Background The HIV epidemic in Bogota, Colombia is mainly driven by transmission among men-who-have-sex-with-men (MSM). Combined Antiretroviral Therapy (ART) introduced since 1997 is hypothesised to have helped control the overall spread of HIV. Our objective was to estimate the impact of ART on HIV incidence in the general population of Bogota.

Methods We developed a deterministic mathematical model simulating the sexual transmission of HIV among MSM, female-sex-workers, their clients and heterosexuals. Parameter values for behaviours and intervention coverage reflect local sources as much as possible. Surveillance data reflect a marked increase in condom use among FSW and MSM HIV prevalence and AIDS-mortality estimates using a rejection-sampling based approach that was used to create inferences on the scale of changes in risk caused by interventions. Counterfactual scenarios were generated in which the inferred impact of changes in condom use and ART were removed.

Results Between 1997 and 2011, there was ~32,864 new infections and ~9,500 AIDS deaths, more than 80% of which were among MSM. The model estimates that there would have been an additional ~96,860 new infections and ~17,353 AIDS deaths if condom use has not increased over time. In the same period, ART became available, without which there may have been a further additional ~4,060 new infections and ~4,493 deaths. Future projections with levels of condom use and ART remaining constant, however, do not show further declines in HIV incidence.

Conclusions Antiretroviral-therapy and condom use may have had a major impact in curbing the HIV epidemic in Bogota. Further reductions in the future require additional intervention efforts focused on men-who-have-sex-with-men. The strength of these conclusions, however, is moderated by incomplete data on changing patterns of risk behaviour in this population.

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