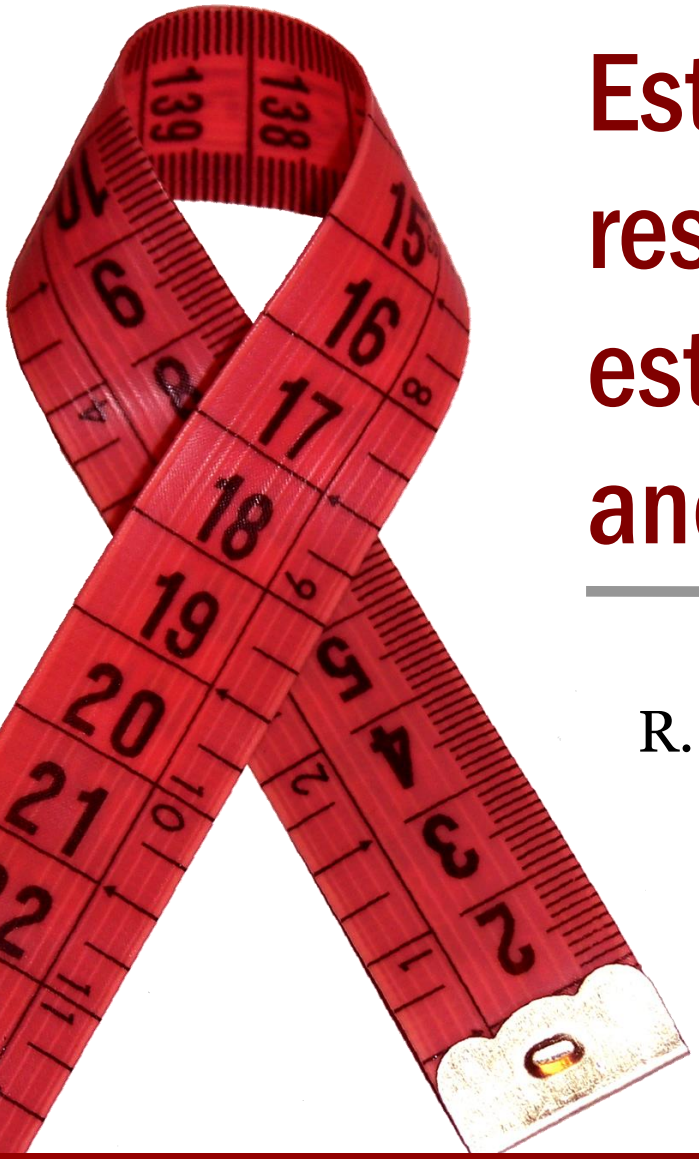

Estimating effect of non response on HIV prevalence estimates from Demographic and Health Surveys

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R. Vallo, S. Yaro, P. Msellati, N. Méda, B. Ferry.

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Context

- Since 2001, several national population-based surveys with HIV testing in sub-Saharan Africa.
  - in particular, Demographic and Health Surveys (DHS) and AIDS Impact Surveys (AIS)

- Significant non response rates were often cited to explain differences between DHS results and estimations from sentinel surveillance in antenatal clinics.

- How can we estimate the bias due to non-response in DHS and AIS ?

DHS and AIS design

- Two-stage stratified sample design.
  - At the first sampling, clusters are selected.
  - Then, households are selected.

- Household response rates are relatively good (>95%).

- For people living in a household not surveyed (absence or refusal), we don't have any information. So, it is impossible to estimate their HIV prevalence.

Eligibility for HIV test

- In selected households, all eligible women (usually 15-49) are selected for the individual questionnaire.
- Only a part of these households are selected for the men questionnaire and the HIV test.
- All eligible men (usually 15-59) and women are tested for HIV after consent.
- All results presented hereafter concern only 15-49 years old men and women, recorded in households database, from 8 DHS and 1 AIS, for which data were available and HIV results linkable to individual questionnaires.

Non-tested persons

Country	Year	Sex	Neither HIV testing nor individual survey	Individual survey without HIV testing	HIV testing without individual survey	HIV testing and individual survey	No. eligible for HIV testing
Burkina Faso	2003	Men	6.9	6.4	2.1	84.6	3501
		Women	2.6	5.3	0.7	91.4	4607
Cameroon	2004	Men	6.4	4.7	1.0	87.9	5146
		Women	3.8	4.6	1.7	89.8	5759
Ethiopia	2005	Men	8.6	9.1	0.1	82.2	6139
		Women	3.4	9.2	0.2	87.3	6963
Ghana	2003	Men	6.2	14.3	0.1	79.4	4636
		Women	4.2	6.5	0.2	89.1	5845
Kenya	2003	Men	12.9	15.0	0.5	71.6	3970
		Women	5.0	16.3	0.3	78.5	4293
Lesotho	2004	Men	16.0	18.2	0.4	65.4	2926
		Women	6.0	15.0	0.3	78.7	3672
Malawi	2004	Men	13.7	25.6	0.0	60.7	3663
		Women	5.6	27.3	0.0	67.1	4057
Senegal	2005	Men	12.6	12.0	1.0	74.5	3997
		Women	5.6	10.9	0.9	82.6	5342
Un. Rep. of Tanzania	2003	Men	9.0	15.7	0.0	75.3	6282
		Women	4.2	13.6	0.0	82.2	7231

Estimation of HIV prevalence of non-tested

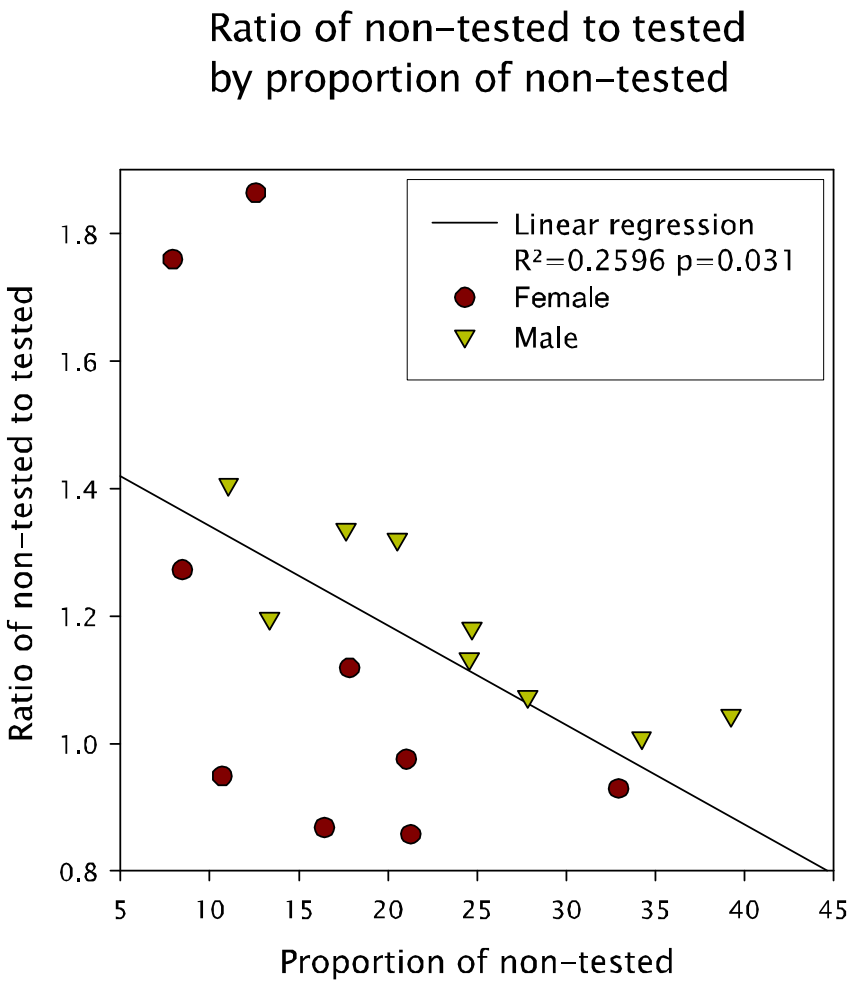
- Logistic regression were used to estimate the probability for each non-tested person to be HIV positive.
- For non-tested and non-interviewed persons, a model was calculated on all tested persons with several variables from the household questionnaire.
- For non-tested and interviewed persons, a second model was calculated on tested and interviewed persons with variables from the household and the individual questionnaire.
- Adjusted prevalence was calculated by using observed HIV status for tested persons and probability to be HIV positive, estimated by the models, for non-tested persons.

Observed, non-tested and adjusted prevalence

Country	Sex	Observed prevalence among those tested (95% CI)		Predicted prevalence	Ratio of non-tested to tested	Adjusted prevalence	Ratio of adjusted to tested	Proport. of non-tested
Burkina Faso	Men	1.8	(1.3-2.2)	2.1	1.196	1.8	1.026	13.4
	Women	1.8	(1.4-2.2)	3.1	1.760	1.9	1.060	7.9
Cameroon	Men	4.1	(3.5-4.6)	5.7	1.406*	4.2	1.045	11.1
	Women	6.6	(6.0-7.3)	8.4	1.272	6.8	1.023	8.5
Ethiopia	Men	0.9	(0.6-1.2)	1.2	1.336	1.0	1.059	17.7
	Women	1.7	(1.4-2.0)	3.2	1.864*	1.9	1.109	12.6
Ghana	Men	1.4	(1.0-1.8)	1.9	1.320	1.5	1.066	20.5
	Women	2.7	(2.3-3.1)	2.6	0.949	2.7	0.995	10.7
Kenya	Men	4.7	(3.9-5.5)	5.0	1.074	4.8	1.021	27.9
	Women	8.7	(7.8-9.7)	7.5	0.857	8.5	0.970	21.3
Lesotho	Men	19.0	(17.3-20.8)	19.2	1.009	19.1	1.003	34.2
	Women	26.0	(24.4-27.5)	25.3	0.976	25.8	0.995	21.0
Malawi	Men	10.1	(8.8-11.3)	10.5	1.044	10.2	1.017	39.3
	Women	13.9	(12.6-15.2)	12.9	0.929	13.6	0.977	32.9
Senegal	Men	0.5	(0.2-0.7)	0.5	1.133	0.5	1.033	24.6
	Women	0.9	(0.6-1.2)	0.8	0.868	0.9	0.978	16.4
Un. Rep. of Tanzania	Men	6.0	(5.3-6.7)	7.1	1.181	6.3	1.045	24.7
	Women	7.5	(6.9-8.2)	8.4	1.119	7.7	1.021	17.8

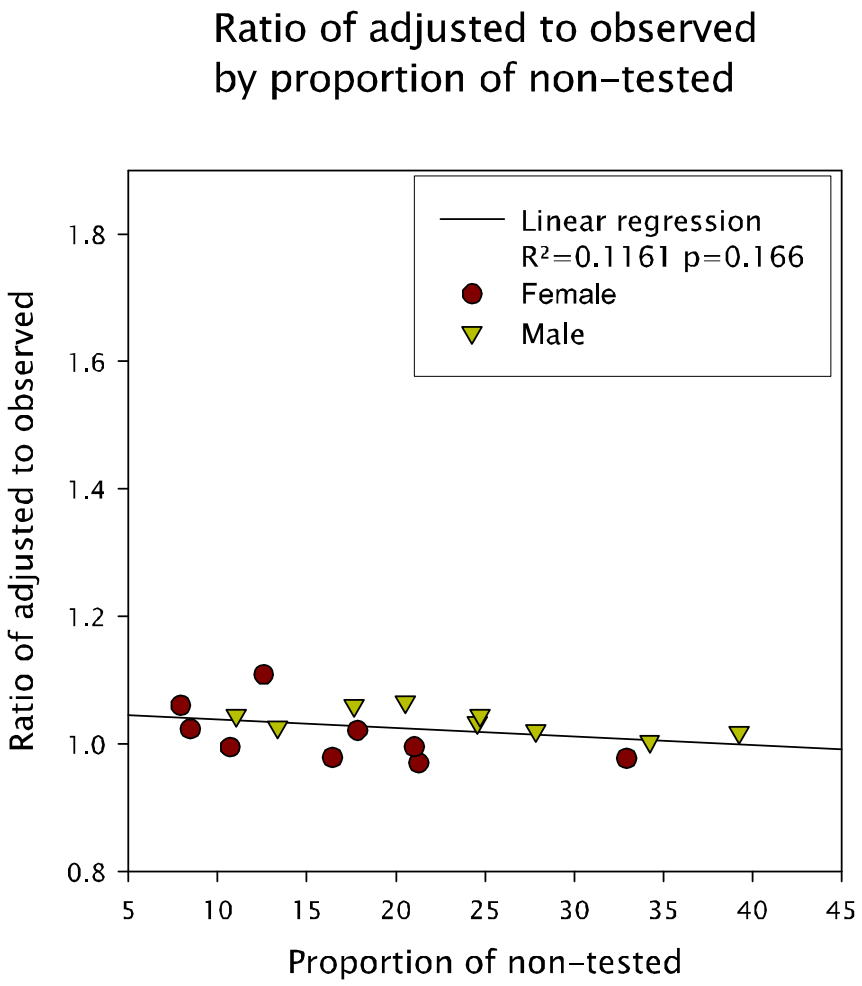
CI = confidence interval * Predicted HIV prevalence among non-tested is statistically different at 5% from observed prevalence (t test).

Selection bias and proportion of non-tested



- When the proportion of non-tested persons increases, the selection effect decreases.

Two effects compensating themselves



- There is no correlation between ratio of adjusted to observed and proportion of non-tested.

DHS prevalence are a good indicator of national level

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CI = confidence interval * Predicted HIV prevalence among non-tested is statistically different at 5% from observed prevalence (t test).

Discussion

- Variables included in the models are not direct determinants of HIV prevalence but remain statistically discriminant and so useful for estimation.

- Although this approach doesn't take in account some populations (not surveyed households and people not living in a household), we can conclude that biases due to non-response are small.

- National population-based surveys can provide representative and quality national estimates of HIV prevalence level in countries with a generalized epidemic.

Thank you

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