Reviewer's report

Title: Malaria case-management in the era of artemisinin-based combination therapy across 15 northern states in the Sudan

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Reviewer: Kenneth L Leonard

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Malaria Case-Management in the era of artemisinin-based combination therapy across 15 northern states in the Sudan.

Summary:
This paper presents the results of survey designed to measure the degree of compliance with new national protocols on the management of malaria cases. They find that the old therapy has been effectively eliminated from malaria management but that recommended first line therapy is not universal, in particular, a significant proportion of facilities do not have the recommended medicines on site. The most disappointing results are seen in the compliance with protocol; too many patients receive injectable therapy when it is not indicated, too few patients are tested for malaria, and too many patients receive medication despite testing negative for malaria. However, the authors state that these results are similar to results found in other countries. The primary recommendation of the research is that the supply of medicines and tests be improved, allowing more facilities to properly implement the protocols. These gains are expected to come from current government plans to increase the use of RDTs.

Review:

The research project is well designed. In particular, the authors have taken care to study the question recognizing the important difference between capacity and effort. In collecting data on supplies as well as the practices, they are explicitly allowing for the know-do gap, in which health workers are capable of properly administering protocol but choose not so to do. This is very different from health workers who do not follow protocol because they cannot (when they are missing supplies). In addition, they are aware of the possibility of the Hawthorne effect and take that into account in their design.

Overall, it is clear that the authors have answered the question they set out to answer: how are the new protocols being implemented?

My concerns with this paper rest with the implications of their findings. As far as I can tell, the results are not particularly surprising given the experience in other countries. (If they are different from the experience in other countries, the author(s) have not adequately communicated this and I would like to see the differences more clearly outlined.) For example the comparison of Northern Sudan with other African countries on the rates of testing and the explanation
that there are more doctors and that there is a greater tradition of testing, is illuminating (page 13). Furthermore, the simple conclusion appears to be: “The program has not adequately taken hold, so we need more of what we have already done.” I realize I am oversimplifying the case, but it does appear that most of the problems with the implementation are the kinds of things that could have been anticipated ahead of time. The fact that RDTs are not available excuses the health workers in a particular clinic (maybe the lack of supplies is the health workers responsibility—the paper does not clarify) but it does not excuse the implementation.

What would be interesting to the potential reader of this article is some understanding of the reasons for the failures, not a suggestion that some future program may fix it. I think the authors have in hand the data to start to understand the components of the shortfalls in the program, even though overall, it achieved many of its gains. There are, within the data, multiple levels, multiple systems and multiple distances from major urban centers. Is the lack of supplies determined by distance to urban centers and it is the same in public and non-public? Question such as these will help the reader to understand what could be done to improve a program like this in Sudan as well as what could be done for such a program in another country. Indeed, the multiple necessary inputs for this program (knowledge, effort, diagnostic tests and medicines) is something likely to be repeated in other programs on different therapies. As it is, the paper is too narrowly focused to be of much use to future program implementers. The statement that further research is needed is inadequate—the researchers have the data to do a better job and if not, they should have realized that such data would have been necessary before they did the first research project. Are the authors really willing to say that they did an in depth study of whether the program was working, were surprised to discover that it was not working perfectly and now need more money to go and find out why?

**Level of interest:** An article of limited interest

**Quality of written English:** Acceptable

**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.