

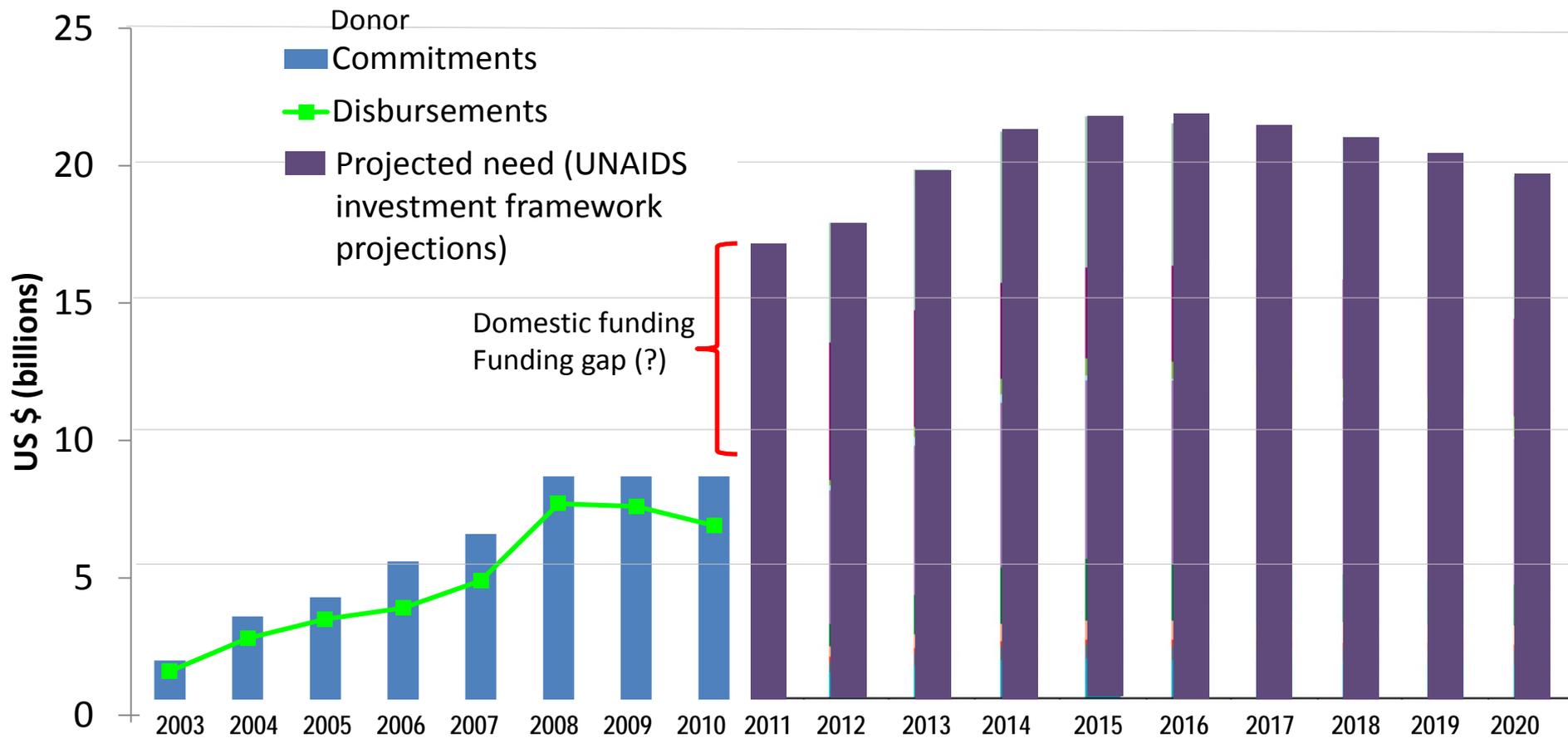


Program Science – Approaches to Maximize Return on Investment in HIV Prevention

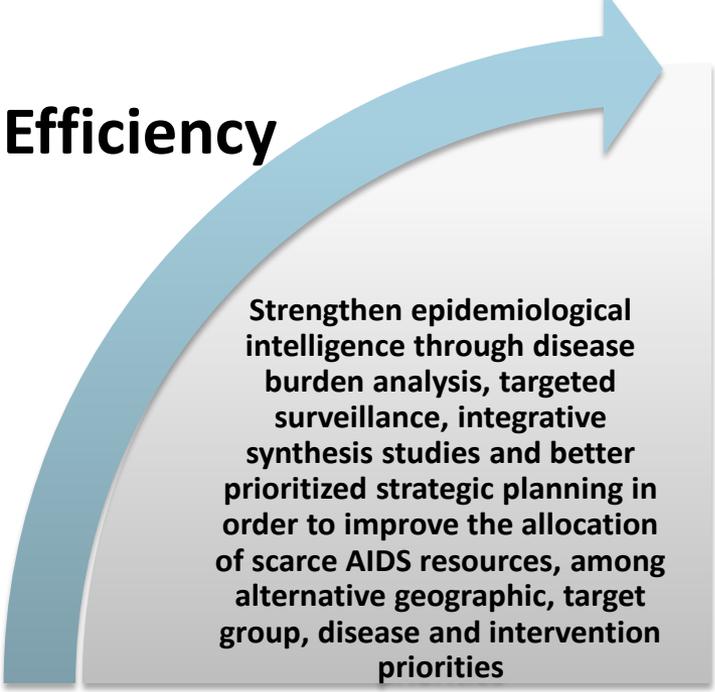
**David Wilson, World Bank
Program Science Symposium
Minneapolis, 12 March, 2012**



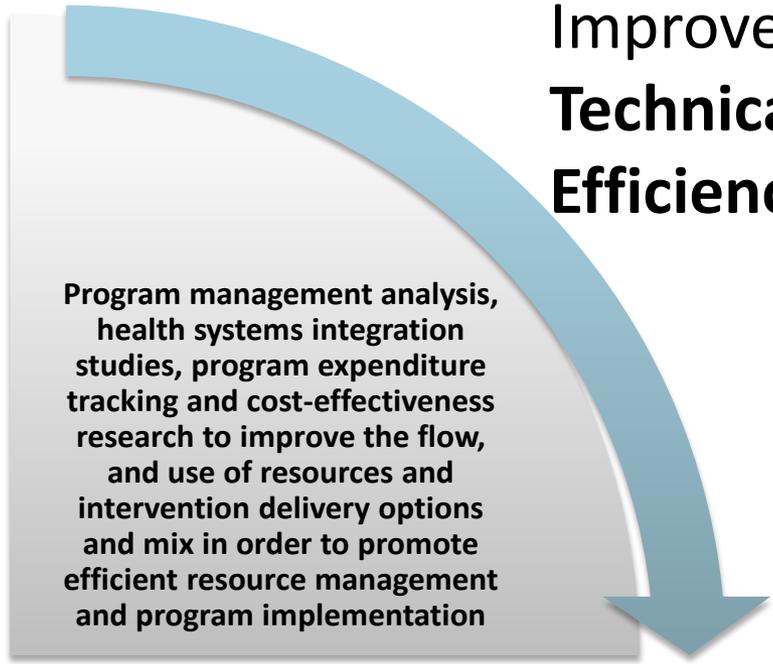
The widening HIV financing gap



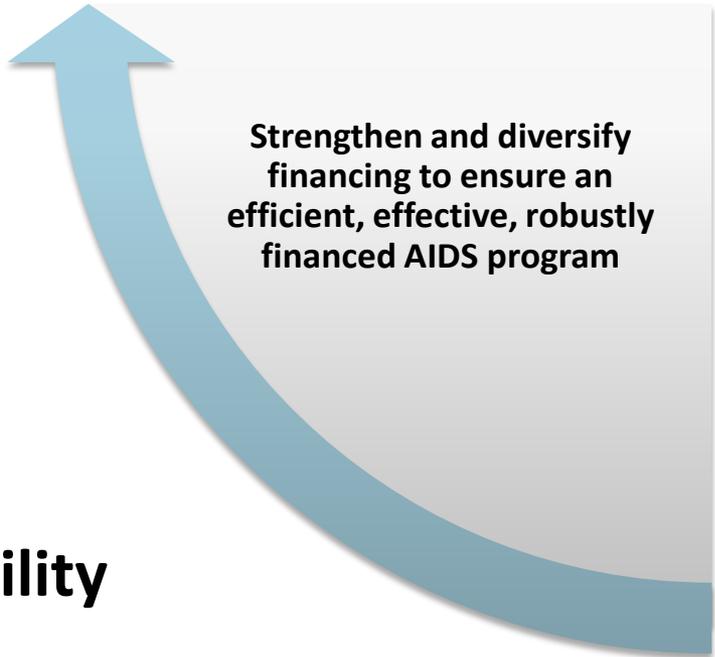
**Improve :
Allocative Efficiency**



**Improve :
Technical Efficiency**



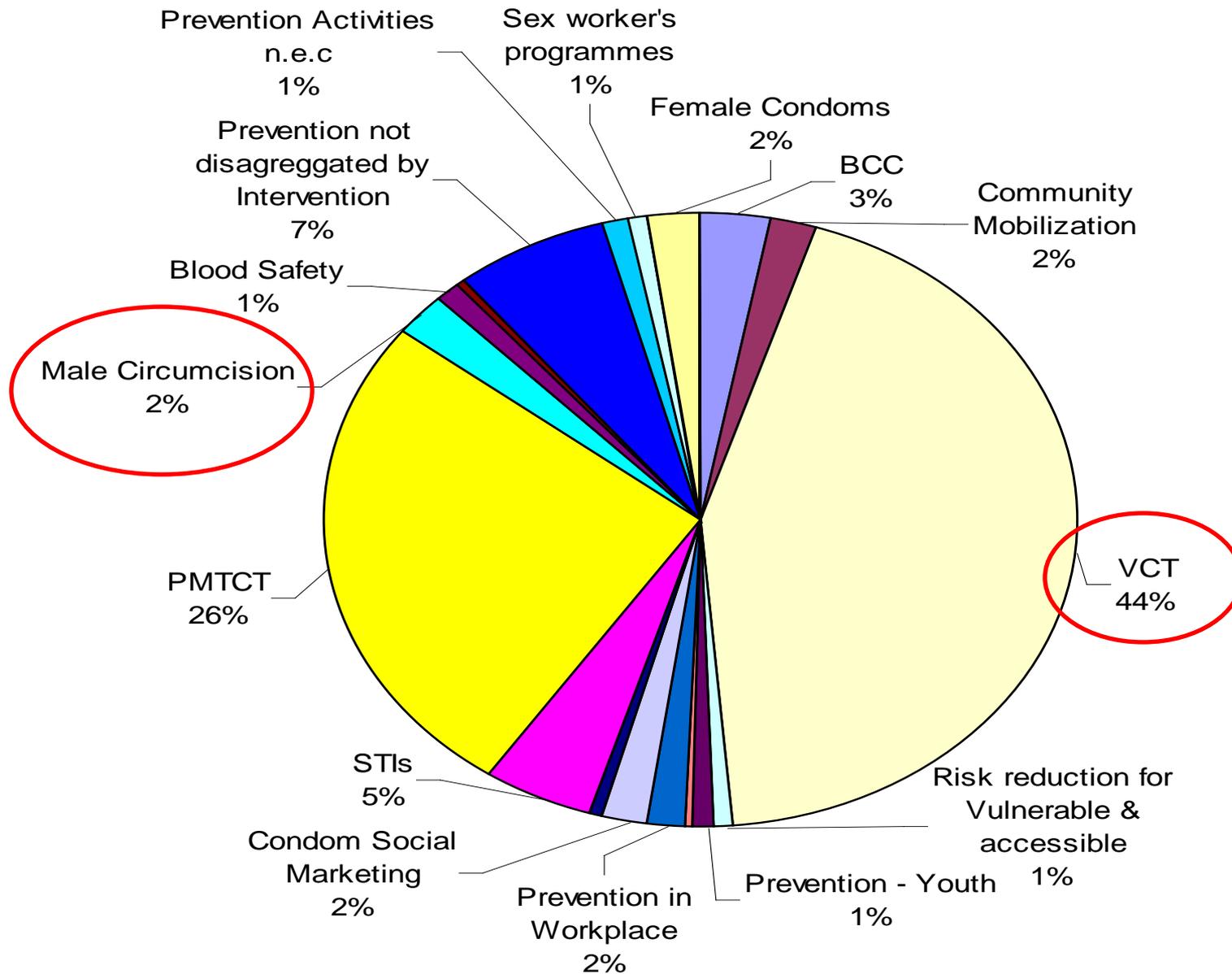
**Improve :
Sustainability**



**Improve :
Effectiveness**

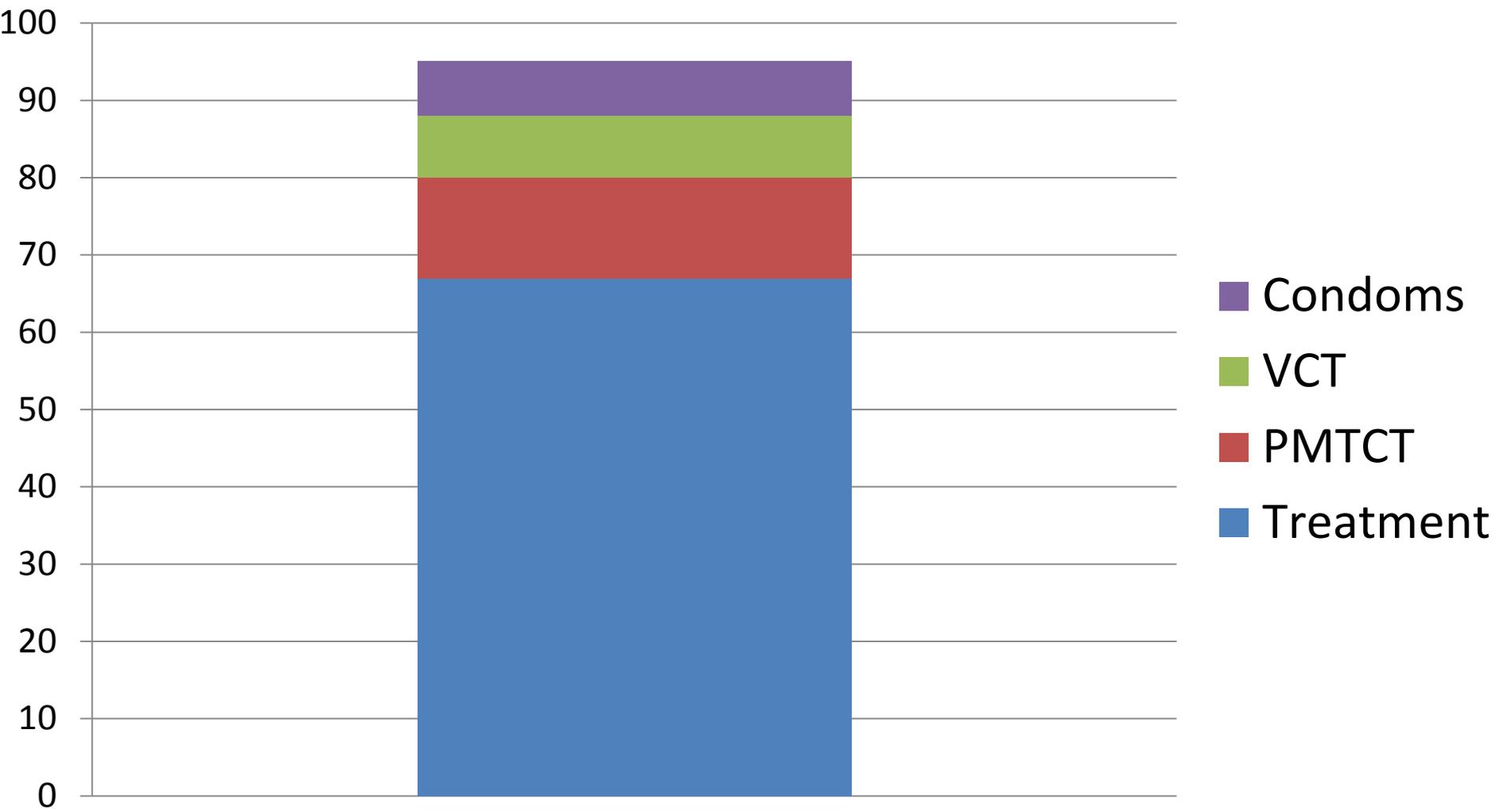


Allocative efficiency: Lesotho, 2010





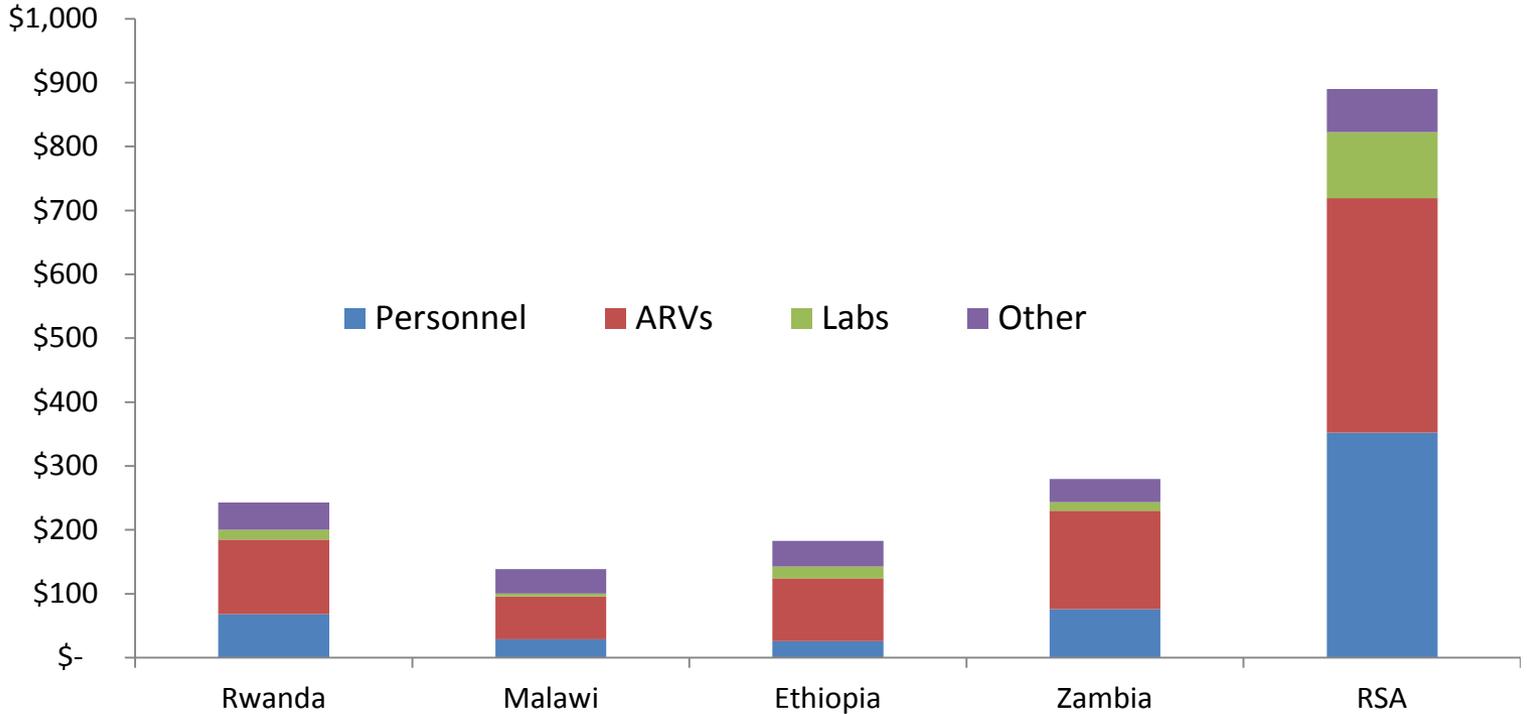
Allocative and technical efficiency: the South African conundrum





Technical efficiency starts with service unit costs

Unit Costs for Delivering ART



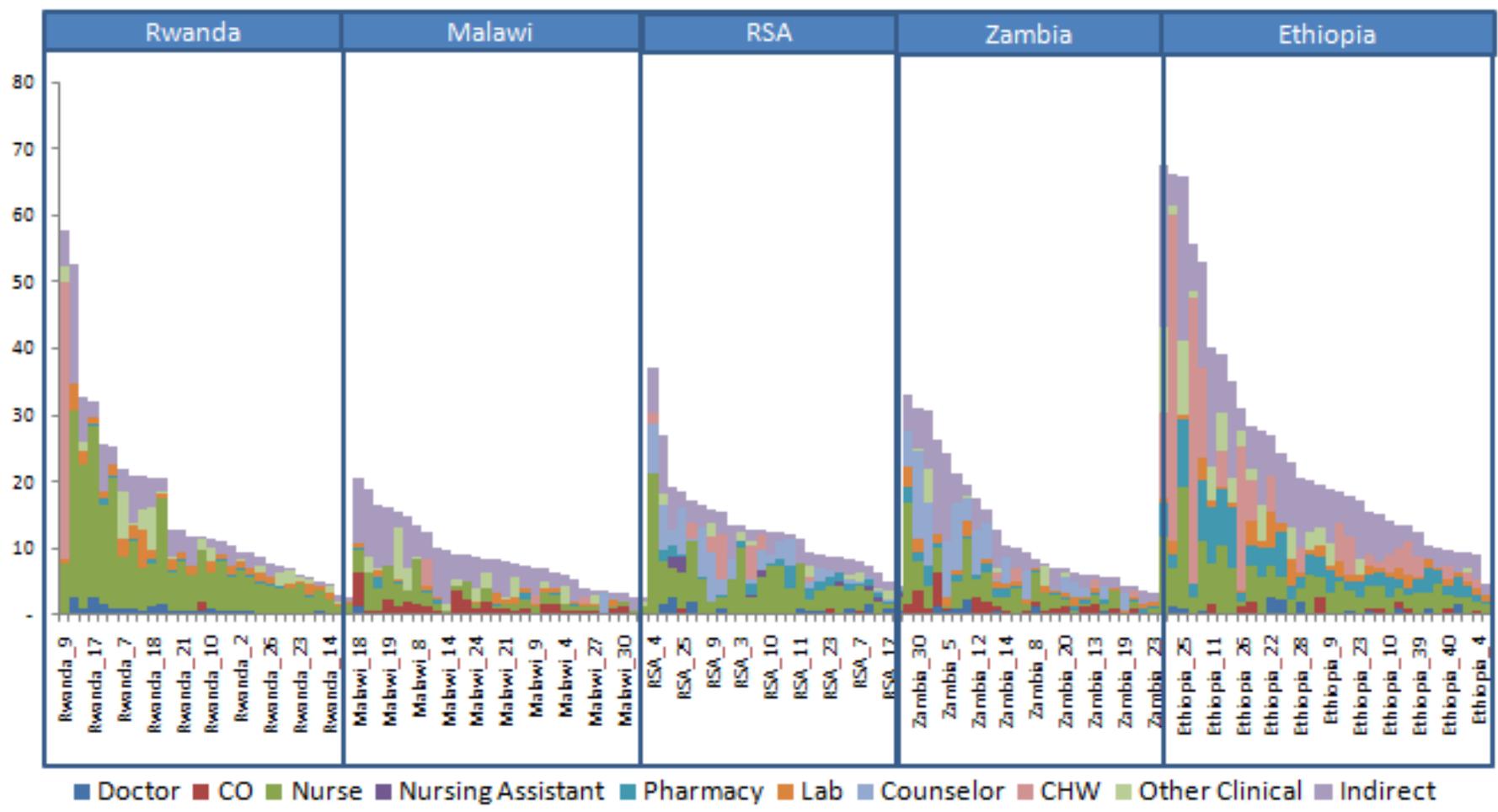
Source: CHAI, 2011



Reducing unit cost drivers: idle staff time

Number of FTE per 1000 patients by cadre

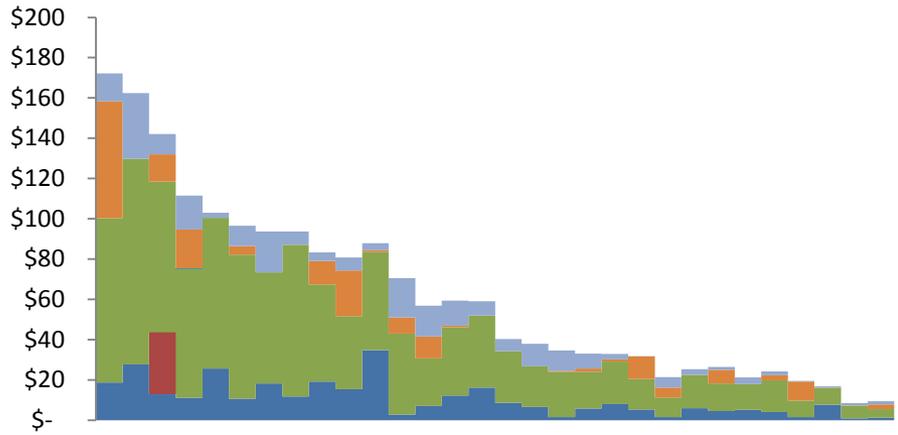
FTE per 1000 patients



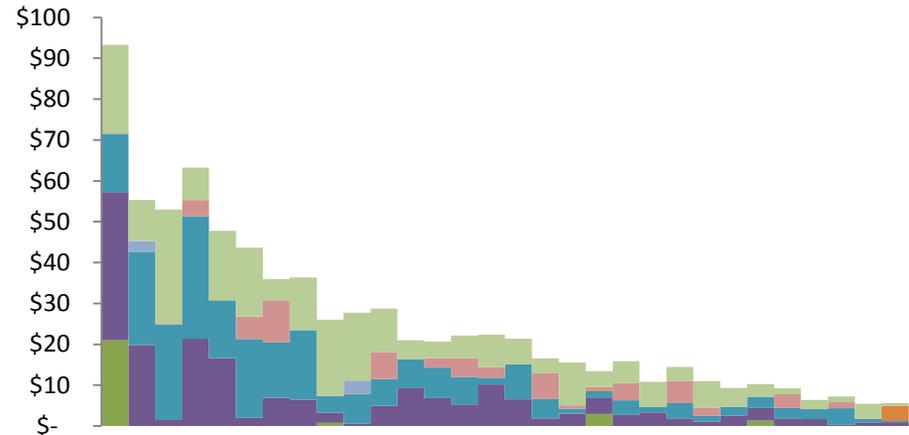


Reducing unit cost drivers: staffing model

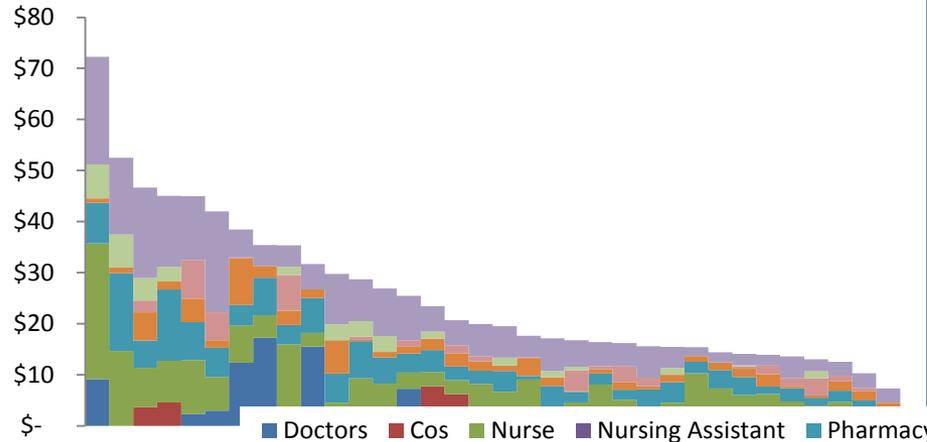
Rwanda – Heavily nurse centered model with roving doctor supporting multiple sites. Heavy use of CHWers



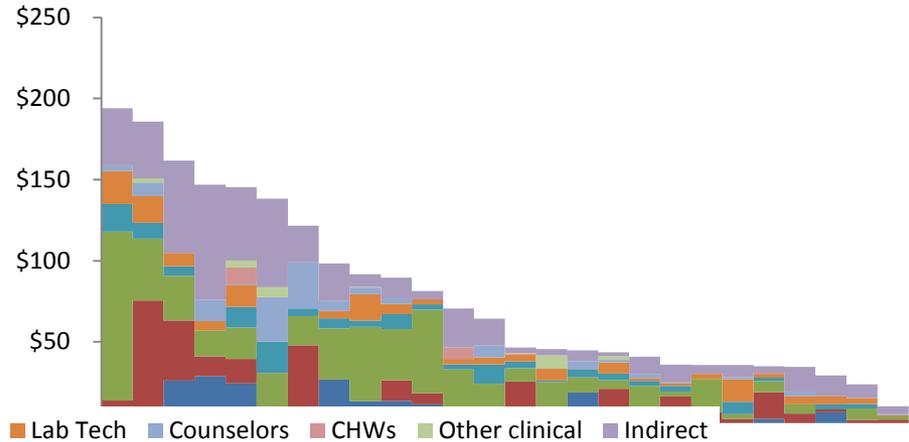
Malawi – Clinical officers are playing the doctor’s role in all HC’s, and admin clerks are acting as nursing assistants



Ethiopia –Cost driven primarily by nurses and pharmacists. Private facilities have heavier staffing levels leading to higher cost



Zambia – Preliminary data indicates a wide variety of models being used



■ Doctors
 ■ Cos
 ■ Nurse
 ■ Nursing Assistant
 ■ Pharmacy
 ■ Lab Tech
 ■ Counselors
 ■ CHWs
 ■ Other clinical
 ■ Indirect



Reducing unit cost drivers: too much equipment

Average Loaded CD4 Test Cost

US Dollar

Component	Rwanda	Malawi	Ethiopia	Zambia	RSA
CD4 Unit Cost	\$ 6.28	\$7.21	\$7.11	\$6.20	\$8.42
Personnel	\$ 3.00	\$8.11	\$0.49	\$2.19	\$ -
CD4 Machine	\$ 0.69	\$19.21	\$1.99	\$2.30	\$ -
Buildings	\$-	\$0.32	\$0.06	\$0.19	\$0.10
Running Costs	\$ 0.70	\$9.19	\$0.15	\$0.39	\$0.28
Training	\$ 0.25	\$ -	\$0.17	\$0.33	\$ -
Total	\$ 10.93	\$44.04	\$9.98	\$11.59	\$8.79



- Fully loaded cost of CD4 test is high in Malawi. Driven by installed capacity of 1.5 million test per year running 180,000 tests per year.
- Low availability of sample transport a real barrier to Improved utilization, which would reduce price per test significantly



Sustainability: In Africa, only South Africa and Botswana finance their own AIDS programs

Table 1		SADC: HIV/AIDS Spending and Financing				
Country	Year	HIV/AIDS spending			External financing (% of total)	GDP per capita (US\$)
		Total (US\$ millions)	% of GDP	Per capita (US\$)		
Angola	2009	33.7	0.05	1.9	n.a.	3,972
Botswana	2008	348.1	2.6	194.4	32.1	7,552
Congo, Dem. Rep. of	2008	96.4	0.8	1.5	86.0	184
Lesotho	2008	56.4	3.6	22.9	53.1	645
Madagascar	2008	12.0	0.1	0.6	54.7	468
Malawi	2008	107.4	2.6	7.8	97.6	298
Mauritius	2008	n.a.	n.a.	n.a.	n.a.	7,330
Mozambique	2008	146.4	1.5	7.1	95.6	478
Namibia	2007	18.5	0.2	9.1	49.2	4,341
Seychelles	2009	0.6	0.1	6.8	19.4	8,973
South Africa	2009	2,088.0	0.7	42.3	27.3	5,824
Swaziland	2006	48.5	1.8	47.7	61.3	2,698
Tanzania	2008	465.0	2.3	11.7	98.1	519
Zambia	2008	279.3	2.6	23.5	97.1	901
Zimbabwe	2009	54.1	1.2	4.6	69.8	375
Total (latest years) ^a		3,745.5	0.8	14.7	49.9	1,782



The three core HIV prevention questions we want program science to help us answer

- **Where** do new HIV infections come from?
- **What** proven, feasible interventions do we have for each major source of new infections?
- **How** do we implement, monitor and evaluate the delivery of proven feasible interventions for each major source of new infections?



The role of program science

- The first duty of program science
 - Knowing our epidemics
 - Understanding our last 1,000 infections
 - Understanding transmission dynamics
- And fundamentally, making sure the ***money follows the epidemic and the interventions follow the evidence***

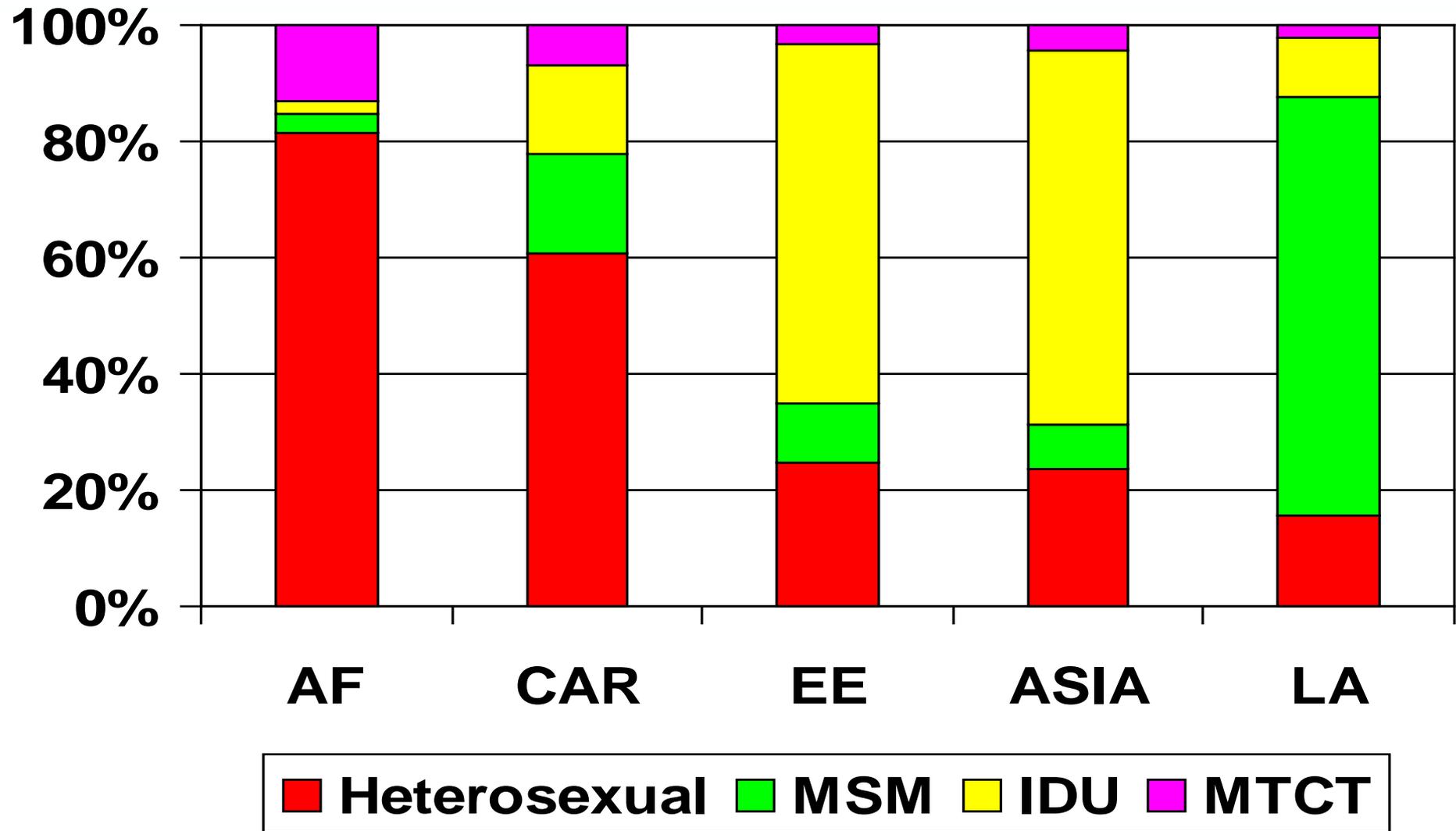


Global epidemic diversity

- Insufficient recognition of global epidemic diversity

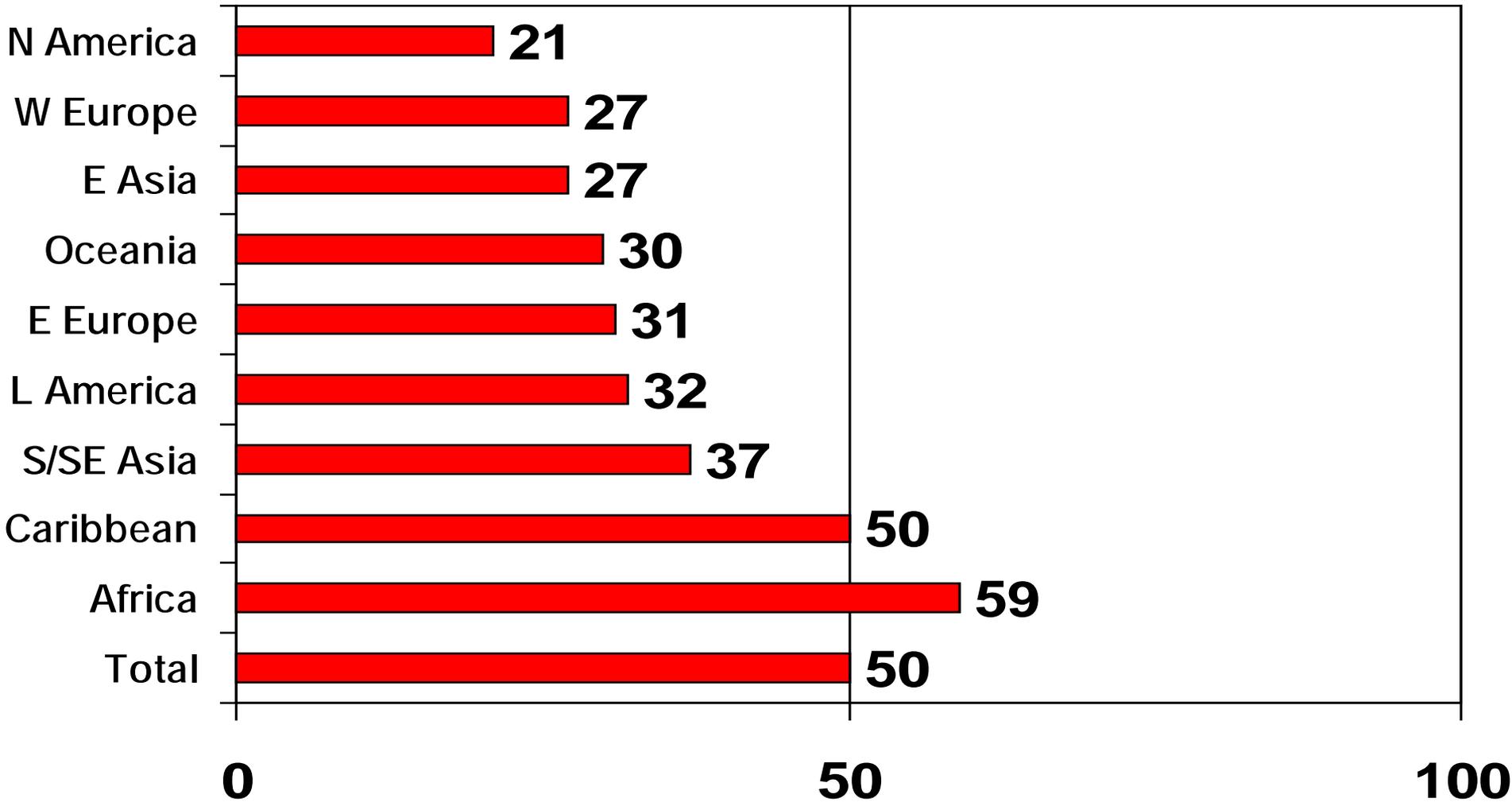


Transmission sources vary widely by region





Women a majority of those infected in one region - Africa





Global epidemic diversity

- Southern Africa only region of world where HIV is existential threat:
 - Southern Africa - 2% of world population and over 33% of HIV infections
 - Almost 1 in 5 people with HIV globally South African

Remarkable epidemic diversity -era of standard global prevention guidance truly over

No single set of prescriptions relevant across, say, South Africa, Ukraine and PNG



Core program science focus on epidemic typologies

- Core program science distinction between **CONCENTRATED** and **GENERALIZED** epidemics
 - Not based on arbitrary prevalence thresholds, but transmission patterns
- Epidemics **CONCENTRATED** if protecting SW, MSM, IDU would prevent wider epidemic
 - Epidemics **GENERALIZED** if epidemics would persist despite effective SW, MSM, IDU programmes

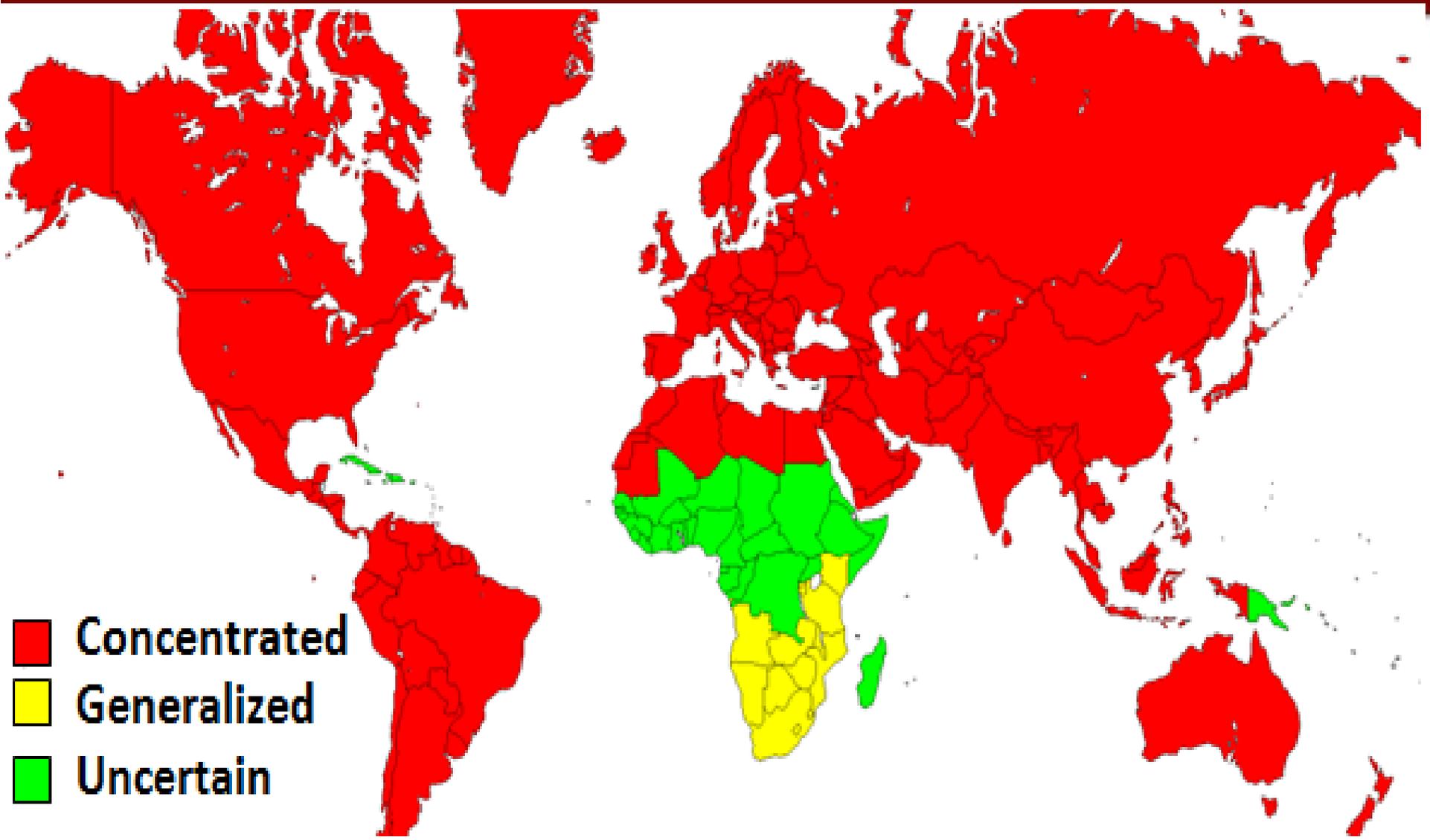


Most HIV epidemic are concentrated

- Improved surveillance shows HIV outside Southern Africa lower – **and more concentrated**

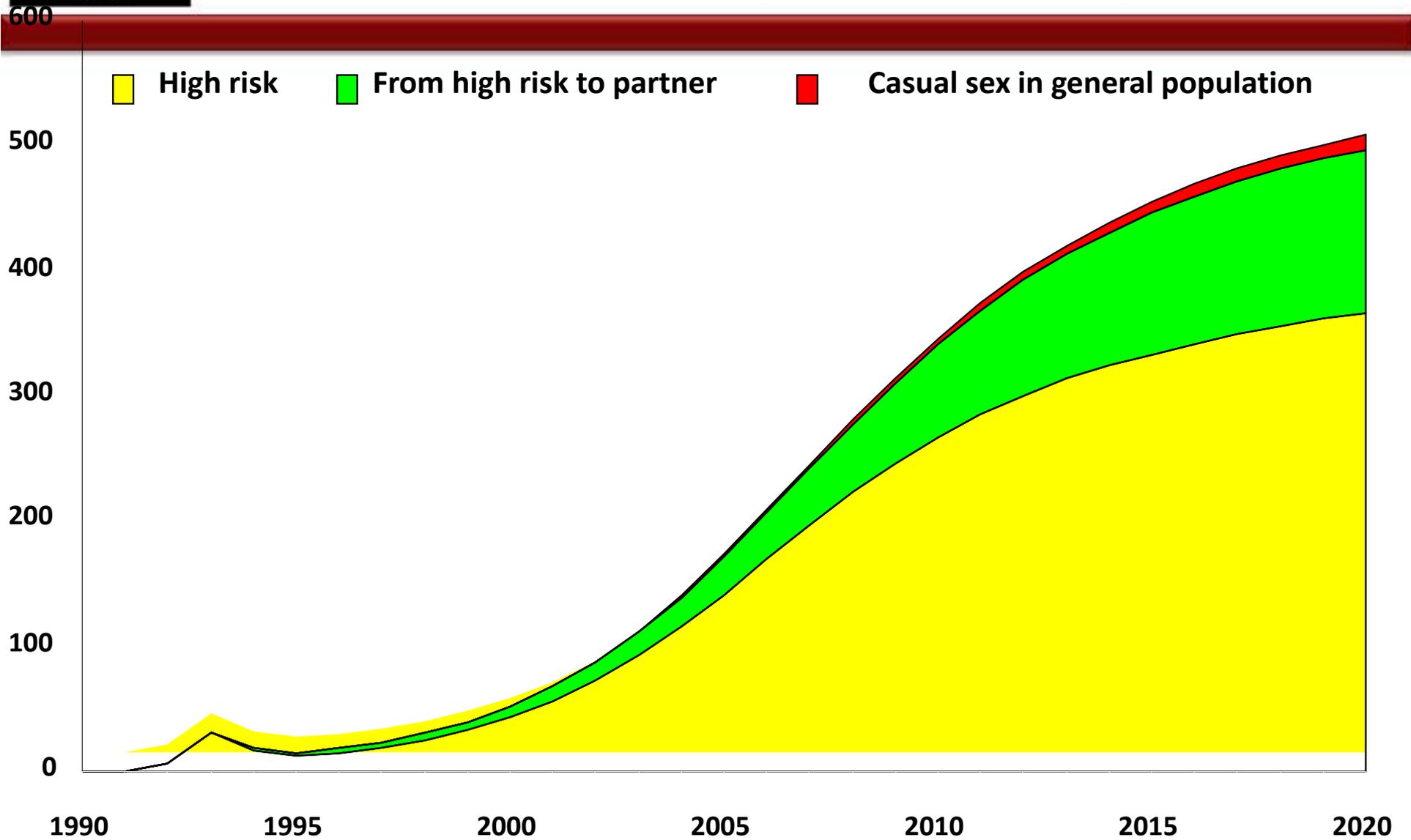


Most epidemics globally are concentrated





Asian epidemic are not driven by the general population





Can we respond effectively?

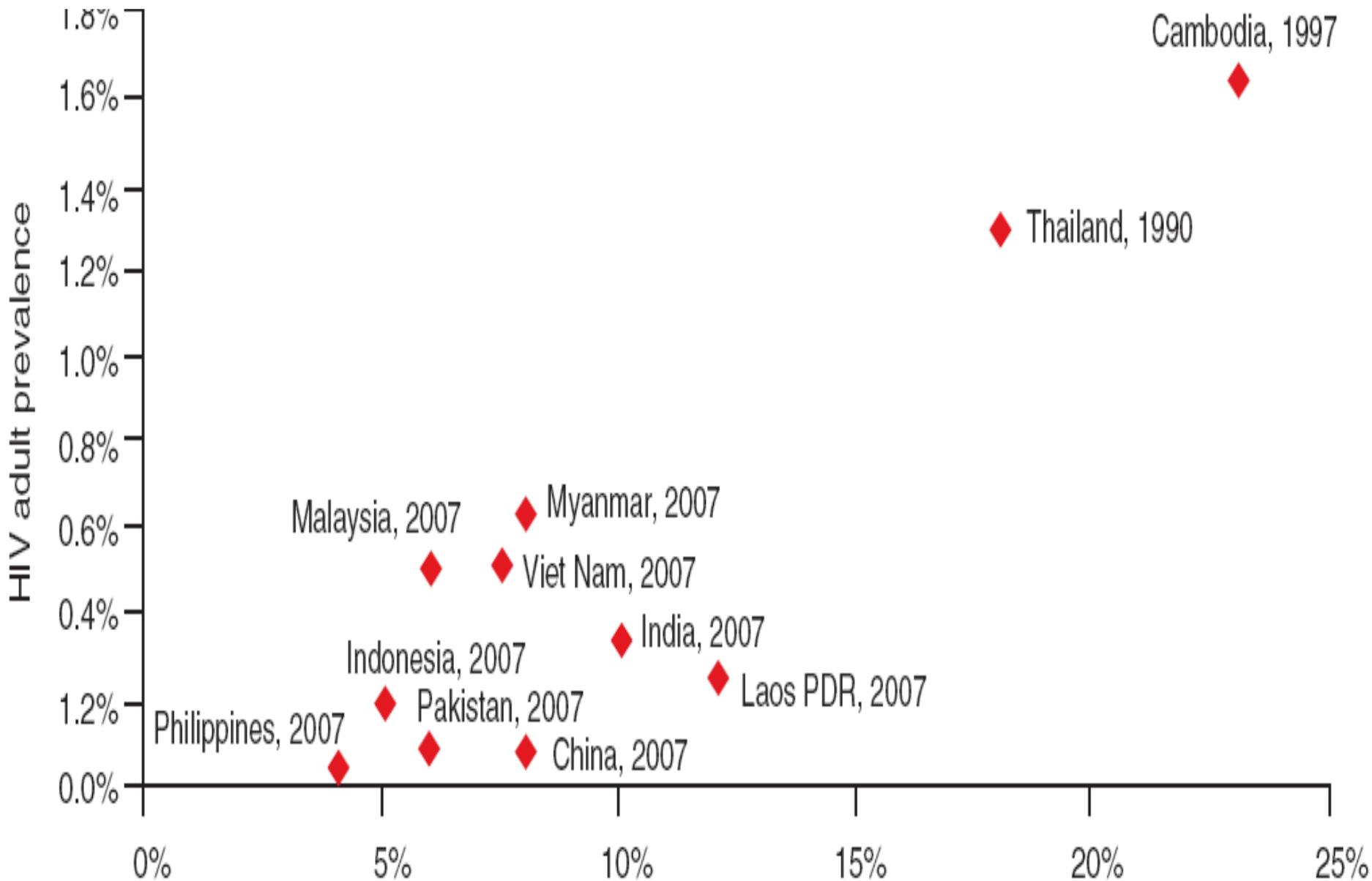
- Once we better understand our epidemics, can we respond effectively with proven approaches?
- Experience sobering in both concentrated and generalized epidemics



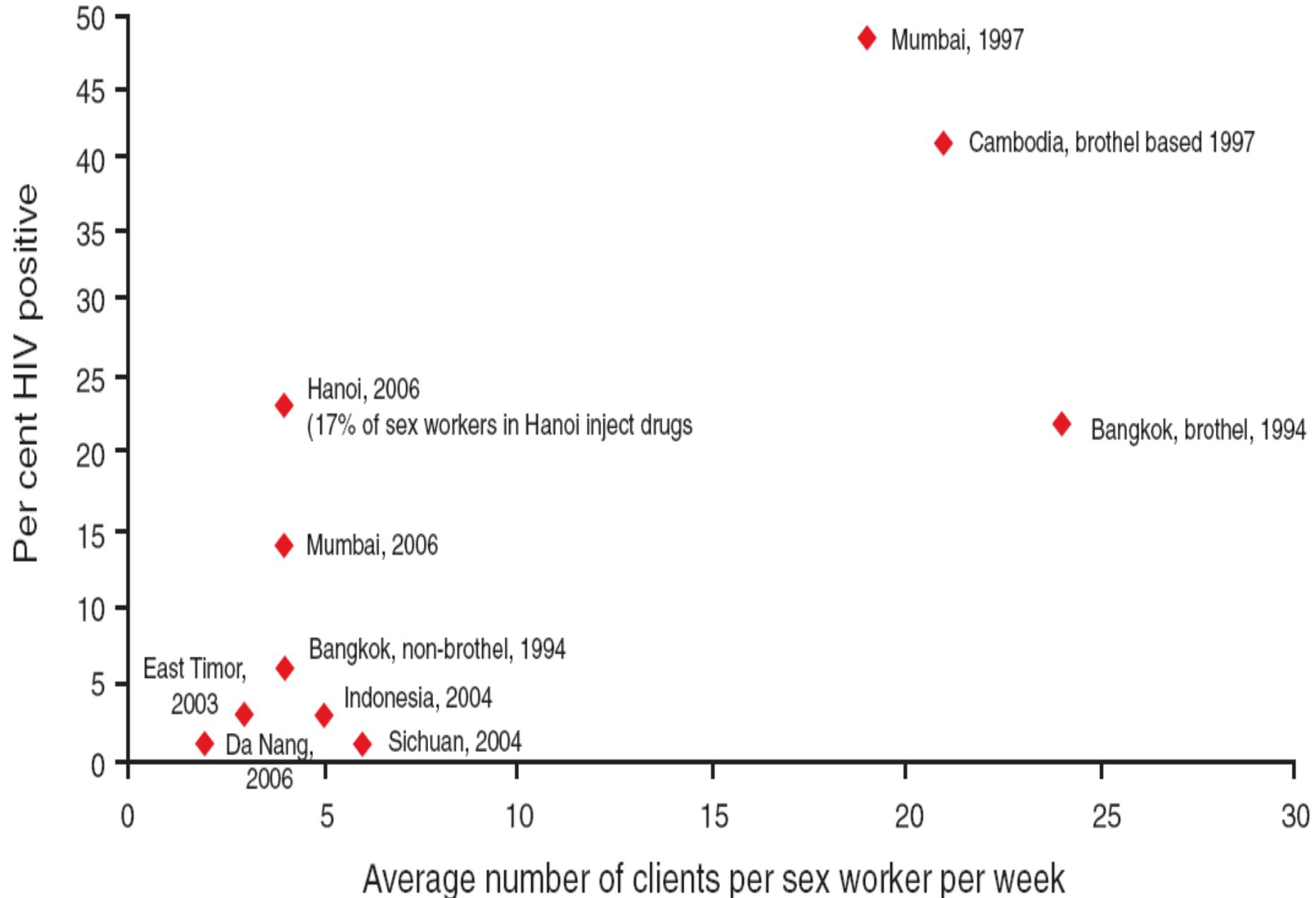
Addressing concentrated SW epidemics

- Consider concentrated epidemics initiated by SW
- Asian epidemics are only initiated by sex work if:
 - Men uncircumcised
 - Many men visit sex workers (> 10%)
 - Sex workers have many clients (> 20 weekly)
- Thus, first wave of epidemics in Asia - Thailand, Cambodia, India (outside North East) – largely ignited by SW

HIV prevalence by percentage of men visiting sex workers, Asia



HIV prevalence by number of clients per sex worker





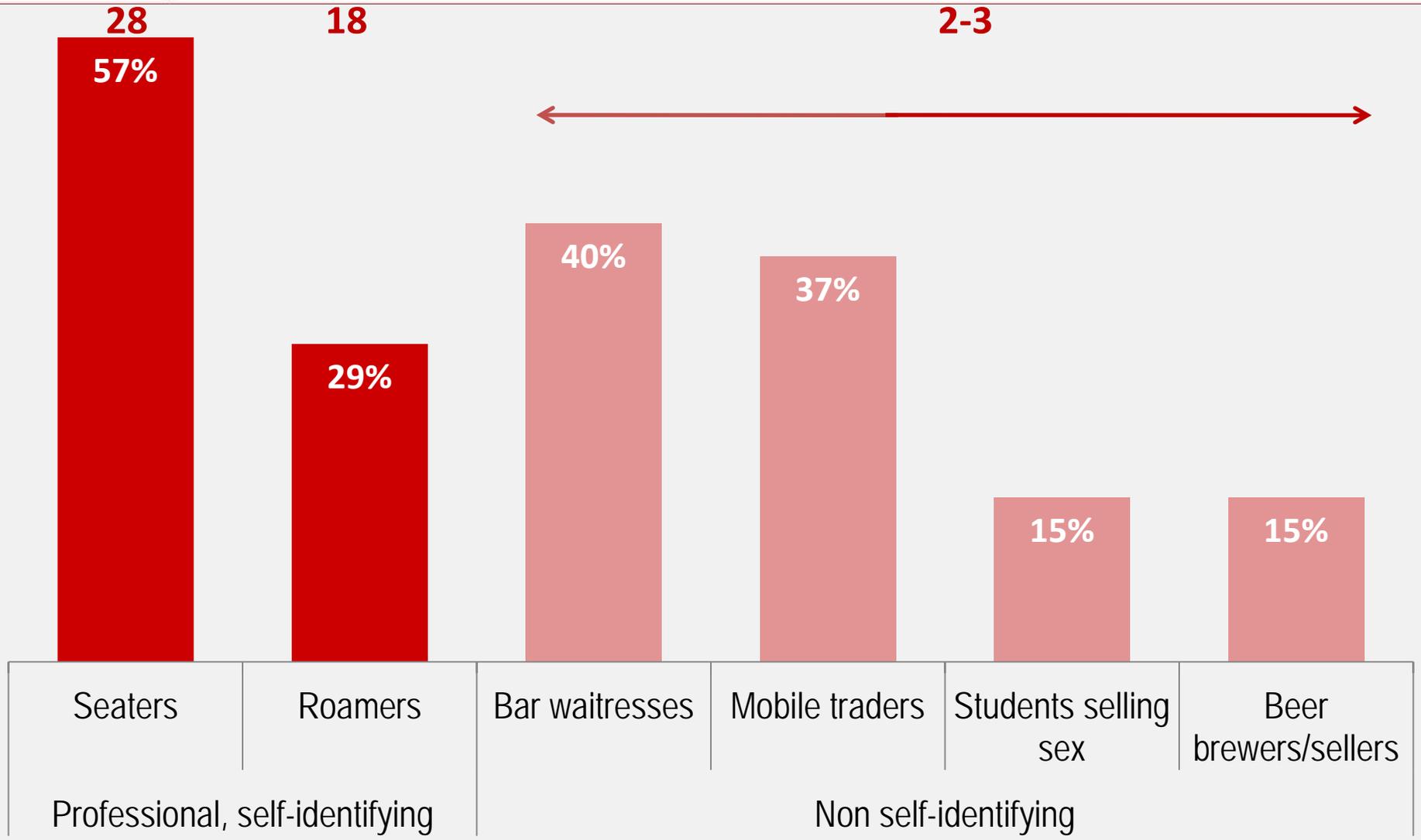
Addressing concentrated SW epidemics

- Concentrated SW epidemics - know what to do in real world at scale
- Have successfully checked numerous SW epidemics in virtually all regions – perhaps the most robust single prevention success



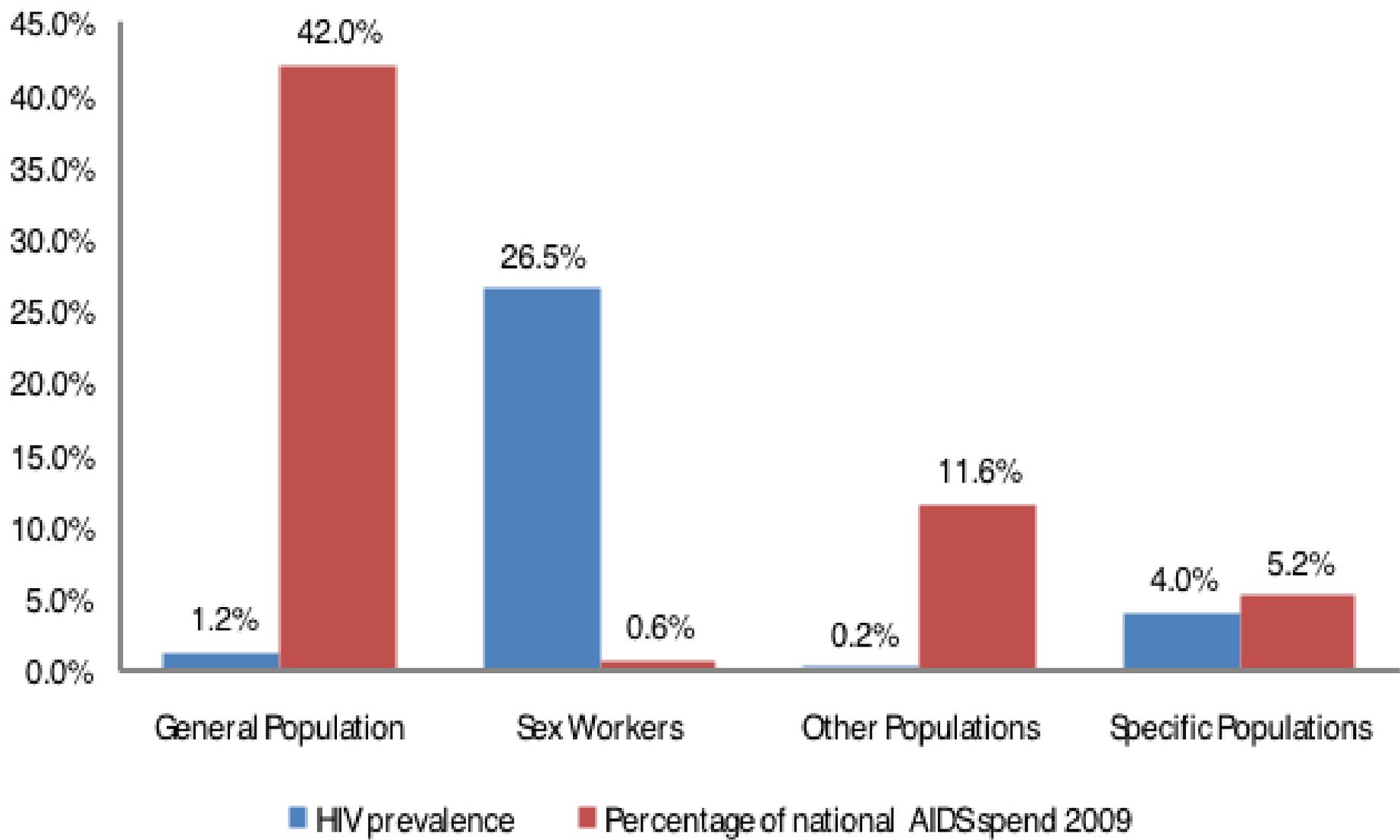
However, the complexity of sex work in Africa poses a challenge

Clients per week





And concerted SW investments are elusive





We know the elements of effective SW interventions

- **Effective SW programs have six tightly interconnected components:**
 - **Behavior change communication usually through peer education**
 - **Condom promotion and provision**
 - **Tailored sexual health services**
 - **HIV testing and counseling**
 - **Solidarity and group empowerment**
 - **A supportive local and national legal environment**

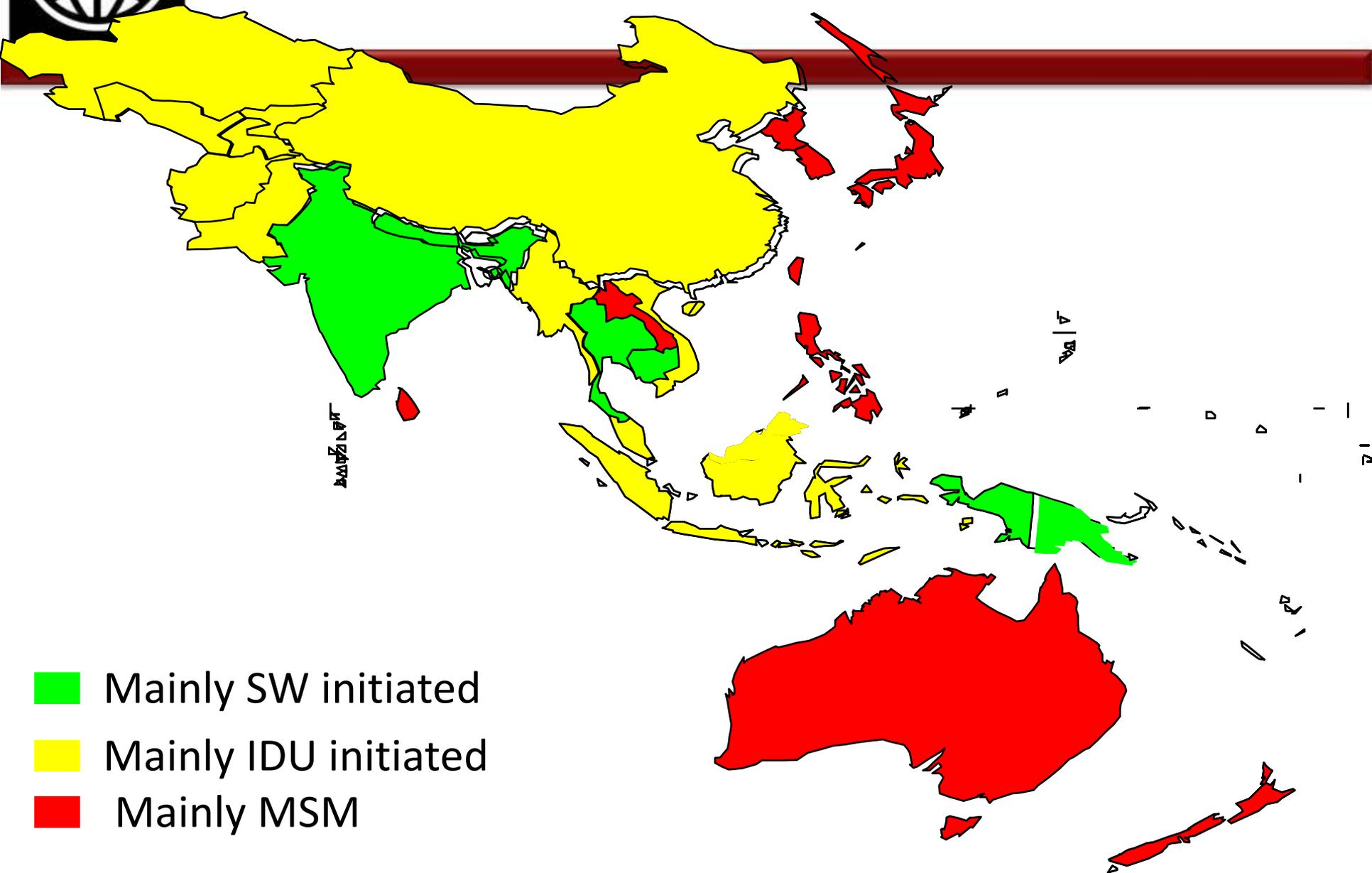


Addressing concentrated IDU epidemics

- Throughout Asia and Eastern Europe, IDU drives HIV, directly and by injecting HIV into commercial sex networks
- Injecting drug use the spark plug that ignites sexual transmission, sex work the engine that maintains it
- European and Asian data shows how injecting drug use fuels HIV in sex work, fundamentally amplifying epidemic potential
- Eastern Europe, Central Asia, Iran, Afghanistan, Pakistan, Indonesia, Philippines lands of opportunity - effective IDU programs can radically curtail sexual epidemics



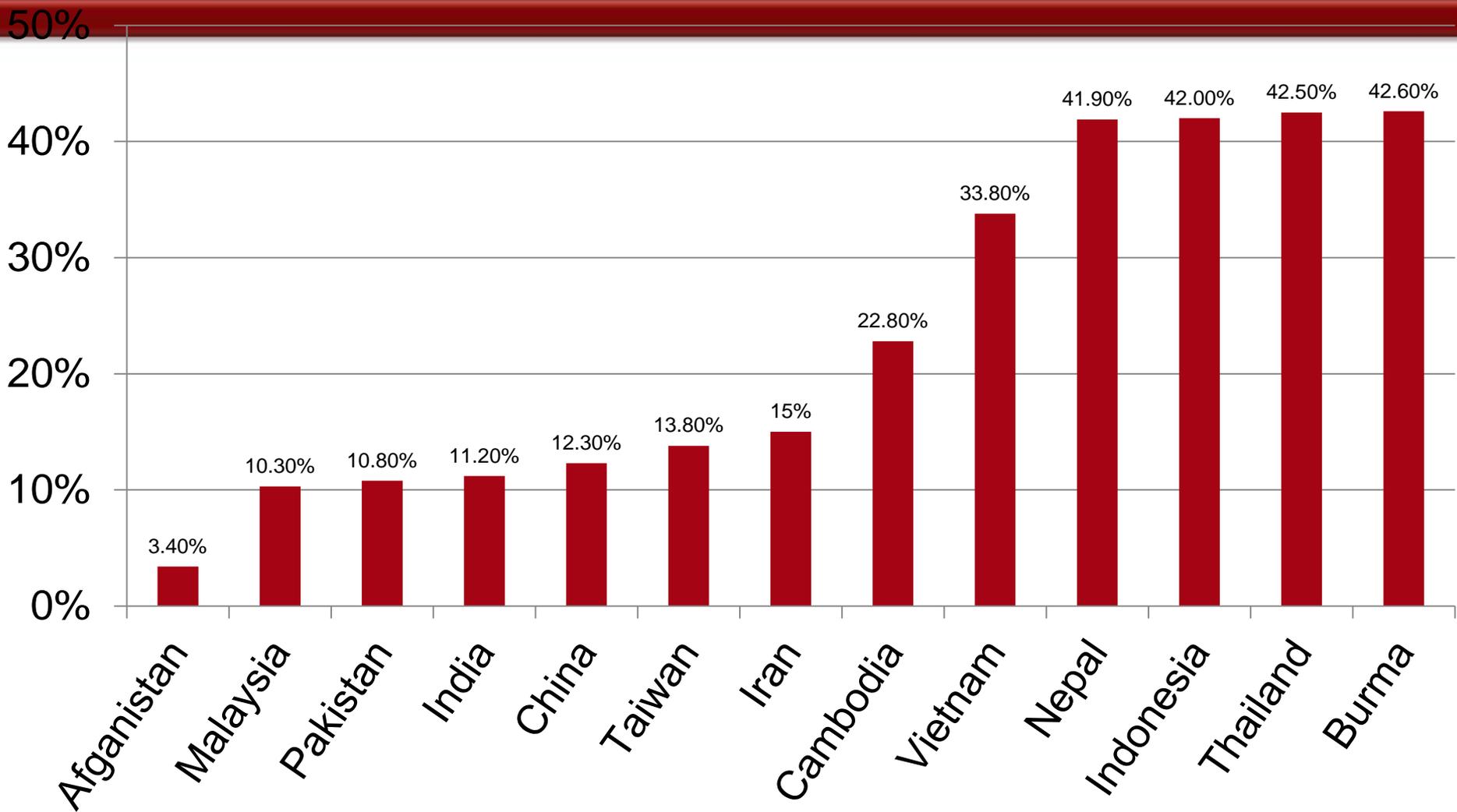
Initiators of HIV epidemics in Asia



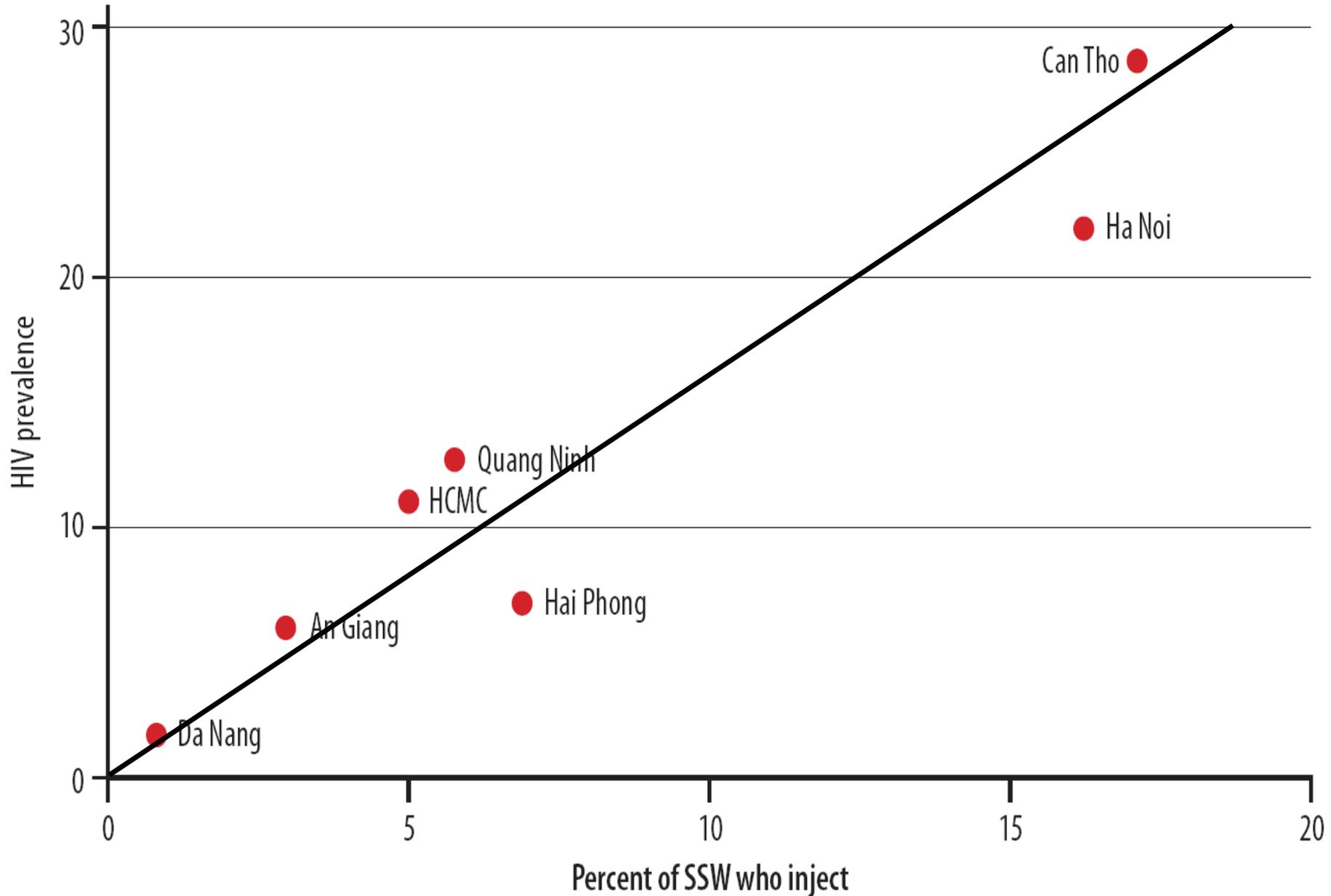
-  Mainly SW initiated
-  Mainly IDU initiated
-  Mainly MSM



HIV prevalence among IDU in Asia



HIV higher in SW who inject drugs in Vietnam





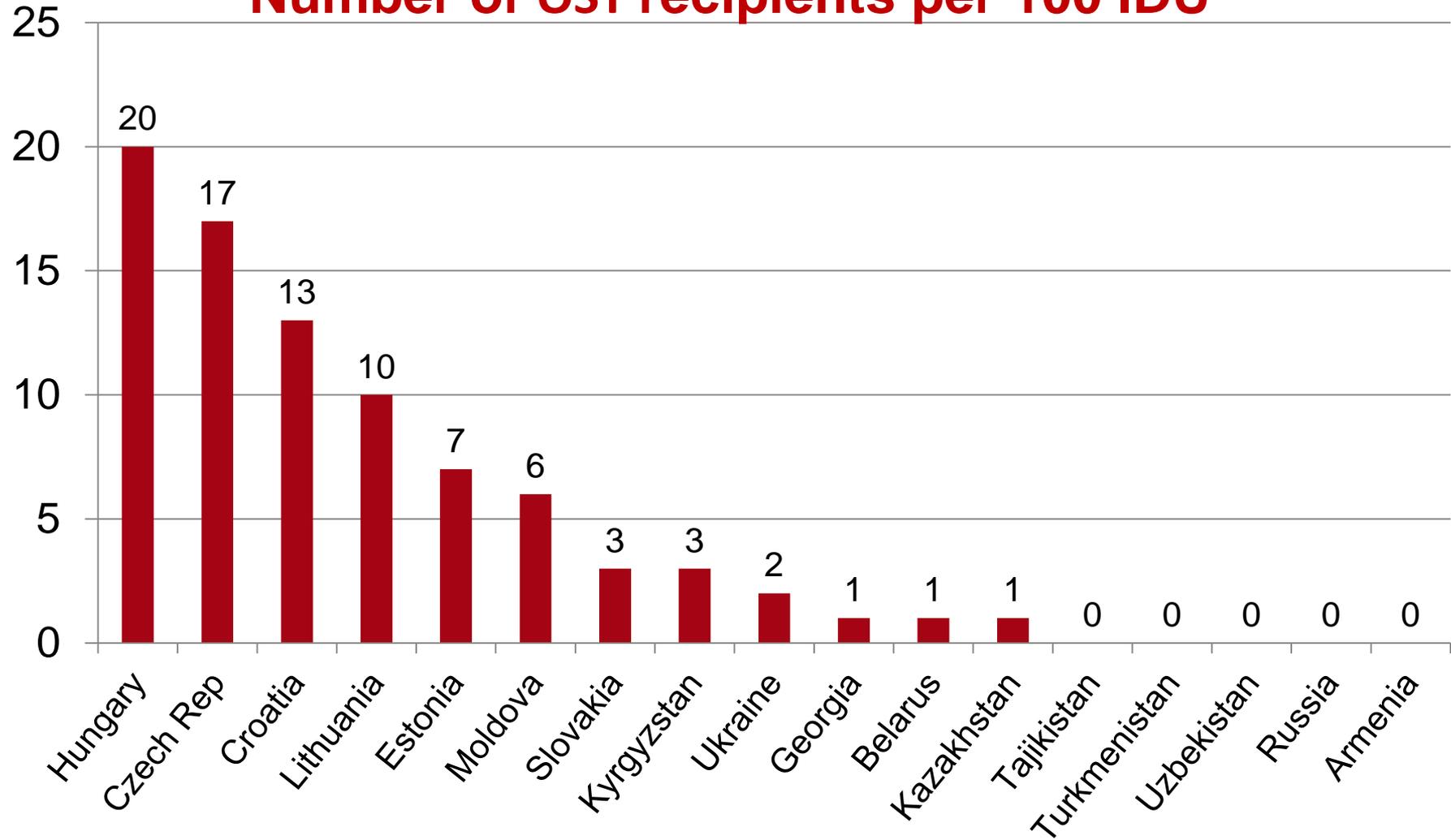
Addressing concentrated IDU epidemics

- Yet real world experience discouraging
- Can we keep saying that harm reduction works, for example, in former Soviet Union or Asia, when we can't convince authorities it is preferable to coercion?
- Limited progress towards large-scale harm reduction programs in Asia, with partial exception of substitution therapy in China
- Yet, if we can increase programs, we have inherent advantages - unlike condoms, which inhibit spontaneity, no-one WANTS to share dirty needles



Access to opioid substitution therapy in Eastern Europe and China

Number of OST recipients per 100 IDU



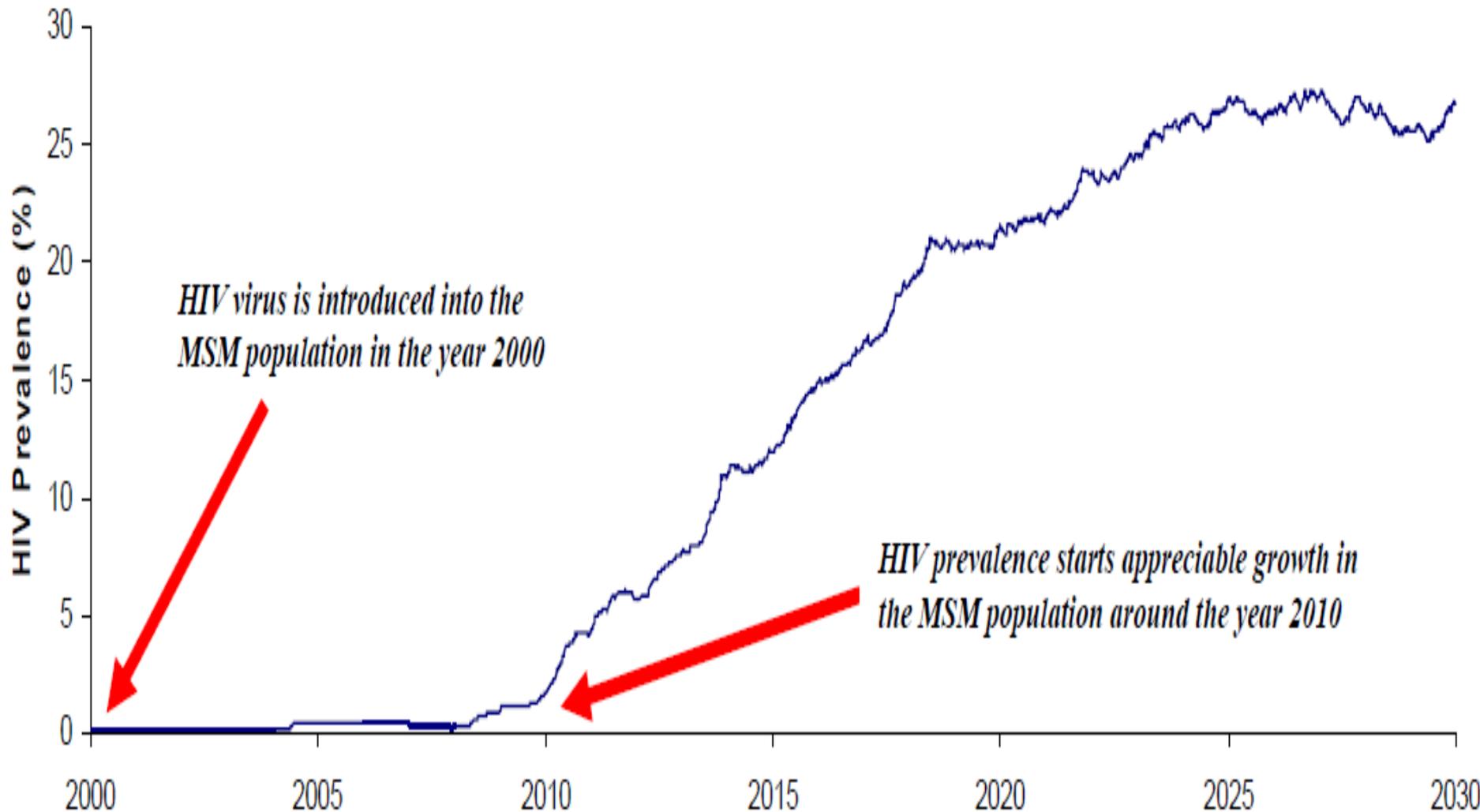
Addressing concentrated MSM epidemics

- **Greatly underestimated contribution of MSM to HIV transmission in developing countries**



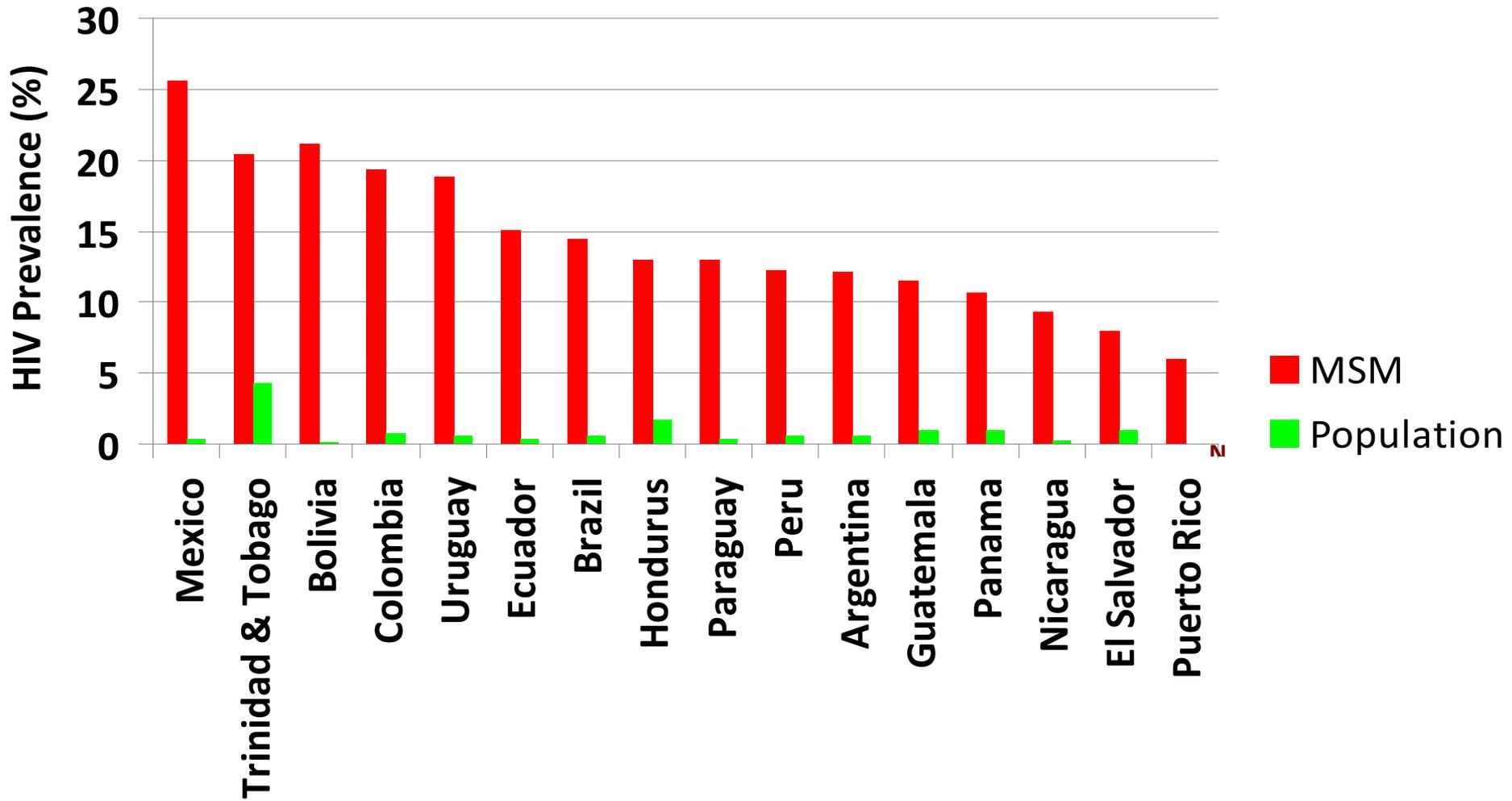


MSM epidemics may incubate slowly then surge



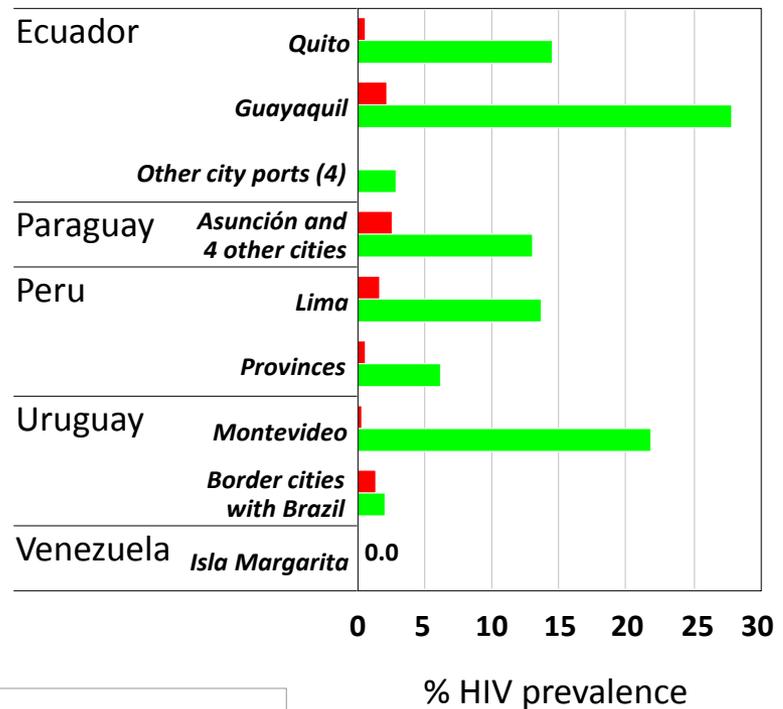
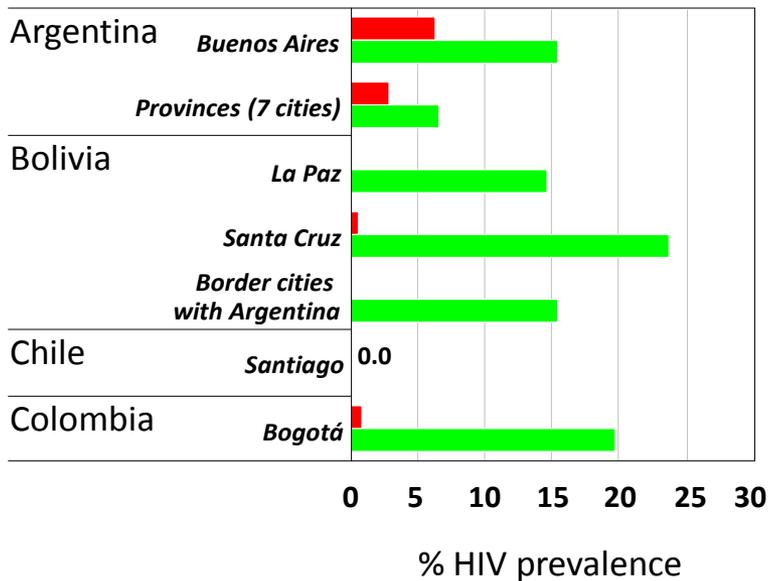


HIV prevalence among MSM in Latin America





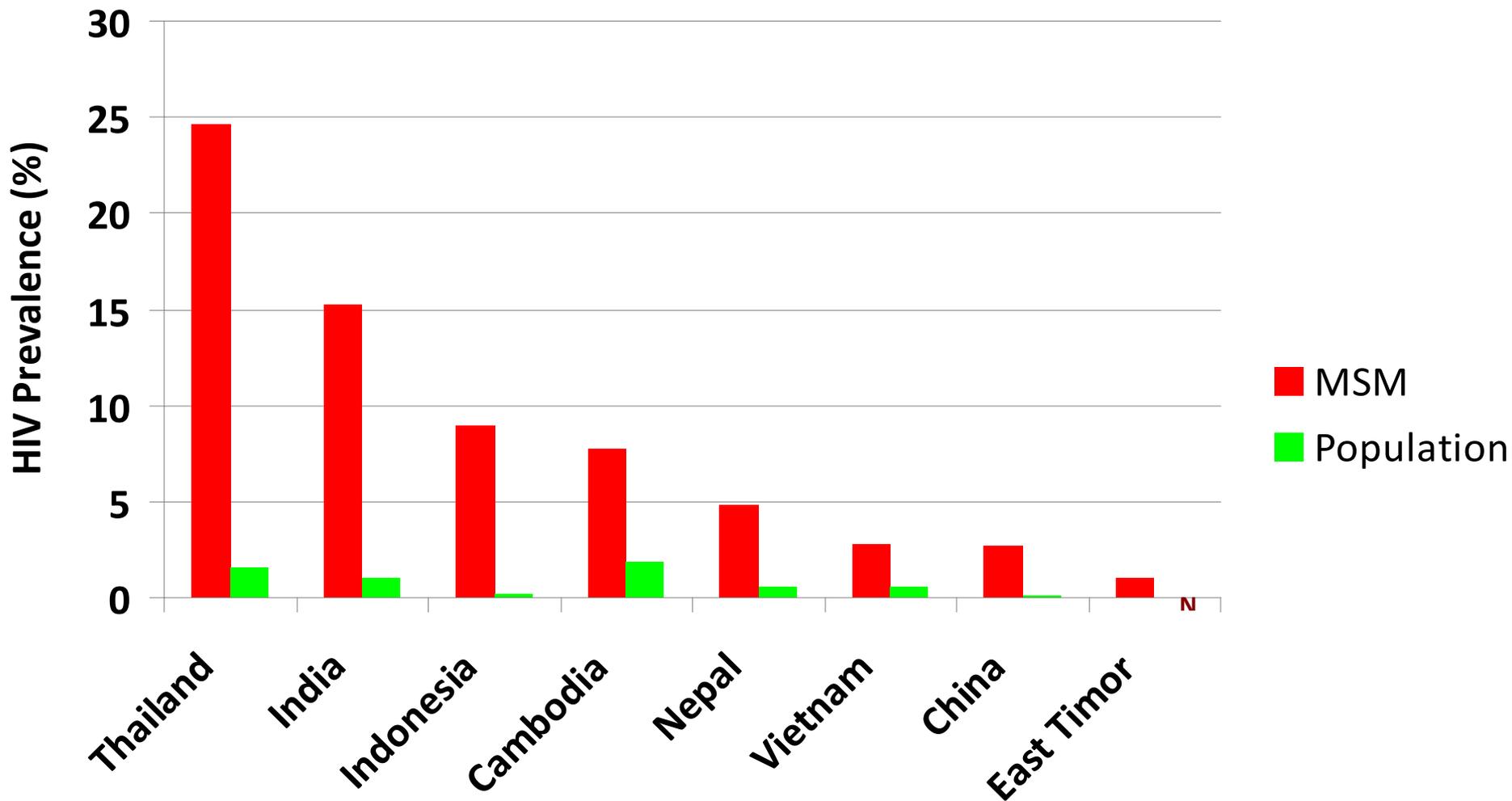
HIV prevalence far higher in MSM than FSW in Latin America



■ Female sex workers ■ Men who have sex with men

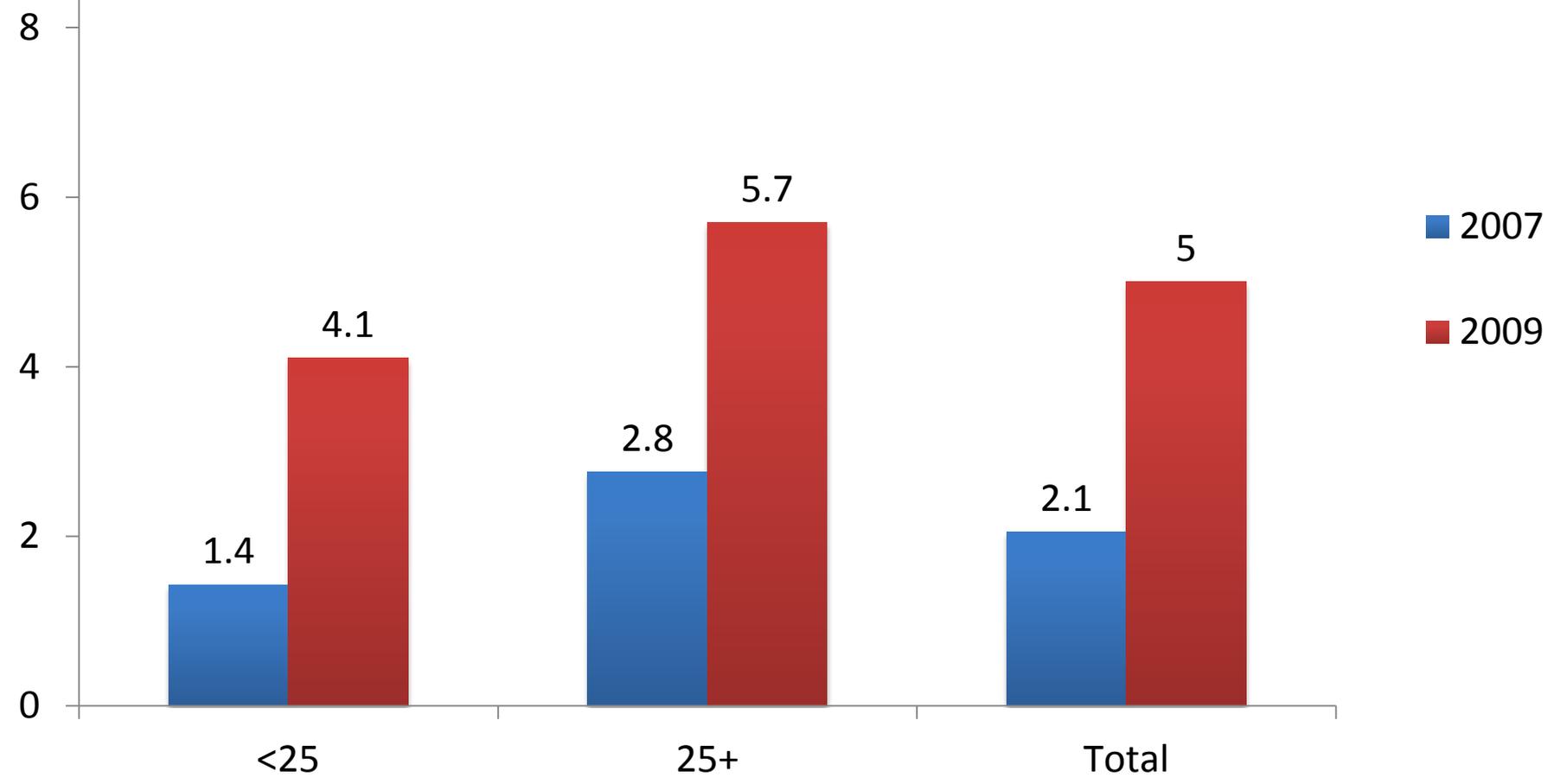


HIV prevalence among MSM in Asia



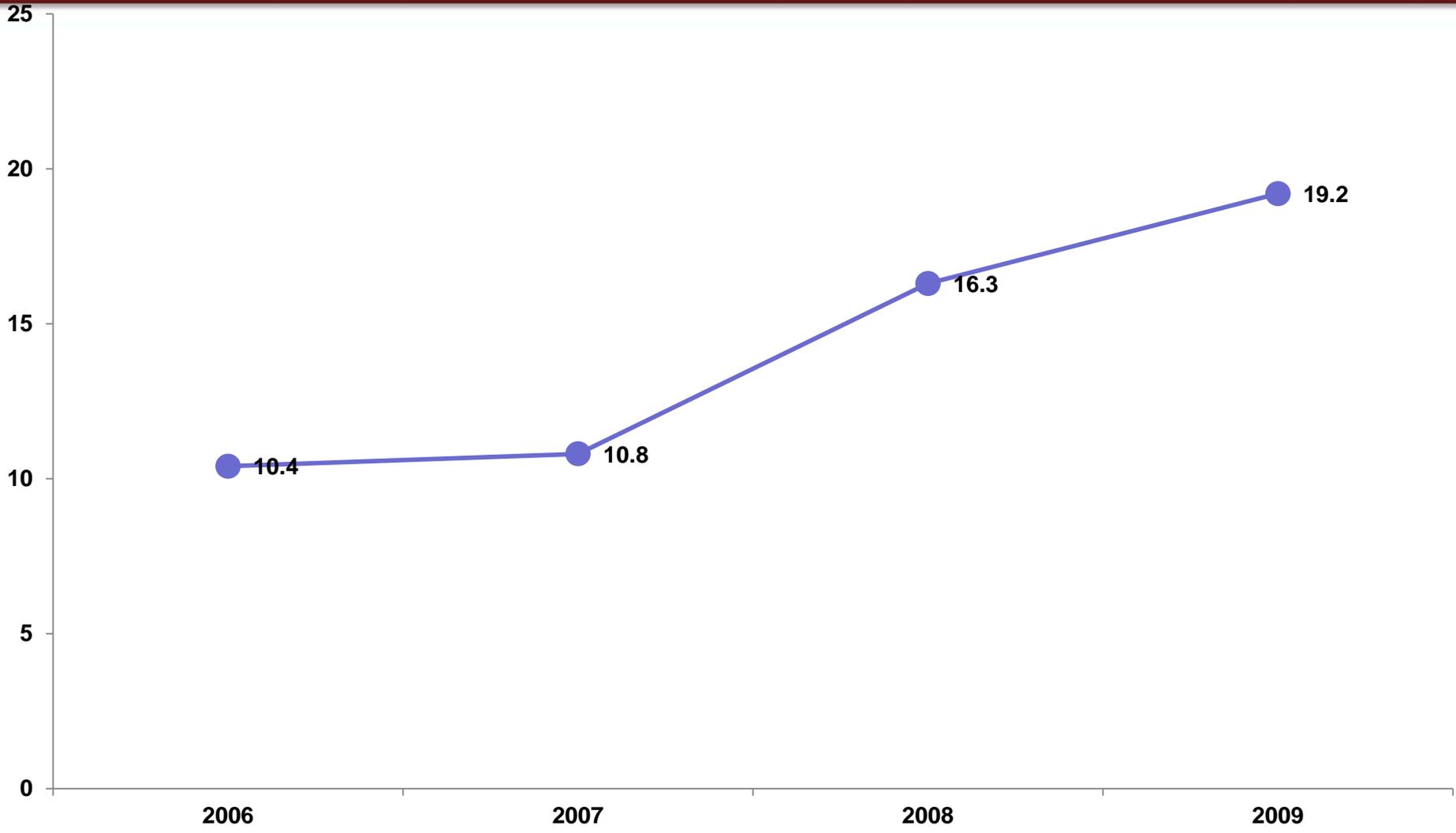


HIV prevalence among MSM in China



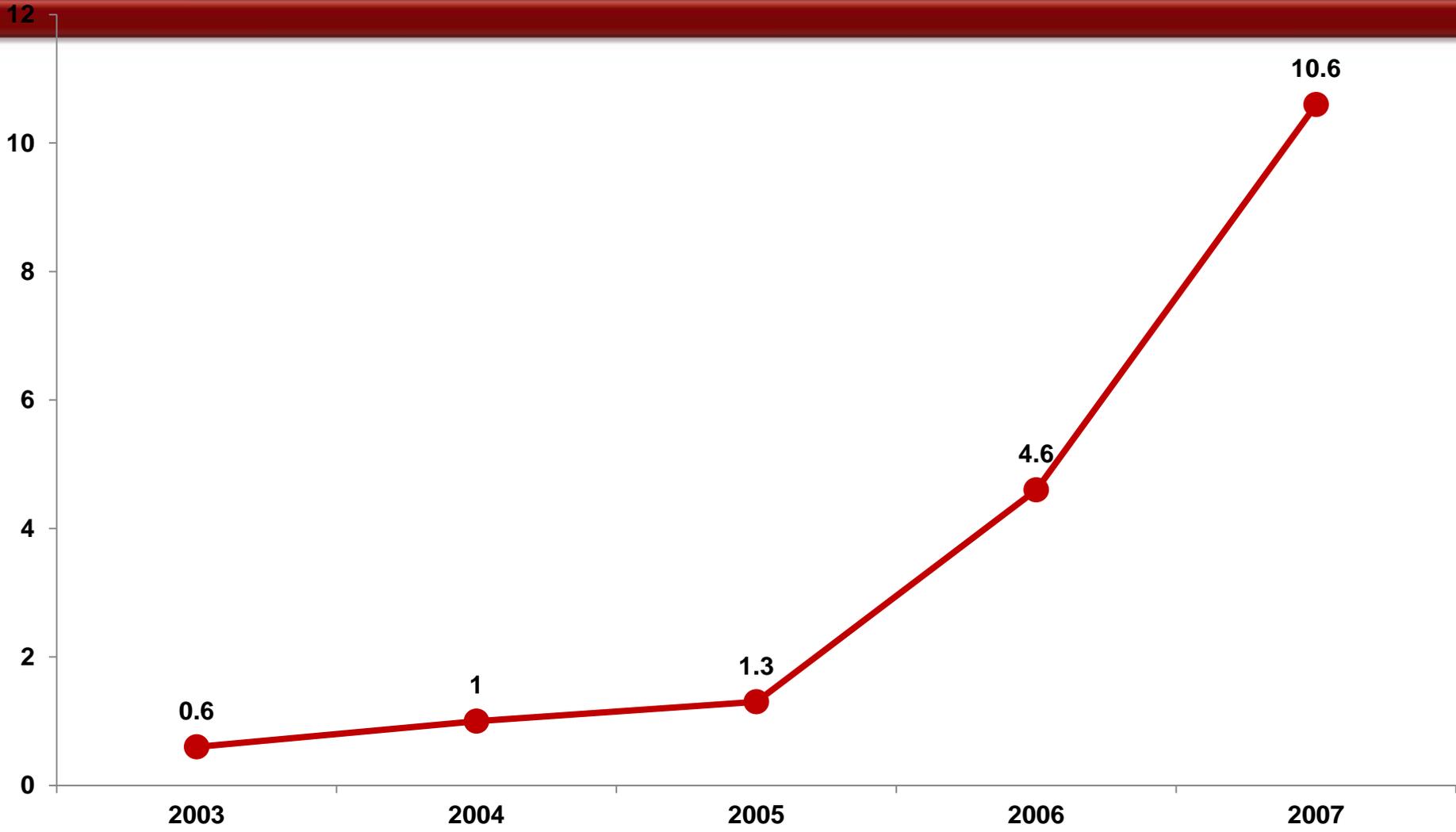


HIV prevalence among MSM in Chongqing, China



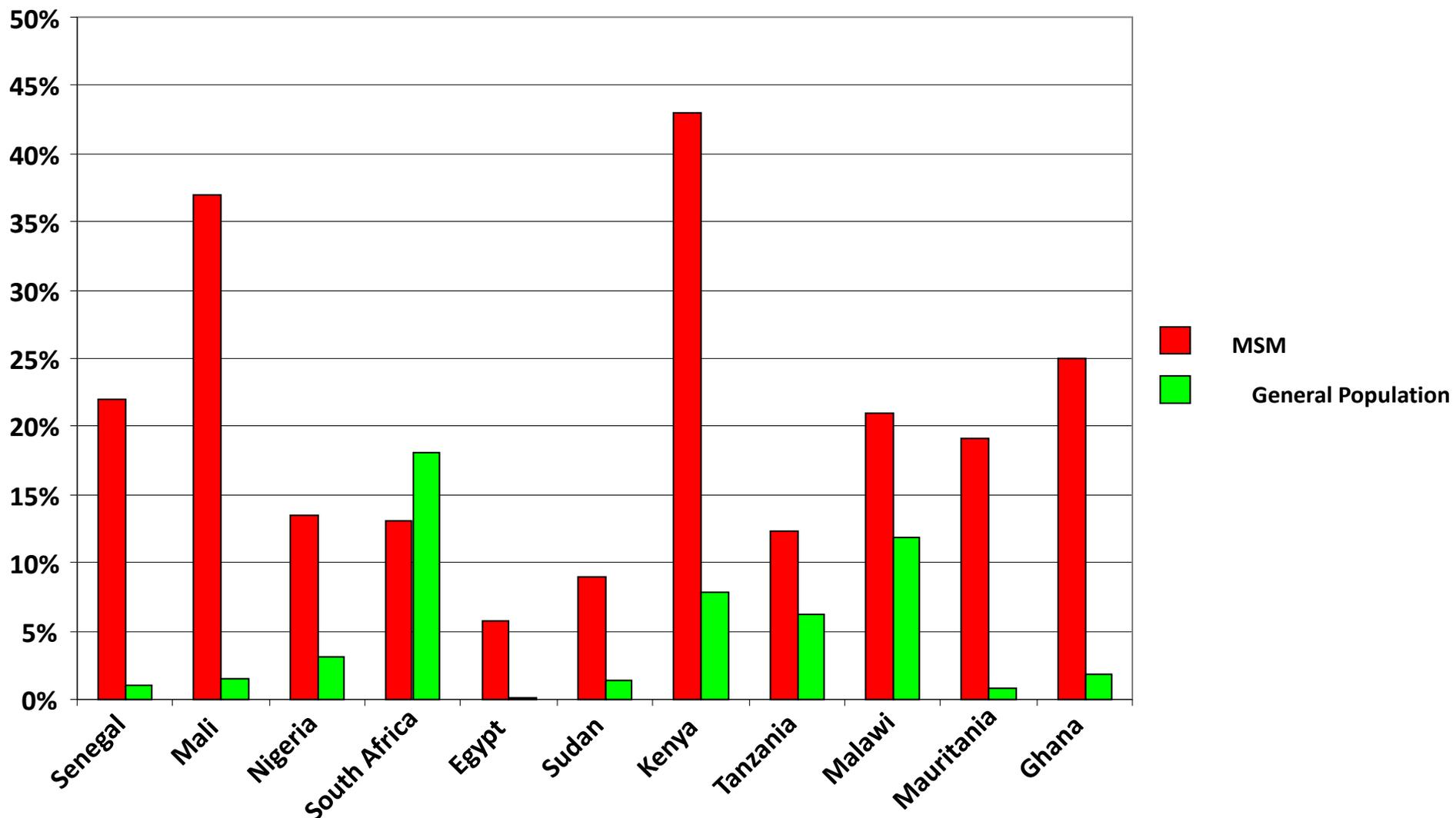


HIV prevalence among MSM in Sichuan, China

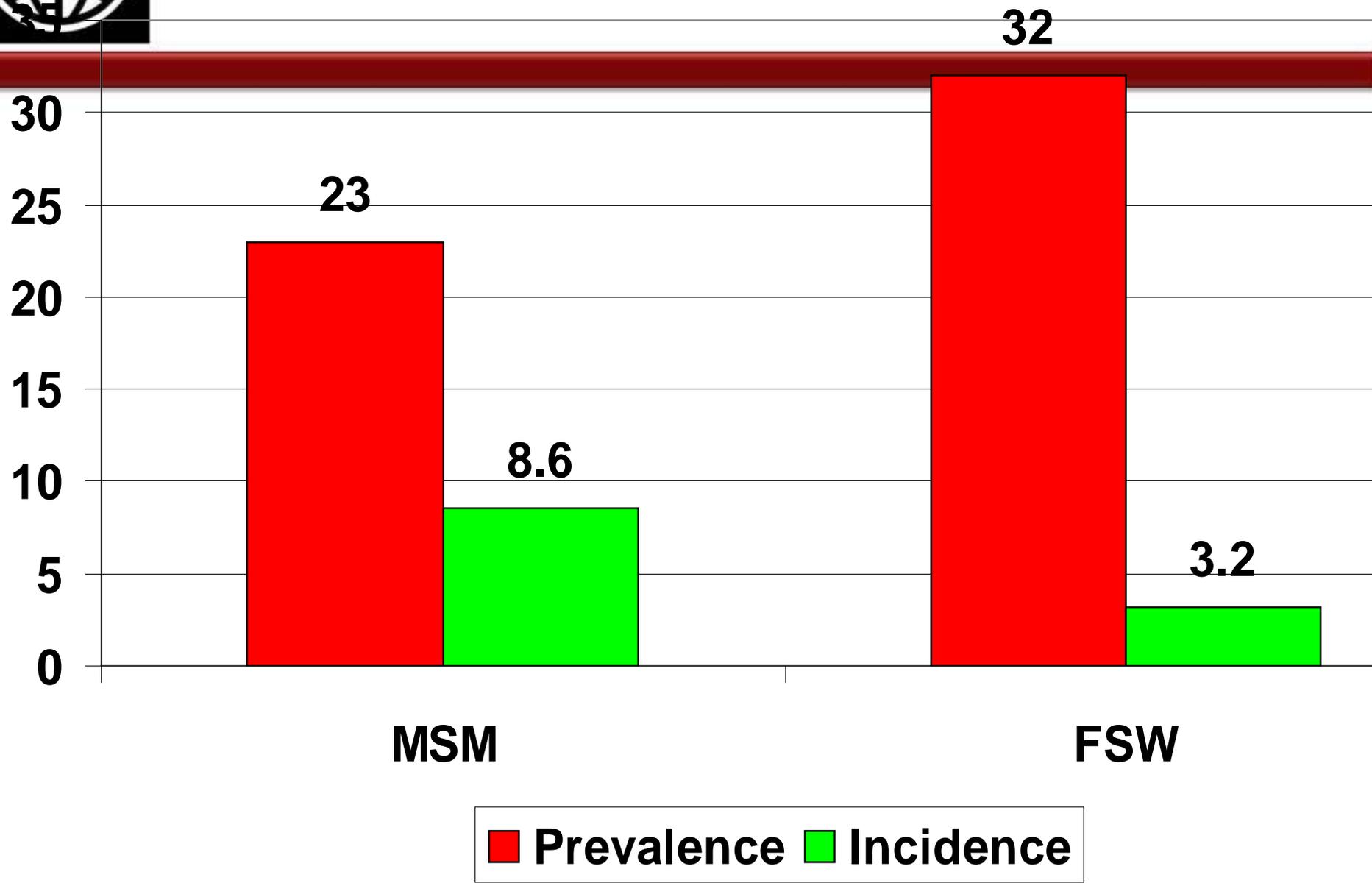




HIV prevalence among MSM in Africa



HIV PREVALENCE AND INCIDENCE AMONG FSW AND MSM IN MOMBASA, KENYA





Addressing concentrated MSM epidemics

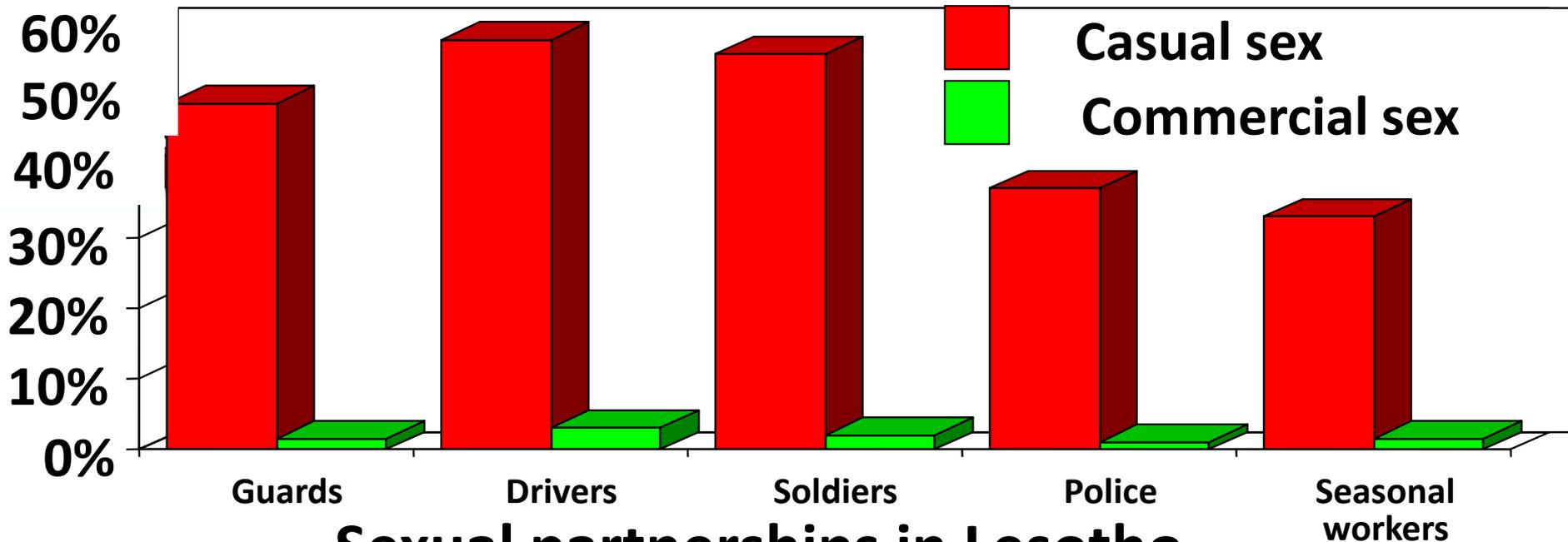
- Despite developed world successes , few developing country MSM programs have demonstrably reduced HIV incidence
- In developing countries, know little about how to reach hidden MSM, reduce stigma, effect policy change and manage large-scale programs
- Easier in contexts open to homosexuality, such as India or Nepal – than more repressive contexts
- Still need to navigate between southern unwillingness to address male-male sexuality and northern temptation to frame response within western constructs of limited relevance to developing countries



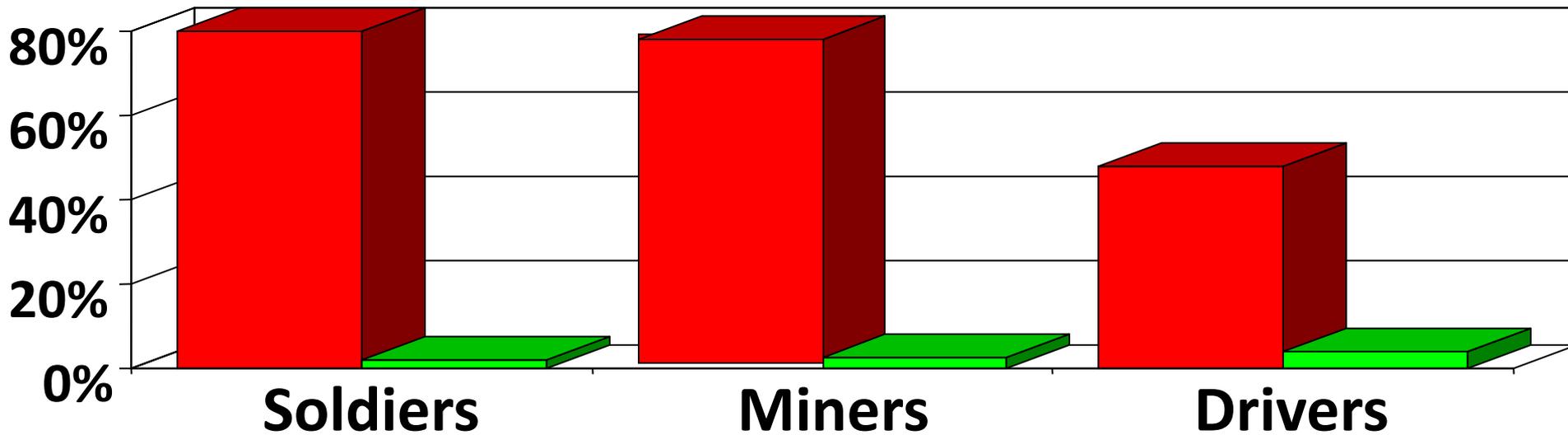
Addressing generalized epidemics

- Let's remind ourselves what generalized epidemics look like

Sexual partnerships in Swaziland

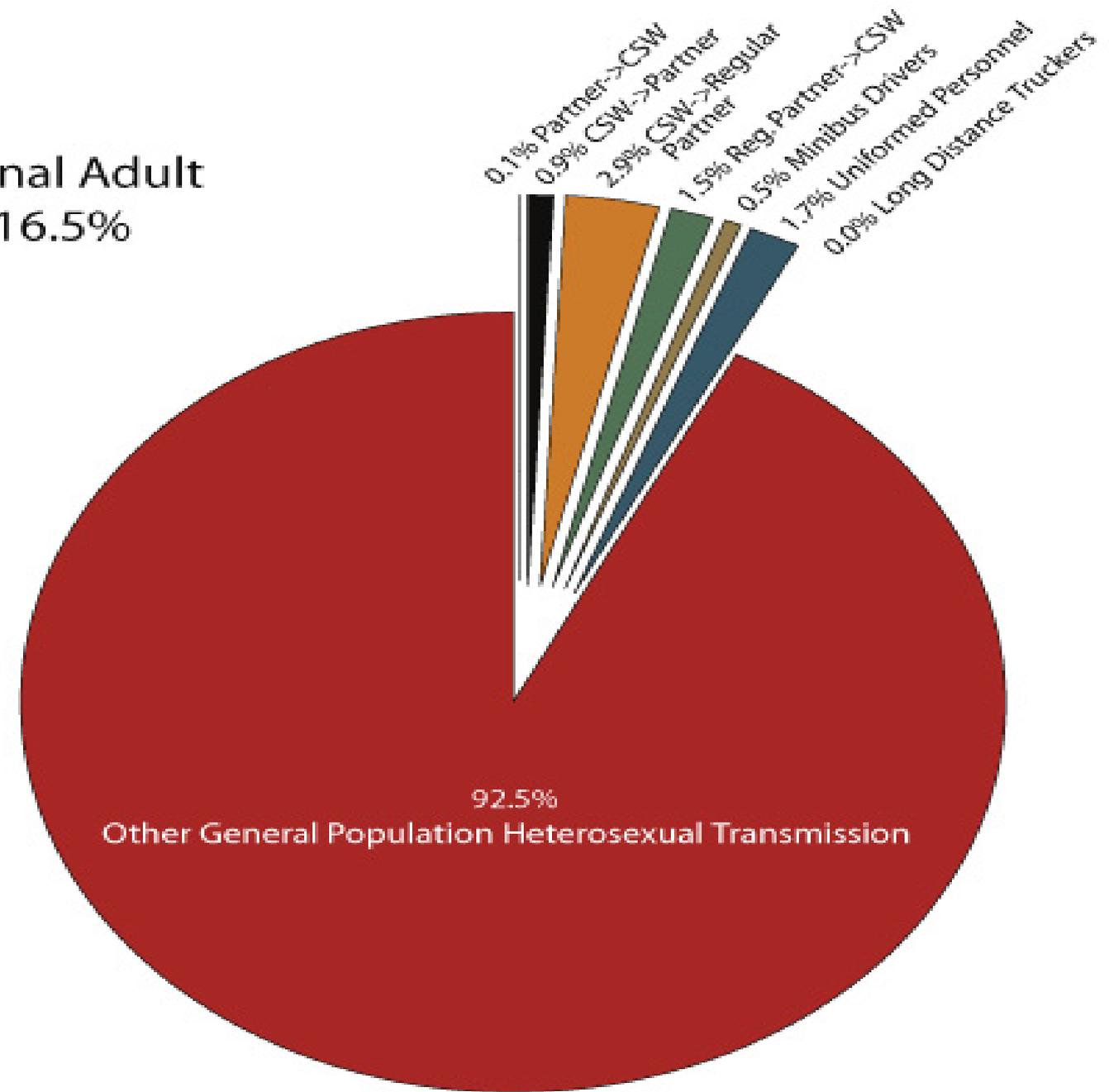


Sexual partnerships in Lesotho



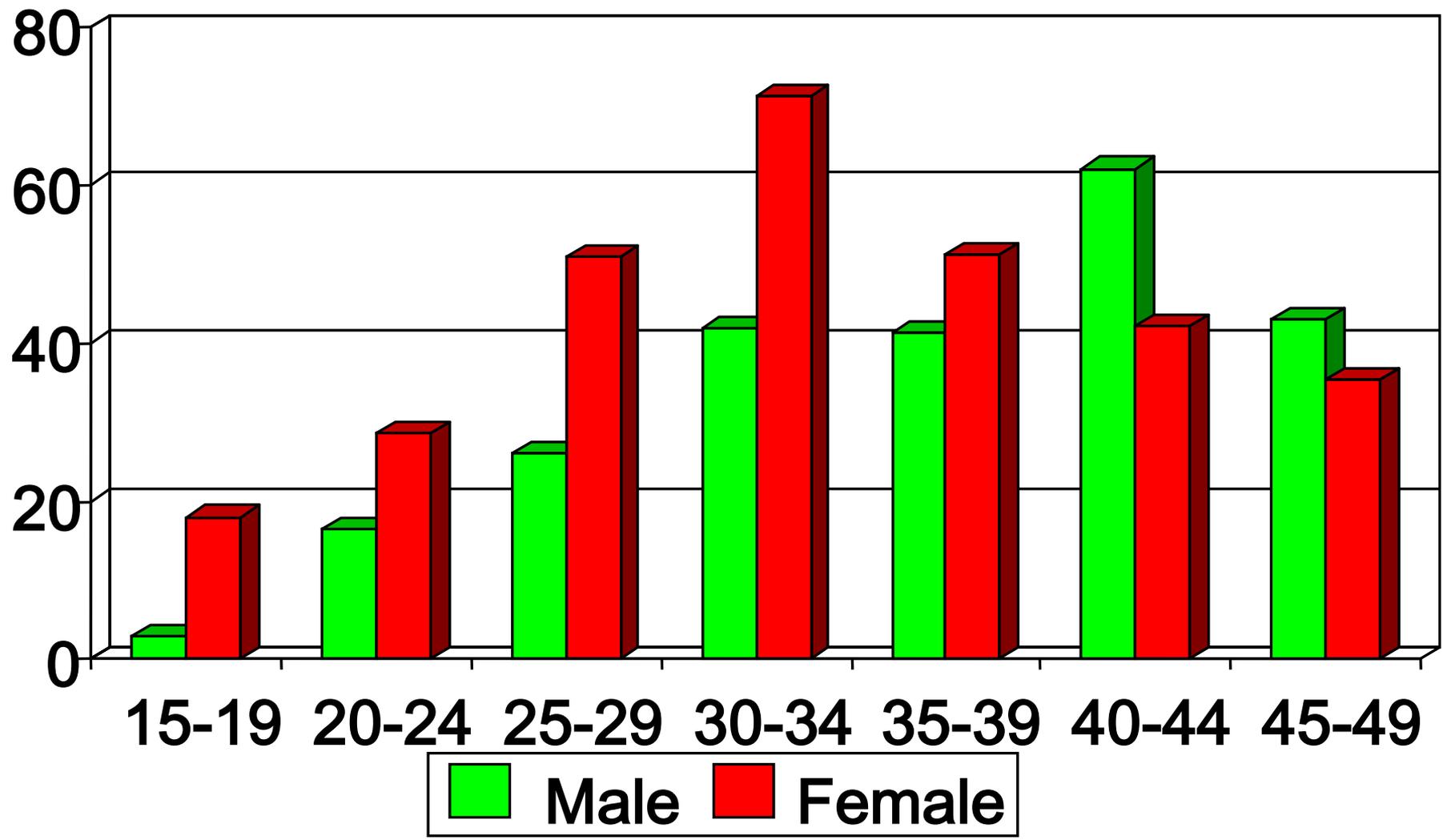
Zambia: Relative Proportion of Incident Cases (modeled)

Estimated National Adult HIV Prevalence: 16.5%





Household HIV prevalence in Francistown, Botswana





Addressing generalized epidemics

- Do we have proven interventions in generalized epidemics?
- Consider this updated familiar summary of 49 HIV prevention randomized controlled trials, including 37 completed/stopped studies, with HIV incidence end-points



Results of HIV prevention trials

Intervention	Number	Completed/ Stopped	Effective
Microbicides	12	10	1
Behavior change	9	8	0
STI treatment	8	7	1
HIV vaccines	5	4	0
PEP	5	1	0
Male circumcision-male acquisition	3	3	3
HIV treatment as prevention	3	1	1
PREP	3	2	1
Total	49	37	7



Addressing generalized epidemics

- Four major challenges
- First, many trusted interventions – treatment of sexually transmitted infections, testing and counseling, school and youth programs, condom promotion - at best unproven, at worst disproven, for reducing HIV incidence



Addressing generalized epidemics

- Second, best proven intervention, male circumcision, barely advancing - since 3 trials were terminated early 2 years ago, few extra men protected
- Yet immense potential – 7 of 8 highest prevalence countries globally have male circumcision rates below 20% and expanding safe circumcision services in these countries could prevent 2+ million deaths
- In countries such as Zambia, with 15% adult HIV prevalence and a billion dollars in annual AIDS financing, little funding for male circumcision, despite growing waiting lists at public facilities



Addressing generalized epidemics

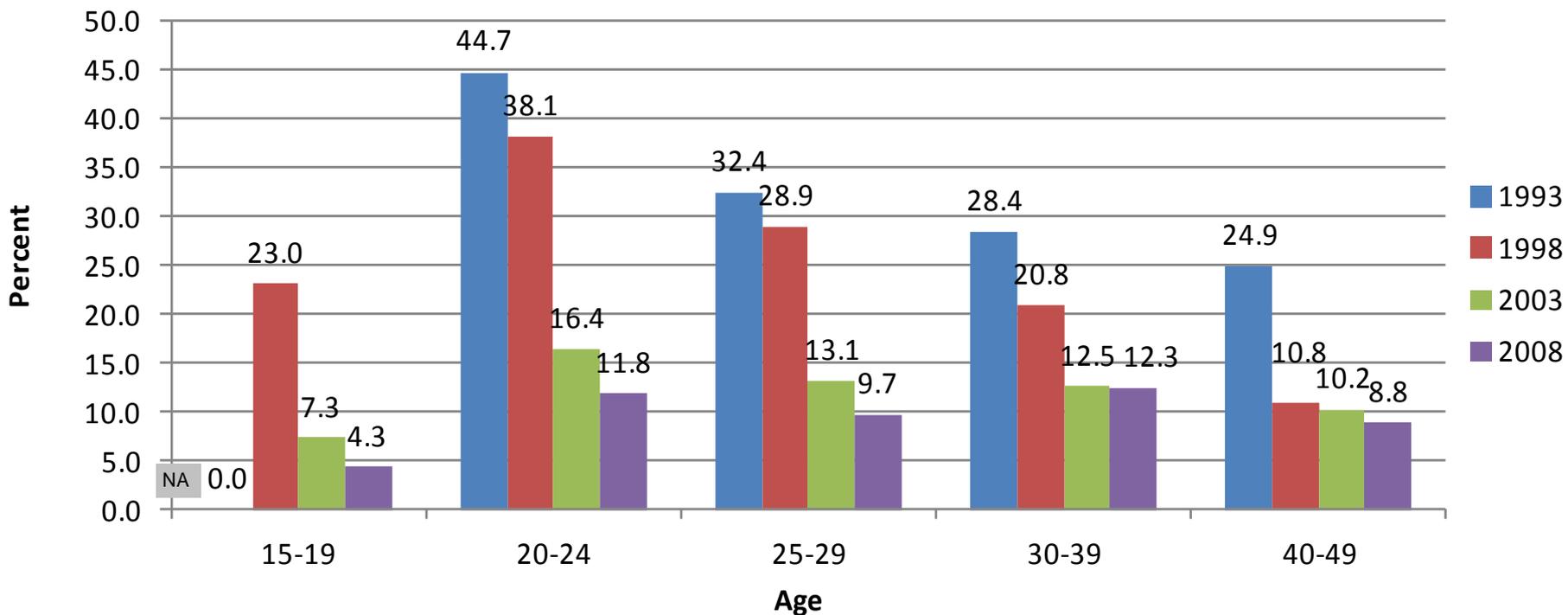
- Third, major contributor to reduced HIV transmission in generalized epidemics is partner reduction – have seen this in country after country
- Yet, partner reduction investment, implementation and evaluation still neglected

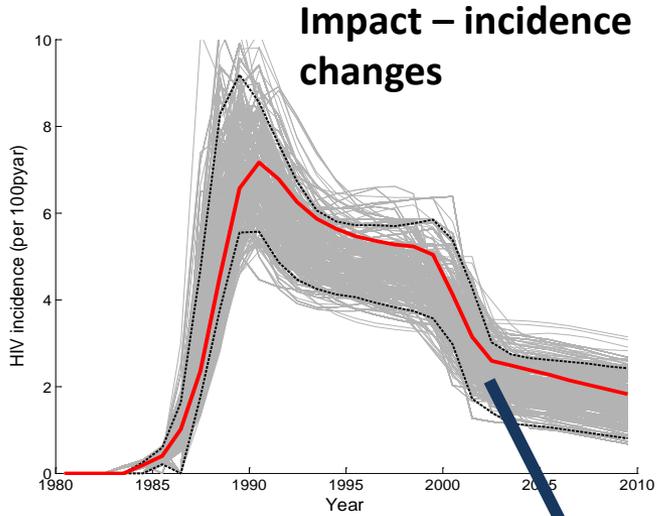


Kenya's changes ... but have programmes contributed?

Percent of Men with 2 or More Partners, Kenya 1993-2008

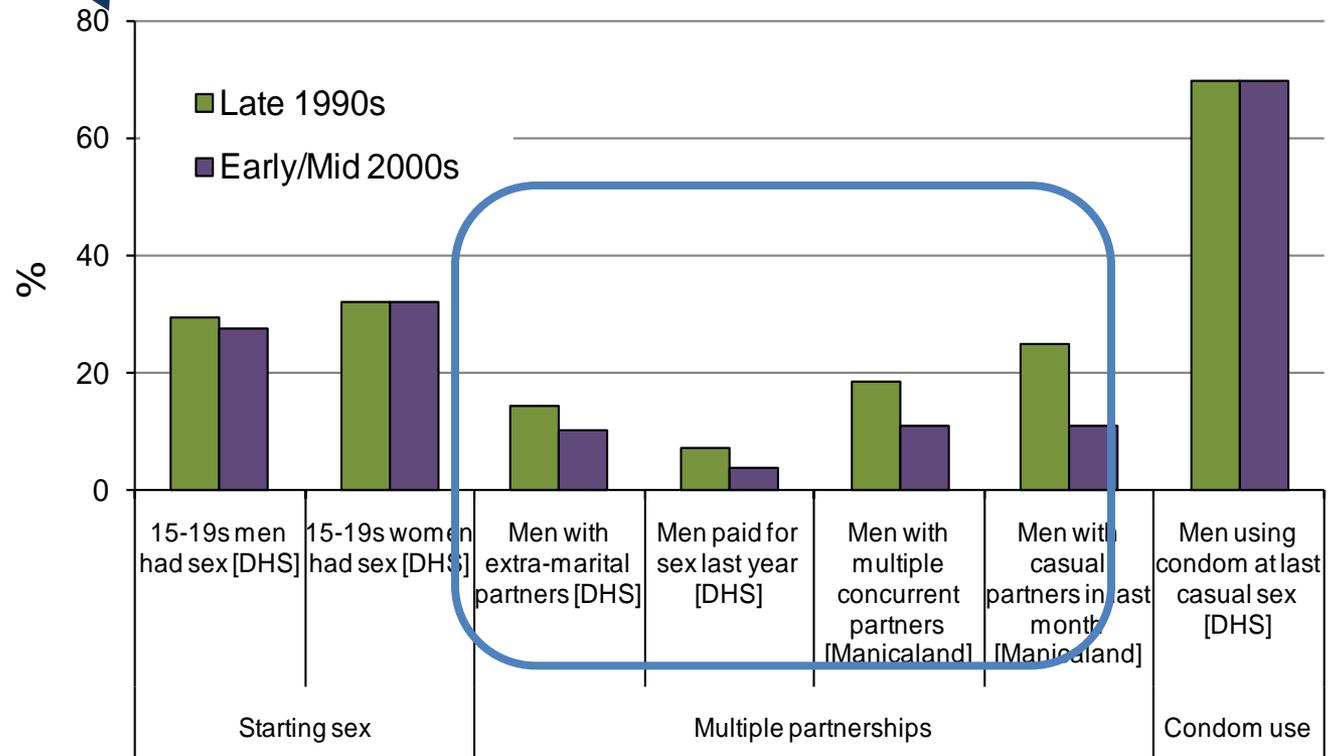
(In last 6 months for 1993, in last 12 months for 1998 and 2008)





HIV incidence and behavior change in Zimbabwe

Proximate factors





RESPONDING TO GENERALIZED EPIDEMICS

- Fourth, what do we do about ART-based prevention, including treatment as prevention and PREP? How do we establish real world effectiveness, finance it and balance ART-based prevention with obligation to treat the sick?



Conclusion – why program science matters so much

- **CONCENTRATED** SW epidemics preventable, but protecting MSM and IDU in developing countries requires new and creative approaches
- In **GENERALIZED** epidemics, core challenge to reallocate resources from unproven or disproven approaches to proven but sensitive approaches - male circumcision and partner reduction – and to figure out role of ART-based prevention
- Clear challenge - insufficient effort to align prevention priorities with epidemic transmission dynamics, compromising prevention with mismatched or unfocused responses and insufficient effort to align interventions with evidence
- Global AIDS community slow to implement genuinely proven approaches at adequate scale - with knowledge we already have, far more can be done to curb HIV globally