

Introduce Vaccines to Reduce Typhoid Disease Burden in Malawi

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Policy Brief

Introduction

Malawi has been experiencing frequent outbreaks of typhoid fever and increase in multi-drug resistant *Salmonella typhi*, which causes typhoid fever. From 2009 to date, the country has been experiencing multiple outbreaks in the districts of Neno, Mwanza, Dowa, Mchinji and Kasungu. These outbreaks have resulted in more than 1000 cases of typhoid fever and 50 deaths. Laboratory test results show widespread resistance to first-line drugs and isolates from the Neno and Mwanza outbreaks were multi-drug resistant [1-3]. As such, multi-drug resistant *Salmonella typhi* is a growing public health problem in Africa [3].

Multiple severe or life-threatening complications can occur in typhoid fever involving intestinal perforation associated with high case-fatality rates as seen in other parts of Africa and neurologic manifestations in Malawi and Mozambique [1-3]. Varied and atypical presentations of typhoid fever in the paediatric age group and older children, respectively, result in delayed diagnosis of typhoid fever in children or even children remaining unrecognized [4].

Methodology

This policy brief is based on a comprehensive review of existing literature. The literature reviewed included scientific papers, research reports and government policy documents.

Discussion of Policy Options

Despite the foregoing, the country does not have a clear strategy on how to contain the subsequent multiple outbreaks of typhoid fever, and respond to the problem of multi-drug resistant typhoid fever. There is, therefore, an urgent need to come up with effective public health strategies that will contain both the typhoid fever outbreaks and the growing threat of multi-drug resistant *Salmonella typhi* causing typhoid fever.

Currently, there is an array of public health non-vaccine- and vaccine-based prevention interventions that have proven to work elsewhere [3-6]. Since the outbreaks have been of multi-drug resistant typhoid fever (MDRTF), as such introducing a typhoid fever vaccine would lessen the burden of the disease, thereby reducing transmission of MDRTF through outbreaks due to the herd protection that the vaccines can confer.

Key Messages

- Malawi has a significant public health problem of typhoid fever and multi-drug resistant *Salmonella typhi* that causes typhoid fever.
- The country has no clear strategy on how to contain outbreaks of typhoid and to respond to the problem of multi-drug resistant typhoid fever.
- There is need for vaccine-based prevention interventions as additional measures to complement non-vaccine public health interventions.
- The government should consider the adoption of the available safe and efficacious typhoid fever vaccines.

Need for typhoid vaccine to complement the current public health approaches to tackling the problem

Improvements in drinking water and sanitation infrastructure and in food safety are the definitive longer-term solutions to preventing transmission of typhoid fever and other enteric infections. These strategies, however, take a longtime to fully fund and implement. For instance, in Malawi by the year 2008 only 56% (far below the MDG target of 75%) and 80% of the population had access to improved sanitation and improved source of water, respectively [6]. Hence, the World Health Organization (WHO) recommends wider use of typhoid fever vaccines in endemic countries in addition to water, hygiene and sanitation interventions for outbreak control [3]. In addition, the changing behaviours, and the increase in antimicrobial resistance, heighten the potential benefits of targeted immunisation programmes in outbreak settings [7].

“The country does not have a clear strategy on how to contain the subsequent multiple outbreaks of typhoid fever, and respond to the problem of multi-drug resistant typhoid fever.”

Therefore, vaccination is an effective way to try to prevent typhoid fever. Currently, two typhoid fever polysaccharide vaccines, namely, Ty21 and Vi are licensed as being safe and efficacious. A

new and unlicensed vaccine named Vi-rEPA is efficacious and may confer longer immunity. A vaccine that could be given to infants would be helpful as they are probably at increased risk of this infection [6]. The targeted use of currently available typhoid fever vaccines could help mitigate the risk of typhoid fever in the intermediate term and reduce typhoid fever-associated morbidity and mortality in endemic areas [3]. Use of vaccines as an additional public health measure for controlling other enteric diseases of outbreak potential has proved effective, feasible and acceptable by the communities in Malawi. For instance, in response to 2014-2015 cholera outbreak and perennial cholera outbreaks in Lake Chilwa area, the country has been conducting a mass oral cholera vaccination (OCV) as an additional public health measure. The vaccine proved effective [8].

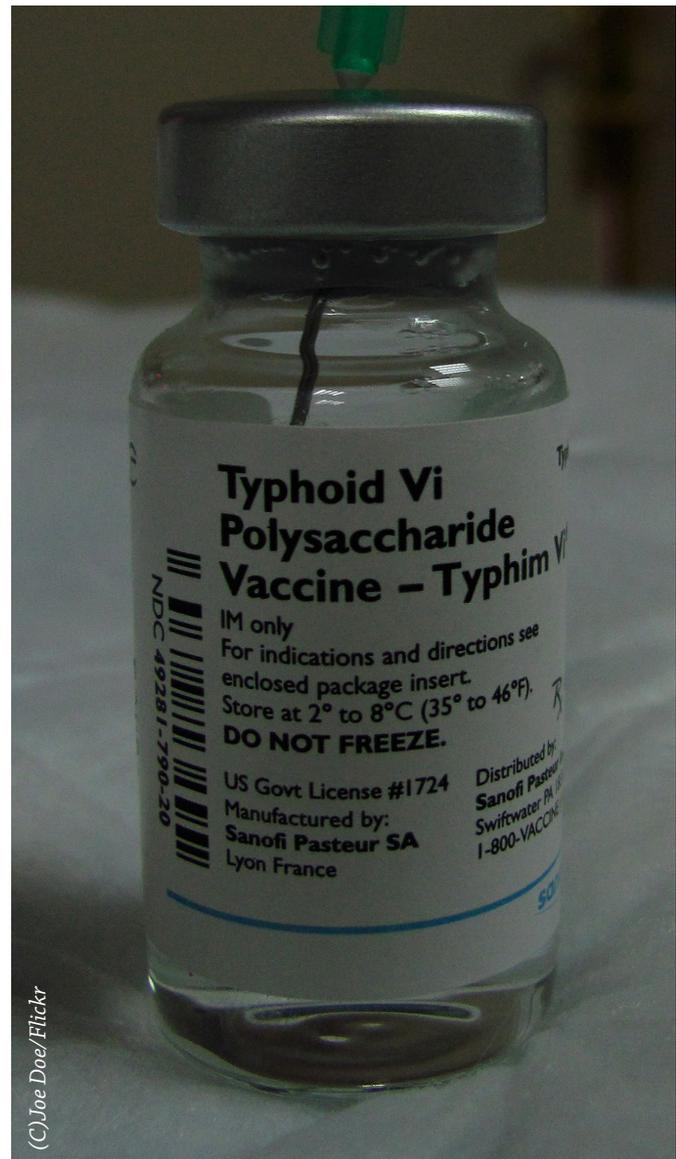
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Considerations

The Vi polysaccharide vaccine is not licensed for administration to children aged less than two years. However, immunising other high-risk populations, such as school-aged children, could decrease the risk among younger children by conferring herd protection. Mathematical modeling of immunisation strategies has quantified the potential impact of vaccinating high-risk groups against other vaccine-preventable diseases [3]. For instance, maternal influenza immunisation is a highly cost-effective intervention at disease rates and severity that corresponds to both seasonal influenza epidemics and occasional pandemics [9]. It should be noted, however, that there is need for more sophisticated modeling methodologies that capture the complexities of these systems and can account for geographic and social heterogeneity in risk and vaccine use [10]. In addition, the fact that typhoid vaccines are not 100% effective and their protection period is less than five years, should always be considered. Therefore, the typhoid vaccines should be introduced alongside water, sanitation and hygiene (WaSH) programmes to ensure a comprehensive and sustainable approach [11].

Recommendations

- Introduce typhoid fever licensed Ty21a and Vi polysaccharide vaccines in children, particularly those from settings with poor water, sanitation and health and food hygiene practices so as to reduce the risk of typhoid fever infection and transmission of drug resistant *Salmonella typhi* [7].
- Strengthen disease surveillance and outbreak response system for timely detection of and response to outbreaks of typhoid fever.



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References

Lutterloh, E., Likaka, A., Sejvar, J., Manda, R., Naiene, J., Monroe, S. S., et al. Multidrug-Resistant Typhoid Fever With Neurologic Findings on the Malawi-Mozambique Border. *Oxford Journals, Medicine, Clinical Infectious Diseases*, Volume 54, Issue 8, Pp. 1100-1106.

Sejvar, J., Lutterloh, E., Naiene, J., Likaka, A., Manda, R., Nygren, B., et al. Neurologic Manifestations Associated with an Outbreak of Typhoid Fever, Malawi - Mozambique, 2009: An Epidemiologic Investigation. *Plos One*, December 2012, Volume 7, Issue 12, e46099.

Slayton, R.B., Date, K.A., and Mintz, E.D. Vaccination for typhoid fever in Sub-Saharan Africa. *Human Vaccines & Immunotherapeutics* 9:4, 1-4; April 2013.

Zaki, S. A. and Karande, S. Multidrug-resistant typhoid fever: a review. *Journal of Infection in Developing Countries*. 2011 May 28;5(5):324-37.

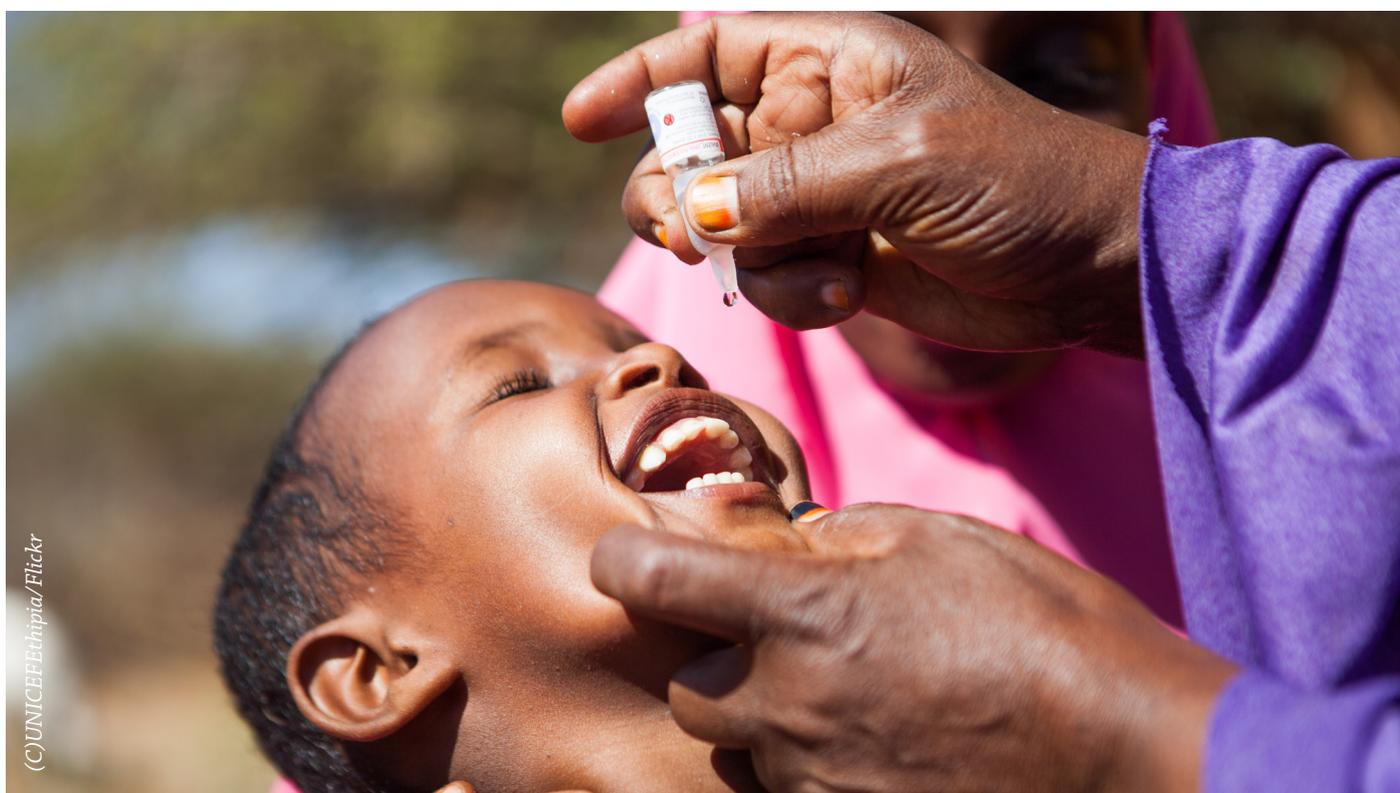
WHO/UNICEF Joint Monitoring Programme. *Progress on Sanitation and Drinking Water*, 2010 Update.

Anwar E, Goldberg E, Fraser A, Acosta CJ, Paul M, Leibovici L. Vaccines for preventing typhoid fever. *The Cochrane Database Systematic Reviews*. 2014 Jan 2;1:CD001261. doi: 10.1002/14651858.CD001261.pub3.

Crump JA, Luby SP, Mintz ED, 2004. The global burden of typhoid fever. *Bull World Health Organ* 84: 346-353.

Msyamboza, K., M'bang'ombe, M., Hausi, H., Chijuwa, A., Nkukumila, V., Kubwalo, H. W., Desai, D., Pezzoli, L., Legros, D. Feasibility and acceptability of oral cholera vaccine mass vaccination campaign in response to an outbreak and floods in Malawi. *Pan African Medical Journal*. 2016; 23:203 doi:10.11604/pamj.2016.23.203.8346

Beigi RH, Wiringa AE, Bailey RR, Assi TM, Lee BY. Economic value



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