District-level male medical and traditional circumcision coverage and unmet need in sub-Saharan Africa

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Abstract

Background

In 2016, UNAIDS developed a Fast-Track strategy that targeted 90% coverage male circumcision (MC) among men aged 10-29 years by 2021 in priority countries in sub-Saharan Africa (SSA) to reduce HIV incidence. There is substantial variation across subnational regions within countries in both traditional male circumcision (TMC) practices and progress towards implementation of voluntary medical male circumcision (VMMC). Tracking progress and remaining gaps towards VMMC HIV prevention targets requires detailed district-level circumcision coverage data.

Methods

We analysed self-reported data on male circumcision from x nationally representative household surveys conducted in x SSA countries between 2006-2020. A spatio-temporal Bayesian competing-risks time-to-event model was used to estimate rates of traditional and medical circumcision by age, location, and time. Circumcision coverage in 2020 was projected assuming continuation of estimated age-specific rates, with probabilistic uncertainty.

Results

Across x countries, from 2010 to 2020 an estimated x million men (x% CI x-x million) were newly circumcised, of whom x million (x - x million) were medically circumcised, and x million (x - x million) traditionally circumcised. In 2020, MC coverage among men 10-29 years ranged from x% (x% - x%) in Zimbabwe (?) to x% (x%-x%) in Togo. MMC coverage ranged from x% (x%-x%) in Malawi to x% (x%-x%) in Tanzania, and TMC coverage from x% (x%-x%) in Eswatini to x% (x%-x%) in Ethiopia. The largest increase in MMC coverage was in Lesotho from x% to x%. Within countries, the median difference in MC coverage between the districts with lowest and highest coverage was x%, with the smallest variation in Eswatini (x% to x%) and largest in Zambia (x% to x%). x million men aged 10-29 need to be circumcised to reach 90% coverage in all countries.

Conclusions

VMMC programmes have made substantial, but uneven, progress towards male circumcision targets. Granular district and age-stratified data provide information for focusing further programme implementation.

1   Background

HIV remains the single largest cause of years of life lost among adolescent boys and men of reproductive age in eastern and southern Africa.

Voluntary Male medical circumcision (VMMC) reduces the rate of male-to-female HIV incidence by 60%. Efficient, cost-effective, one-time procedure for preventing HIV transmission.

Matt's model ... (Thomas, Matthew L. and Zuma, Khangelani and Loykissoonlal, Dayanund and Dube, Bridget and Vranken, Peter and Porter, Sarah E. and Kripke, Katharine and Seatlhodi, Thapelo and Meyer-Rath, Gesine and Johnson, Leigh F. and Eaton, Jeffrey W., 2021)

2   Data

120 household surveys conducted in 33 SSA countries 2002-2019 Self-reported circumcision: o Status (MC vs uncircumcised), o Type (MMC vs TMC), o Year, and o Age recorded Sub-national populations from WorldPop (reference)

Major survey series (DHS, AIS, PHIA, MICS, HSRC in ZAF) Individual-level data: self-reported circumcision status by male respondents Respondents located to districts using cluster geocoordinates Located to admin 1 (province) where coordinates not available (MICS) VMMC programme data not used

Circumcisions performed by a medical professional and/or in a medical setting are categorised as MMC Otherwise, circumcisions are TMC Where no data is present on location or provider, circumcision type Missing

Individual-level household survey data provide direct estimates of circumcision rates over time and by type for years preceding survey

Direct estimates of TMC practices, age at circumcision, VMMC impact

3 Methods

3.1 Model

Bayesian spatio-temporal, competing-risks, time-to-event model Stratified by age, location and time Rates of TMC and medical male circumcision (MMC) estimated Coverage in 2020 projected assuming continuation of estimated age-specific rates with probabilistic uncertainty Important assumption: Probability of traditional male initiation ceremonies (TMICs) constant over time (needed? Might lead to a lot of questions!)

Model stratified by: Age District circumcision type (traditional / medical)

TMC & MMC rates estimated (by age, district, and time) Spatial smoothing allows for district level estimates

Circumcision coverage since most recent HH survey: projected assuming continuation of estimated age-specific rates, with probabilistic uncertainty

Important assumption: TMC rate assumed constant over time

Samples drawn from model fit, weighted by population and aggregated, to produce estimates for less granular regions (e.g. District to Province aggregation). Computed posterior summary statistics for coverage, circumcision incidence and probability of being circumcised. Done for all strata, for both discrete ages and "binned" age groups.

4   Results

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5   Discussion

Challenges Inconsistent MC self-reporting by same cohort in successive surveys E.g. in 2017 survey, men 30-34 report higher % circumcised in 2012 than 'same' men age 25-29 in 2012 survey Affects circumcision level, and distribution by type

'Replacement' of traditional circumcision by medical circumcision Evidence of this in surveys from several countries; work in progress Also not fully accounted for in DMPPT2 baseline coverage inputs

Surveys imply different level of scale-up than programme data Several countries: surveys suggest fewer VMMCs conducted than programme data

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6 References

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