

HIV prevention priorities in high prevalence epidemics: an overview

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Focus of presentation: sexual transmission

- Combination prevention
- Evidence on specific **risk factors** and approaches
 - Multiple and concurrent partners
 - Male circumcision
 - Condoms
 - For young people
 - Counselling and testing
 - Other prevention technologies, incl for STIs
- Using KYE/E/R research and summary conclusions

Combination of interventions at different levels to prevent HIV

- Reduced individual **biological susceptibility** and **infectivity** (e.g. MC, treatment: ARVs, treatment for other infections; nutrition)
- **Increased barrier protection** (male and female condoms, diaphragm, microbicides)
- Changed **sexual behaviour, reduced networking/partnering**
- Reduced **vulnerability/changed risk environments** (e.g. gender inequality, SGBV, mobility and separation; socio-economic inequality)

Make decisions on the basis of **evidence; sound M&E essential**

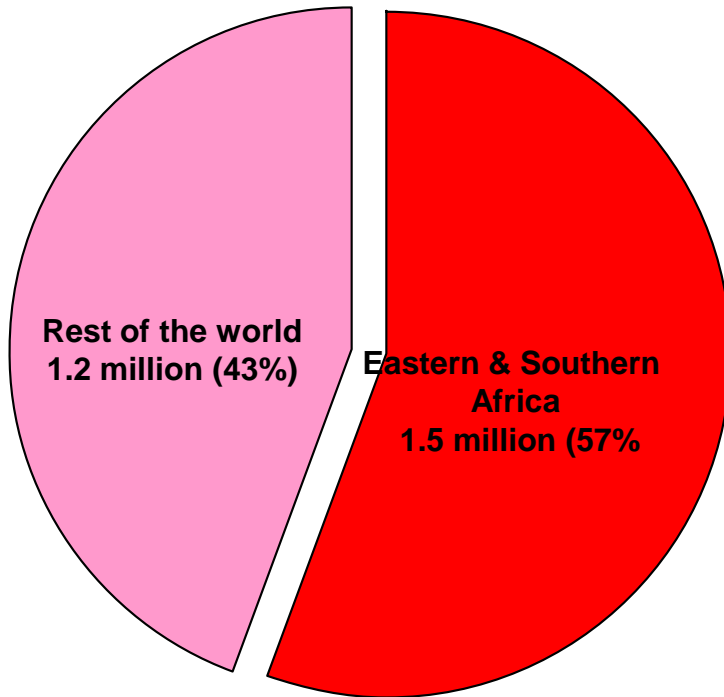
Address the **right populations** with the **right strategies** at sufficient **scale, quality and intensity** to turn back the HIV epidemic

Address and ensure complementarity of short-term, intermediate and long-term factors **BUT MAX FOCUS ON IMMEDIATE RISK FACTORS**

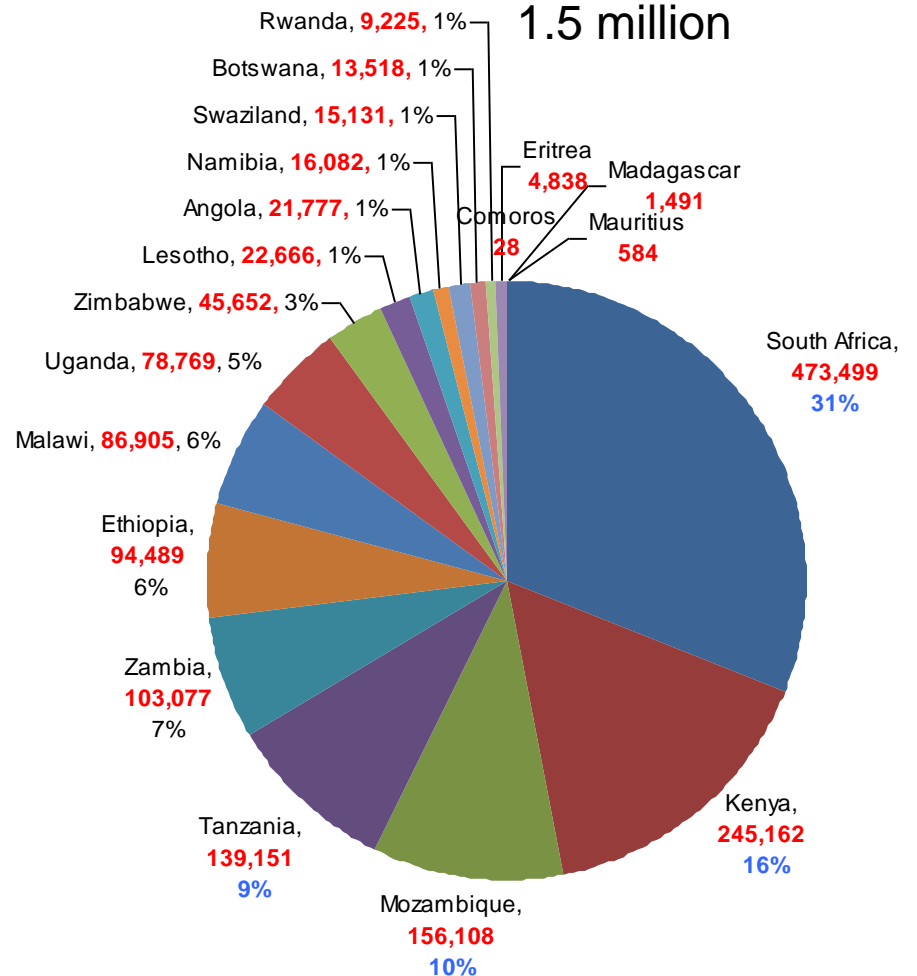
Prevention is essential to ensure treatment sustainability

Estimates of New Infections in Eastern and Southern Africa, 2007

Global new infections,
2.7 million



ESA new infections,
1.5 million



Does poverty drive HIV?

Complex inter-relationship

- In-country data do **not** show uniform correlations between lower SES (or education) and higher HIV
 - Poor populations in less developed rural areas, with lower mobility, usually have lower HIV
 - Higher HIV prevalence does not correlate with the poorer African countries
 - Male-female inequality contributes to HIV risk:
 - Poor women driven into sex work for survival
 - Richer men better able to sustain second houses/partners (concurrency), and to pay for sex more often
 - Young women enter age-disparate relationships to gain many material benefits
 - **BUT UNCLEAR CORRELATIONS AT COUNTRY LEVEL**
- AIDS DOES INCREASE POVERTY**

The disproportionate “weight” of urban areas in the HIV epidemic in Africa

- >1 million inhab.: 40 cities
- >100.000 inhab: 300 cities
- 40 largest cities: ~25% of the HIV epidemic in Sub-Saharan Africa
 - >5 million PLHA
 - >1 million (Greater Johannesburg)
 - >100,000 PLHA in 15 cities
- **Urban areas: 30-50% of the epidemic**
 - Share of the 300 cities >100.000 inhabitants ???
 - Definitions and estimates to be “validated”

National evidence of epidemic decline: changes in sex behaviour

- **Partner reduction** the most significant factor in reducing epidemics in Uganda, Kenya, Zimbabwe
 - Probably linked with fear, seeing people die, reinforced by policy and programming
- **Condom use**: also contributed
- **Age at sexual debut**: contributed in Kenya and possibly Uganda, probably not in Zimbabwe where it was already high (but impact is more to delay infection than reduce life-time risk)



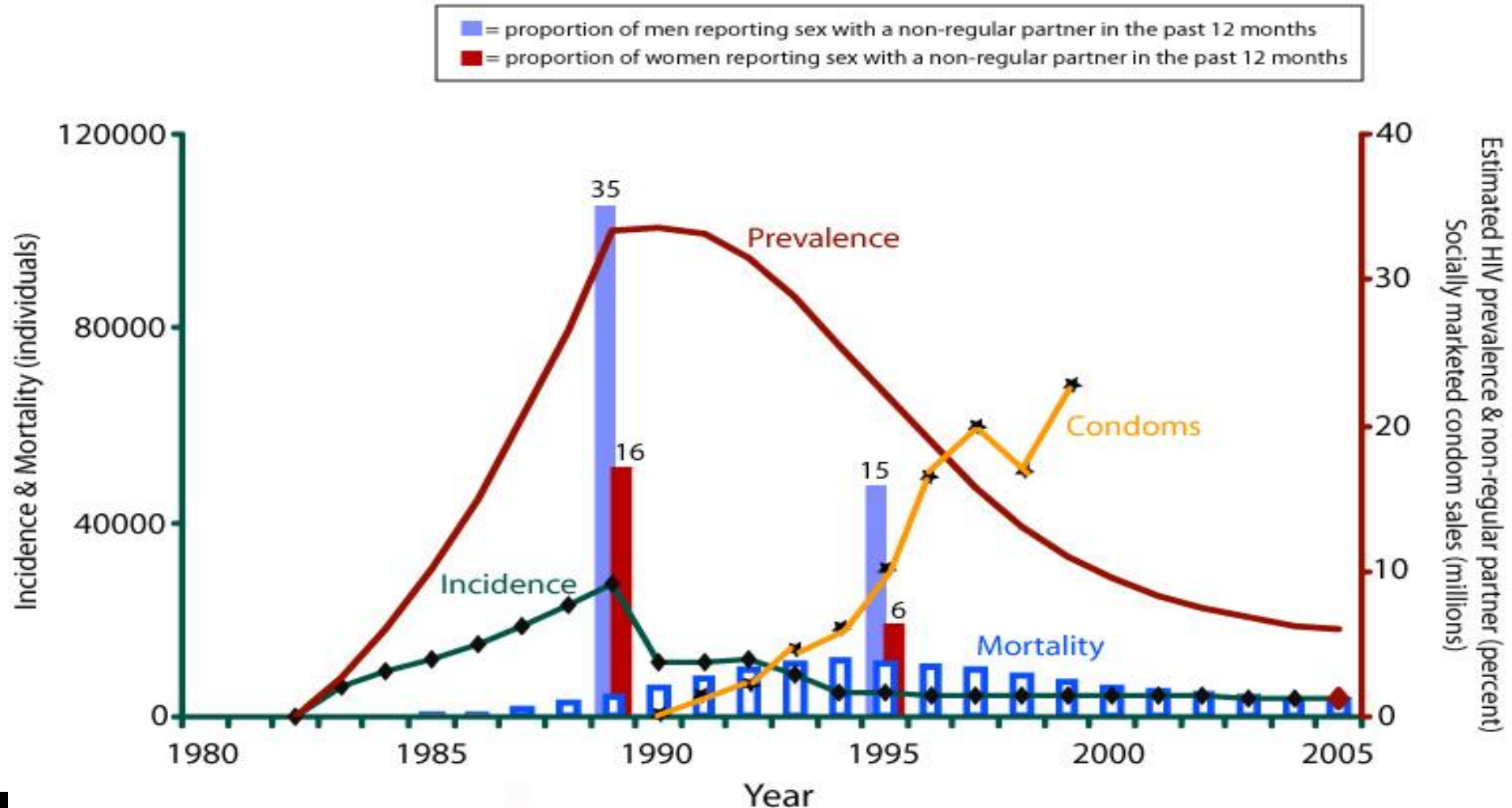
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Early successes: Uganda and “zero grazing”

“Trends” in HIV prevalence, incidence and possible correlates over time



Conclusions: SADC Prevention Think Tank 2006

“**key drivers** of the epidemic in southern Africa - **multiple and concurrent partnerships by men and women with low consistent condom use and in the context of low levels of male circumcision**”.

And:

- male attitudes and behaviours
- inter-generational sex
- sexual and gender based violence
- stigma, denial, lack of openness
- untreated viral STIs
- lack of male involvement

Underlying context - gender and socio-economic inequalities, mobility, and other structural factors



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East and Southern Africa

- **SADC Report relates to mainland Southern Africa:** 9 hyper-endemic countries, > 15% prevalence in adults aged 15-49
- **East Africa:** range from concentrated, Zanzibar, to generalised in Kenya, Uganda, Tanzania, Rwanda, Burundi.
 - But wide **within-country** differences spatially, by age and sex, and by mode of transmission. **COMPLEX EPIDEMICS**
 - As epidemics are maturing, also increased HIV prevalence among older people (as reported from Uganda)



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Multiple and concurrent partnerships

- Note particular risk for **young women, linked with age-disparate sex**
 - E.g. Kenya ratio in females 15-24 is about 4:1 compared to males of the same age cohort
 - Overall, in SSA, ratio of female to male infections is about 60-40%

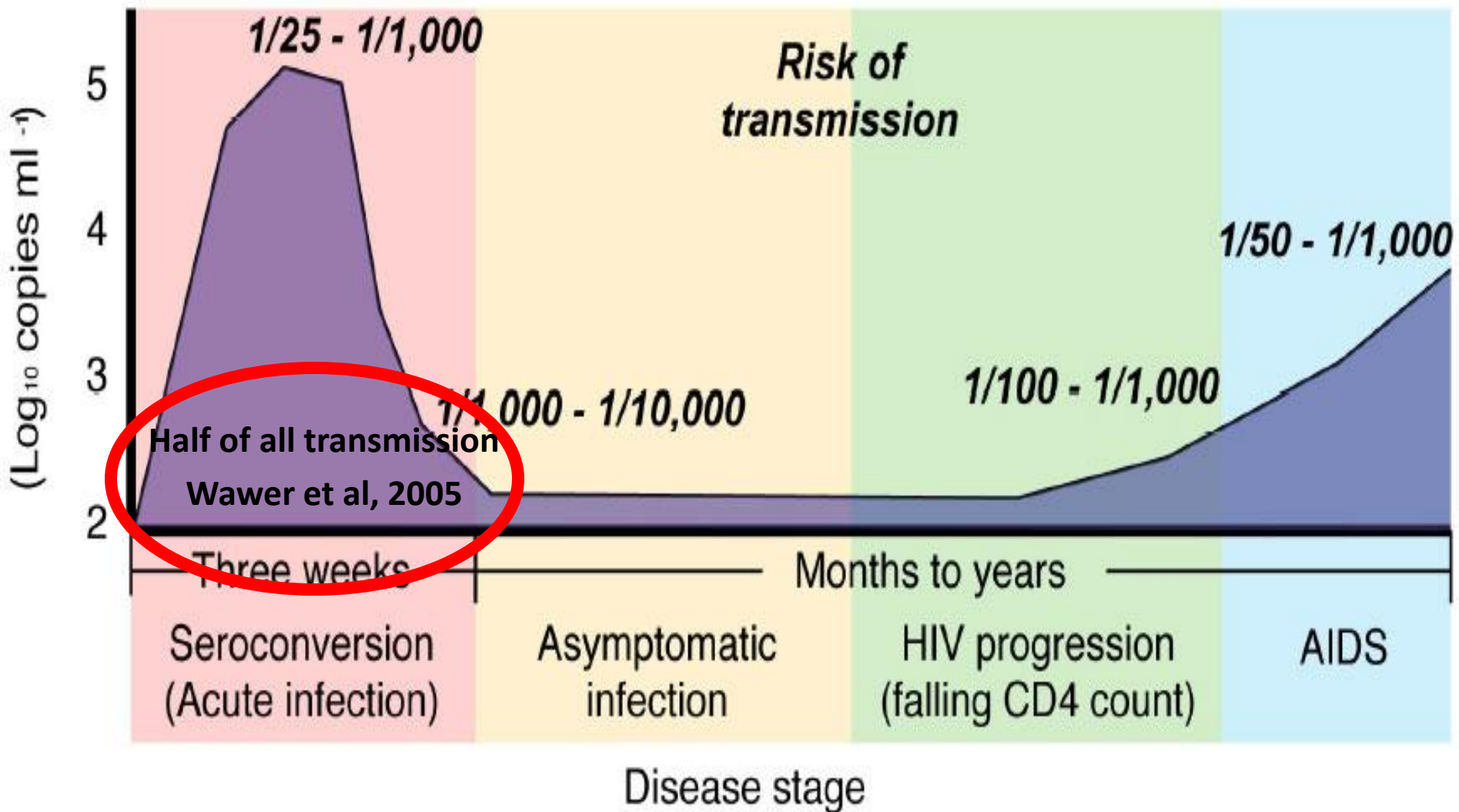
Do men and women in East and Southern Africa have **more partners**?

- NO

BUT

- Higher frequency of long-term **concurrent** partners: small houses, second office, etc by both men and women in East and southern Africa, combined with low condom use in long-term relationships

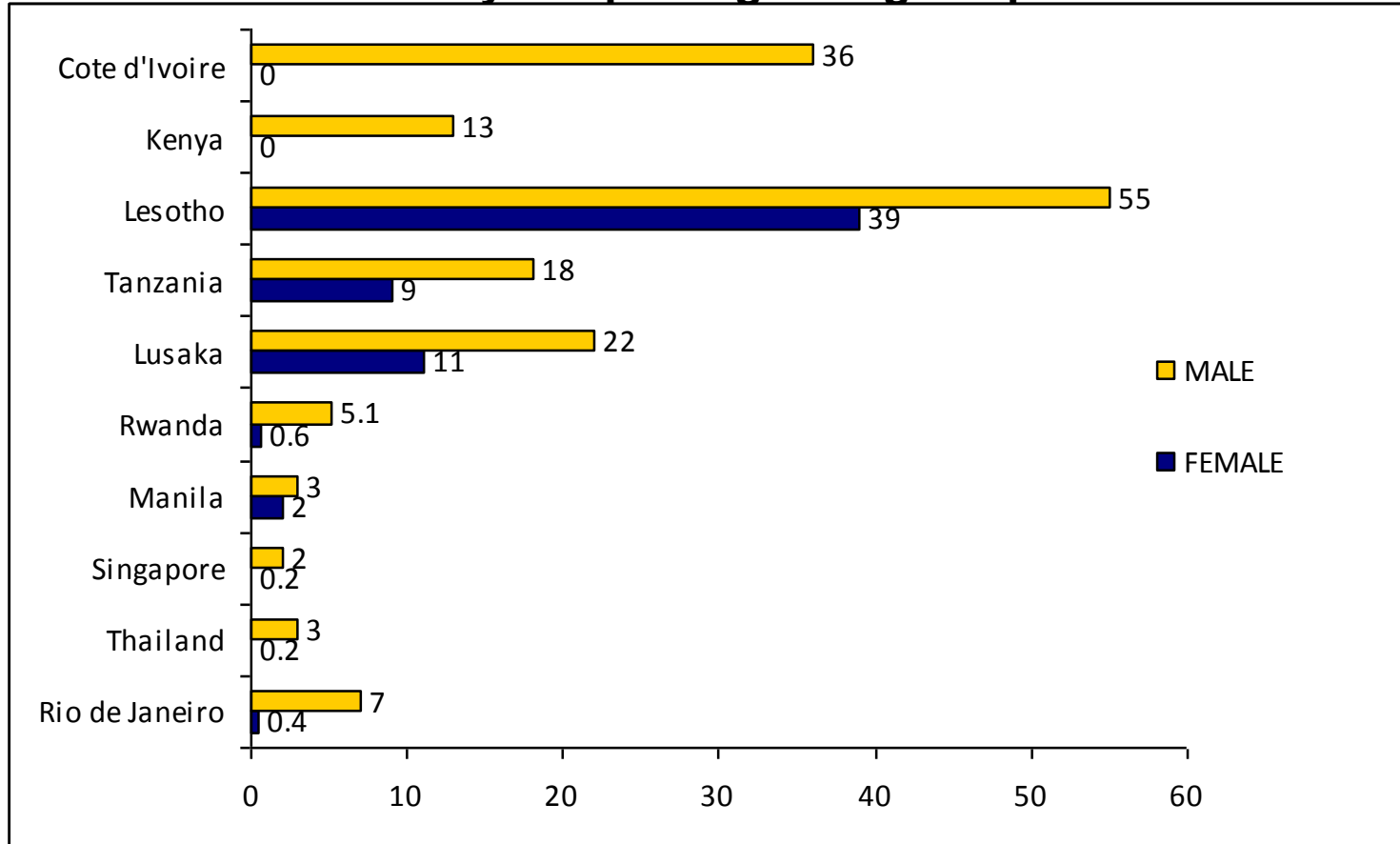
Infectiousness - HIV transmission risks



Source: Galvin, S.R. & Cohen, M.S. (2004) The role of sexually transmitted diseases in HIV infection. *Nature Reviews Microbiology*, 2(1).

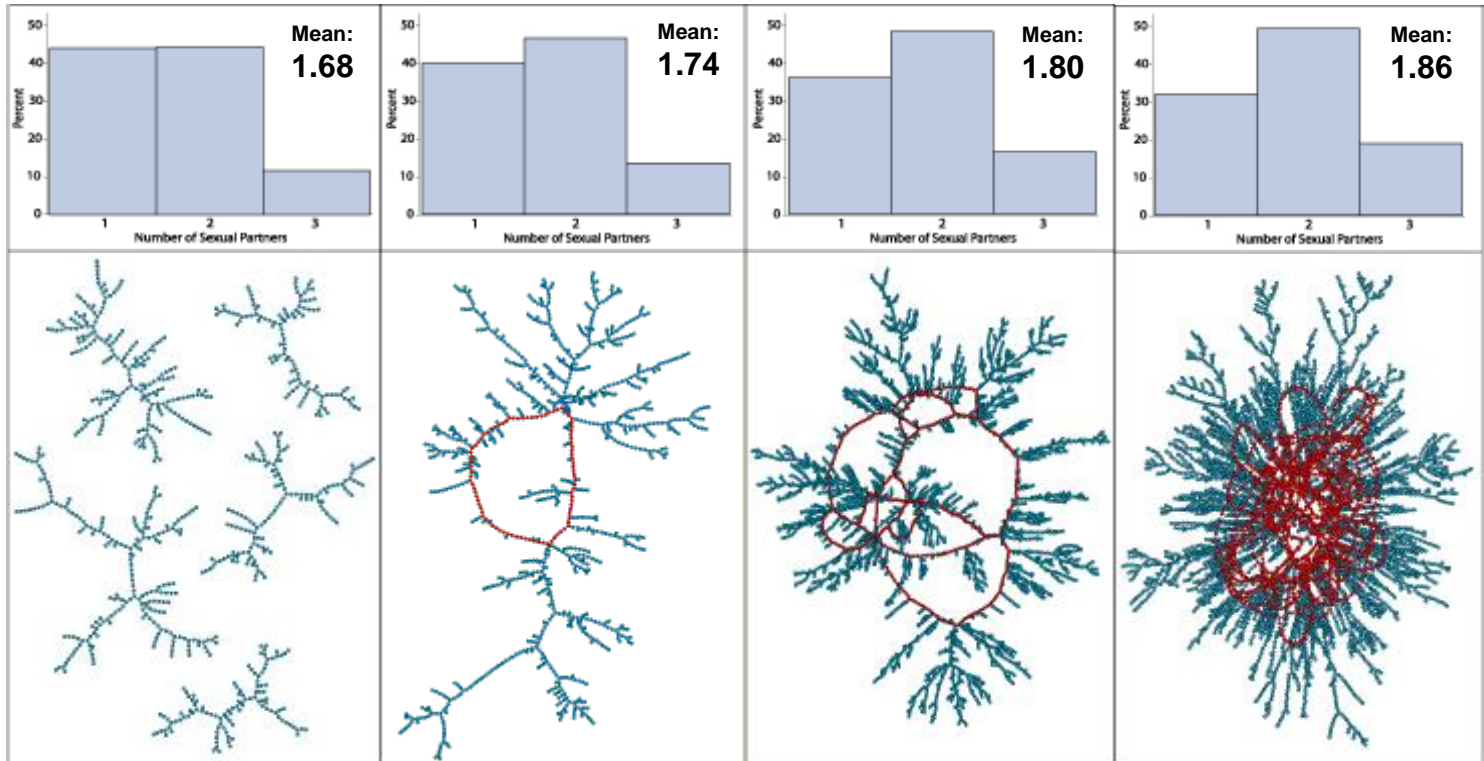
Prevention priorities and emerging issues

% 15-49 yrs reporting 2+ regular partners



Modeling Sexual Networks: Even low degree networks create a transmission core

Number of Partners



Largest components

Bicomponents in red

In largest component:

2%

10%

41%

64%

Source: Martina Morris, University of Washington and James Moody, Duke University, used with permission from a presentation at a meeting on concurrent sexual partnerships and sexually transmitted infections at Princeton University, 6 May 2006.

“Map” of the largest component of a sexual network in Likoma, Malawi

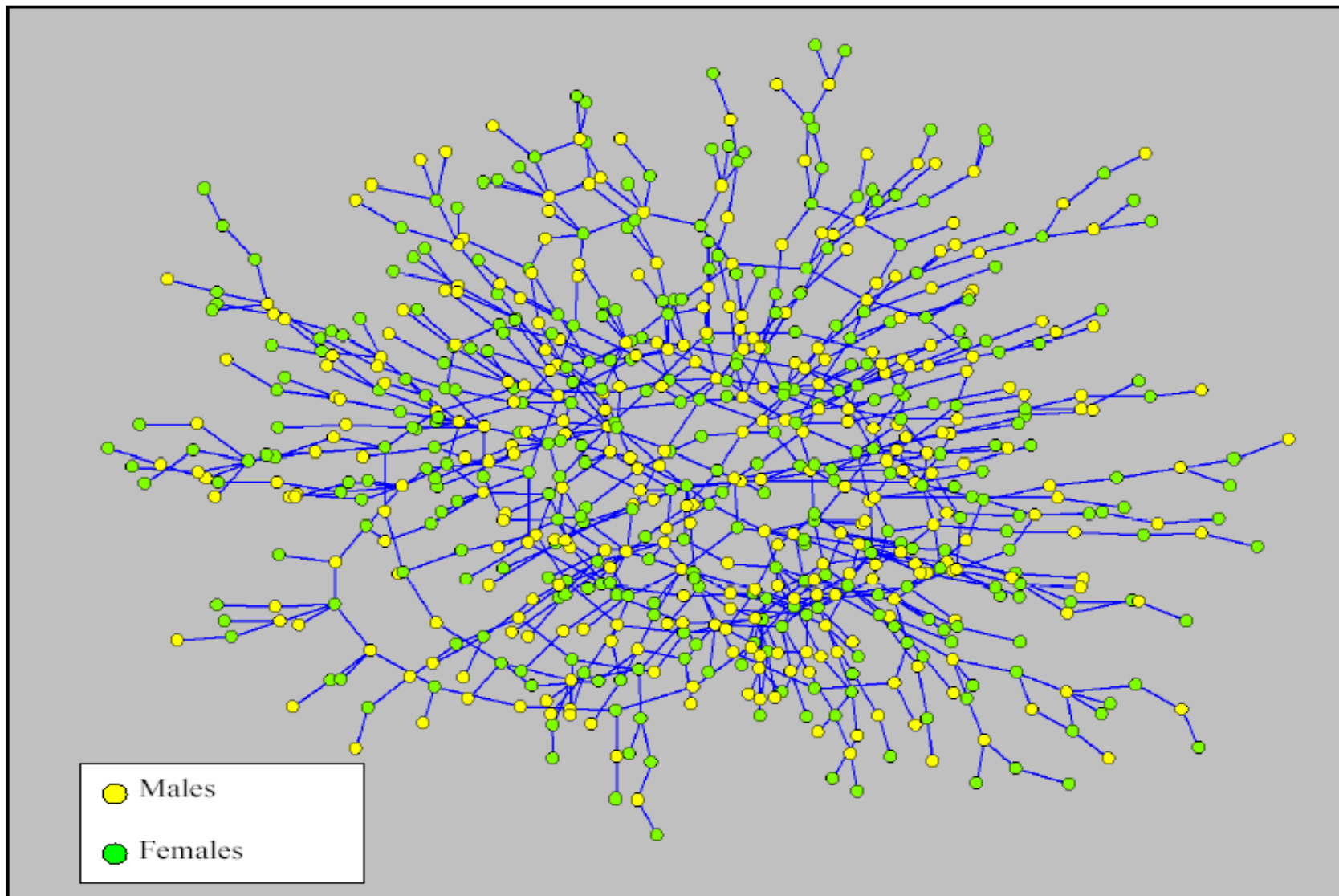


Fig. 5: largest connected component. N = 685. It comprises more than 65% of the population of the 7 villages surveyed.

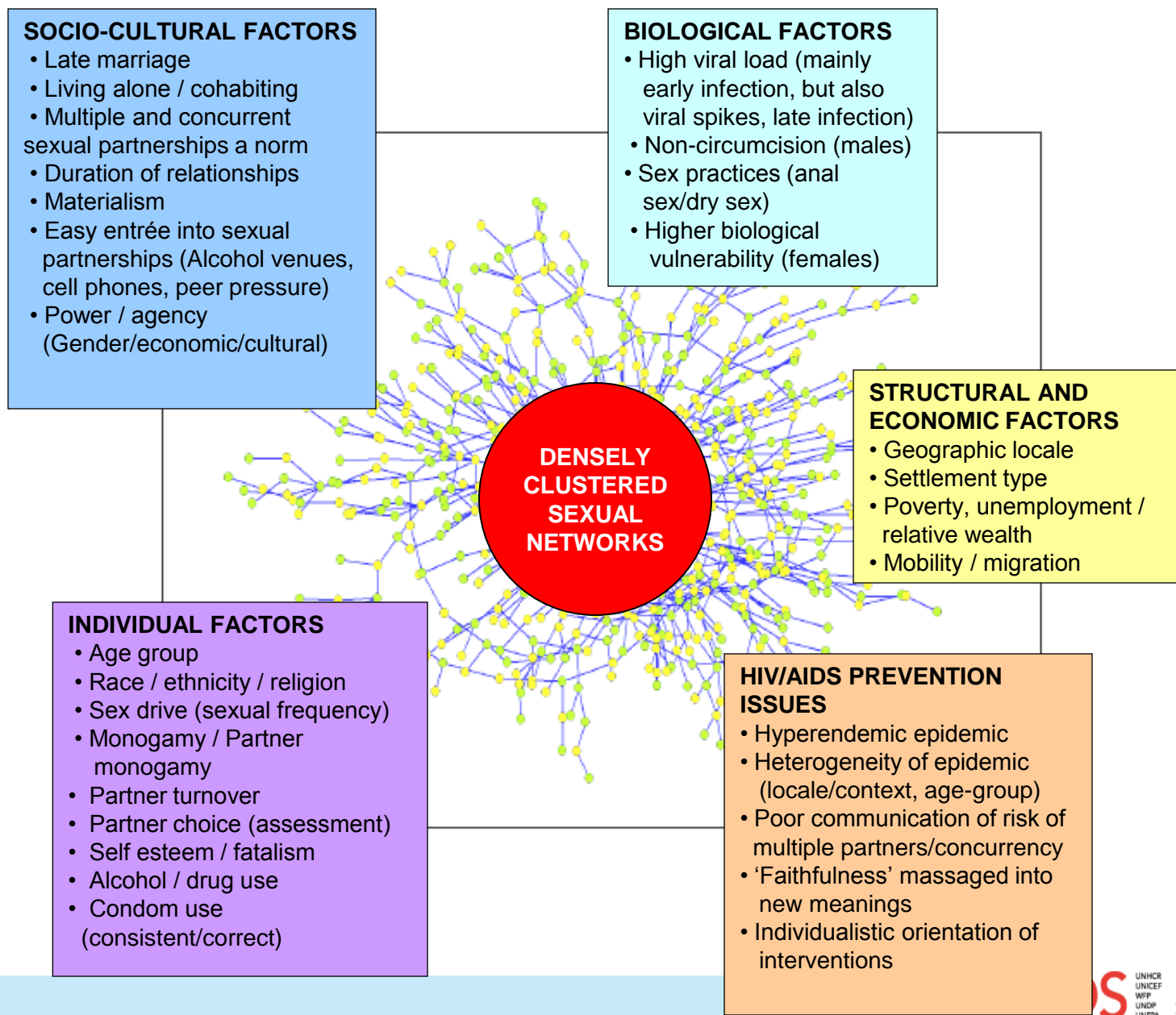
Source: Kohler H and Hellinginger S. The Structure of Sexual Networks and the Spread of HIV in Sub-Saharan Africa: Evidence from Likoma Island (Malawi). PARC Working Paper Series: WPS 06-02

What does research tell us about contemporary patterns of sexual networking in the region?

- **Multiple concurrent partnerships are common and viewed as normal.**
- **Men & women seek multiple partners for a variety of reasons.**
- **Economic transfers of money or gifts are a normative feature in relationships.**
- **Transactional sex is more than 'survival sex', consumerist aspects come to the fore with expansion of economies.**
- **Many women are active agents in seeking/exploiting partners for gain.**
- **Intergenerational/age disparate sex is common & has cultural resonance.**
- **'Sugar daddies' can be rich or poor.**

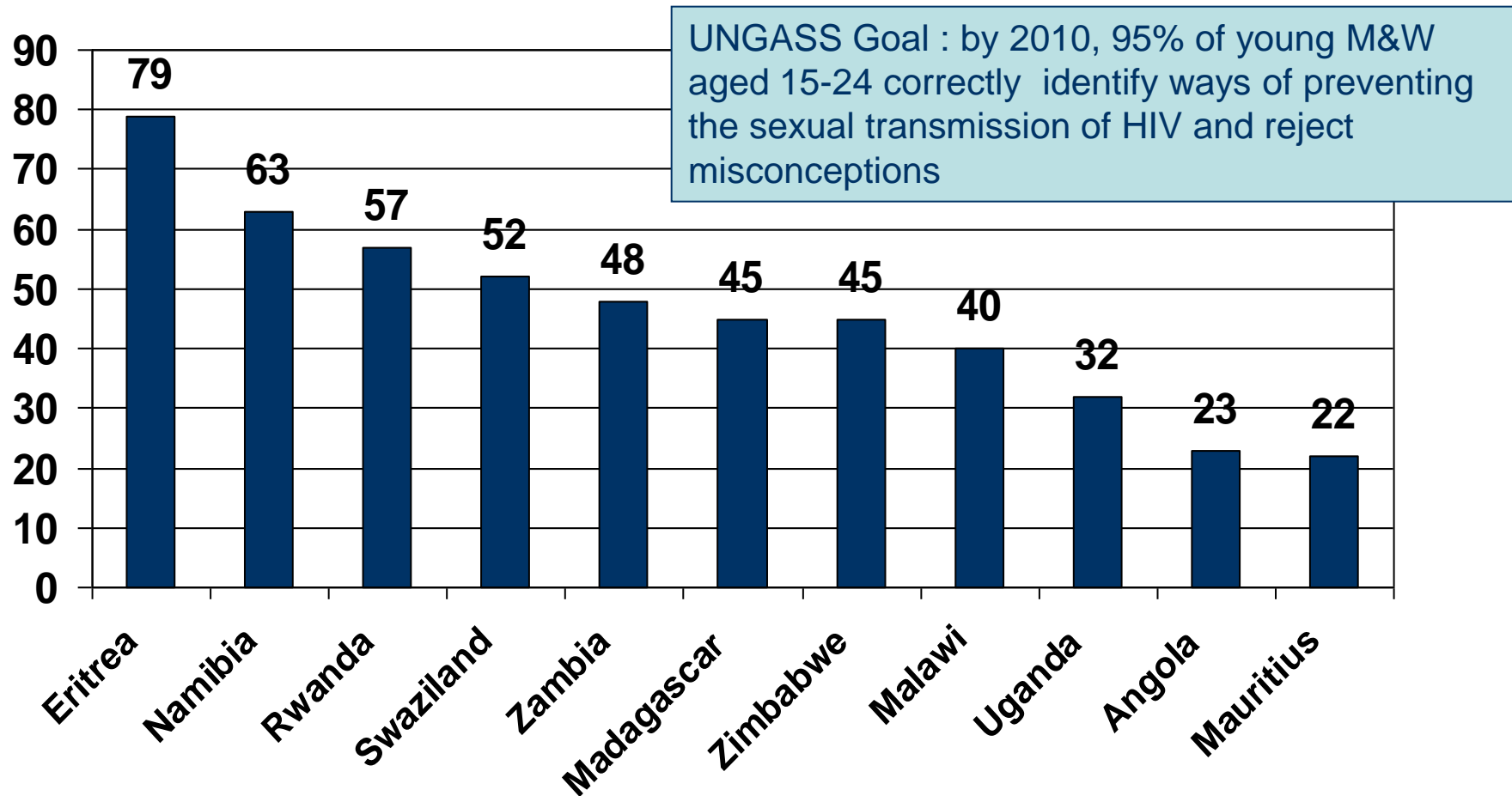
(Lesotho, Romero-Daza 1994; Namibia, Mukonda 1998; Tanzania, Silberschmidt & Rasch 2001; Zimbabwe, Gregson et al 2002; South Africa, Leclerc-Madlala 2003, Swaziland, Mader 2004, Mozambique, Bagnol & Chamo 2004, Botswana, Ng'andu 2006).

Progress: Regional Consensus on Concurrency



- Knowledge of HIV and AIDS may be widespread, but not usually sufficient and accurate, and knowledge alone is usually insufficient to change behaviour
- Beyond knowledge, **risk perception is often low and inaccurate**
 - Casual sex seen as risky, but concurrent, long-term partnerships seen as safe
 - Sex with healthy partner seen as safe
 - Intergenerational/age-disparate sex often seen as safe, particularly by men, but is an important factor for HIV transmission

Prevention - Comprehensive Knowledge (Eastern and Southern Africa, 2007)

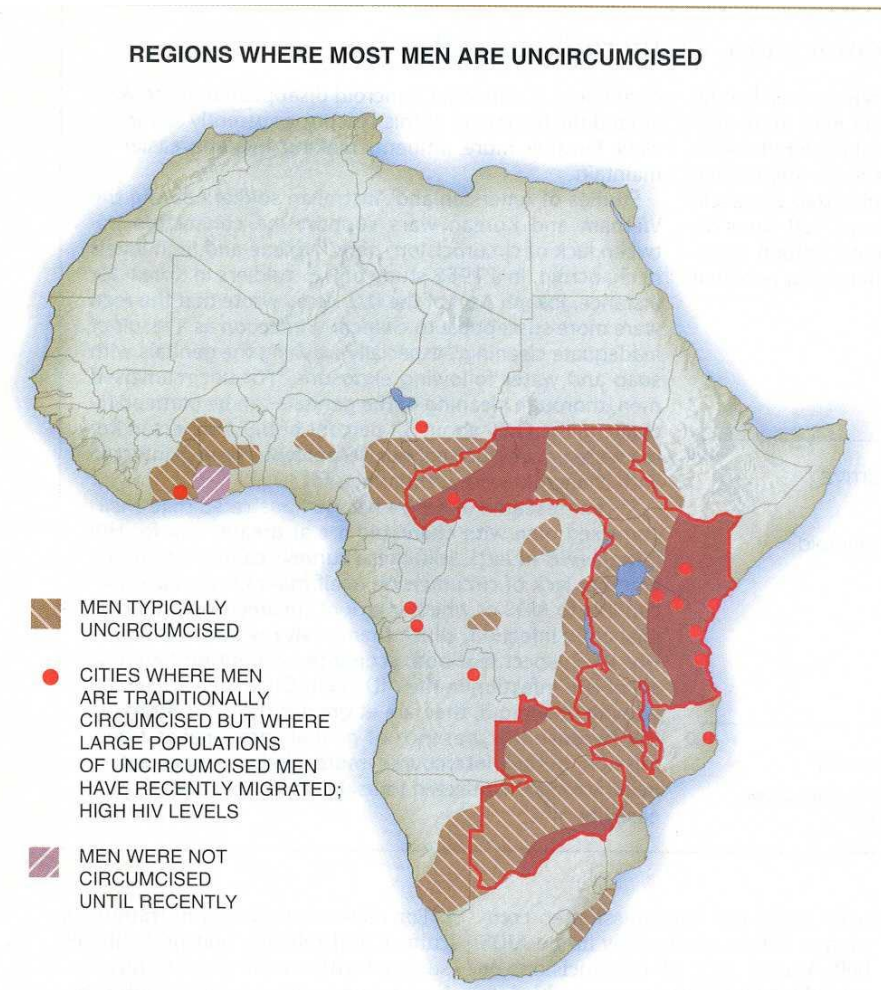


What evidence on Male Circumcision and Reduced Risk of HIV Infection?

- 4 **ecological studies**: HIV prevalence lower with higher male circumcision prevalence
- 35 **cross-sectional studies**: meta-analysis
 - Overall Crude OR: 0.52 (95% CI: 0.40 to 0.68)
 - Adjusted OR: 0.42 (95% CI: 0.34 to 0.54)
- 14 **prospective studies**: adjusted relative risk of HIV infection for circumcised men is 0.52 – 0.18 (i.e. at least half the probability of acquiring HIV)



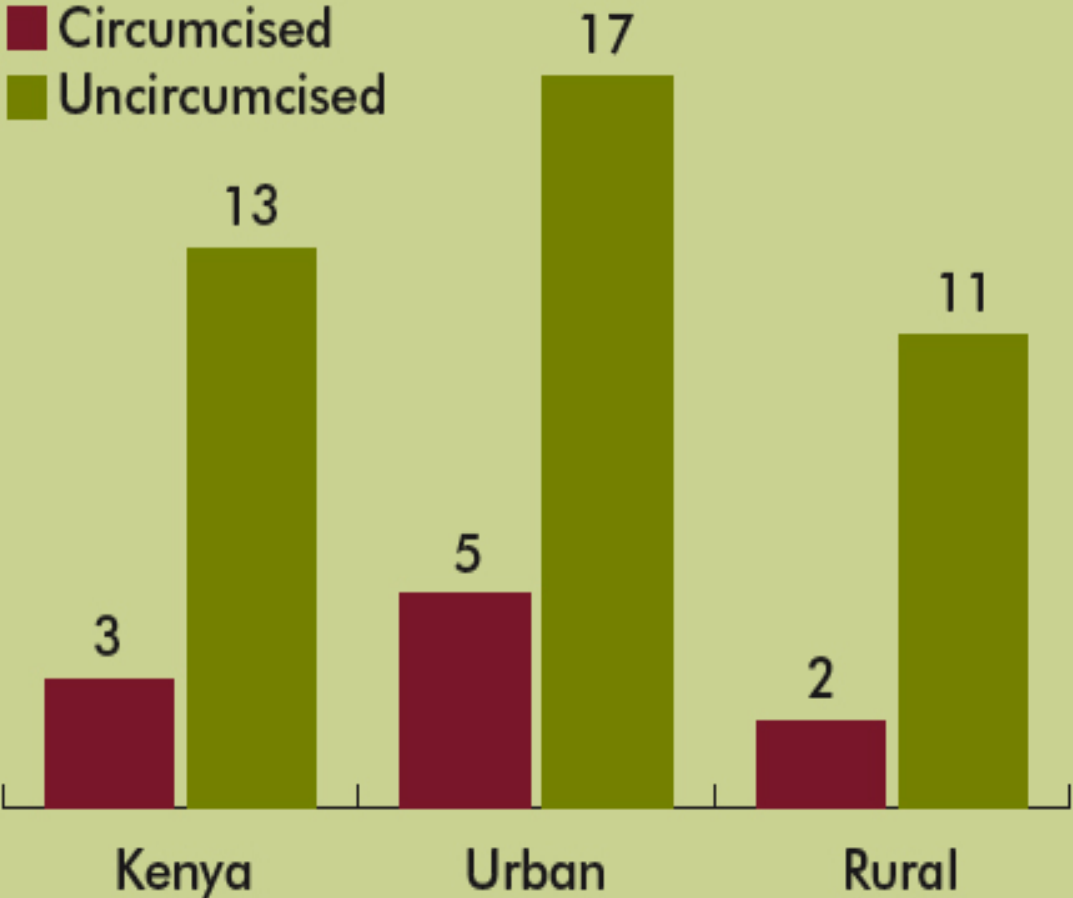
Male circumcision & HIV: Ecological evidence



Caldwell & Caldwell, *Sci Am*, 1996. 274(3): p. 62-3, 66-8.



HIV Prevalence by Male Circumcision



HIV prevalence is significantly higher among men who have not been circumcised (13 percent) than among circumcised men (3 percent).

Three Randomised Controlled Trials (RCTs)

- Orange Farm, South Africa (2005)
- Kisumu, Kenya (2006)
- Rakai, Uganda (2006)

In all three, review by Data Safety & Monitoring Boards found sufficient impact of male circumcision to halt trials early:

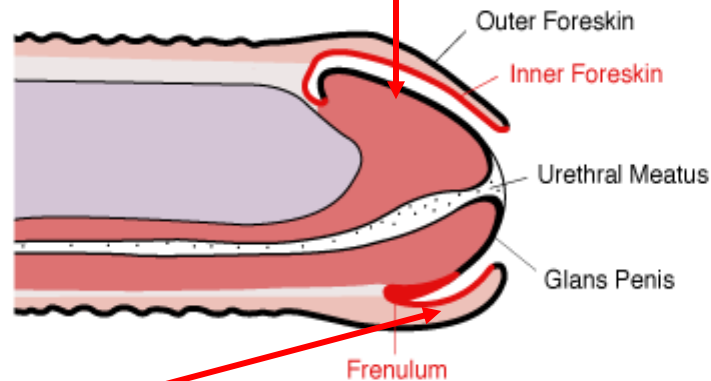
Overall conclusion: **approx 60%** protection for men in heterosexual sex

Protective factor appears to increase with time

Biological plausibility:
How the foreskin increases infection risk

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

How the foreskin increases risk of HIV

- Increased risk of genital ulcers in uncircumcised men
 - ➔ Increased risk of HIV through disrupted mucosal surface of the ulcer
- High density of HIV-1 target cells in penis, and those in the inner foreskin are nearer the epithelial surface due to lack of keratin

McCoombe, AIDS, 2006 20 p. 1491

- Study of foreskin & cervical biopsies showed that inner foreskin is more easily infected with HIV than external foreskin, or cervical tissue

Patterson Am J Pathol, 2002. 161 p. 867



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General summary

- **Evidence** of protective effect of MC on STIs and HIV is compelling: observational, biological, clinical trials.
- **Modelling** indicates that MC could avert millions of new HIV infections in East and southern Africa, and would be highly cost-effective.
- **Safety** is feasible (though alarming at present) and will take resources and extensive training, esp outside hospitals; better to train a few health staff to do many circumcisions.
- **Acceptability** of MC in non-circumcising populations is already high and growing.
- **Social aspects** need consideration and research, in traditionally circumcising & non-circumcising settings.
- **Entry point** to reach men incl adolescents with **wider sexual and reproductive health services**, especially for reduced partners, increased consistent condom use and STI Rx



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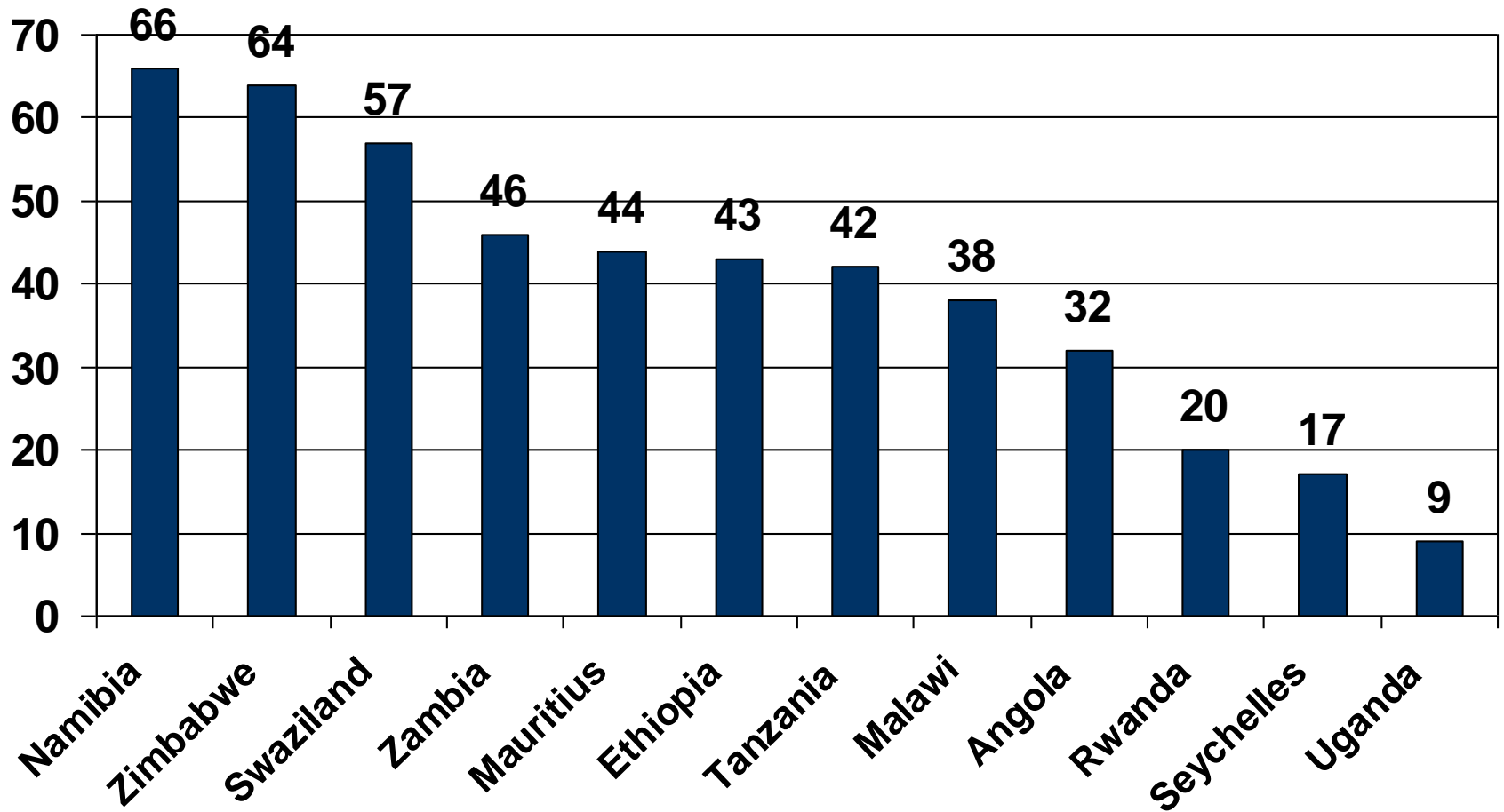
What Evidence Condoms?

- Male condoms ~**90% efficacy** with perfect use, female condom efficacy also high;
- Contributed to declines in Kenya, Zimbabwe, Uganda

BUT

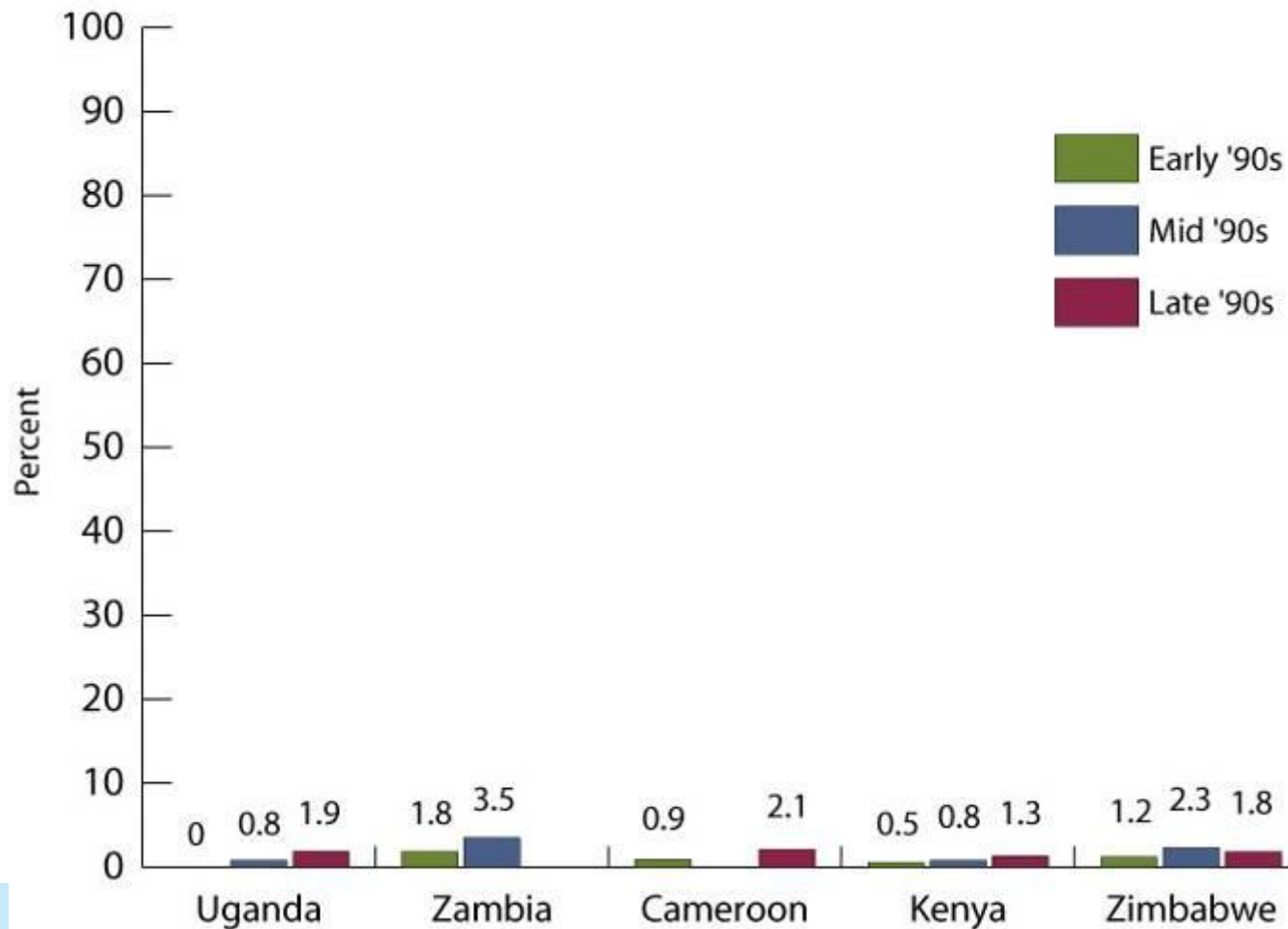
- Very difficult to achieve consistent correct condom use in stable partnerships, MCP

Prevention - Condom use at last risky sex (Eastern and Southern Africa, UNAIDS 2007)



Condom use in regular partnerships

Current use of condoms among married women (DHS data)



Strategic Comprehensive Condom Programming, CCP

- Regular, sufficient male condom **supplies** essential and female condom supplies as feasible
- **Demand creation** should particularly target all high risk settings (e.g. alcohol venues) for casual and commercial sex; and reach mobile populations, uniformed forces, prisons, MSM and **secondary prevention, discordant couples**
- Pregnant women an entry point for condom use in couples
- **Address stigma** of condom link with sex work/casual sex and with lack of trust

Main risk factors for discordant long-term couples

Repeated sex without condoms over many years, even though risk per act is low

Behavioural factors increasing risk per sex act, eg anal sex, dry sex, rough sex

Higher susceptibility through eg:

- Non-circumcision of male
- Adolescent girl with immature vaginal tract; post-menopausal women
- STIs including GUD, HSV-2
- Poor general health and nutrition, chronic parasites etc

High viral load through eg:

- New infection in one partner
- STIs, malaria and other infections
- Late stage infection

**RISK PERCEPTION IN STABLE PARTNERSHIPS MAY BE LOW,
AND CONCURRENT PARTNERSHIPS COMMON**



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Proposals to reduce HIV transmission in discordant long-term couples

- **Knowledge, information, BSCC:** many people do not understand discordancy;
- **Couple testing and counselling linked with support services:** and also couple counselling for partner disclosure; gender aspects are important
- Support for **positive living**, CD4/viral load testing, OI prophylaxis and treatment, **ART (earlier initiation at higher CD4 count)**
- **Advice and intensive support for consistent correct male or female condom use**
- **Male circumcision**
- Counselling and support for **mutual monogamy**
- Advice on **abstinence around riskier times**, (if condoms refused), eg active HSV2, STI/RI, menstruation, malaria, TB/OIs and other infections
- Access to **quality PMTCT+** in the context of transmission reduction measures (ART?)
- **Enabling environment, community and leadership involvement**, reduced stigma and discrimination and universal prevention, care and treatment access
- **Training of health providers** at all levels

- **Socio-cultural action research** is needed to find out what works in different settings



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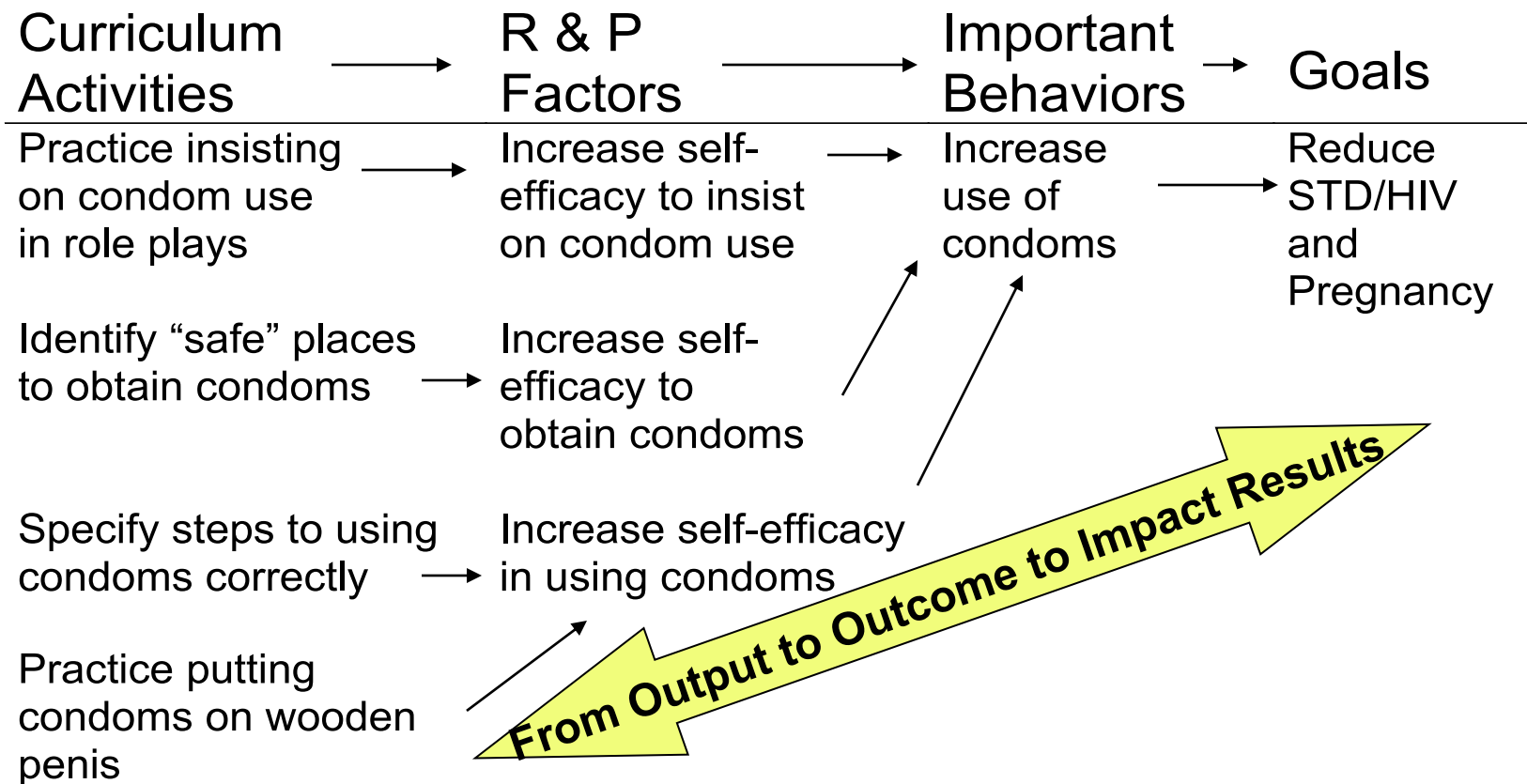
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Summary of approaches and settings for scaling up prevention with young women and men

Mass media	Messages delivered through radio & other media (e.g.. print media), with or without TV*
Schools (including out-reach to out-of-school)	Curriculum-based, skills-based sexual health education, led by adults +/- peers, with specific characteristics (developing the curriculum, content, implementation)*
Health Services	Training of service providers and clinic staff, facility improvements, and actions in the community to generate demand

- * KEY: intervention design needs to follow good practice
- both in terms of **content and process**

Promote “evidence based inputs”– recognize the importance of content and quality of intervention



What evidence for counselling and testing?

- **Limited population-level impact** of VCT shown for HIV prevention **except** in discordant couples (27-study meta-analysis) and for HIV + clients (eg. Zimbabwe study/Sherr et al found increased risk beh)

BUT: counselling and testing (PICT and VCT) provide:

- Essential entry point for **PMTCT**
- Important entry point for care and treatment, esp PICT
- May contribute to opening up the epidemic and to reducing stigma and discrimination
- Important to identify **discordant couples**
- Need quality counselling & sufficient intensity for behaviour change

Conclude:

Health-provider initiated counselling and testing essential

Couple counselling important



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Other prevention technologies

- **Diaphragm:** disappointing early trial results
- **Vaginal interventions:** limited data suggest douching not useful; dry sex should be avoided
- **Male genital hygiene** under investigation, some evidence of benefit
- **HSV-2 Rx** under investigation, early results limited
- **ARVs:** ART highly effective but costly; essential for PMTCT; PEP established but not widespread; PreP under investigation;
 - Consider earlier ART onset (at lower viral threshold) to reduce transmission
- **Microbicides and vaccine** research ongoing; but disappointing results to date



STI syndromic management

- STIs increase HIV transmission, esp GUD **BUT**
- Syndromic management has limited impact on HIV prevention (7 of 8 randomised controlled trials showed limited or no impact)
 - Misses asymptomatic infection, esp women
 - Does not treat viral STIs
 - In many countries in ESA, viral STIs now predominate, **esp HSV-2**

Syndromic management greatly reduced bacterial STIs, so it has probably contributed to lower peaks in HIV prevalence

STI treatment is **ESSENTIAL** in its own right, but **syndromic management is not a proven prevention strategy for HIV**

How should KYE influence programming?

- Appropriate **focus** on incidence and prevalence
- **Evidence informed strategies** appropriate to population group
- **Prioritise** what can have **most impact**: appropriate distribution of resources
- **Balance different needs**: HIV prevention central, but also e.g reproductive health, or treatment access, and wider development goals



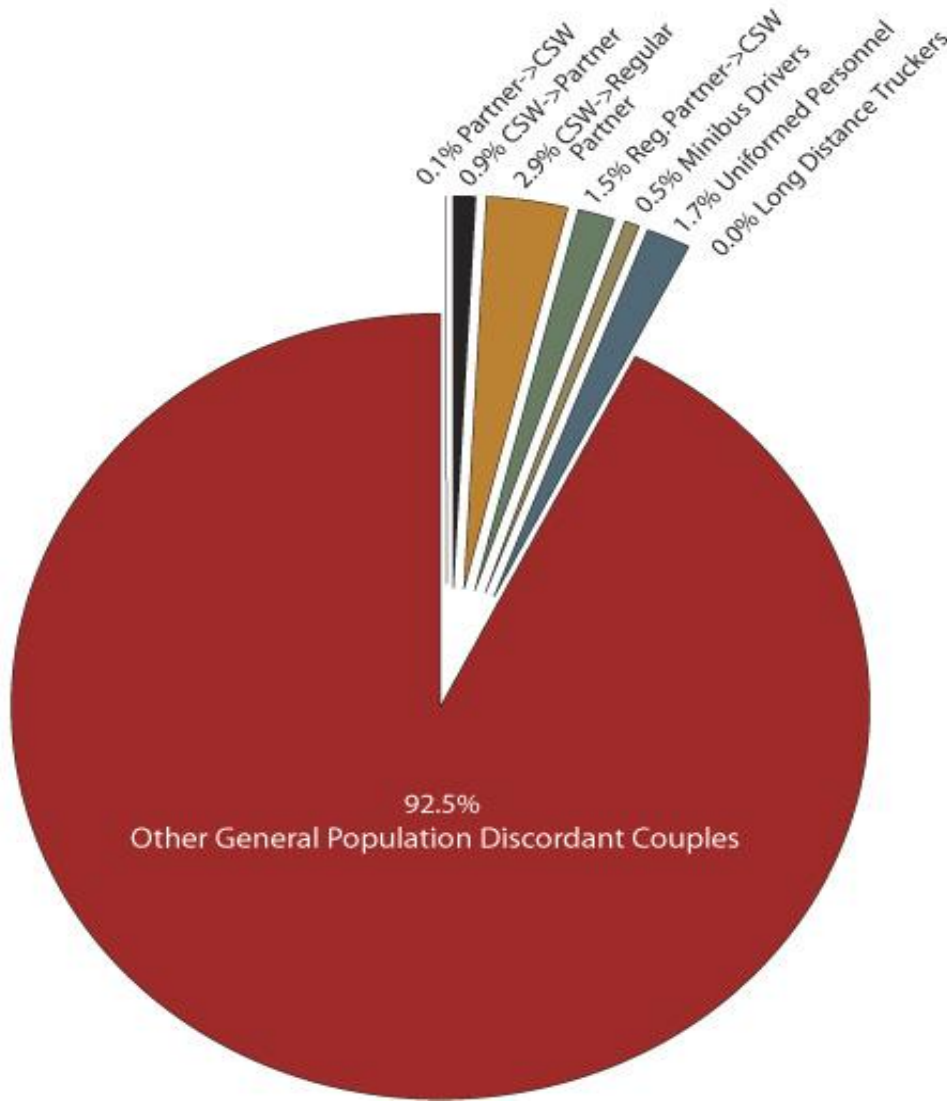
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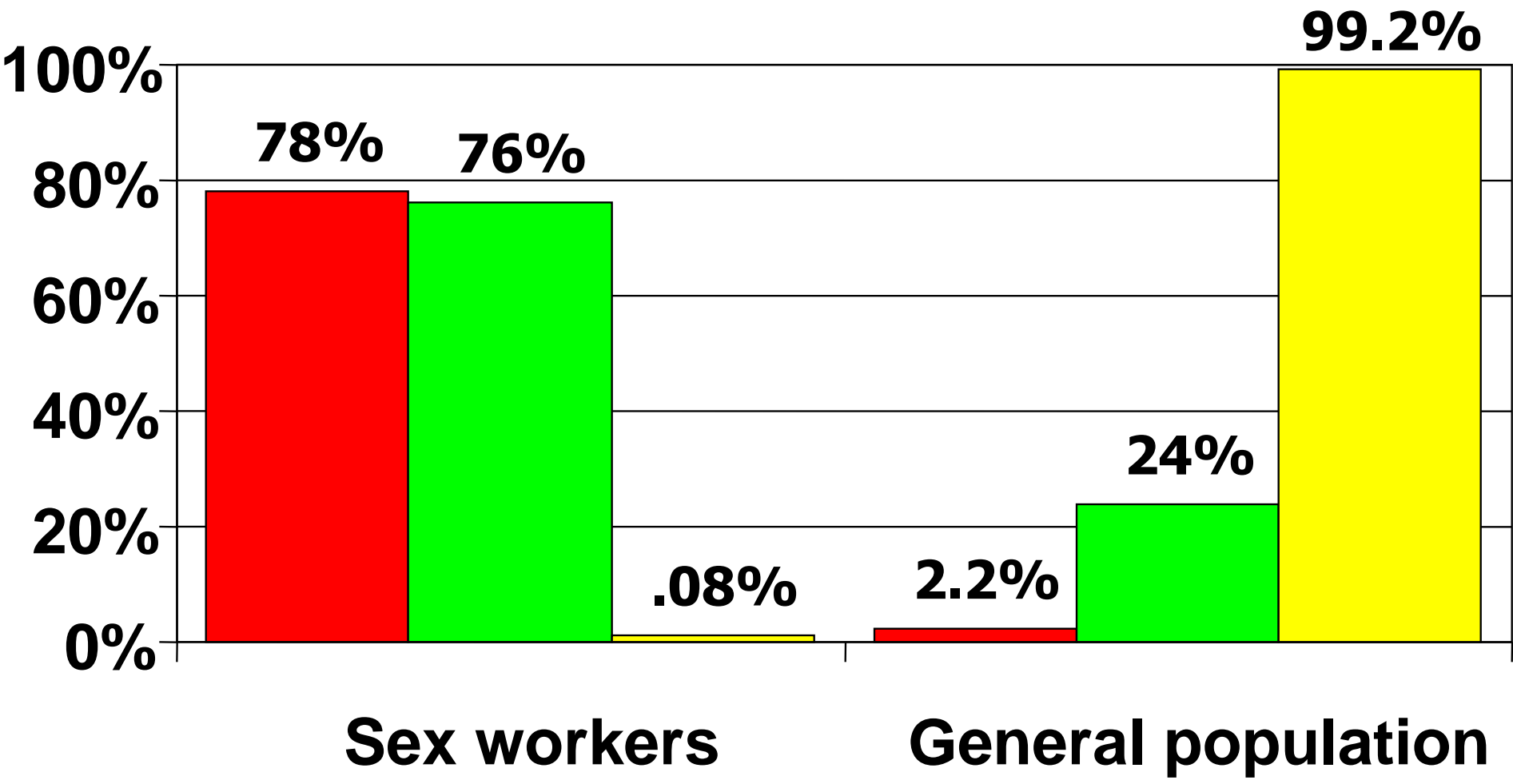
Who has HIV? (Zambia)

Zambia: Relative Proportion of Incident Cases (modeled)



Source: personal communication, Mark Shields (Zambia)

HIV PREVALENCE, TRANSMISSION SOURCES AND FUNDING IN ACCRA, GHANA



■ HIV prevalence
 ■ Transmission sources
 ■ Funding

Summary

- Know your epidemic, evidence for what works, and current responses: **KYE, KE, KYR**
 - Develop a **combination of proven responses**
 - To scale
 - With sufficient intensity and quality
 - With the right strategies for the right populations
1. Allocate **sufficient resources** to prevention to “turn off the tap”
 2. Undertake **cost-effectiveness** or cost-benefit modeling
 3. Remember that **sustaining treatment** depends on prevention
 4. Do **less** of what has no/little evidence for impact or very high cost per infection averted
 5. **Strong M&E** needed, collect **strategic information** to measure impacts as well as process and outputs

Thank you