CROI 2016:
Highlights on epidemiology

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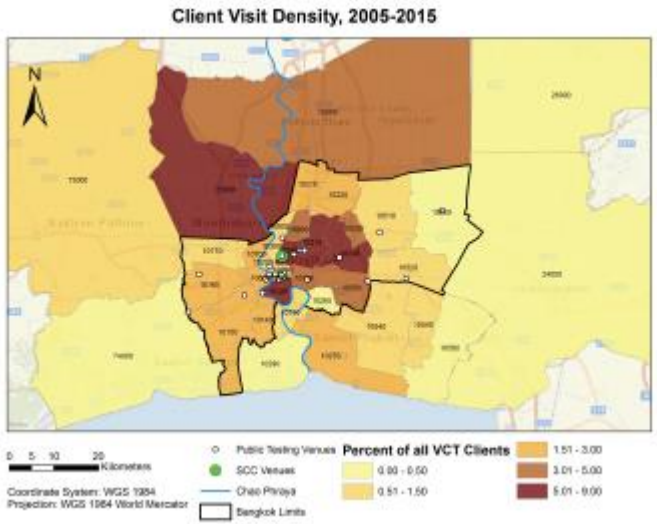
UNAIDS

MSM: incidence and behaviours



Bangkok (#972): MSM testing uptake was spatially correlated. MSM who tested positive were more likely to be testing for first time.
5% of a cohort were diagnosed with acute or early infection.

Recent infections rising among MSM in UK. Largest increase among African heterosexuals (abstract #895)

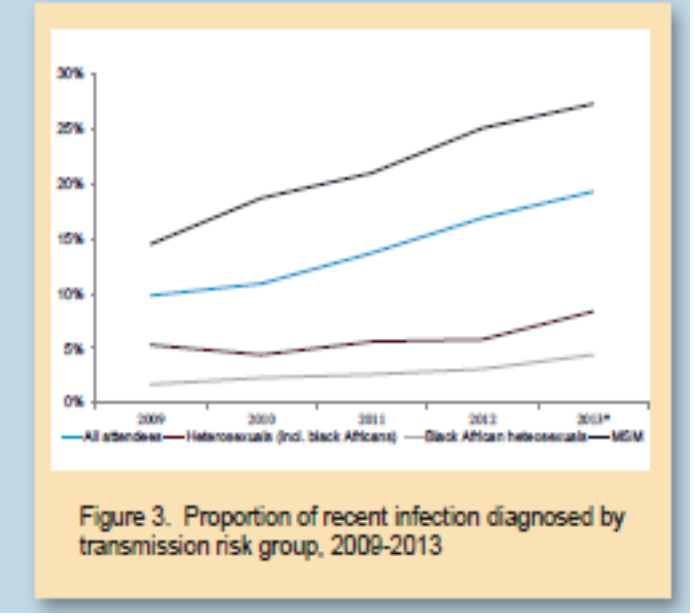
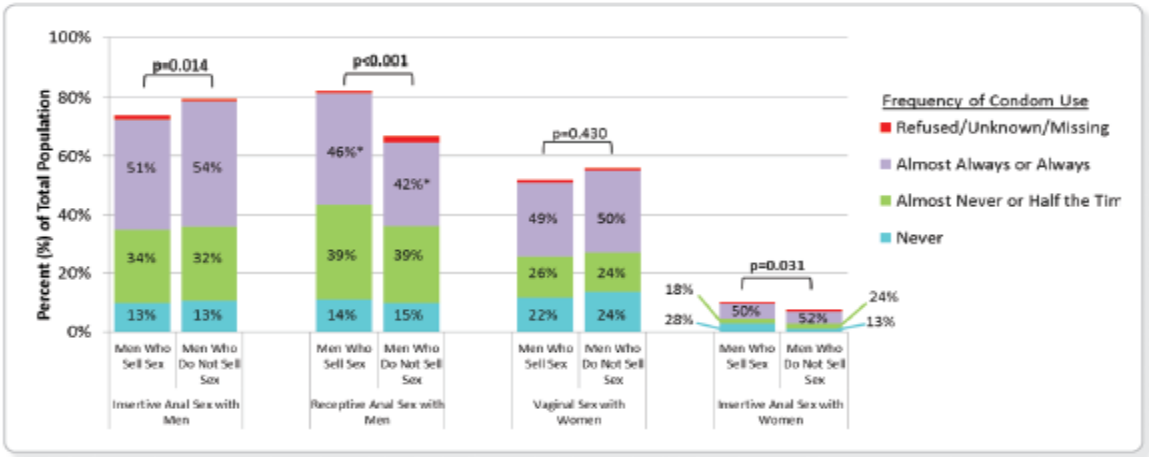


Figure 3. Proportion of recent infection diagnosed by transmission risk group, 2009-2013

Figure 1. Sexual Behaviors and Condom Use



Nigeria (#922): Condom use among MSM is high but not high enough

Stigma and status awareness among MSM in Africa

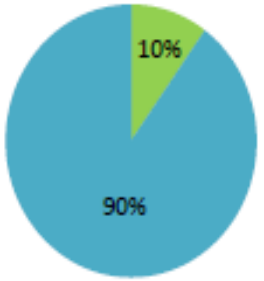
Table 1. Significant bivariate associations of MSM social/sexual networks and sexual behavior stigma with online sex-seeking, among MSM in Nigeria TRUST study at baseline (N=1,370)

Explanatory variable	Odds Ratio	95% Confidence Interval
MSM social and sexual networks		
MSM network size (per 15 MSM)	1.02	1.01, 1.03**
Participates in MSM community activities	1.81	1.36, 2.41***
RDS accrual wave number	0.93	0.92, 0.95***
Number of male anal sex partners within past 12 months (per 5 MSM)	1.05	1.00, 1.11*
Sexual behavior-related stigma (ever experienced/perceived)		
Did not feel protected by police	2.42	1.75, 3.36***
Felt scared to walk around in public	1.41	1.06, 1.88*
Verbally harassed	1.71	1.35, 2.18***
Blackmailed	2.39	1.80, 3.18***
Physically hurt	2.51	1.85, 3.42**
Afraid to seek healthcare services	3.44	2.16, 4.53***
Avoided healthcare services	4.35	3.12, 6.08***

*p<0.05; **p<0.01; ***p<0.001

Nigeria (#924): Men go on-line to find partners and avoid stigma

Figure 5. Awareness of being HIV-positive prior to the study



Mali (#921): Low HIV status awareness among MSM

VL among MSM and PWID, FSW intervention effect, TG HIV prevalence

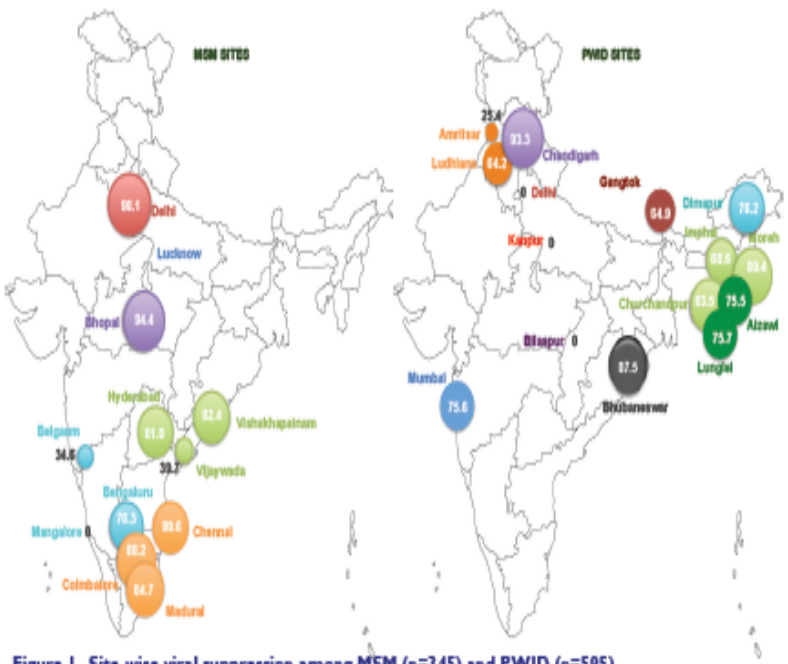
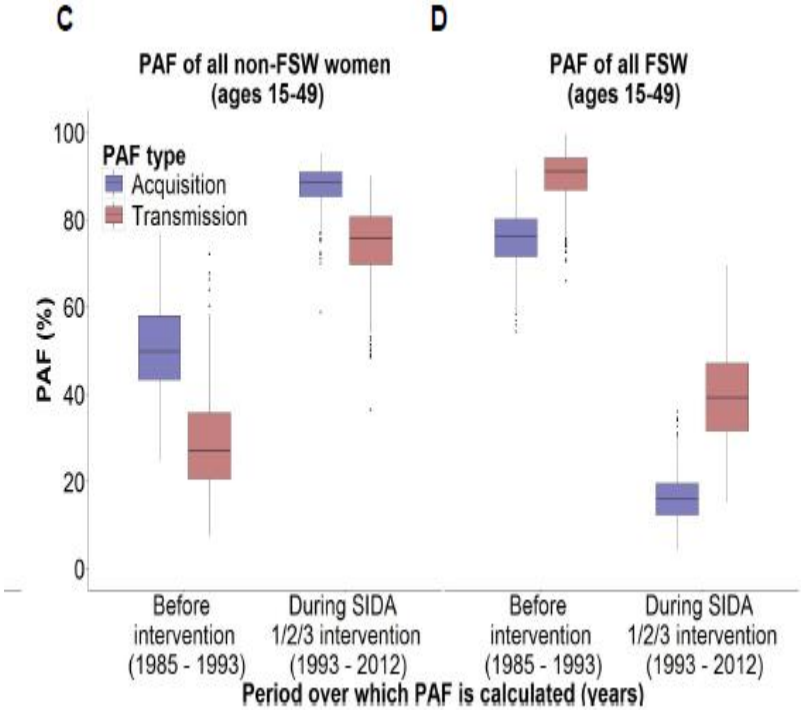


Figure 1. Site-wise viral suppression among MSM (n=345) and PWID (n=595)

Note: Fewer than 10 persons reported initiating ART in Mangalore, Lucknow (none), Bhopal, Bilaspur, Chandigarh, Delhi, and Kanpur



India (#1032): Viral suppression among MSM and PWID

Benin (#1047): Intervention reduced HIV transmission related to FSW but to other women

PMTCT

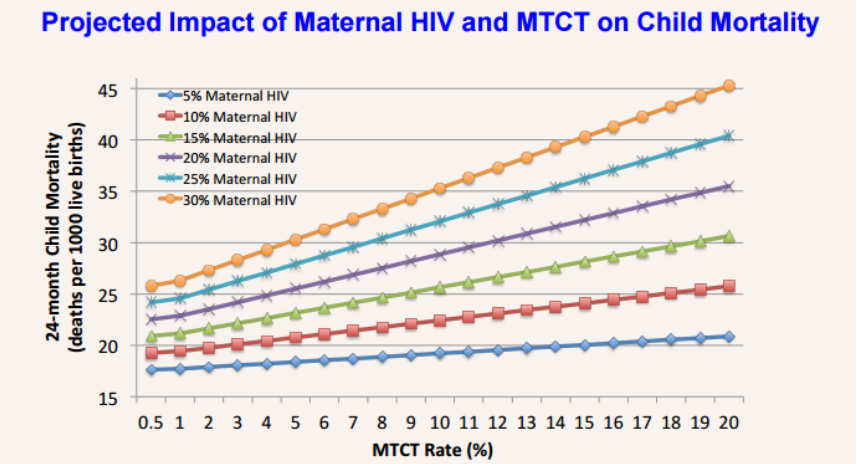
Increasing numbers of PMTCT impact studies being published:

- National study from Malawi (Gupta #37) of women in PMTCT programme found impact of Option B+ at 6-12 weeks was 2.9%
- Study from Western Cape, South Africa on transmission rates at 6 weeks found a decline between 2009 and 2014 from 5.9% to 1.5%, testing of infant at birth increased from 1% to 14% (Maritz #782)

Cost effectiveness of confirmatory testing (Ciaranello et al, #786). Up to 30% of children could be false positives without confirmatory testing. Especially important in low prevalence settings.

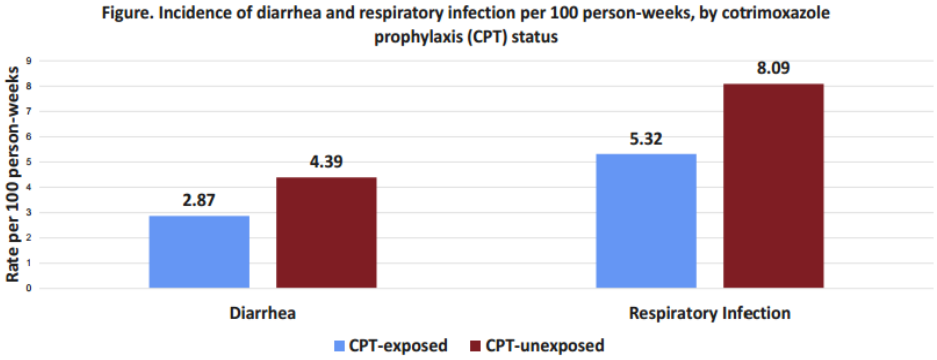
Mortality among HIV exposed, uninfected (HEU) children: growing population in coming years

- Study in Botswana (#800) showed mortality 3 times higher in HEU children compared to HIV uninfected children. (They were not able to tease out breastfeeding impact.)
- Half of 24-month child mortality is among HEU in Botswana (#802)
- Davis et al (801LB) showed the importance of cotrimoxazole prophylaxis in reducing morbidity, and potentially mortality, among HEU children in Malawi



In Botswana, where 26% of pregnant women are HIV-infected, our data suggest **54% of all 24-month child mortality is among HIV-exposed children**

- 46% HEU and 8% HIV-infected



Mortality

- Good news among people lost to ART follow up in sub-Saharan Africa: decreasing mortality in the population associated with higher CD4 at start of ART. Not explained by increasing transfers (Egger #1021)

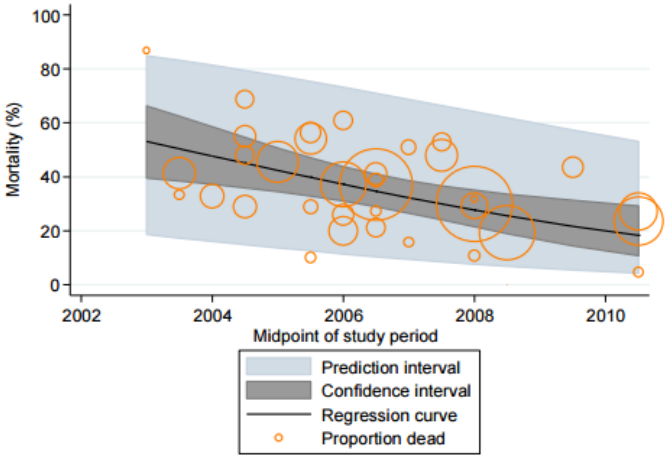


Figure 2. Estimated change in mortality over time among patients LTFU and successfully traced. Circle size is inversely proportional to the variance of estimates.

Reaching the 90*90*90 targets

SEARCH, POPART, Botswana: close to reaching 90*90*90 targets (#111, 114, 115, 979, 981)

Differences in 90x90x90 by age and sex

- Viral suppression is less likely among young adults 16-34 (Novitsky #904)
- Among age 40+ population, 22% prevalence in Agincourt, SA; 44% did not know their status (Rosenberg #905)

Young HIV-infected adults were approximately 36% less likely to have undetectable HIV-1 RNA load (RR: 0.64; 95% CI: 0.59–0.69; p<0.0001). Young men were 46% less likely to be virologically suppressed (RR: 0.54; 95% CI: 0.46–0.65).

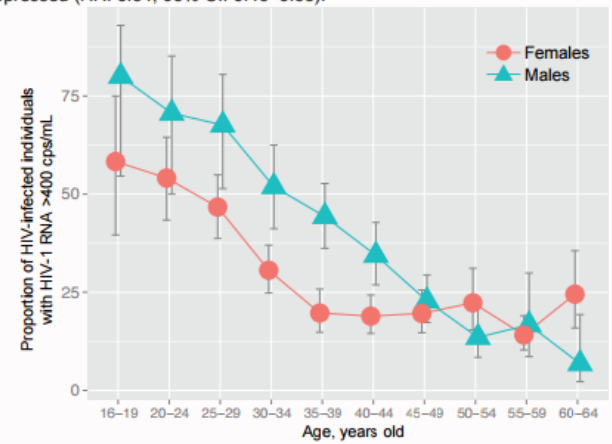
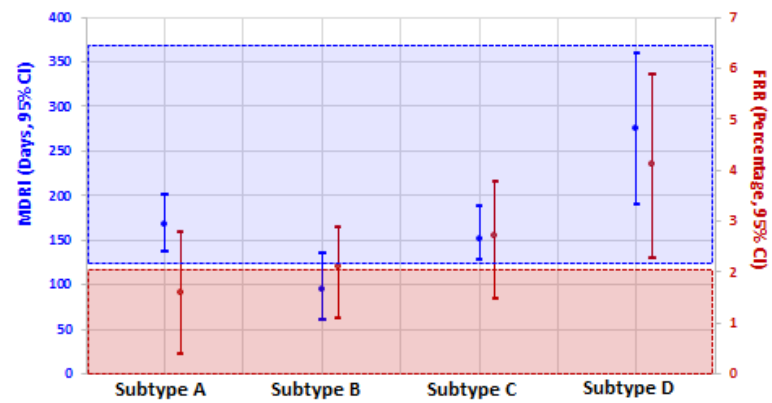


Figure 4. Proportion of HIV-positive individuals with detectable HIV-1 RNA (>400 cps/mL) in BCPP community pairs 1–12 stratified by age and gender. Females are shown by circles. Males are depicted by triangles. Error bars indicate 95% confidence intervals.

HIV incidence assays (pre/post-CROI meeting)

- Assay performance can provide reasonable estimates of national level incidence for most countries in SSA; large sample sizes required for detecting small reductions in incidence
- Evidence that assay performance depends on subtype; more data on subtype A and D needed (found in Eastern Africa, e.g., Uganda)
- New assays under development, including Geenius and Architect Avidity possibly have longer MDRIs and may be used for diagnostic and incidence testing; still more development work to do.

Revised Comparison of HIV Subtype MDRI & FRR
LAg-Avidity <1.5 OD-n



	Sample Size Required for Survey of Target Population for Indicated RSE and MDRI		Sample Size Required for Survey of Target Population for Indicated Reduction and MDRI	
	RSE 30%	RSE 20%	40% Reduction	25% Reduction
Botswana	5,007	12,654	34,374	94,810
Cameroon	13,236	32,486	91,388	253,577
Equatorial Guinea	19,004	47,811	130,737	360,774
Kenya	24,042	60,824	165,116	455,268
Lesotho	3,174	7,818	21,897	60,702
Malawi	12,978	32,878	89,081	245,583
Mozambique	7,404	18,273	51,119	141,615
Namibia	6,671	16,681	45,954	126,954
South Africa	4,853	12,046	33,476	92,620
Swaziland	3,723	9,290	25,643	70,879
Tanzania	20,772	52,037	143,069	395,073
Uganda	8,606	21,116	59,407	164,859
Zambia	7,628	18,960	52,619	145,530
Zimbabwe	6,702	16,804	46,134	127,390

* assumes MDRi of 130 days

HIV incidence: levels and determinants

- **HIV incidence in Rwanda (Abstact 166 – Remera).** Prospective national population-based survey (15-49 yrs, 2013-2014) followed for 1 year. 33 of 12,686 people seroconverted for 0.27% (95%: 0.18-0.35%) incidence rate; highest in urban areas and among ages 46-55 yrs; results higher than model estimates (being investigated)
- **HIV incidence during pregnancy in SA and Zim (Poster 770 – Teasdale, et al).** MIRA cohort 2003-2006. 4,549 women, of which 776 pregnant. Pregnancy did not increase risk of HIV incidence in unadjusted (HR 0.8, 95%: 0.5-1.3%) or adjusted models (AHR 0.7, 95%CI 0.4-1.2)
- **HIV and men -** ART coverage in SA and Pop ART (HTPN 072) in Zambia and SA – majority of people not knowing partner's status were women. Men not accessing testing services, not at home for home-based outreach services (90% women but 77% of men)

Focus on location and population: recent trends in surveillance

- New emphasis on case-based surveillance; cases come with information on geographic location;
- Population-based surveys extended to include incidence assays, viral load assays; ART coverage;
- HIV prevalence among pregnant women derived from programmatic data (hence all facilities) rather than sentinel surveillance;
- Key populations: size estimates, IBBS supported by several partners; size estimates for 99 countries; > 136 countries with recent IBBS (last 5 years)

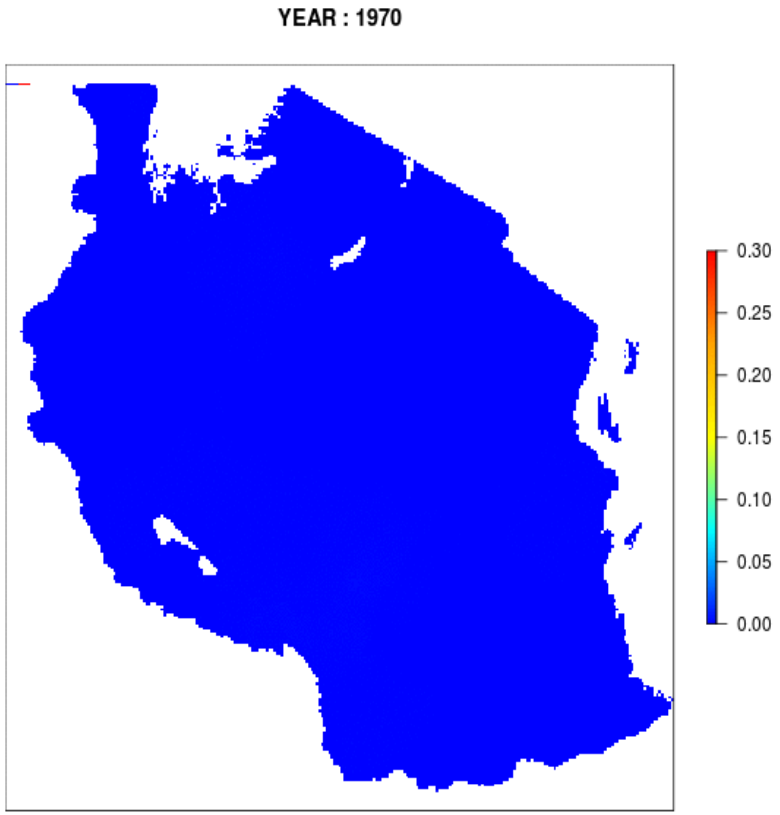
Focus on location and population: model-based geostatistics

Method

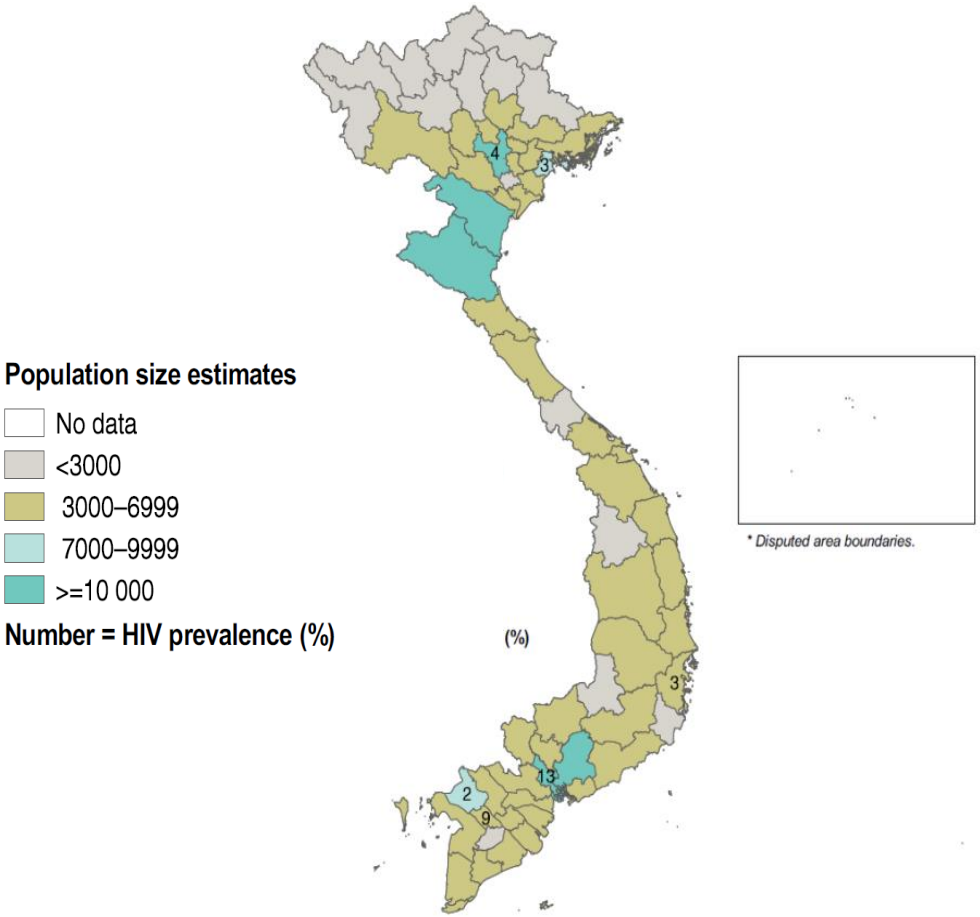
- Uses time trend from national or 1st subnational model, HIV prevalence from PBS as well as co-variates. Potential to include other data (ART, new diagnoses, PMTCT prevalence)
- Currently predicting HIV prevalence, PLHIV, and ART coverage and gap at high resolution, including time trends
- Bayesian methods: allow for uncertainty

Results

Geospatial mapping, United Republic of Tanzania, all ages



Focus on location and population: men who have sex with men in Viet Nam: population size estimate and HIV prevalence, 2013–2014



***Sources**:* Viet Nam AIDS response progress report, 2014; HIV sentinel surveillance with a behavioural component (HSS+) and Integrated Biological and Behavioural Surveys (IBBS), 2013; Global AIDS Response Progress Reporting, 2015; 2013 HIV estimates.

Focus on location and population: Conclusion

- Distribution of HIV geographically, by sex and age and for key populations has become essential in informing estimates and an efficient response for ending the AIDS epidemic. Today's funding decisions are taken on this basis in many countries.
- Local distribution of programme gaps can further inform management of the response, while holding facility, community, sub-district, district, province, state and national managers and leaders accountable.
- New and expanded data sources and innovative analytic tools are key.