.50%	12.1 - 24.5
Student/pupil/learner	2093	6.40%	4.7 - 8.8
Self-employed- full time	393	8.40%	4.9 - 14.0
Self-employed - part time	257	14.20%	8.3 - 23.0
Employed part time	675	16.50%	11.6 - 22.9
Employed full time	2295	12.40%	10.4 - 14.7
Other	200	12.30%	6.6 - 21.8
Total	11844		

Source of household income and HIV prevalence

Source of household income	n	HIV+	95% CI
Formal salary/earnings, taxed	3623	10.80%	9.3 - 12.7
Contributions from adult family or relatives	4028	16.20%	14.2 - 18.5
Contributions by younger family members/relatives	150	18.40%	9.7 - 32.2
Govt pensions/grants	1874	10.30%	8.2 - 12.8
Grants/donations by private welfare org	156	20.60%	13.3 - 30.6
Other	1291	16.00%	12.8 - 19.8
No income	521	16.20%	11.7 - 22.1
Total	11643		

Conclusions

- HIV prevalence has levelled off
- Females significantly more vulnerable to infection and incidence levels are high amongst, women, youth, and younger adults and pregnant women
- High infections among children aged 5 - 9 years are of concern
- HIV prevalence amongst children aged 2- 9 years and people aged ≥50 years confirmed

Conclusions (contd)

- Behavioural response is positive and increasing in relation to condoms and VCT
- Partner turnover is high and not perceived as a major risk
- Early sexual debut and sex with older partners are major risk factors for youth
- Good response in relation to non stigmatising attitudes and involvement in community level activities

Recommendations

- Still a false sense of security needs to be addressed
- Reduction in stigma provides opportunity for HIV disclosure and community action
- Integration of family planning and HIV/AIDS
- Women encouraged to increase condom use
- Periodic HIV testing is crucial

Recommendations (contd)

- Young people should be encouraged to delay sexual debut
- Sexually active youth should avoid older partners
- Avoid high partner turnover and concurrent sexual partnerships
- Getting treated for STIs and never having sex when one has STIs
- Warn older South Africans that they too are at risk of HIV

Recommendations (contd)

- HIV infection among children is real and needs emphasis
- Include children and older people in surveillance and modelling the HIV/AIDS epidemic
- Positive Prevention is an important tool for HIV prevention
- Refocus communication strategy to expand areas of focus
- Study implications of ARVs

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References

This presentation is based on the following two publications:

A. The main research report:

- Shisana, O., Rehle, T., Simbayi, L.C., Parker, W., Bhana, A., Zuma, K., Connoly, C., Jooste, S., Pillay, V. et al. (2005). *South African National HIV Prevalence, Incidence, Behaviour and Communication Survey 2005*. Cape Town: HSRC Press.

  Available on www.hsrc.ac.za or www.hsrcpress.ac.za

B. Incidence paper:

- Rehle, T., Shisana, O., Pillay, V., Zuma, K., Puren, A. & Parker, W. (2007). National HIV incidence measures – new insights into the South African epidemic. *South African Medical Journal,* 97(3), 194-199.