Mass vaccination campaigns reduce the substantial burden of yellow fever in Africa

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Yellow fever, an acute viral disease, is estimated to have been responsible for 78,000 deaths in Africa in 2013 according to new research published in *PLOS Medicine* this week. The research by Neil Ferguson from Imperial College London, UK and colleagues from Imperial College, WHO and other institutions also estimates that recent mass vaccination campaigns against yellow fever have led to a 27% decrease in the burden of yellow fever across Africa in 2013.

Yellow fever is a serious viral disease that affects people living in and visiting tropical regions of Africa and Central and South America. In rural areas next to forests, the virus typically causes sporadic cases or even small-scale epidemics (outbreaks) but, if it is introduced into urban areas, it can cause large explosive epidemics that are hard to control. Although many people who contract yellow fever do not develop any symptoms, some have mild flu-like symptoms, and others develop a high fever with jaundice or hemorrhaging from the mouth, nose, eyes, or stomach. About 50% of patients who develop these severe symptoms die. Fortunately, an effective vaccine against the disease exists.

The authors of the study used sophisticated statistical methods to estimate the burden of yellow fever in Africa based on outbreak data, serological surveys and environmental data but note that there is substantial uncertainty in their estimates because of the difficulty of diagnosing yellow fever and a lack of available data. Therefore the estimates for the number of severe cases of yellow fever in Africa in 2013 range from 51,000 to 380,000, and from 19,000 to 180,000 for

deaths due to the disease

Nevertheless, the study provides the most reliable contemporary estimates for the burden of yellow fever and the impact of vaccination campaigns in Africa. The researchers estimate that vaccination has reduced yellow fever cases and deaths by 27% across Africa, with much higher reductions in some countries targeted by vaccination campaigns. The authors note that their study has already been influential, "[p]artly as a result of [our estimates], in late 2013 the GAVI [Global Alliance for Vaccines and Immunization] Board decided to make available support for additional yellow fever vaccination campaigns, targeting 144 million people across the endemic region in Africa"

The authors also note, "[t]he impact of both past and future mass vaccination campaigns will prevent a substantial proportion of yellow fever disease burden for years to come... the achievements of the current mass vaccination campaigns could be sustained if a high level of immunization is achieved through a strong EPI [infant immunization] program and preventive vaccination of populations that remain at risk, such as migrants or populations from as yet unvaccinated districts."

More information: Garske T, Van Kerkhove MD, Yactayo S, Ronveaux O, Lewis RF, et al. (2014) Yellow Fever in Africa: Estimating the Burden of Disease and Impact of Mass Vaccination from Outbreak and Serological Data. *PLoS Med* 11(5): e1001638. DOI: 10.1371/journal.pmed.1001638

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