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Fractional dose of scarce meningitis vaccine may be effective in outbreak control

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A partial dose of a commonly used vaccine against meningitis may be as effective as a full dose, according to new research published December 2 in the open-access journal *PLoS Neglected Tropical Diseases*. Fractional dosing would enable large-scale vaccination campaigns during epidemics, especially at a time of global vaccine shortages.

In the study, immune responses in patients receiving smaller doses of a meningitis vaccine were comparable to a full dose. The study's findings contributed to a 2007 WHO recommendation that a fractional dosing strategy be utilized in the context of severe vaccine shortages during a meningitis epidemic.

Meningitis epidemics occur nearly every year across a wide swath of sub-Saharan Africa, dubbed the "Meningitis Belt". Outbreaks are caused by specific bacterial strains (primarily Neisseria meningitidis serogroups A and W135), which current vaccines target. Because of global shortages of meningococcal vaccines, the researchers investigated the use of lower doses.

In a 2004 randomized clinical trial of 750 healthy volunteers (2-19 years old) in Uganda, immune response, assessed by serum bactericidal activity (SBA), was measured for 1/5 and 1/10 doses against a full dose. SBA response and safety/tolerability using 1/5 dose were comparable to full dose for three serogroups (A, Y, W135), though not a fourth (C).

Although another measure of immune response, IgG level, was lower for

fractional doses, the aim of mass vaccination during epidemics is short-term protection, which is best measured by SBA.

Because of the lack of vaccine producers and publicly financed vaccine stock, current supplies will likely be insufficient in the case of a large-scale epidemic. Efforts are under way to increase production, but this will not be soon enough if a massive epidemic occurs in the coming months as meningitis season nears. If a large-scale outbreak occurs, WHO will need to quickly advise countries on the fractionate strategy before vaccine supplies run out, the authors say.

"In view of the current shortage of meningococcal vaccines for Africa, the use of 1/5 fractional doses should be considered as an alternative in mass vaccination campaigns," the authors say.

Citation: Guerin PJ, Næss LM, Fogg C, Rosenqvist E, Pinoges L, et al. (2008) Immunogenicity of Fractional Doses of Tetravalent A/C/Y/W135 Meningococcal Polysaccharide Vaccine: Results from a Randomized Non-Inferiority Controlled Trial in Uganda. PLoS Negl Trop Dis 2(12): e342. doi:10.1371/journal.pntd.0000342
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