

Prevalence and Predictors of Hepatitis B Virus Surface Antigen and Human Immunodeficiency Virus Seroprevalence, Zambia 2016

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Background

Hepatitis B virus surface antigen (HBsAg) may be detected during acute or chronic hepatitis B virus infection. Measuring the seroprevalence of HBsAg and human immunodeficiency virus (HIV) at the population level is critical in light of the successful expansion of antiretroviral therapy (ART) and concerns about HBV treatment resistance to current HIV treatment regimens in use in Zambia.

Methods

- Data collected in the Zambia Population-based HIV Impact Assessment (ZAMPHIA), a national household survey conducted in 2016 were used
- Household-based rapid hepatitis B virus surface antigen (HBsAg) and HIV tests were conducted on all consenting adults and children 0 to 59 years of age
- Positive HBsAg status was defined as having a positive HBsAg test; positive HIV status was defined by the national HIV antibody testing algorithm of a positive Determine (Alere) test and a positive Unigold (Trinity Biotech) test; all positive or indeterminate rapid tests in the household were confirmed by a Geenius (Bio-Rad) test
- We calculated prevalence and number of individuals seropositive for HBsAg alone and both HBsAg and HIV and conducted multivariate logistic regression to determine correlates of HBsAg seropositivity
- All analyses were weighted to account for the complex survey design and population structure based on the 2016 national population projections; variance was estimated using jackknife variance estimation method

Results

ZAMPHIA recruited 27,130 individuals aged 0-59 years residing in 12,193 households across all 10 provinces. The national seroprevalence of HBsAg was 5.6% (95% CI:5.2%-6.0%) for adults 15-59 years of age and 1.3% for children 0-14 years of age (95% CI:1.0%-1.6%), translating to an estimated 446,819 adults and 94,518 children currently seropositive for HBsAg, nationally (Table 1). HBsAg seroprevalence was higher in adult men than in women (7.2%, 95% CI: 6.4%-7.9% vs. 4.1%, 95% CI: 3.7%-4.5%) and highest among adults 25-34 years of age (6.5%, 95% CI: 5.7%-7.4%). Among HBsAg-seropositive participants, 15.2% (95% CI: 12.7%-17.7%) of adults and 5.2% (95% CI: 1.6%-8.8%) of children were found to be co-infected with HIV (Table 1). Highest HBsAg seroprevalence among adults was found in Luapula province (8.5%, 95% CI: 6.6%-10.5%) and among children was found in Northern province (2.0%, 95% CI:0.5%-3.5%). The highest rate of co-infection with HIV was found in Western province for adults (19%, 95% CI: 9.2%-28.8%) and in Lusaka province for children (29.7%, 95% CI: 5.6%-53.8%) (Table 1).

Statistically significant predictors of HBsAg seropositivity status in adults included HIV positive status (aOR_{HIV+ vs.HIV-}=1.45, 95% CI:1.19-1.77), male sex (aOR_{Male vs.Female}=1.88, 95% CI:1.63-2.18), aged 25-34 years (aOR_{25-34y vs.15-24y}=1.34, 95% CI:1.11-1.61), and residence in Luapula (aOR_{Luapula vs.Eastern}=2.17, 95% CI:1.53-3.06) (Figure 1).

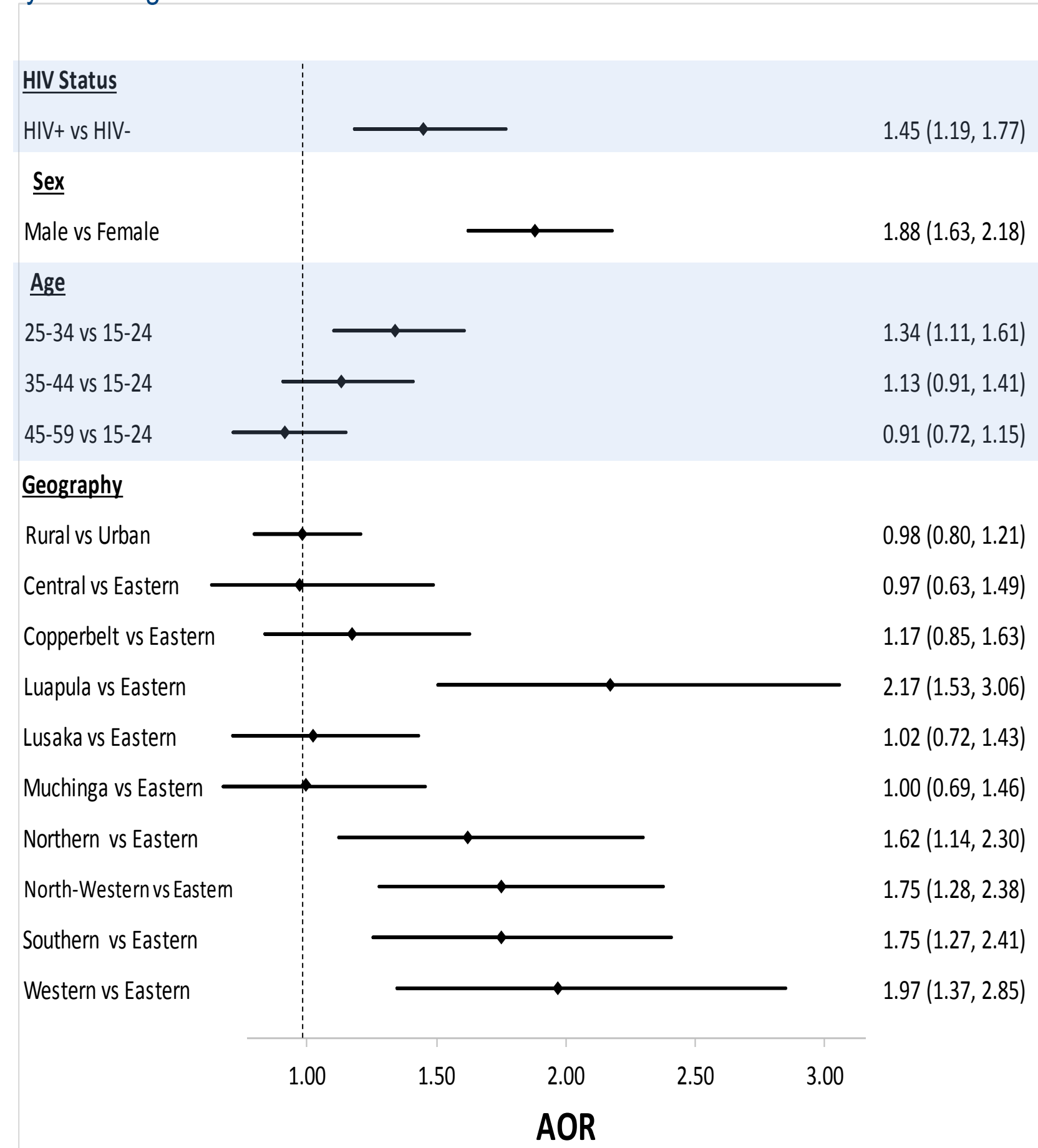
Table 1: Prevalence of HBsAg seropositive status and HIV prevalence among those HBV+ among ZAMPHIA participants 0-59 years of age, by sex, age, residence and province of residence in Zambia, 2016

	Description of Estimate	% HBsAg positive (15-59)		% HIV positive among HBsAg+ (15-59)		% HBsAg positive (0-14)		% HIV positive among HBsAg+ (0-14)	
		N=19,115	N=1,035	N=1,035	N=8,015	N=111	N=111		
		%	95% CI	%	95% CI	%	95% CI	%	95% CI
Sex	Overall	5.6	5.2-6.0	15.2	12.7-17.7	1.3	1.0-1.6	5.2	1.6-8.8
	Female	4.1	3.7-4.5	18.6	14.8-22.4	1.2	0.9-1.5	7.5	2.3-12.7
	Male	7.2	6.4-7.9	13.2	10.1-16.3	1.4	0.9-1.8	3.2	0.0-8.2
Age	15-24 years	4.9	4.3-5.6	5.3	2.5-8.0	NA	NA	NA	NA
	25-34 years	6.5	5.7-7.4	13.8	9.3-18.2	NA	NA	NA	NA
	35-44 years	6.0	5.2-6.9	26.8	20.4-33.2	NA	NA	NA	NA
Residence	45-59 years	4.9	4.1-5.8	30.2	21.0-39.4	NA	NA	NA	NA
	Urban	5.2	4.6-5.9	19.5	15.2-23.9	1.2	0.9-1.6	7.5	2.4-12.5
	Rural	5.9	5.3-6.5	12.0	9.1-14.8	1.3	0.9-1.7	4.0	0.0-8.9
Province	Central	4.1	2.7-5.6	15.0	2.4-27.6	1.1	0.2-1.9	10.6	0.0-31.0
	Copperbelt	5.0	4.2-5.9	14.3	8.3-20.3	1.9	1.2-2.6	0.0	0.0-0.0
	Eastern	4.2	3.3-5.1	14.7	5.9-23.6	0.8	0.0-1.6	0.0	0.0-0.0
	Luapula	8.5	6.6-10.5	13.8	7.0-20.6	1.8	0.7-2.9	0.0	0.0-0.0
	Lusaka	4.4	3.6-5.3	16.6	10.1-23.2	0.8	0.3-1.2	29.7	5.6-53.8
	Muchinga	4.2	3.1-5.3	13.1	1.1-25.1	1.3	0.5-2.0	0.0	0.0-0.0
	Northern	6.6	5.0-8.2	14.7	7.2-22.2	2.0	0.5-3.5	0.0	0.0-0.0
	North-Western	7.0	5.7-8.3	6.7	2.5-11.0	0.9	0.2-1.7	14.0	0.0-39.1
Southern	7.3	5.8-8.9	18.5	11.6-25.4	1.4	0.7-2.1	0.0	0.0-0.0	
Western	8.0	5.9-10.1	19.0	9.2-28.8	0.9	0.0-1.8	25.2	0.0-87.7	

Conclusion

These findings highlight, for the first time in Zambia, the high seroprevalence of HBsAg, suggesting high rates of chronic HBV infection and a need for hepatitis B vaccination programs, screening and treatment programs, and for careful attention to national HIV and HIV/HBV treatment and pre-exposure prophylaxis guidelines. Particularly high rates in Luapula and Western provinces require further investigation.

Figure 1: Predictors of HBsAg seropositive status for ZAMPHIA participants 15-59 years of age



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