Reviewer's report

**Title:** Phenotypic and genotypic characterization of meningococcal carriage and disease isolates in Burkina Faso after mass vaccination with a serogroup A conjugate vaccine

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**Reviewer:** David Stephens

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Kristiansen et al. report the phenotypic and genotypic characterization of meningococcal carriage and disease isolates in sub-Saharan Burkina Faso just before and after mass vaccination with a new serogroup A conjugate vaccine. The study is important as the new serogroup A meningococcal polysaccharide-conjugate vaccine, MenAfriVac, introduction across sub-Saharan Africa is expected to impact meningococcal carriage.

A cross-section carriage study of 1-29 year olds was conducted in Burkina Faso in 2010 and 2011 before and up to thirteen months after MenAfriVac mass vaccination of this population. A limited number of invasive isolates were collected through national surveillance in the country during the same period.

The results are of note for the very low rate of serogroup A meningococcal carriage and disease before the vaccination campaign (.08% serogroup A carriage in only one district) and the absence of serogroup A carriage and essentially A disease after the mass vaccination campaign. In contrast, serogroup X ST-181 carriage, with associated disease, was quite high throughout the study (remarkably 49.8% of all characterized meningococcal carriage isolates) with the appearance of W, ST-11 clones after the vaccination campaign as carriage and disease-associated isolates. No “capsule switched” isolates were observed and “the serogroup X and W carriage and disease was probably not induced by vaccine introduction.”

**Major Concern:**

1. Better address the limitations of the study:

   a. This is a descriptive study of meningococcal carriage in Burkina Faso. Based on the baseline low prevalence of serogroup A carriage and disease at the time of vaccine introduction and the demonstrated natural changes in meningococcal carriage in the surveillance populations, it is not possible to draw conclusions about the vaccine’s impact on meningococcal carriage from the data.

   b. The follow-up period 13 months after vaccination is also not long enough to determine herd immunity, identify serogroup replacement events (such as a link with the reemergence of W ST-11 after vaccine introduction) or judge impact on capsule switching events. Historically, the serogroup A polysaccharide vaccine was said to have a transient effect or suppression on meningococcal carriage in
some populations, but has not been shown to be effective long term at creating herd immunity. The original description of meningococcal “capsule switching” was in a serogroup B outbreak that had been ongoing for several years.

c. The small number of characterized invasive isolates apparently not linked to the surveillance districts is also a limitation.

d. More emphasis should be placed on the comparison of the changing local micro-dynamics of meningococcal carriage evident by the data from the three sites and by comparing these data with those obtained in the districts in prior studies. The dynamics of serogroup X carriage and the appearance of W, for example, are quite remarkable.

e. Absence of carriage data in those not vaccinated (>29 <1) is also a potential limitation.

Nevertheless, the information is useful as a base line, speaks to the differences in meningococcal carriage in Africa versus developed countries and reinforces the importance of continued surveillance of carriage and disease isolates after vaccine introduction.

Minor Concerns:
1. Is ST-2859 not a member of the ST-5 complex?
2. The discussion is quite speculative based on the descriptive nature of the study and can be more concise.
3. Abstract, p.2, line 20: 98.1 % of “invasive” X isolates
4. Table 1 could be incorporated into the text.
5. Figure 2 is not very useful.
6. Supplementary File 1 very important.

**Level of interest:** An article of importance in its field

**Quality of written English:** Needs some language corrections before being published

**Statistical review:** No, the manuscript does not need to be seen by a statistician.

**Declaration of competing interests:**

I declare that I have no competing interests.