Nature Reviews Neurology **9**, 602–603 (2013); published online 15 October 2013; doi:10.1038/nrneurol.2013.208

INFECTIOUS DISEASE

Conjugate vaccine is effective against serogroup A meningococcal meningitis

A collaboration between the African Meningococcal Carriage Consortium (MenAfriCar), the Meningitis Vaccine Project and researchers from several countries has shown that a meningococcal conjugate vaccine prevented meningitis during an epidemic of serogroup A meningococcal infection in Chad. The vaccine was previously licensed in India in 2009 and prequalified by the WHO in 2010 on the basis of its safety and immunogenicity, but this study is the first clear demonstration of the vaccine's efficacy.

Most meningoccocal infections in Africa are caused by serogroup A bacteria. Periodic outbreaks of meningococcal meningitis are common in Chad and the surrounding regions, in part owing to the long dry season, during which epidemics occur. Prevention of these outbreaks had already been attempted using a meningococcal serogroup A whole-cell vaccine and polysaccharide vaccines, but these approaches had little or no effect on the extent of the epidemic. To increase vaccine immunogenicity, developers of the new vaccine conjugated meningococcal serogroup A polysaccharide (PsA) with the tetanus toxoid (TT) protein.

MenAfriCar carried out epidemiological studies before and after a PsA–TT vaccination programme during a meningococcal epidemic in Chad that began in 2009 and lasted until 2012. Three regions were targeted for vaccination, and individuals aged 1–29 years were vaccinated in three phases during 2011–2012.

The incidence of meningitis was monitored approximately 13–15 and 2–4 months before and 4–6 months after vaccination through local health-care teams, who reported clinically diagnosed cases to the central hospital in N'Djamena, the capital of Chad. Samples of cerebrospinal fluid or oropharyngeal swabs from vaccinated individuals were tested for microbial antigens and genotyped to confirm serotype A infection, in order to monitor carriage of the meningococcal pathogen throughout the course of the epidemic and during vaccination.

In the three regions targeted for vaccination, the research team achieved around 100% and 94% vaccine coverage in 2011 and 2012, respectively. Compared with areas that were not targeted by the vaccination programme, the incidence of reported meningitis cases decreased by 90% in the regions in which vaccination was undertaken, despite the ongoing meningococcus epidemic in neighbouring areas. Moreover, no case of serogroup A meningococcal meningitis was reported in the target regions post-vaccination, despite enhanced surveillance as part of the vaccination programme. These findings represent a unique description of the incidence of meningitis in vaccinated and unvaccinated areas at the same time during an epidemic, and demonstrate the efficacy of the PsA–TT conjugate vaccine in preventing meningitis outbreaks.

> "...this study is the first clear demonstration of the vaccine's efficacy"

Vaccination was associated with a 98% decrease in meningococcal pharyngeal carriage among all age groups, which probably also contributed to the substantial effect of the intervention. The duration of protection afforded by the vaccine is currently unknown, and whether it will prevent future epidemics of serotype A meningococcal infection remains to be established.

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Original article Daugla, D. M. *et al.* Effect of a serogroup A meningococcal conjugate vaccine (PsA–TT) on serogroup A meningococcal meningitis and carriage in Chad: a community trial. *Lancet* doi:10.1016/S0140-6736(13)61612-8