

Comparing adult antenatal-clinic based HIV prevalence with prevalence from national population based surveys in Sub-Saharan Africa

Outline of presentation

1. Countries with national population based surveys

Compare adult HIV prevalence estimates from national surveys to ANC surveillance estimates.

- Can national survey estimates be confidently used to calibrate ANC data to estimate prevalence among the general population?

2. Countries in which national surveys have not been carried out

Can we adjust ANC based estimates in countries without surveys using information from countries in which we have national surveys?

- Urban areas
- Rural areas

1. Countries in which national population based surveys have been carried out

National population based surveys in countries with generalized HIV epidemics

Since 2000 more than 20 countries with generalized HIV epidemics have conducted national population based surveys (including DHS and AIS) in which HIV testing has been included

Challenges in obtaining reliable estimates from national surveys:

- Sample should be representative of all adults
- Survey procedures should be of high quality
- Biomarker data collection should be of high quality
- **Non-response** (refusal to participate and absence) should be minimized
- Sound laboratory testing procedures should be employed
- Exclusion of population not living in households (e.g. those living in hostels, prisons, military barracks, refugee camps, brothels) could lead to under-estimation of prevalence, particularly in countries with low HIV prevalence

Level of non-response in national surveys

COUNTRY	HIV TESTING COVERAGE
South Africa	66.4
Malawi	67.0
Equatorial Guinea	75.0
Kenya	77.2
Zambia	79.1
Ethiopia	80.0
Mali	80.4
Lesotho	81.5

COUNTRY	HIV TESTING COVERAGE
Senegal	84.7
Ghana	86.5
Tanzania	87.0
Burkina Faso	91.2
Cameroon	91.4
Guinea	92.9
Uganda	94.5
Rwanda	96.5

Mean

83.2

Adjusting for non-response in national surveys

Assessing the impact of **non-response** in five national surveys, Mishra and colleagues (Bull WHO, 2006) show that:

- Predicted prevalence among non-responders is generally higher (on average about 12%) than observed prevalence among tested participants
- However, accounting for predicted prevalences among non-responders made little difference to observed prevalences
- Small effect of non-response bias is due to the small proportion of non-responders in relation to the proportion tested
- For non-response in the survey to have a significant effect on observed national prevalence, the non-response rate, relative risk of HIV among non-responders, or both, have to be substantial.

Adjusting for non-response in national surveys

Table 3. Predicted HIV prevalence among non-respondents and adjusted human immunodeficiency virus (HIV) prevalence estimates for all eligible males and females in five countries with linked HIV testing data

Country/sex (age range)	Year	Observed prevalence among those tested (95% CI ^a)	Predicted prevalence among those not tested (95% CI)	Ratio of non-tested to tested	Adjusted prevalence among all eligible respondents (95% CI)	Ratio of adjusted to tested
Kenya	2003					
Male (15–54)		4.71 (3.94–5.47)	5.10 (4.70–5.50)	1.08	4.81 (4.25–5.38)	1.02
Female (15–49)		8.70 (7.73–9.66)	7.52 (7.05–7.99)	0.87 ^b	8.44 (7.68–9.20)	0.97
Ghana	2003					
Male (15–59)		1.66 (1.28–2.05)	1.79 (1.62–1.95)	1.07	1.69 (1.38–2.00)	1.01
Female (15–49)		2.70 (2.26–3.13)	2.78 (2.52–3.03)	1.03	2.71 (2.32–3.10)	1.00
Burkina Faso	2003					
Male (15–59)		1.94 (1.48–2.40)	2.47 (2.18–2.76)	1.27	2.01 (1.61–2.41)	1.04
Female (15–49)		1.83 (1.43–2.23)	3.29 (2.73–3.84)	1.80 ^b	1.95 (1.57–2.32)	1.06
United Republic of Tanzania	2003–04					
Male (15–49)		6.26 (5.58–6.95)	7.08 (6.77–7.40)	1.13 ^b	6.45 (5.91–6.99)	1.03
Female (15–49)		7.70 (7.02–8.37)	8.22 (7.70–8.73)	1.07	7.79 (7.22–8.36)	1.01
Cameroon	2004					
Male (15–59)		3.91 (3.38–4.44)	5.16 (4.76–5.57)	1.32 ^b	4.04 (3.56–4.52)	1.03
Female (15–49)		6.75 (6.07–7.43)	7.81 (6.91–8.71)	1.16	6.82 (6.17–7.46)	1.01

^a CI = confidence interval.

^b Significantly different at 5% from observed prevalence among those tested.

Average	
Male	1.03
Female	1.01

Scenarios of adult HIV prevalence assuming different risks of prevalence for non-tested relative to tested participants

Country	Proportion non-response	Observed HIV	Adjusted HIV prevalence			Adjusted vs observed prev ratio (for RR 1.25)
			RR			
			1.1	1.25	1.5	
Burkina Faso	0.089	1.8%	1.82	1.84	1.88	1.02
Cameroon	0.086	5.5%	5.55	5.62	5.74	1.02
Equatorial Guinea	0.250	3.2%	3.28	3.40	3.60	1.06
Ghana	0.135	2.2%	2.23	2.27	2.35	1.03
Guinea	0.072	1.5%	1.51	1.53	1.55	1.02
Kenya	0.228	6.7%	6.85	7.08	7.46	1.06
Lesotho	0.185	23.5%	23.93	24.59	25.67	1.05
Malawi	0.330	11.8%	12.19	12.77	13.75	1.08
Mali	0.196	1.7%	1.73	1.78	1.87	1.05
Rwanda	0.034	3.0%	3.01	3.03	3.05	1.01
South Africa HSRC	0.336	16.2%	16.74	17.56	18.92	1.08
Senegal	0.154	0.7%	0.71	0.73	0.75	1.04
Tanzania	0.130	7.0%	7.09	7.23	7.46	1.03
Uganda	0.055	7.1%	7.14	7.20	7.30	1.01
Zambia	0.209	15.6%	15.93	16.42	17.23	1.05
Zimbabwe	0.255	16.5%	16.92	17.55	18.60	1.13

Other potential biases in national surveys

- HIV prevalence among people not living in households (e.g. those living in hostels, prisons, military camps, refugee camps and brothels) is likely to be higher than those living in households
- Excluding these groups could therefore lead to an underestimate of national prevalence
- This is more likely to effect low-prevalence countries

Summary:

In countries with national population based surveys

- When DHS population is stratified to match the ANC population, the HIV prevalence estimates are very close
- Where non-response rate or relative risk of HIV among non-responders is high, national survey results should be adjusted for prevalence among non-responders.
- When methodology is sound, DHS prevalence estimates can be used to calibrate ANC data to estimate prevalence among the general population

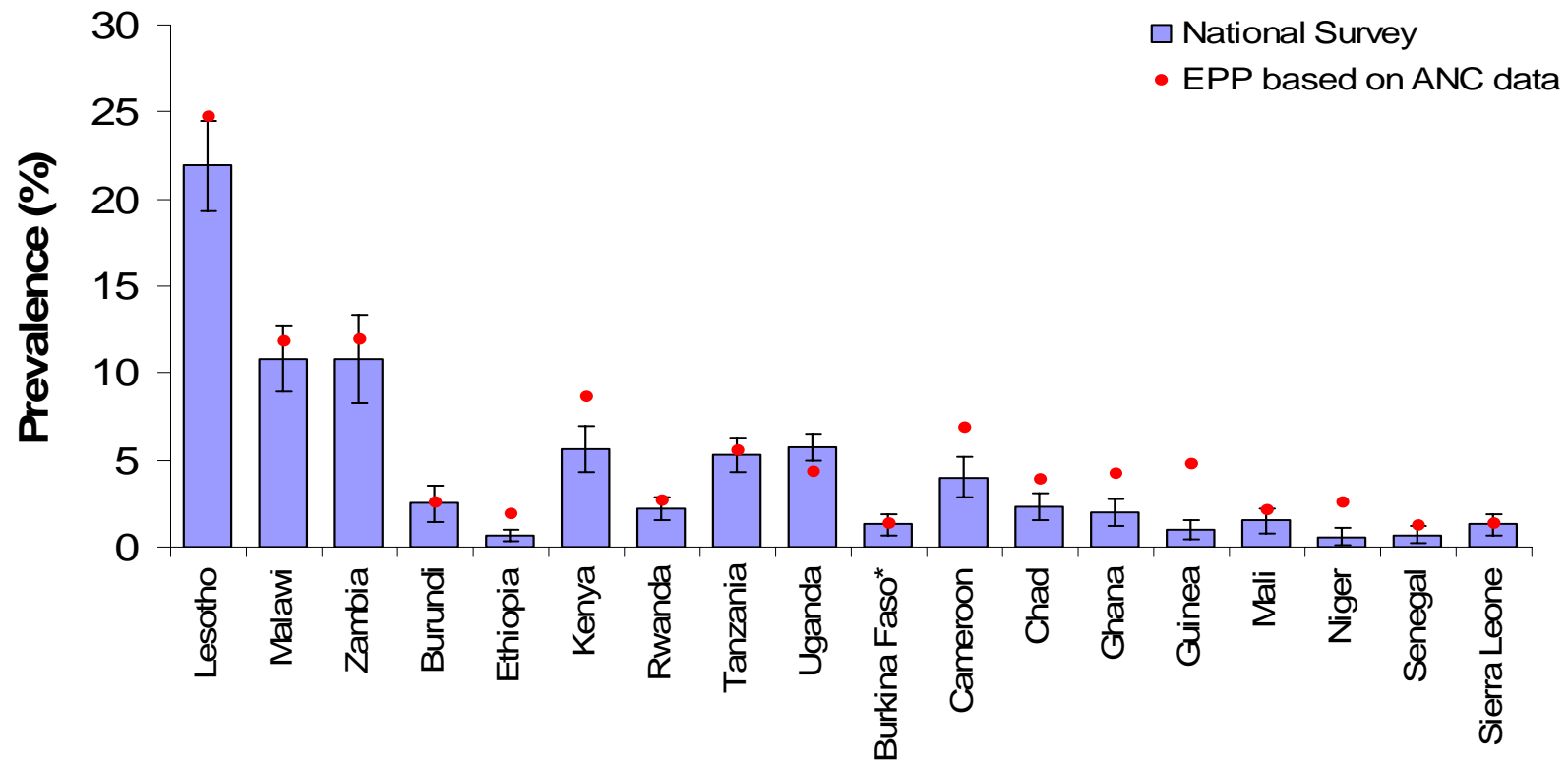
2. Countries in which national surveys have not been carried out

How can the information from those countries with surveys be used to inform the correction factor needed to adjust ANC estimates in countries with no national survey?

Rural areas

Rural settings:

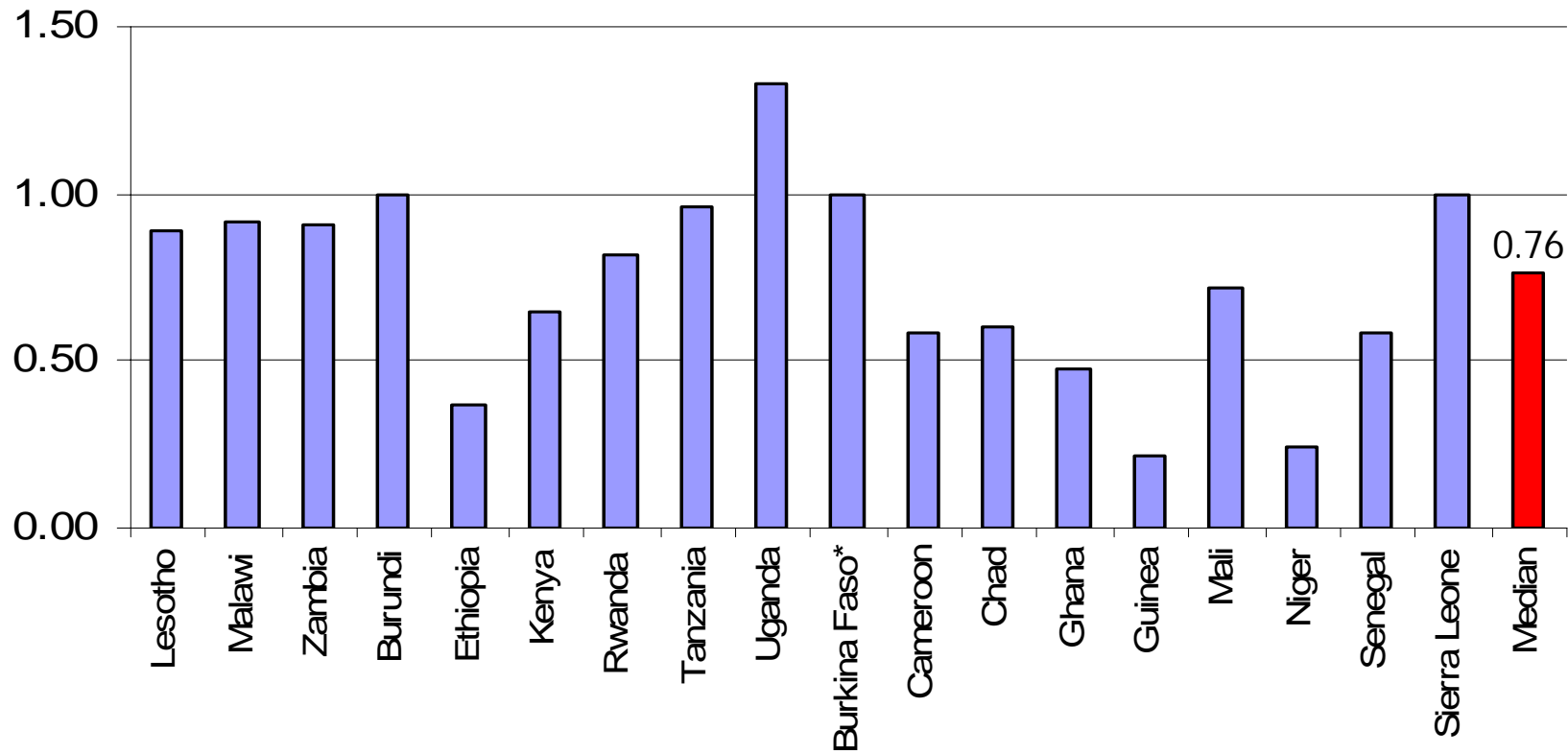
Comparison between national survey and ANC based prevalence estimates for the same year



Rural settings:

Ratio national survey: ANC prevalence

Median **0.76** (IQR: 0.53 – 0.98)

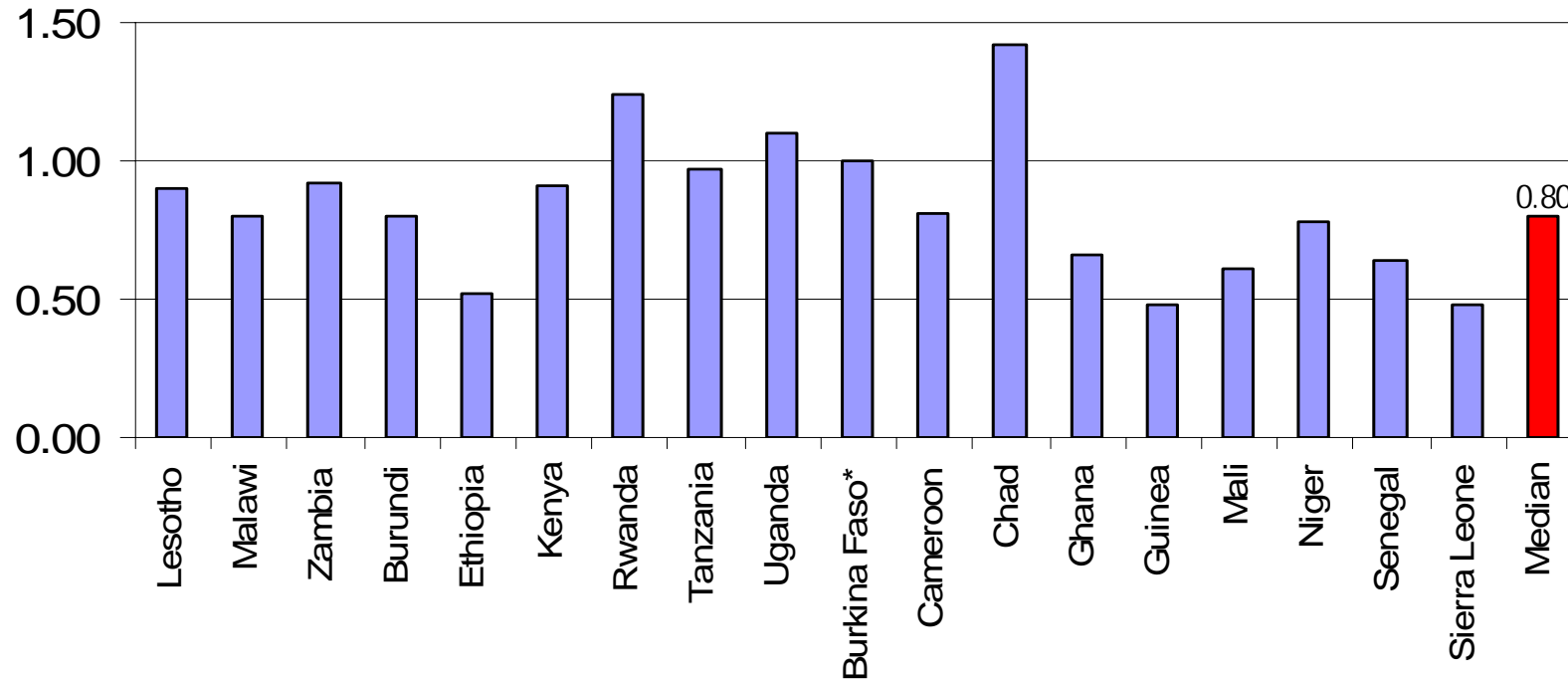


Urban areas

Urban ratio:

National survey: ANC

Median **0.80** (IQR: 0.62 – 0.99)



Summary:

In countries without national population based surveys

- ANC surveillance data tend to overestimate the true prevalence.
- Recommended to adjust using the survey: ANC prevalence ratio (around 0.8).
- This is implemented in EPP as the second calibration option which is recommended in countries without national population-based survey.