

MEASURING AND UNDERSTANDING THE DYNAMICS OF HIV

Prof Khangelani Zuma, PhD

Executive Director: Social Aspects of Public Health

Human Sciences Research Council

PRETORIA

South Africa

kzuma@hsrc.ac.za

BURDEN OF HIV

- AIDS was first recognized in early 1980s as a new disease.
- In South Africa, first two cases of AIDS were reported in 1983.
- Between 1983 and 1989 HIV prevalence was estimated at 0.5%.
- HIV relentlessly spread out within urban areas then to rural areas in early 1990s
- SA has over 5.6 million people living with HIV (PLHIV), which means that **worldwide, one in six PLHIV is in South Africa.**
- SA has made significant progress in scaling up some key interventions, with the main goals
 - to reduce the HIV incidence rate of 2007 by 50%, and
 - to expand the access to ART to 80% of people in need of ART by 2011.
- **However, the number of new infections continues to outstrip the number of AIDS-related deaths - an indication that prevention efforts are failing to keep pace with the HIV epidemic.**

METHODS OF MEASURING HIV AND AIDS

- Antenatal Care Sentinel Surveillance (ANC)
- Second generation Population based surveys
- Health management information system
- Vital registration systems
- Behavioural surveillance system
- Census

INTRODUCTION

- South Africa started conducting ANC surveys since 1990.
- The surveys have been conducted annually.
- Provides among the best available estimates of HIV infection among South African population.
- Population-based or household surveys are increasingly becoming available.

ANC SURVEILLANCE

- ANC has been used for sometime in the health system as a tool to monitor HIV.
- Monitoring includes STIs such as syphilis.
- Collected among pregnant women aged 15-49 presenting for ANC.
- Provides the key data for studying temporal dynamics of the epidemic.

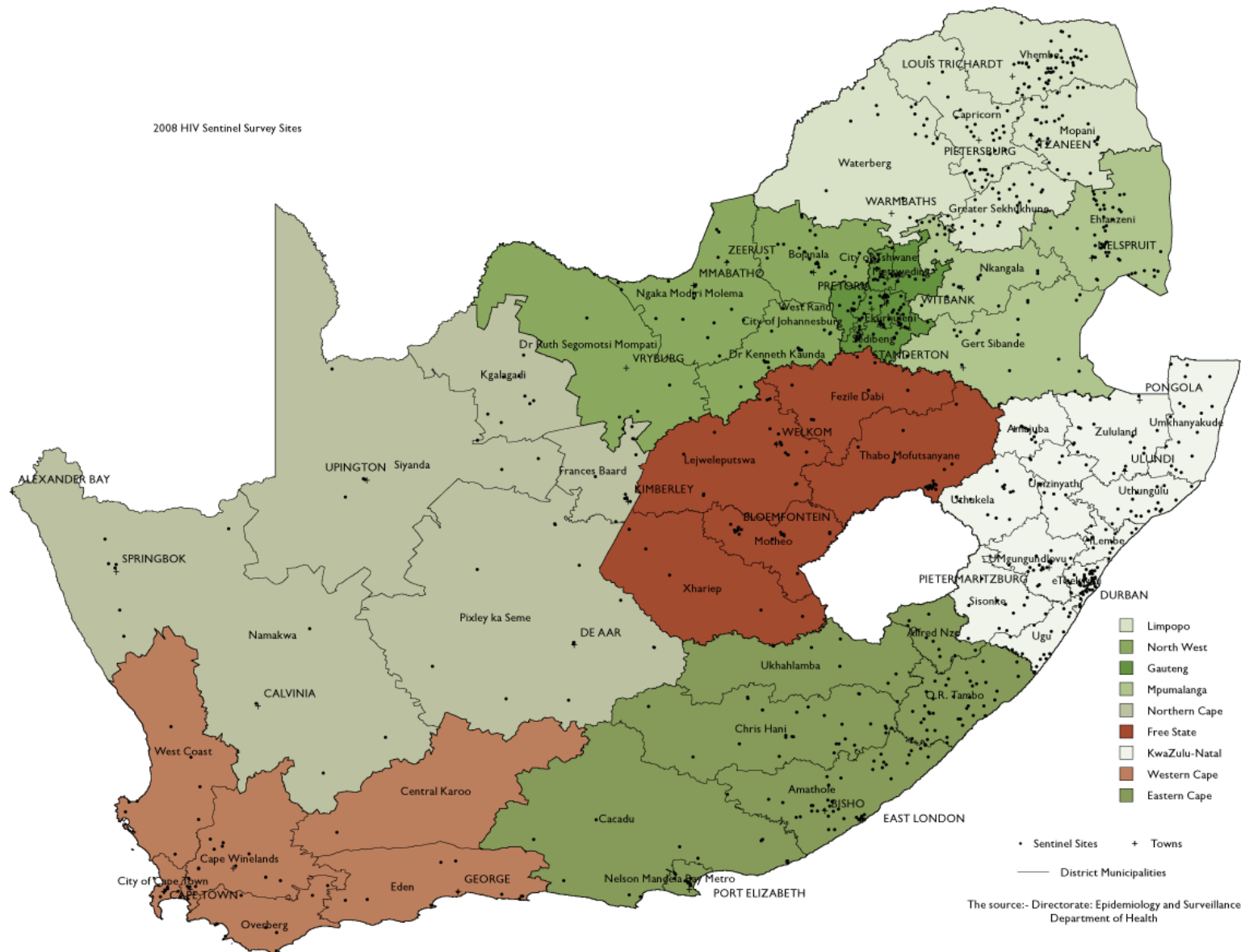
ANC SURVEILLANCE OBJECTIVES

- To provide information on HIV/Syphilis prevalence among pregnant women attending ANC in public sector.
- Specific objectives are to
 - Determine the prevalence
 - Determine trends in terms of time place and age among pregnant women.
 - Determine HIV infection in the general population.

STUDY DESIGN

- Cross-sectional, anonymous and unlinked survey.
- Conducted among pregnant women attending ANC at selected sites in all provinces.
- All women attending ANC for the first time during the current pregnancy were eligible for inclusion.
- Survey conducted in October.
- Some demographic details are collected excluding identifiers.
- Blood samples collected and labelled with a barcode.
- Blood transported to the lab and tested for HIV using ELISA.

STUDY DESIGN



LIMITATIONS

- These surveys have limitations including.
 - Costs of conducting these surveys
 - Logistical problems.
 - Low response in some settings.
 - Inadequate sampling frame used.
- UNAIDS estimates refusal rate between 24 and 42% in some African countries.

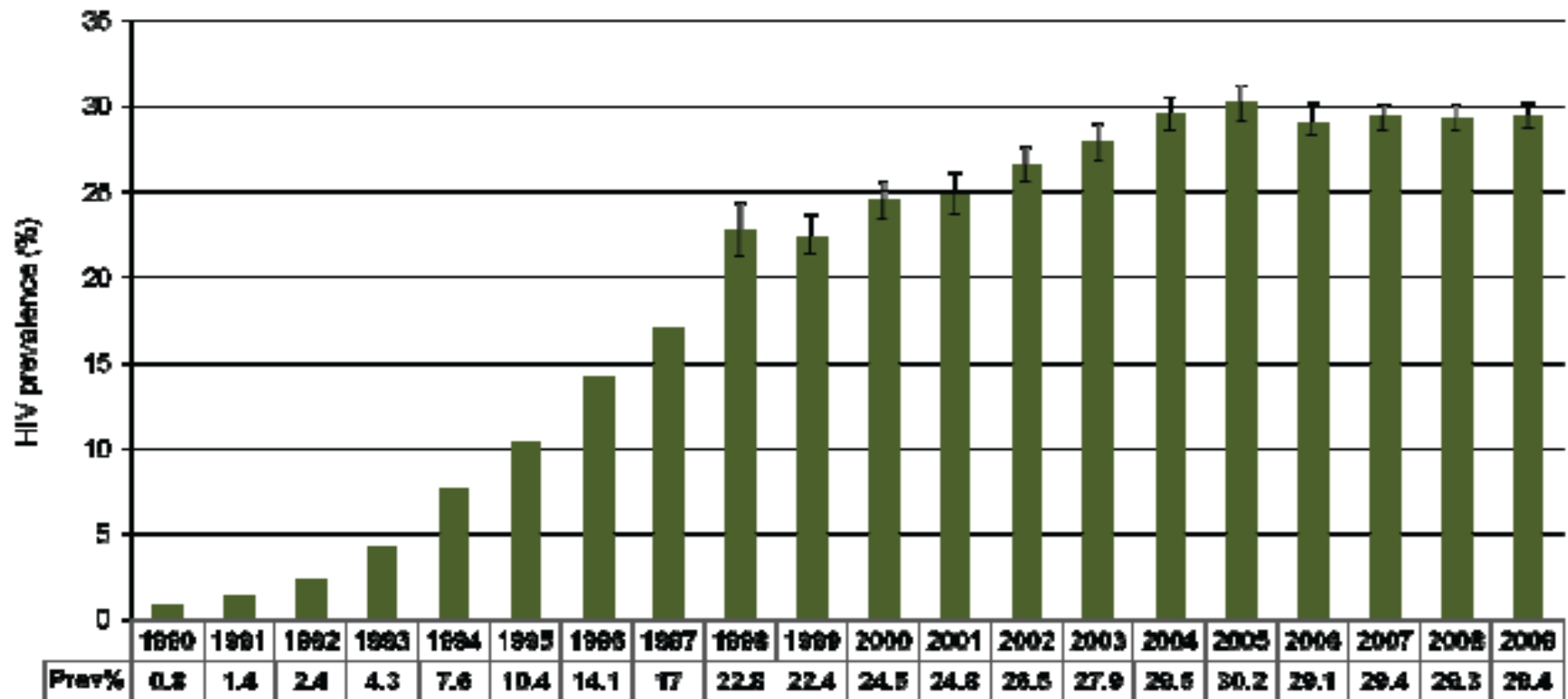
EXTRAPOLATING TO GENERAL POPULATION

- Based on modelling techniques with assumptions such as
 - HIV prevalence in all pregnant women in SA is same as that of women attending public antenatal clinics
 - Prevalence in all women 15 to 49 is the same as prevalence in pregnant women.
 - Males infected=85% of infected females
 - Mother to child transmission rate is ????

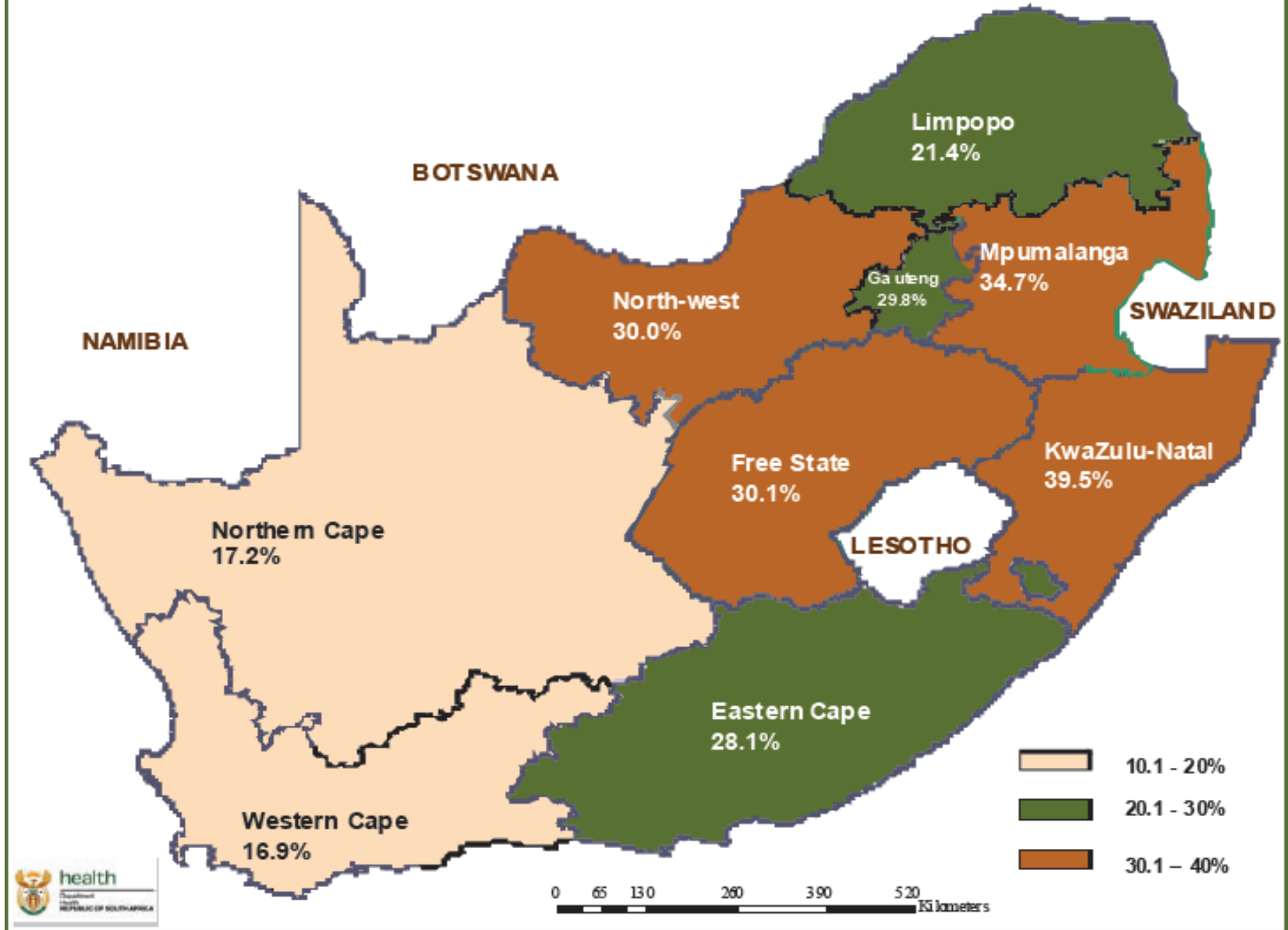
HIV PREVALENCE

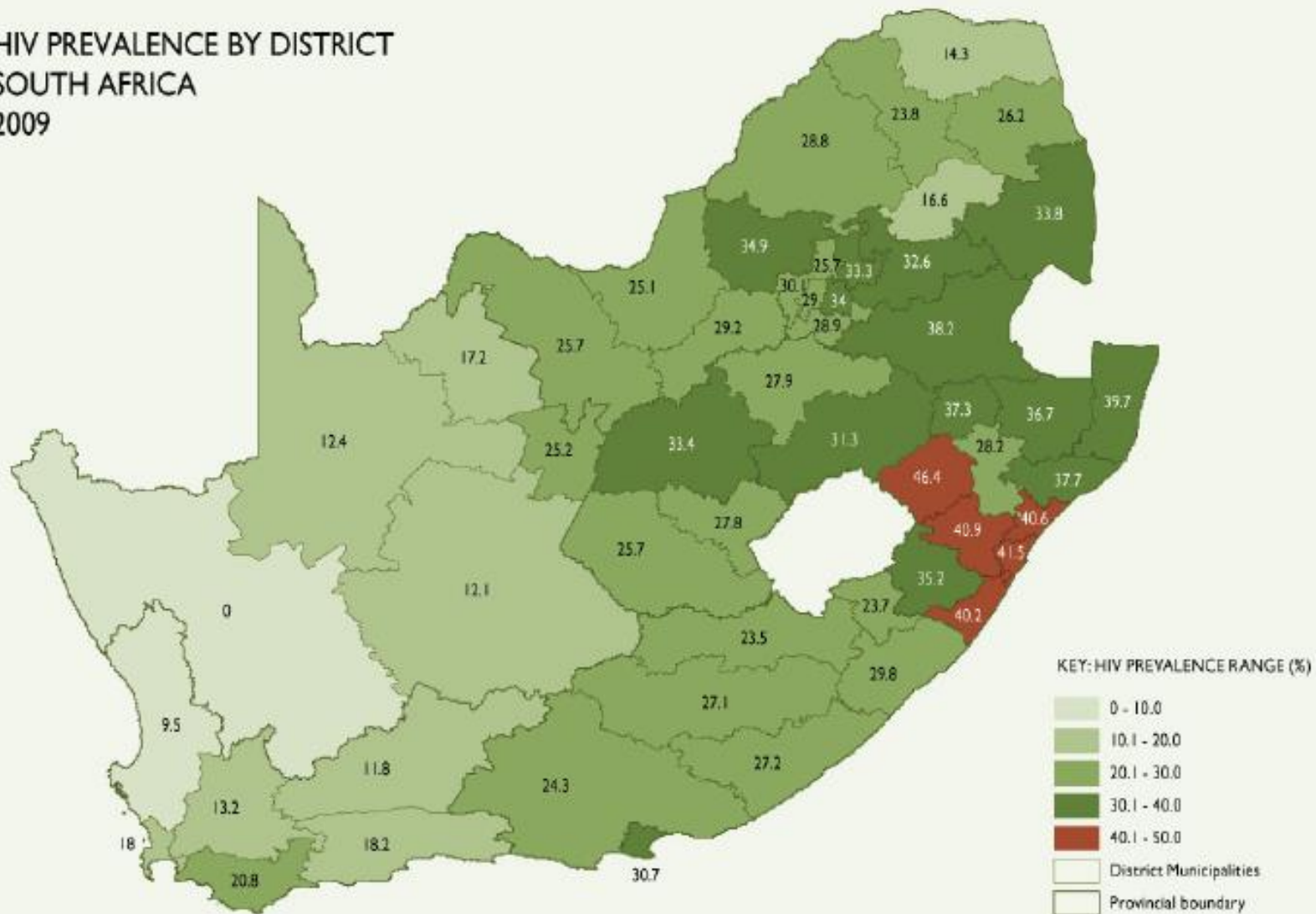
- HIV prevalence among pregnant women in 2006 was 29.1% and 28.9% in 2007, compared to 30.2% in 2005.
- HIV prevalence has gradually levelled off - estimates for 2006, 2007, 2008 and 2009 are very similar with 29% sampled ANC clients HIV positive
- Although HIV prevalence is stable, **the total number of PLHIV is on a steep increase** of approximately 100,000 additional PLHIV each year due to population growth and the effect of ART reducing the mortality rate to below the HIV incidence rate.

TRENDS OVERTIME

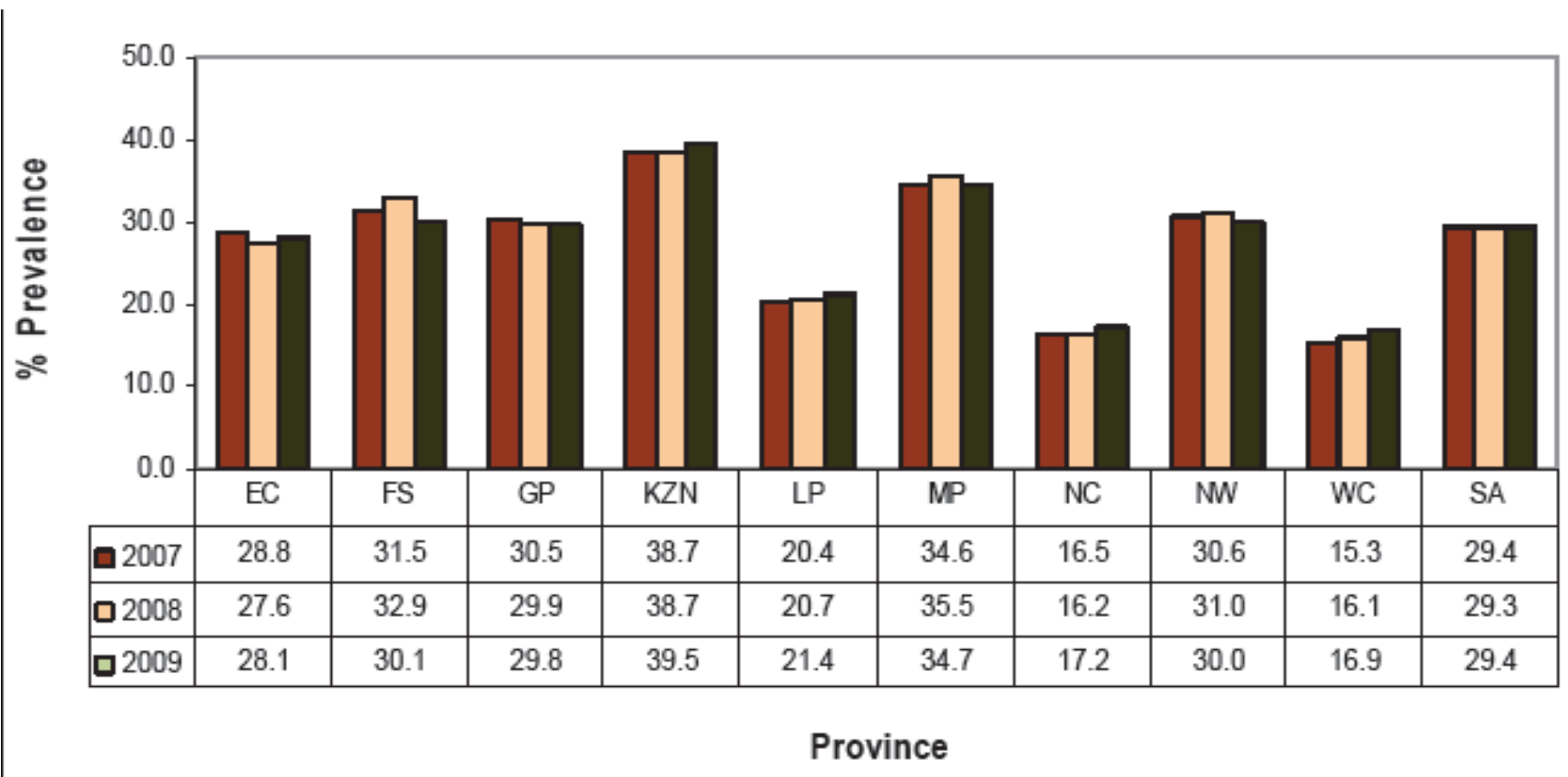


*Note that the estimates from 2006 are based on a different sample to the previous year.

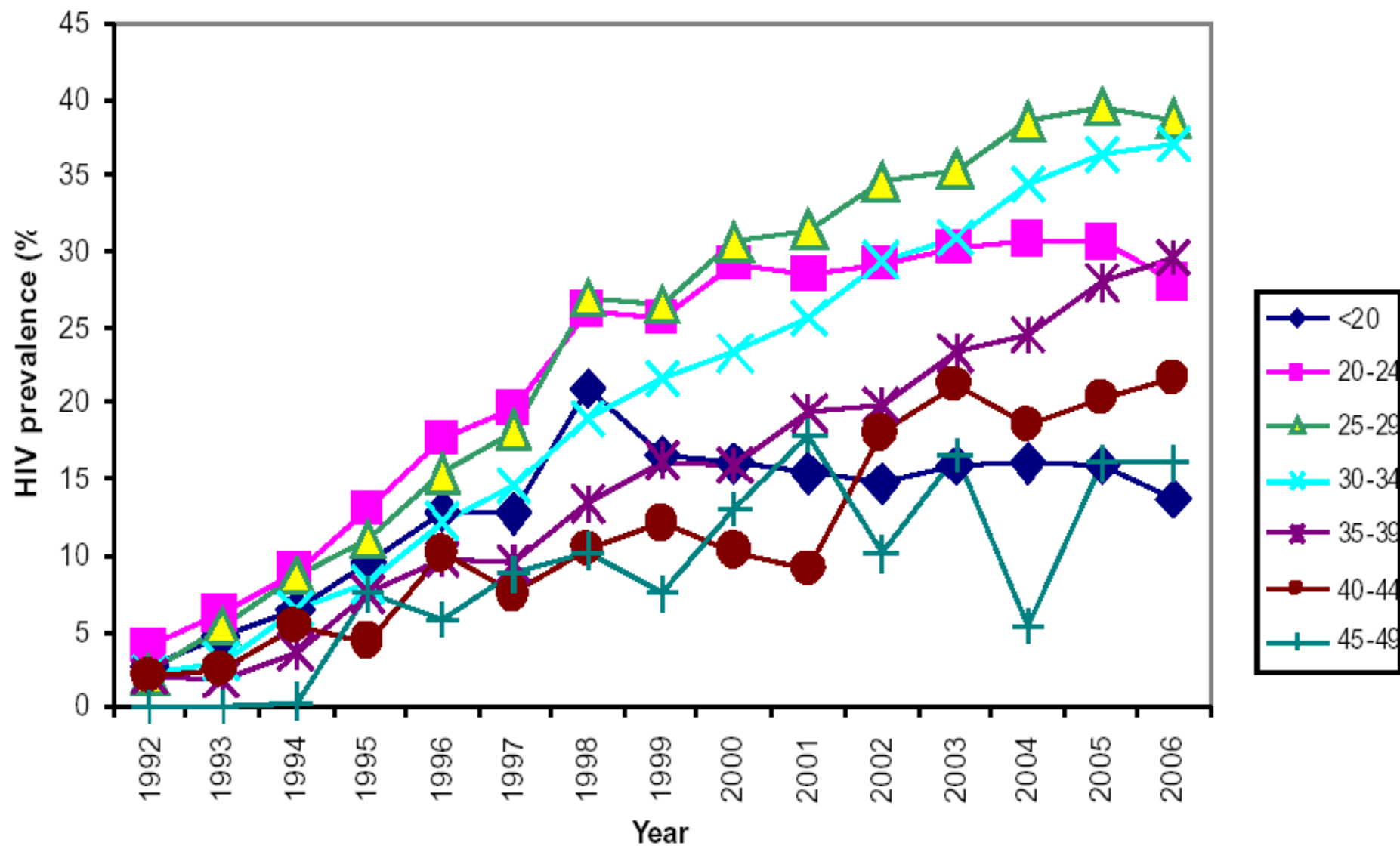


HIV PREVALENCE BY DISTRICT
SOUTH AFRICA
2009

PREVALENCE BY PROVINCE



AGE GROUP PREVALENCE



POPULATION BASED SURVEYS

- Population-based studies have been conducted in a number of countries including
 - Botswana, Burundi, Guinea, Kenya, Mali, Niger, Uganda, Zambia, Zimbabwe
- This is the first national population-based repeat survey

COMPARISON OF STUDY TYPES

POPULATION-BASED STUDIES

- Provide direct measures of HIV for the overall population including by:
 - sex, province, residence geotype, age, race
- Provide insights into underlying factors and vulnerabilities that influence HIV infection.
- Also provide trends in relation to response including knowledge, condom use, uptake of VCT, attitudes to people living with HIV/AIDS, provision of care and support, etc

COMPARISON OF STUDY TYPES...

Antenatal studies

- Gather information from pregnant women only
- Estimate prevalence in other groups through modeling
- Provide trends of HIV prevalence over time

Limitations

- Antenatal data limited by over-representation of poorer African females
- Population-based limited by response rates

SURVEY DESIGN

- A cross-sectional survey of the entire South African population aged two years and older *living in households*
- Included people living in hostels, but *excluded* prisoners, military and police barracks, university residences, patients in hospitals and children under 2
- Sampling is based on a master sample of households developed by the HSRC based on the 2001 census

SURVEY DESIGN...

- This sample is stratified by province and geotype of EA
- In 2002 an oral specimen collection device was used, whereas in 2005, 2008 and 2011 blood spots were taken through finger-pricks
- Blood spots allowed for incidence testing
- Similar questionnaires used in both surveys
- In 2011 included a module on maternal and infant mortality

An aerial photograph of a residential neighborhood. A red line outlines a specific area that includes a large green field in the upper left, a cluster of buildings in the center, and a dense residential area with many houses and trees. The label '2220034' is centered over the middle of the outlined area.

2220034



Entrance HW Snyman, UP

HW Snyman Building, UP

Pretoria Academic Hospital

Entrance to Dental Hosp. UP

BMS Building, UnivPta

294 m

**Please
move to
the left**



EA 80100119

Unit A
MAYFLOWER
(ERMELO)

Legend

- SASASII Vp's
- ✱ SASAS1 Vp's
- ✱ SABSSMI Vp's
- EA boundaries



HSRC Building
134 Pretorius Street
Pretoria
0001
South Africa

Tel: (012) 302 2600
Fax: (012) 302 2525

<http://www.hsrc.ac.za>



HSRC
GIS Centre

ANSWER THE QUESTION:
..WHERE DID YOU SLEEP
LAST NIGHT?



SAFETY 11-10-01
ZAPIRO ©



INTEGRITY AND GENERALISABILITY

- 2005 findings have been compared with antenatal data.
- There is close correspondence between HIV rates of pregnant women in this survey and antenatal survey data
- Findings consistent with the 2003/4 population-based survey of youth aged 15-24 conducted by the RHR Unit (Lovelife Survey)

INTEGRITY AND GENERALISABILITY...

- Distribution of HIV by key demographic variables are similar to those of other studies
- Behavioral and communication data consistent with previous findings, and contributes new knowledge in key areas
- Response rates of Whites and Indians make it difficult to provide a definitive understanding of HIV in these groups
- Data for Western Cape need more analysis

FEMALES 15-49 IN 2005 COMPARED TO ANC 2004

Age group	African females 2005 n=3,699	African females pregnant in the last 24 months 2005 n=630	Antenatal survey 2004 n=15,976
	HIV+ % (n)	HIV+ % (n)	HIV+ % (n)
15 to 19	11.1 (766)	21.8 (58)	16.1 (3,130)
20 to 24	27.3 (819)	27.8 (215)	30.8 (4,991)
25 to 29	37.9 (435)	37.2 (126)	38.5 (3,702)
30 to 34	31.7 (454)	25.1 (98)	34.4 (2,510)
35 to 39	24.1 (458)	18.7 (84)	24.5 (1,261)
40 to 49	14.3 (767)	12.9 (49)	17.5 (382)
Total	24.4	26.8	29.5

Household survey 2012 vs. Antenatal survey 2012

Age group (years)	HSRC 2012 All females	HSRC 2012 African females	Antenatal survey 2012
15-19	5.6%	6.8%	12.4%
20-24	17.4%	20.6%	24.2%
25-29	28.4%	33.1%	36.8%
30-34	36.0%	42.9%	42.8%
35-39	31.6%	38.2%	40.2%
40-44	28.0%	36.3%	33.2%
45-49	19.7%	26.2%	33.1%
Total	23.2%	28.0%	29.5%

HIV prevalence by age group, Antenatal survey 2008 and 2012

Age group (years)	Antenatal survey 2008	Antenatal survey 2012	Diff. 2008 vs 2012
15-19	14.1%	12.4%	- 1.7%
20-24	26.9%	24.2%	- 2.7%
25-29	37.9%	36.8%	- 1.1%
30-34	40.4%	42.8%	+ 2.4%
35-39	32.4%	40.2%	+ 7.8%
40-44	23.3%	33.2%	+ 9.9%
45-49	17.6%	33.1%	+ 15.5%
Total	29.3%	29.5%	+ 0.2%
Age adjusted	27.9%	30.8%	+ 2.9%

Age Adjustment

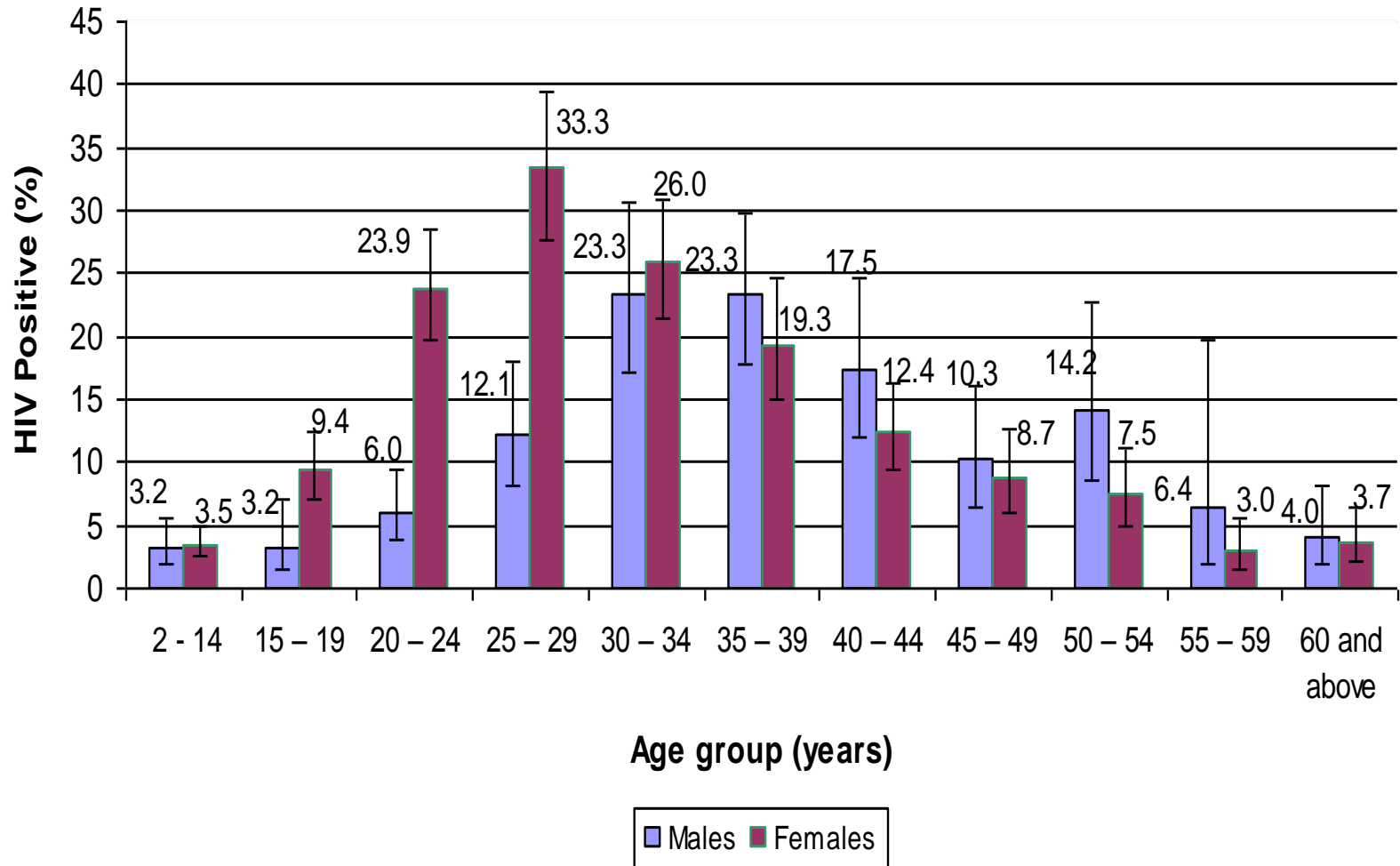
Age group (years)	2012 StatsSA mid-year population African Females N	2012 Antenatal HIV prevalence	HIV prop. applied to reference population n = N * HIV prop.
15-19	2 145 643	0.124	266 060
20-24	2 043 484	0.242	494 523
25-29	1 952 799	0.368	718 630
30-34	1 728 946	0.428	739 989
35-39	1 561 942	0.402	627 901
40-44	1 253 905	0.332	416 296
45-49	995 562	0.331	329 531
Total	11 682 281	Crude: 29.5%	3 592 930
		Adjusted: 30.8%	
		(3 592 930 / 11 682 281)	

FINDINGS

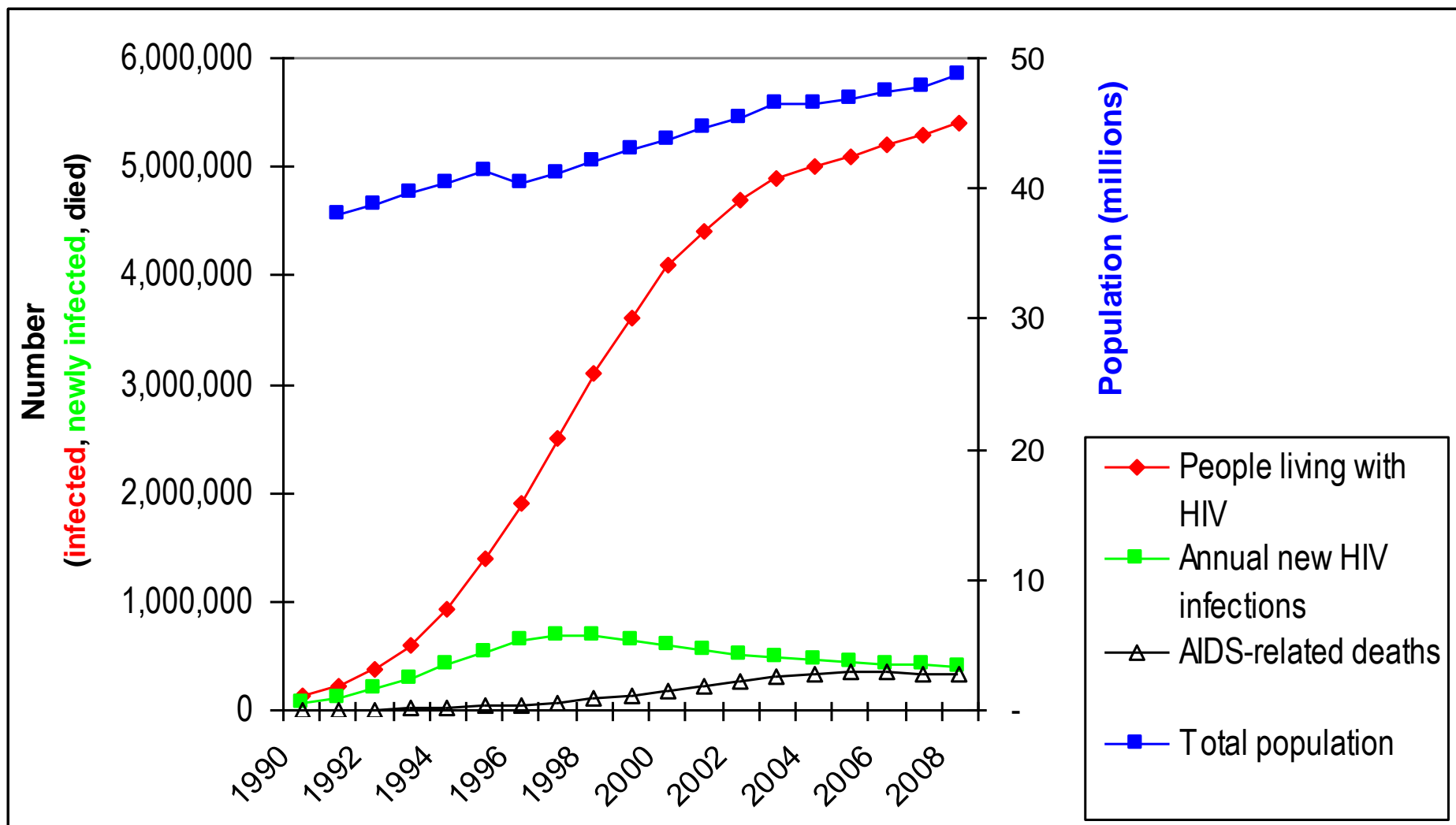
NATIONAL HIV prevalence

- National level HIV prevalence data suggest that **HIV prevalence has stabilized.**
- In adults aged 15-49 years, the three HSRC surveys estimated HIV prevalence at
 - 15.6% (2002),
 - 16.2% (2005)
 - 16.9% (2008,
- increase not statistically significant)

HIV PREVALENCE BY SEX & AGE: 2005



PLHIV, ANNUAL NEW INFECTIONS, AIDS-RELATED DEATHS & TOTAL POPULATION SIZE, ADULTS 15-49

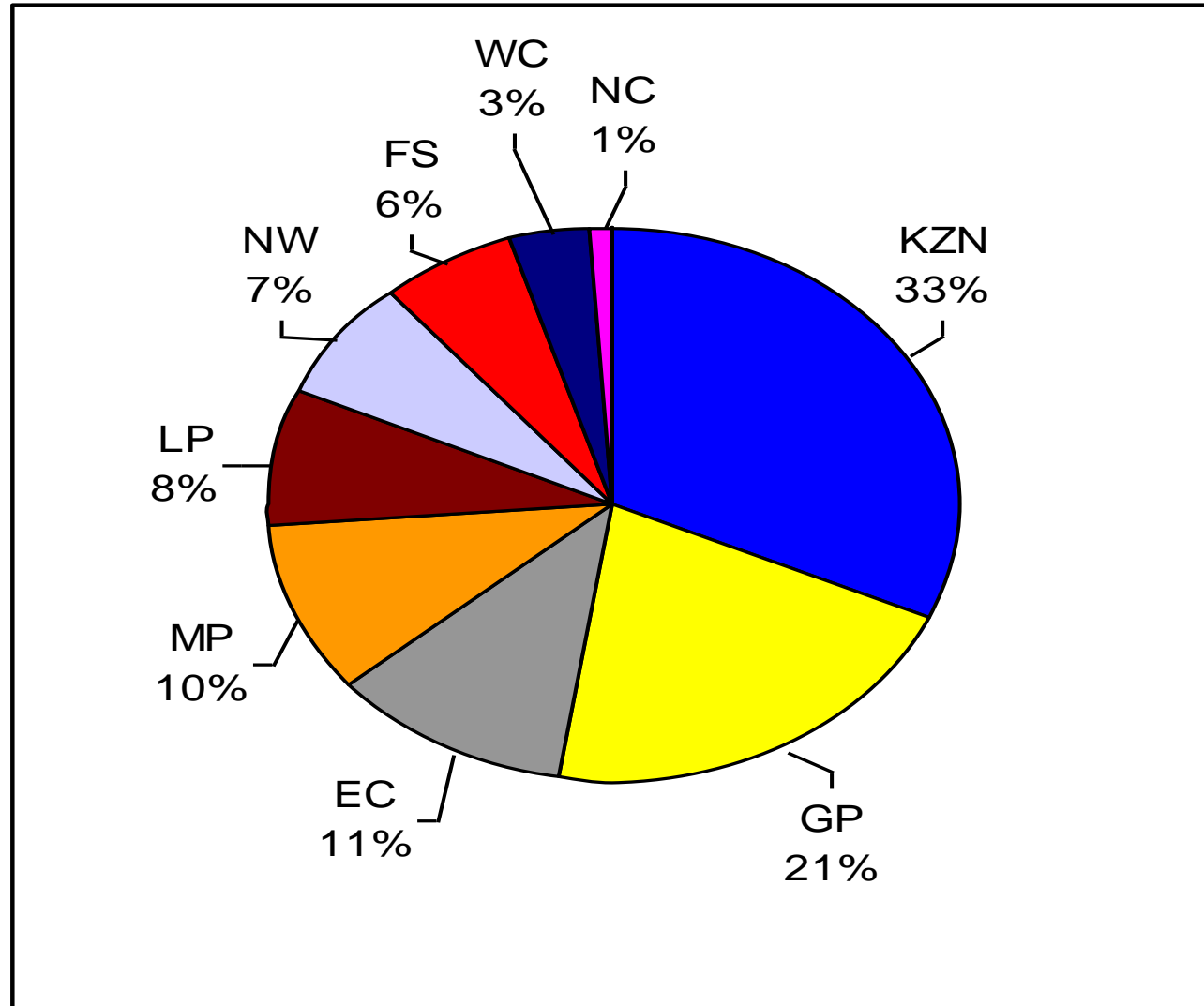


Sources: Spectrum estimations and mid-year population estimates from www.statssa.gov.za

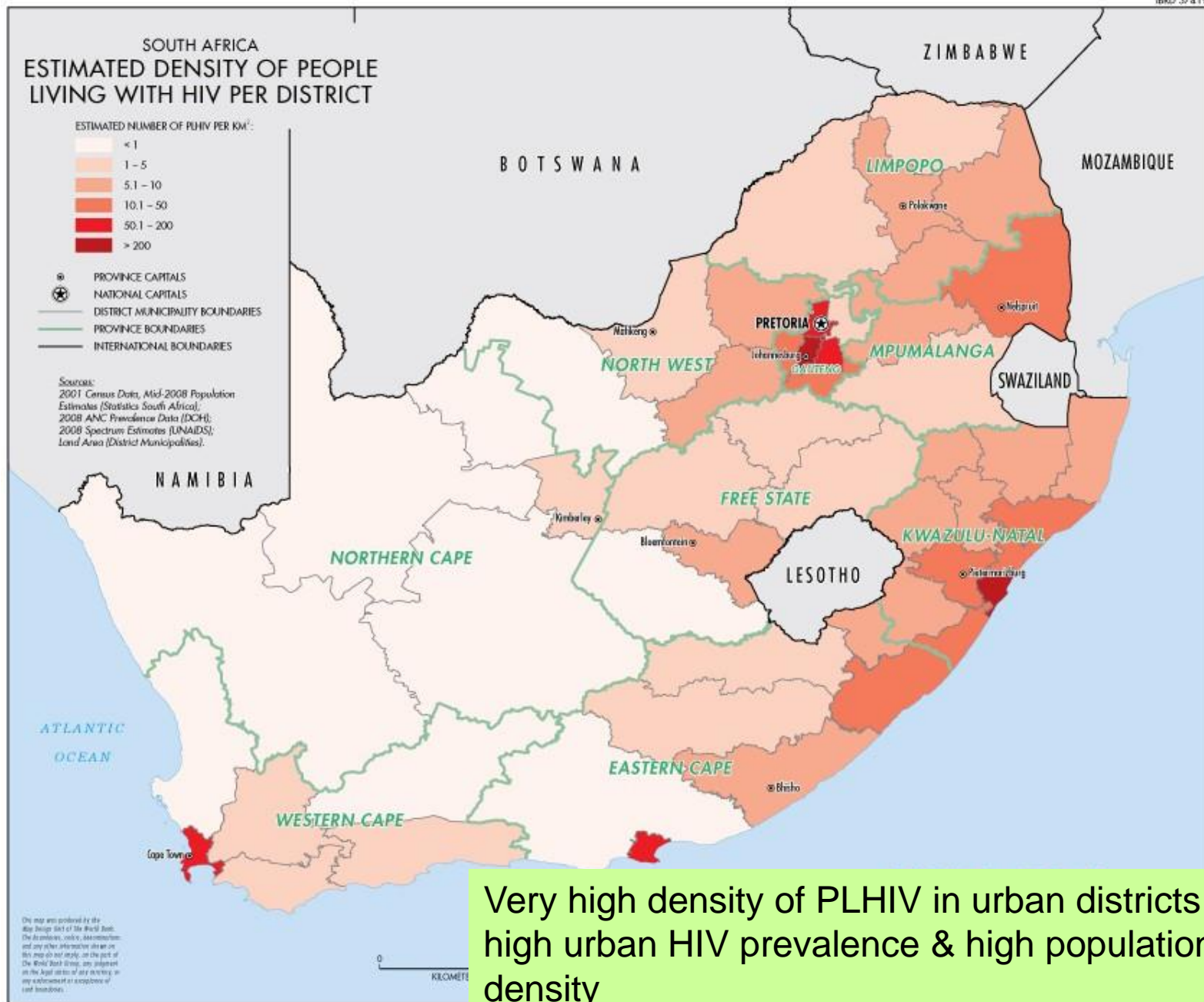
SUB-NATIONAL HIV PATTERNS

- Large differences in provincial HIV prevalence levels
 - lowest 3.8% in Western Cape, highest 15.8% in KwaZulu-Natal)
- Stabilised provincial HIV prevalence levels
- A concentration of PLHIV in certain provinces - 54% of all PLHIV live in KwaZulu Natal & Gauteng.
- Northern Cape only has about 1% of all PLHIV and Western Cape about 3%
- Even larger differentials in maternal HIV prevalence between health districts, ranging from 0% (0/68) in Namakwa/NC to 46.4% in Uthukela/KZN (2009 ANC data).

ESTIMATED NUMBER OF PLWHIV AGED 15-49 years BY PROVINCE (2008)



Sources: Estimated population 15-49 years in mid-2008 from SSA website times-series data, HIV prevalence in persons aged 15-49 years in 2008 from Shisana *et al.* (2009), table 3.10.

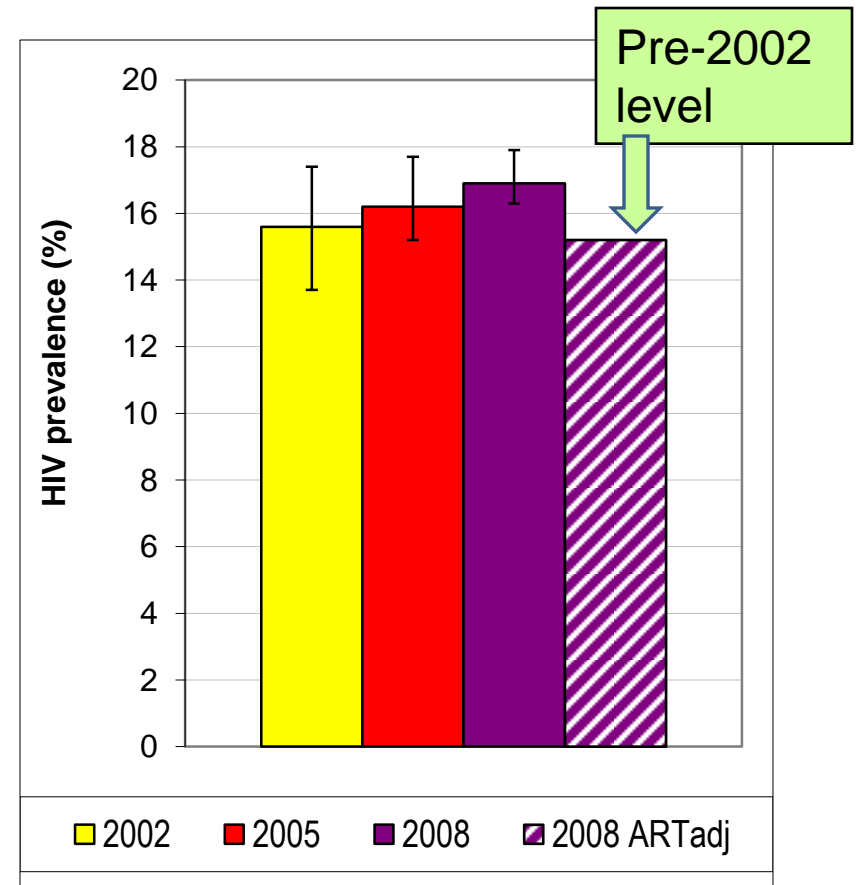


Very high density of PLHIV in urban districts due to high urban HIV prevalence & high population density

Sources: 2001 census data, mid-2008 population estimates (Statistics SA), 2008 ANC HIV prevalence data (DOH), and 2008 Spectrum estimates (UNAIDS) (District Municipalities)

ART & ADULT HIV PREVALENCE

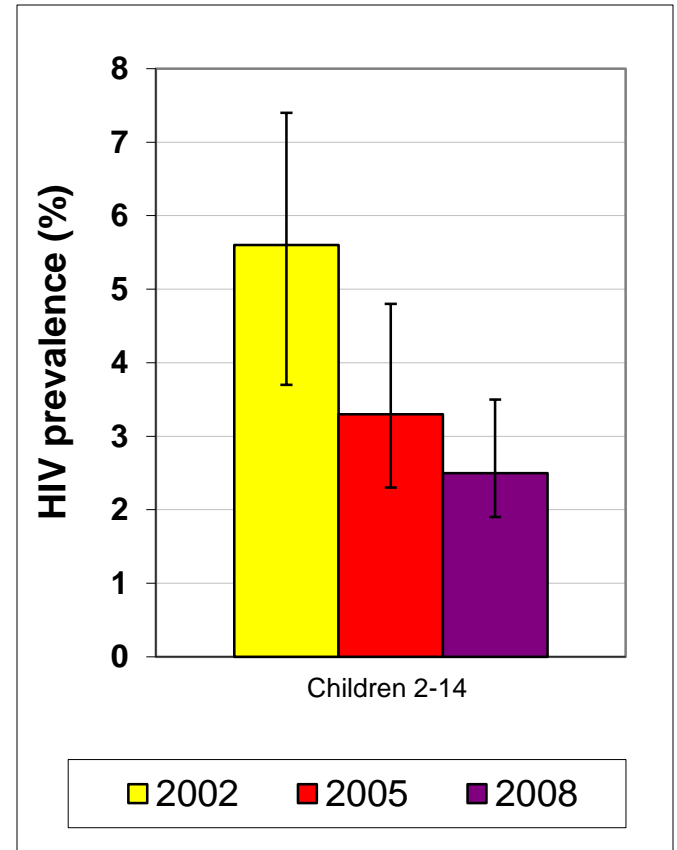
- ART has begun to have an important effect on HIV prevalence levels (adding ~2% to HIV prevalence through PLHIV who would already have died in the absence of ART).
- The life-prolonging effect of ART is the chief reason for the observed increases in HIV prevalence in older people. This 'ART effect' is estimated to be largest in people in the mid-20s to late 40s.



Sources: HSRC survey reports; ART-adjusted data: Rehle et al., 2010.

PMTCT & HIV PREVALENCE

- The PMTCT intervention is believed to be the main factor leading to a **halving of the HIV prevalence level in children** aged 2-14 years between 2002 and 2008.
- By 2008, 95% of public health facilities provided PMTCT services.
- It is plausible that many of the HIV-positive older children identified in the national surveys were infected vertically and are **slow progressors** (local and Zimbabwean estimates predict that about one-third of infected infants are slow progressors with median survival of 16 years).



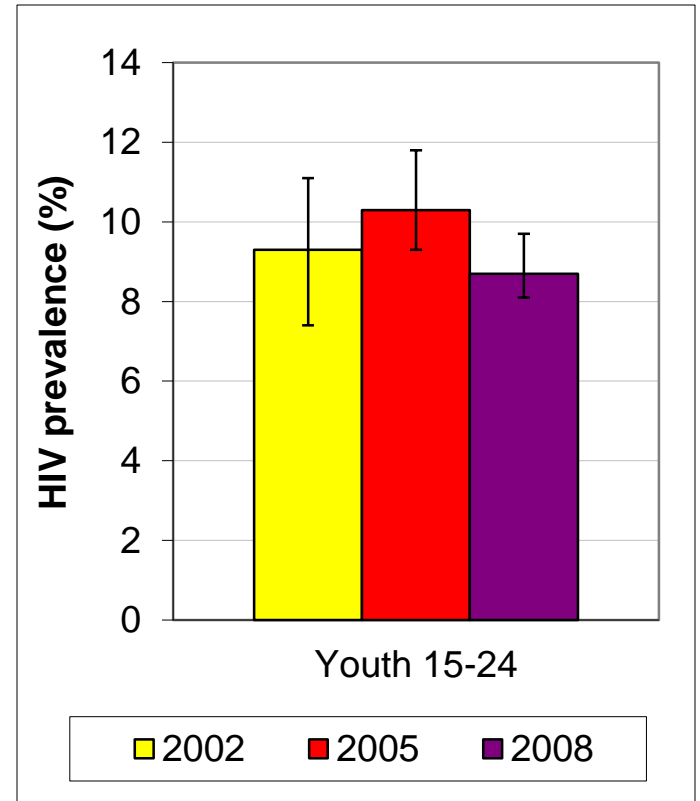
Sources: HSRC survey reports.

HIV PREVALENCE IN MEN AND WOMEN

- On average, females are infected about **five years earlier** than males, with 7% of young women aged 15-19, and 14% of pregnant teenage girls, already infected.
- Females have a statistically significant, higher HIV prevalence than men, nationally and in seven of the nine provinces (not in Northern Cape and North-West).
- Nevertheless, the **life time risk of HIV of men and women** - which is dependent on survival - is probably similar. Estimates for the Africa Centre cohort on life time risk at age 55 were 78% for males and 75% for females, despite there being the typical imbalance of women getting infected earlier and having higher peak prevalence.

HIV PREVALENCE IN YOUTH

- The downturn in HIV prevalence in youth aged 15-24 in the 2008 survey compared to 2005 is encouraging.
- It is not statistically significant, but it may be that there has indeed been a decrease in HIV prevalence in youth and that the survey was too small to detect it.
- The downturn is corroborated by mathematically derived HIV incidence data for this age group.



Sources: HSRC survey reports.

HIV PREVALENCE BY RACE

- HIV prevalence is significantly higher in the African population than in the other three race groups.
- However, HIV prevalence especially of Whites and Indians need to be interpreted with caution due to high survey refusal rates.
- In the regression models, being African was the strongest predictor of HIV status - in 2008, African men were 14x more likely to be HIV+ compared to non-African men, and African women were 9x more likely to be HIV+ than non-African women.
- In the 2007 KZN HIV Impact Study among company employees, HIV prevalence was 30.6% in African employees and 1.5% in non-African employees

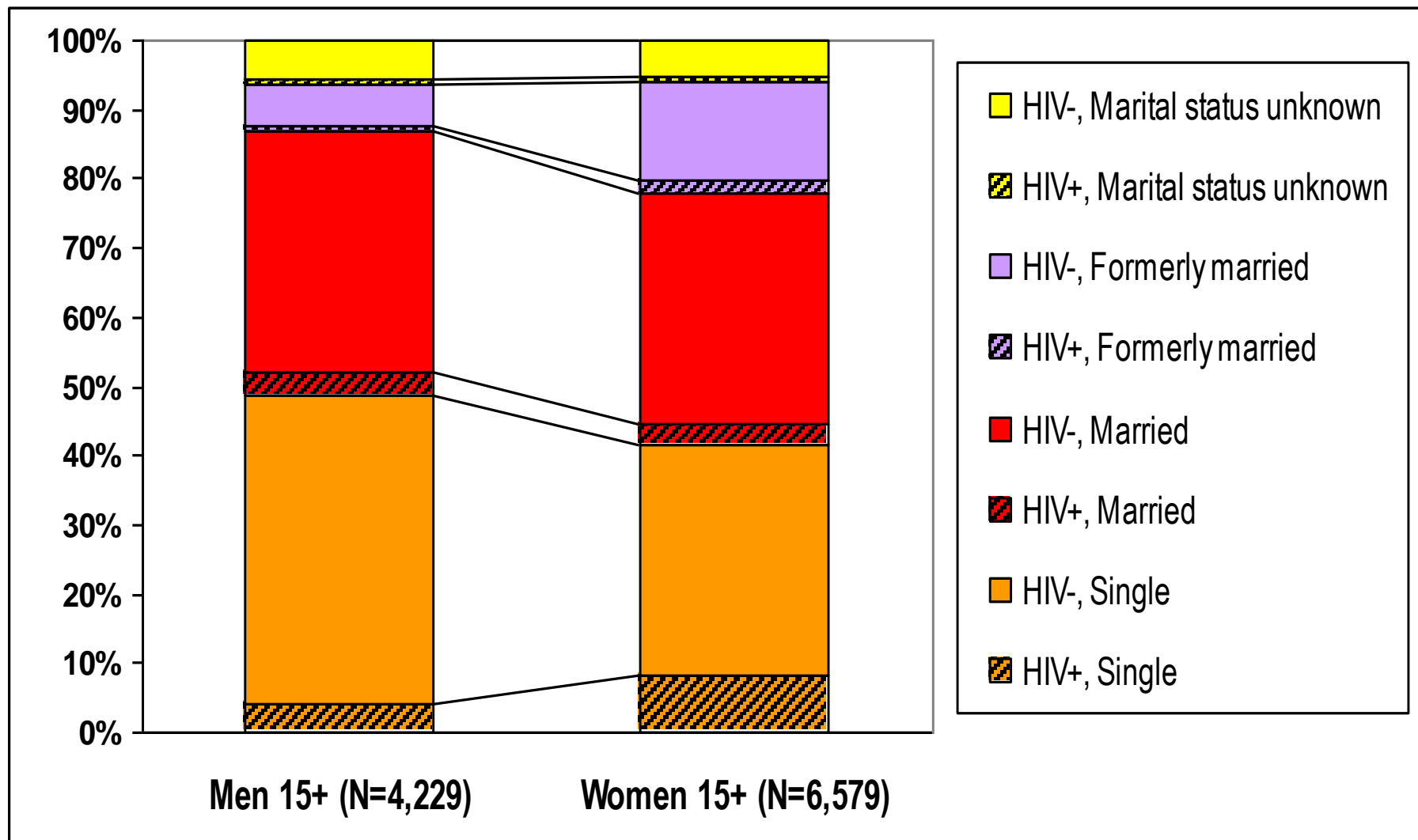
STIs, RACE & SEXUAL BEHAVIOURS

- In the multivariate analysis of STI symptoms in the CAPS (Cape Area Panel Study) data, Kenyon *et al.* (2009) found that race was a strong predictor of STI symptoms in univariate analysis.
- Incorporating partner concurrency into the multivariate model, removed race as a significant variable - implying that **differences in sexual behaviours like concurrency are a key factor responsible for differences in racial/ethnic STI transmission.**

HIV PREVALENCE & MARITAL STATUS

- **Married women have lower odds of HIV infection than unmarried women**
- **Married women in their 20s, 30s and 40s have the odds of HIV infection of unmarried teenage girls** (unmarried women in these older age groups have significantly higher odds of HIV infection)
- It can not be excluded that there is a '**survival effect**' in this with only HIV negative women surviving long enough to get married (median age at first marriage exceptionally high in SA at 27 years)
- For men, marriage was not important for their likelihood of being HIV +
- **Age of first marriage has been increasing**, especially in women, leading to long periods of time spent single and sexually active
- An estimated 60% of all adult PLHIV are not married or cohabiting.

HIV PREV BY MARITAL STATUS, ADULT 15+ YEARS (2005)



Source: 2008 National survey data (HSRC)

HIV STATUS & EDUCATIONAL LEVEL

- Similar to marriage, **higher education appeared to have a protective effect against HIV.**
- Men and women with tertiary education were significantly less likely to be HIV positive than those with no school education.
- Students, as opposed to the unemployed, were also significantly less likely to be HIV positive.
- In 2008 in Eastern Cape and KwaZulu-Natal, men with matriculation or tertiary education were significantly less likely to be HIV positive than those with less education.

HIV & SOCIO-ECONOMIC STATUS

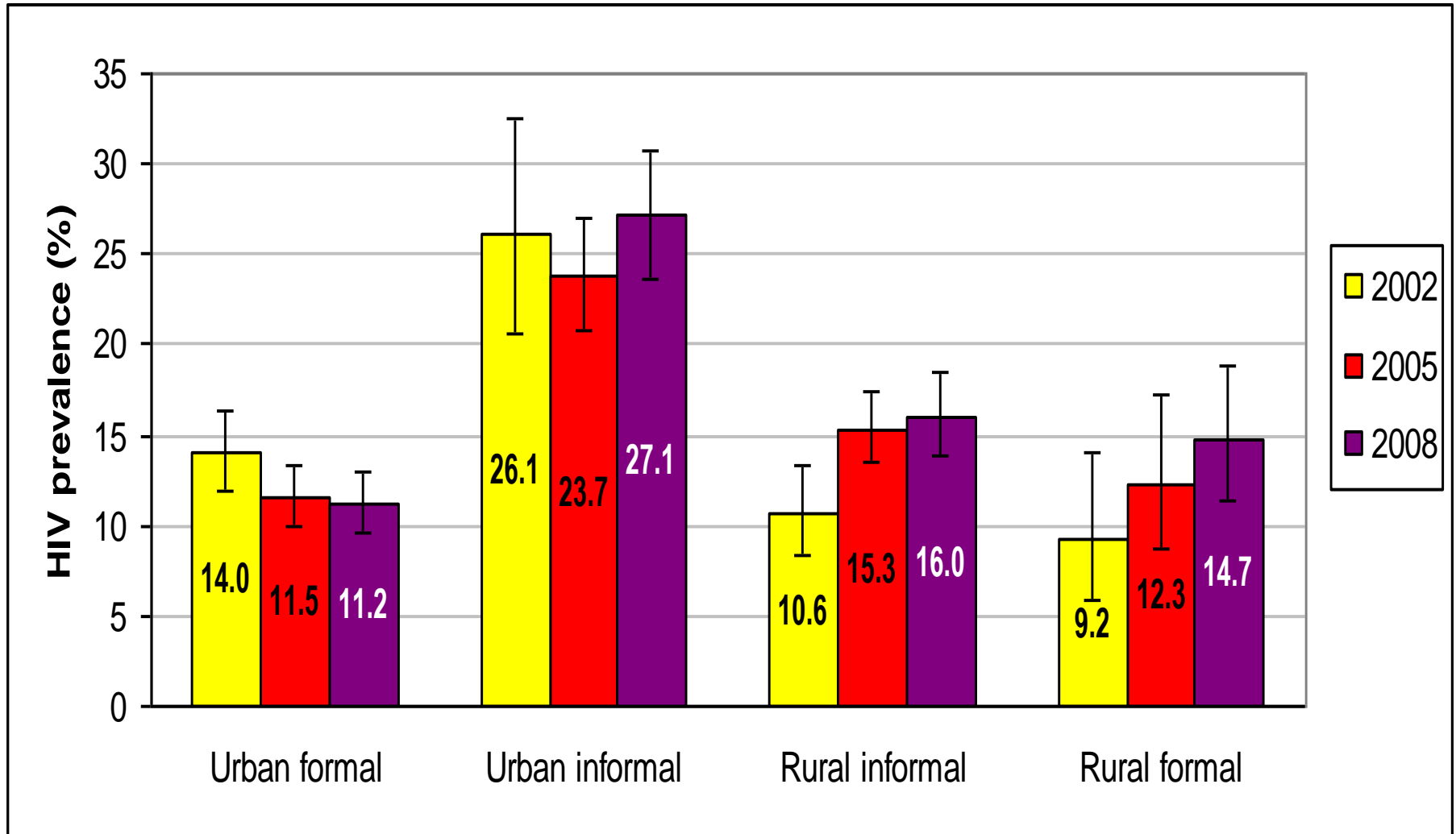
- Low economic status was identified as a risk factor for HIV infection.
- Deprivation was linked to significantly higher HIV prevalence especially in Africans.
- Respondents working in the informal sector had overall the highest HIV prevalence among the different employment groups, with almost one third of African informal workers HIV+
- In women, the greater the lack of money, the more likely they were HIV+

HIV STATUS & RESIDENCE

- Urban *informal* areas are associated with highest HIV prevalence compared to the other three types of location.
- In 2008, women living in urban *informal* areas were 57% more likely to be HIV infected than those in urban formal areas.
- In urban *formal* areas, the HIV prevalence trend has been falling since 2002 by about 3% (decrease not reaching statistical significance)
- In rural areas – both informal and formal – HIV prevalence has increased by over 5% between 2002 and 2008 (increase statistically significant for rural informal areas).

HIV PREVALENCE BY AREA OF RESIDENCE

2002 - 2008



Source: HSRC survey data

HIV & MALE CIRCUMCISION

- Men who reported in the 2005 survey to have been circumcised before first sex were significantly less likely to be HIV positive.
- SA and regional evidence that MC is effective in reducing the risk of HIV and other STIs in men, and indirectly HIV prevalence among women in the population.
- MC has broad support by SA men and women
- A shift among young men to getting circumcised in hospital instead of having the procedure done in the traditional way, and to doing MC for HIV/STI prevention & hygiene, not tradition.
- Parents of young men may play an important role in getting the young man to go for circumcision.

HIV incidence

- Telling us about current transmission, not transmission in the past (HIV prevalence)
- South Africa has considerable experience in the use of a variety of methods to estimate HIV incidence, the rate new HIV infections occur.
- HIV incidence is a key prevention impact indicator in the national HIV response.
- The NSP 2007-2011's main prevention goal is to reduce the rate of new HIV infections by 50% by 2011
- This would mean that HIV incidence in 2011 is reduced to about 0.65%, down from approximately 1.3% in 2007.

ESTIMATED ANNUAL HIV INCIDENCE BETWEEN 2002 & 2009

- Table shows results for different time periods obtained with 5 different methods.
- Recent estimates of 2005 onwards seem lower

Year	Age group	Estimated annual HIV incidence (%)	Method
2002-2005	15+	2.0	Model (synthetic cohort)
2005	15-49	2.4	BED assay
2005	15-49	2.2	Model (ASSA)
2005	15+	1.4	Model (EPP)
2005-2008	15+	1.3	Model (synthetic cohort)
2009	15+	1.2	Model (EPP)
2009	15-49	1.7	Model (MoT)

1.2-2.4%,
recent
estimates at
lower end

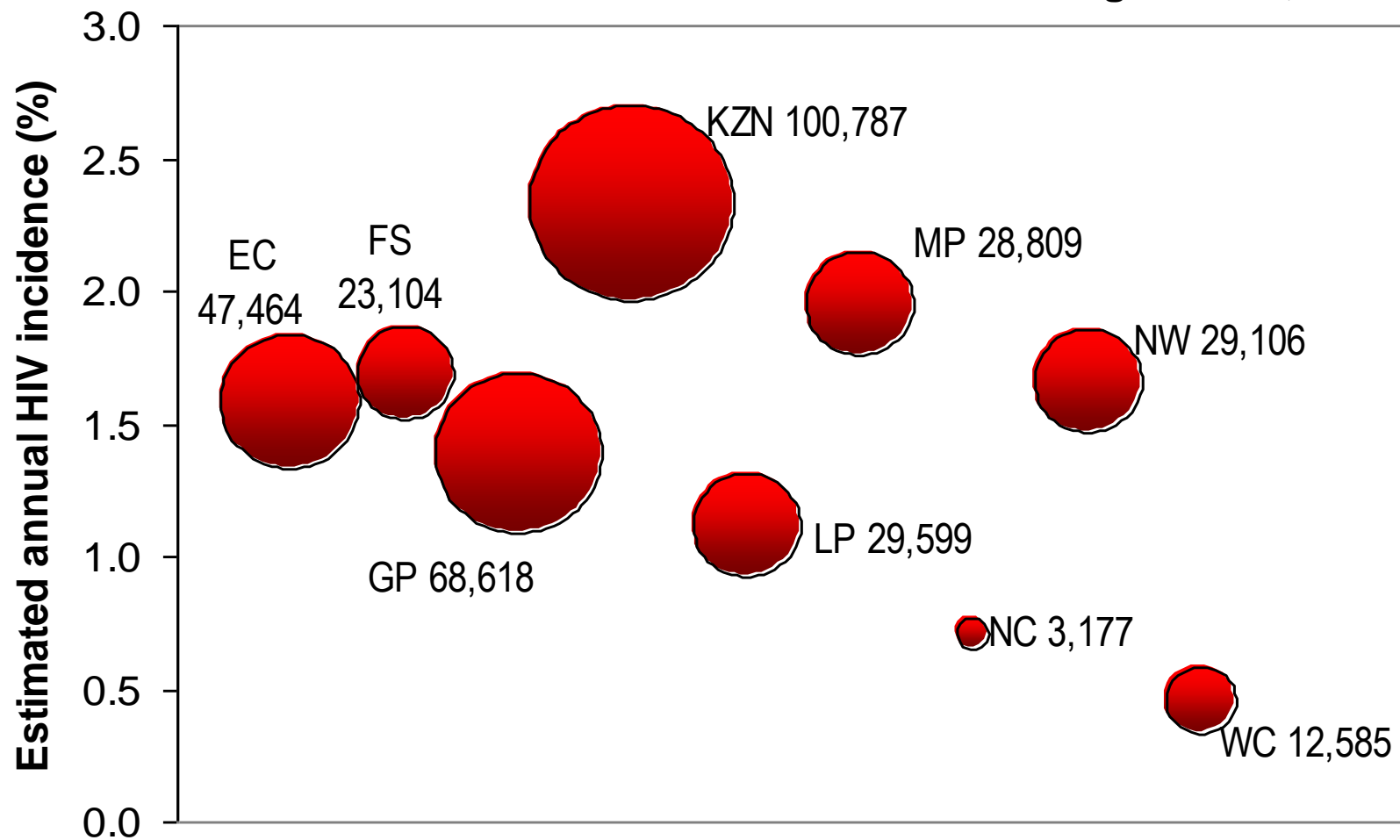
HIV incidence

- An estimated 400,000 new infections in 2009 (of which 12% in children aged 0-14)
- Incidence estimation in 15-20 olds suggest that although youth in their teens prevented infections more effectively in 2008 than in 2002, they still acquire new HIV infections rapidly as they get into their twenties
- Using one incidence estimation method, it was suggested that HIV incidence may have declined by 60% in young women aged 15-24 between the inter-survey periods 2002/05 and 2005/08.

HIV INCIDENCE IN PREGNANCY

- Important local as well as regional evidence from Uganda, Malawi and Zimbabwe suggests that HIV incidence is particularly high in pregnancy and post-partum.
- BED results of 2005 HSRC data suggest high incidence in currently pregnant women (5.2%)
- Recent data from sero-discordant couples in the Partners in Prevention HSV/HIV Transmission Study, in which South Africa participates, suggests that the risk of men being infected by HIV doubles when their partners are pregnant.

Estimated number of new HIV infections in adults aged 15-49, 2009



Source: Gouws (2010) 2009 EPP estimates

CONTINUING HIGH HIV INCIDENCE IN KWAZULU NATAL

- Compared to other HIV monitoring sites in sub-Saharan Africa, HIV incidence in the Africa Centre site has been found exceptionally high.
- Corroborated by recent results from the tonofovir trial which reported for sexually active women in KZN a HIV incidence rate of 9.1/100 person-years (placebo group).
- From the Africa Centre HIV cohort, very high life-time risks of HIV infection have been reported: Life time risk at age 55 is estimated at 78% for males, and 75% for females.

MODES OF HIV TRANSMISSION

MODES OF HIV TRANSMISSION

- The South African HIV epidemic is clearly **driven by heterosexual transmission**, which is typical for generalized and hyperendemic epidemics.
- Research is ongoing on the transmission probability of HIV between heterosexual partners.
- Two estimations both reported very high estimated **per-partnership probability of HIV transmission**, nearing 1.0 for young women (Auvert et al., 2001; Pettifor et al., 2007).

MEN HAVING SEX WITH MEN

- **Several studies on MSM** in South African cities.
- Serological data is conflicting on whether MSM are more likely to be HIV+:
 - In 2008 HSRC survey, HIV prevalence among self-identified MSM was 9.9% (all men aged 25-49 years: 23.7% HIV+).
 - In a survey among young men in Eastern Cape, men with same-sex experience were 3.6 times more likely to be HIV+
- High frequency of self-reported unprotected anal sex and other risk behaviours among MSM. Some evidence of sero-sorting when partners are acquired.
- **Evidence that MSM contribute to current HIV transmission.**

INJECTING DRUG USERS

- While it seems that **South Africa does not have a major IDU problem at present**, it has a growing problem with crack cocaine, especially among sex workers (who inject and smoke heroin as a come-down drug for crack cocaine).
- HSRC survey, **1.6% of adults said they had injected drugs in the last 3 months**, but reported **needle sharing was only 0.1%**.
- HIV prevalence data are scarce. In the 2008 International Rapid Assessment and Response Evaluation, HIV prevalence in 35 IDUs was 20% (highest among those doing sex work and MSM).
- **IDU seems a minor contributor to current HIV transmission and is interlinked with commercial sex work and MSM.**

MEDICAL INJECTIONS & INFECTION CONTROL

- 2005 HIV exposure study among children found that children who had received a medical injection in the past 12 months were slightly more likely to be HIV positive than those who had not had an injection (difference not significant).
- Some data are available for **single, accidental percutaneous injuries** with needles or other sharp objects, commonly involving health care workers and laboratory workers.
- Studies in several hospitals reported that **unsafe practices** are widespread and the **methods of reporting blood exposures inadequate**.
- The 2002 health worker study implemented in several provinces highlighted the need for rigorous infection control practices to protect both health care workers and patients from HIV transmission in health care settings.
- **There is probably some HIV transmission occurring in health care settings.**

BLOOD & BLOOD PRODUCT

- SA National Blood Service & Western Province Blood Transfusion Service for prevention of HIV transmission through blood
- Rigorous internal quality assurance measures
- Inspected by the SA Quality Assurance Systems, other external quality assurance procedures
- **All (100%) of donated blood screened** for HIV-1, HIV-2, hepatitis B and C, and syphilis. Since Oct 2005, all donations screened for HIV-1, hepatitis B and C using nucleic acid amplification
- **HIV transmission through blood transfusion probably close to zero, unless there are frequent transfusions outside the control of the blood services**

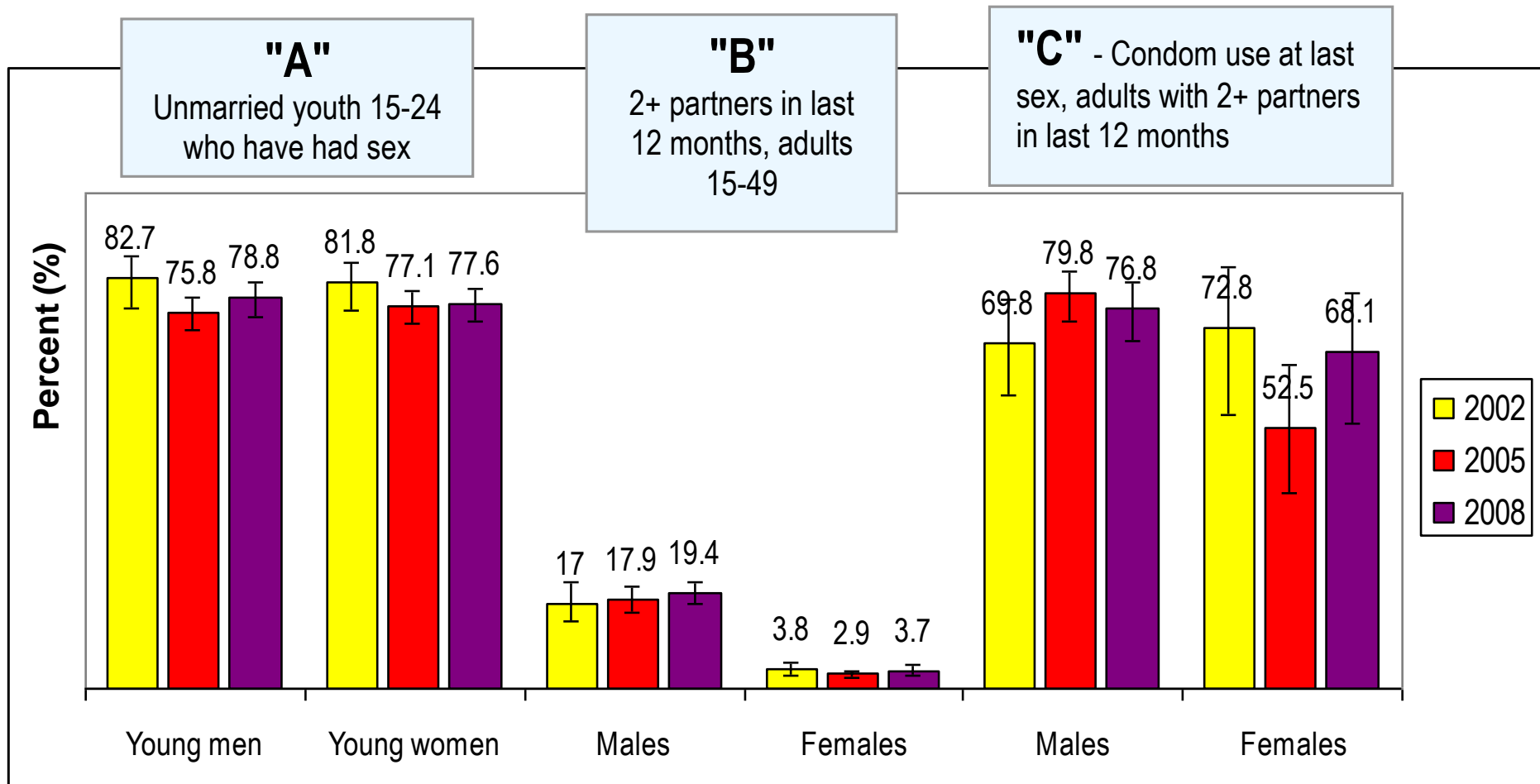
VERTICAL TRANSMISSION

- Body of evidence from biomedical and sociological research and estimation work, including the effects of PMTCT interventions
- In 2009, an estimated 42,700 new infections in children aged 0-14 years, mostly through vertical transmission (**11% of all new infections in 2009**)
- In 2009, about 214,000 HIV+ mothers needed PMTCT services, and about 159,000 children aged 0-14 years needed ART
- Recent study found that **MTCT rates were significantly lower in women who became pregnant on ART** than in those initiating ART during pregnancy (0.7% versus 5.7%), and that each additional week on ART reduced odds of MTCT by 8%.

cont. VERTICAL TRANSMISSION

- Vertical transmission can also be reduced by the **prevention of unwanted pregnancies in HIV+ women**. In the 2003 DHS, **23% of the births were not wanted at the time they were conceived**
- The international literature states that **preventing unintended pregnancies among HIV+ women could produce equivalent reductions in infant HIV incidence as ARV prophylaxis during pregnancy**
- SA research demonstrated importance of exclusive breastfeeding or safe replacement feeding to reduce the risks of MTCT in infants up to 6 months. Proportion of infants exclusively breastfed low in 1998 & 2003 SADHS (**only 8% of infants** under 6 months exclusively breastfed).
- 2005 HIV exposure study among children: **wet-nursing risky for the infant**, increasing the odds for HIV infection 17 times, compared to children breastfed by biological mother.

Factors in the sexual transmission of HIV: overview of key indicators (self-reported behaviours)



Sources: HSCR surveys 2002, 2005, 2008

SEXUAL DEBUT

- Secular trend towards **earlier sexual debut** amongst youth - median AFS 20 years for men & women born before 1950, 18 years for those born in 1980s
- Sex before age 15 has significantly increased in Free State, North West and Mpumalanga between 2002 and 2008
- Young Africans report higher levels of sexual experience than Coloured, White and Indian youth
- Cape Area Panel Study found that girls in **lower income households** had earlier sexual debut, and that community poverty rates were associated with early sex and higher rates of unprotected sex
- In the Africa Centre study area, the most important and highly significant factor protecting females against first sex before 17th birthday was **school attendance**.

SECONDARY ABSTINENCE

- No sex in last 12 months among those who ever had sex
- **Nearly one third of adults report secondary abstinence**, and more than one-fifth of youth aged 15-24 years report secondary abstinence.
- Average period of **abstinence after child birth** 8.2 months for African women, 3.3 months for Coloured women, and 1.9 months for Indian and White women in 2003.
- Evidence from West Africa and Zambia that long-term postpartum abstinence can lead to husband taking sexual risks with secondary partner(s).

MULTIPLE SEXUAL PARTNERS

- **Frequency of reported multiple partners varies by race** , highest in African men
- In 2009 NCS, **16.7% of men and 2.3% of women** aged 16-55 reported >1 partner (among those who ever had sex)
- Multiple partner frequency peaks in **people in their 20s**, but there may be underreporting in older age groups where marriage is more common
- **HIV prevalence higher in respondents reporting more sexual partners.** Women reporting >1 partner at the time of survey in 2005 were 4.3 times more likely to be HIV+ ($p=0.0001$).
- **Sexual concurrency analysis of NCS 2009 data also suggests higher concurrency rate for African men compared to Coloured, Indian and White men.**

ACQUISITION OF NEW PARTNERS (NCS 2009)

- Rate of partner acquisition was **3 times higher in men** than in women, and highest in men aged 20-24 years (NCS 2009).
- Rate highest among those who have no partner, and those who are in their early 20s. African men and women more likely to acquire a new partner than non-Africans.
- Men & women in tribal areas least likely to acquire new partner.
- **People who had an HIV test in the 12 months before the survey had higher acquisition rates in the same period (might be getting tested as they enter the new relationship; or might get tested in response to their risky exposure with new partner).**

CONDOM USE

- **Young singles (not married/cohabiting) and youth reporting multiple partners most likely to report using condoms**
- People above 50, married people, and **young females reporting once-off partners** least likely to report condom use
- Reported condom use has overall **significantly increased** between 2002 and 2008, but not among those reporting multiple partners
- PLHIV who knew that they were HIV+ significantly more likely to use a condom than PLHIV not aware of their HIV status
- Condoms least likely to be used consistently in partnerships characterised by long term concurrency.

PREVENTION KNOWLEDGE & RISK PERCEPTION

- Correct knowledge on the prevention of sexual transmission of HIV **lower in 2008 than in 2005** in all age and sex strata except in males aged 50 or above
- Correct knowledge on prevention and the rejection of misconceptions regarding HIV transmission **overall decreased**, especially in EC, KZN, Limpopo & Mpumalanga
- Relatively small proportion of the population regard themselves to be at any significant risk for HIV, more among those HIV+
- A quarter of adults tested for HIV and received the result

AGE-DISPARATE SEXUAL RELATIONSHIP

- Analysis of the reported age gaps between sexual partners suggests that **as men get older, their partners get younger** (HSRC 2008 data)
- Girls 15-19 years reporting age-disparate relationship with older were 72% more likely to be HIV+ than those girls with similar-aged partners (HIV prevalence 29.5% vs. 17.2%)
- Men and women who have partners much younger/older than themselves are more likely to be HIV+ compared to people who report having partner of similar age only.

TRANSACTIONAL SEX

- Exchange of cash, gifts or services for sex is closely interlinked with age-disparate sex
- Reported frequencies of transactional sex are 2 - 52% (F) and 4 - 30% (M) in different SA surveys
- **Research in several sub-Saharan African contexts has shown that exchange of sex for material resources is common practice, and that the vast majority of women who engage in such transactions do not identify as sex workers**
- Transactional sex is part of a cluster of closely related violent and controlling practices by men, and may often be motivated by ideas of sexual conquest as much as sexual desire

COMMERCIAL SEX WORK

- About **2% of men** reported ever having paid for sex in HSRC's 2005 survey
- Having had sex with a sex worker **almost trebled men's odds for HIV infection**
- Three recent bio-surveys in sex workers reported HIV prevalence levels of around 60%, but infection levels in white and coloured SW were reported to be much lower, just below 20%
- Sex work, alcohol and drug use overlap, and sex workers experience **unsafe and dangerous conditions**: They suffer violence from clients, their partners and the police, and have difficulties accessing health, social, police, legal & financial services.

ALCOHOL USE

- SA data demonstrate that alcohol consumption is associated with **risky sexual behaviour, a higher likelihood of being HIV infected, and poor HIV prevention behaviours**
- Findings from the “SA Community Epidemiology Network on Drug Use” demonstrate that acute alcohol intoxication is associated with increased mortality and morbidity in SA due to accidents, violence, unsafe sexual practices, and misuse during pregnancy.

VIOLENCE AND RAPE

- SA data suggest a **direct link between violence and HIV infection**
 - HIV+ women are more likely than HIV- women to have experienced partner physical abuse
- In Soweto, women with **violent or controlling male partners** were more likely to be HIV+, and abusive men were more likely to be HIV+ and impose risky sexual practices on their partners
- In a HIV- cohort of young women in Eastern Cape, **relationship power inequity and intimate partner violence significantly increased the risk of incident HIV infection** (population attributable fractions were 13·9% for relationship power equity and 11·9% for intimate partner violence).

MOBILITY & MIGRATION

- In SA, the likelihood of being HIV+ has been found higher among individuals who either have personal migration experience or have sexual partners who are migrants.
- Since the early stages of the epidemic, infections in rural areas have been traced to those who had been in urban areas
- Truckers have been found to be at higher risk of HIV
- In the Africa Centre research area, HIV prevalence levels have been higher along major roads
- It has been stated that **oscillating migration** – with spouses living apart for extended periods of time - is an essential component for an epidemic as severe as the one witnessed in South Africa.

Recommendations

(more programmatic and policy recommendations can be made upon conclusion of the KYR assessment)

- 1. Promote data analysis across datasets whenever possible, in order to understand changes over time and obtain better estimates around less frequently reported behaviours through the pooling of data.** This will require more collaboration between research institutions to ensure the same measures can be tracked across surveys and that the survey protocols are harmonized to the greatest extent possible. People involved in the analysis must also be involved in questionnaire and survey design from the start. The sharing of databases with partners would encourage better data management and analysis.

- 2. Strengthen programming, data management and analysis capacity in the main research and survey institutions to be able to address the increasingly complex data analysis and modelling challenges.** The goal of such capacity strengthening would be to have a core group of programmers and statisticians with a high level of skills in order to permit complex data analyses and modelling as well as technical exchange. There is already specialist analytical capacity and skill in a few institutions in South Africa, but this is not sufficient for the amount of population level data collected. Datasets are frequently not fully analysed due to limited human resource and capacity. This KYE analysis calculated for the first time sexual concurrency rates and partner acquisition rates for SA from available national survey data.

3. Reinforce communication campaigns prior to surveys with the aim to have high participation rates in all race groups. The cited reasons among Whites, Indians and Coloureds for non-participation in the surveys must be taken seriously and specific solutions found which increase the trust of sampled individuals and the perception that HIV concerns all South Africans. Even if sophisticated data analysis methods are used to allow for non-participation, as done in this KYE study, biases arising through systematic differences in participation cannot be ruled out.

- 4. Establish a knowledge hub which centralises, stores and archives HIV survey and research study protocols, the actual databases and reports and publications.** The aim is to make HIV research and survey data and information accessible long-term in one central repository. This study showed that data is scattered and although some institutions have searchable lists of their own publications (e.g. MRC, HSRC, Africa Centre), survey protocols, grey literature and data bases are often not accessible or shared, and there is no centralisation in one hub.

- 5. Further strengthen the methodological work on the measurement and estimation of HIV incidence.** The aim is to improve the understanding of each method of incidence measurement and its relative performance compared to other methods, and to agree on the best method to track national HIV incidence. This KYE process with its HIV incidence workshop showed that South Africa is already leading in this methodological work but that there is still no consensus on how to track the main indicator in the NSP on HIV prevention – national HIV incidence.

- 6. Support research into the methodologies of behavioural surveys to broaden the spectrum of available measuring tools and deepen the understanding of the validity of responses obtained from study participants.** The overall aim would be to improve the research tools – both quantitative and qualitative ones - for behavioural surveys and studies. This KYE analysis demonstrated that unless data with better validity can be obtained, it is difficult to understand people's behaviours and practices in their sexual lives. Any research results need to be communicated effectively to other research institutions working in the country in order to impact the quality and validity of behavioural research results in South Africa.

7. Investigate the prevention behaviours in different categories of PLHIV (those on ART, those in the pre-ART cohort, those who know they are positive but are well, and those who are unaware that they are positive). This KYE analysis summarized the available evidence, and findings like the one on significantly higher condom use by PLHIV if they know that they are positive are crucially important and supportive of HIV testing campaigns. Findings of high rates of unprotected sex in pre-ART patients is alarming and points to a lack of communication and counselling activities in these patients. In order to make 'Prevention for Positives' activities work in a context a fast-growing PLHIV numbers, prevention behaviours in the different categories of PLHIV must be better understood.

8. Strengthen research on vertical transmission and M&E of PMTCT interventions. The overall aim would be to understand better the factors leading to HIV transmission in pregnancy and how the PMTCT programme impacts HIV transmission. Specific areas of focus:

- Use and non-use of family planning services by positive couples (many pregnancies in positive couples are unwanted)
- Prevention and sexual behaviours of positive couples during pregnancy (pregnant women and their partners have an increased chance of HIV acquisition during pregnancy)
- Use of PMTCT services (testing as a couple, re-testing in late pregnancy, etc.)

Apart from such research studies, the PMTCT programme also needs improvements in routine programme monitoring.

9. **Explore possibilities of structural interventions on the promotion of earlier marriage.** The objective would be to stop and reverse the trend of late marriage in SA, which undoubtedly contributes to the HIV epidemic. This analysis summarised the evidence on the extended periods of sexual activity with different partners where there is no marital commitment and where people compete for partnering with those few who have a good income. The *lobola* payment for marriage is a major contributor to late marriage. Possible structural interventions could be policy provisions on preferential access to housing and work programmes for married people, or tax breaks for those married.

10. Develop structural interventions for female and male commercial sex workers - to decriminalise sex work and move towards the protection of male and female sex workers. The KYE review showed the deficiencies in South Africa addressing sex work, and the problems with violence, discrimination and stigma of commercial sex workers, who are sometimes even attacked by police officers instead of protected. Making sex work safer requires policy provision and may entail medical follow-up and the issuing of permits for sex workers.