Reviewer's report

Title: Systemic bacteraemia in children presenting with pneumonia symptoms and the impact of non-typhoid salmonella (NTS)

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Reviewer: James Berkley

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The manuscript describes a blood culture study of about a thousand children admitted to hospital with the findings interpreted in relation to clinical syndromes of pneumonia. The subject is of significant public health importance.

Major compulsory revisions

i) Methods: the authors have used the syndromes defined in the original IMCI guidelines, which are aimed at identifying children requiring referral to hospital. There was a technical update in 2005, coinciding with the publication of the WHO pocketbook of guidelines for inpatient treatment. The findings would be more easily compared with other studies if the standardised clinical database were reanalysed using the current definitions for the syndromes of 'pneumonia', 'severe pneumonia' and 'very severe pneumonia. If this is not possible from the database, this should be discussed as a significant weakness

ii) Laboratory methods: Please include details of any external quality control procedures in place, which are helpful for readers to interpret the microbiological findings. Which scheme of antimicrobial susceptibility breakpoints was used? How were pneumococci classified (by an oxacillin disk)? How were contaminants defined?

iii) Analysis: what was the rationale for splitting the data at 1 year of age? It seems more logical to stratify groups of 'pneumonia' and 'severe pneumonia' since their antibiotic management differs (antibiotic treatment does not differ with this age cut off)

iv) Findings: Please give some details of those who did not have a blood culture so that bias may be assessed. For all groups: How many patients died in each group? What was their length of hospital stay? How many had concomitant malaria parasitaemia and/or anaemia (given a likely association between NTS and malaria)? Again, these allow comparison with other studies.

v) Discussion: The sentence ‘The results of the presented studies show that blood cultures of most of the children admitted to a rural hospital in central Ghana with pneumonia were positive for NTS.’ is not correct, in fact only 19 (11%) had NTS.

There are two important implications of the study findings that are not adequately
discussed:

a) The pattern of organisms were not different between cases and non cases. The purpose of WHO syndromic classification is to allocate different treatments, rather than to give patients a diagnostic label. However, these data suggest that the syndromes might not be helpful in this setting. Either the WHO syndrome classification really doesn’t work (here it is important to use the current guidelines) or there may be unreliability in eliciting clinical signs or in microbiology, or the study is too small. This should be discussed, along with potential weaknesses of the study.

b) The antimicrobial sensitivities suggest use of ceftriaxone. Please discuss more detailed positive and negative consequences of changing to ceftriaxone e.g. dosing schedule, cost, promotion of resistance including extended spectrum beta lactamase in Enterobacteriaciae.

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

**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