Reviewer’s report

Title: Prevalence of Human Salmonellosis in Ethiopia: a Systematic Review and Meta-analysis

Version: 2 Date: 24 October 2013

Reviewer: James Hurley

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Minor points

P4-5 – I think your Eligibility criteria of the studies needs to state that you were studying incidence rates for Ethiopia. Likewise “primary outcome of interest (p4)”

P6 “stratified on the basis of feel of relative homogeneity”..what do you mean?

P8 “heterogeneity was substantially high.”..suggest “heterogeneity was high.”

Major points

Abstract conclusion: Does “need of development and implementation of a policy to regularly screen individuals” follow from the finding of an increased incidence? What about implementation of public hygiene measures?

Figures 2-4 need to have something to indicate what the scale is. Is this isolates per 1000 screened? If this is the case then it is not meaningful for the scale to extend below zero as is implied in your 95% CI’s.

Discretionary revisions

The manuscript clear and the objectives and study design are appropriate. The data as extracted is presented in the Tables. The author here has attempt to derive a summary result from only 17 studies (? 16 + 3 with data NA in Table 1). Even with 17 this is a relatively small number. Within this the number of samples per study varies from 22 to over 1000. It is evident from a cursory view of the data and figures 2-4 that larger studies give smaller prevalence. All but one of the studies larger than 500 samples had incidences less than 5% and all but one less than 500 give prevalence greater than 5%. This is not unprecedented and is a volume effect. I have three suggestions to improve your analysis;

1. Can you get data from neighboring regions or countries to increase the generalizability?

2. To deal with the issue of 95% CI’s that cross below zero you transform you data to logits as I have done in a similar analysis of ventilator associated pneumonia (VAP) rates in ICU’s. This I used to generate a benchmark against which you can compare infection rates from other sources [Hurley JC. Profound effect of study design factors on ventilator-associated pneumonia incidence of prevention studies: benchmarking the literature experience. J Antimicrob
Chemother 2008; 61: 1154–61. It is a five step method [steps 3 – 5 apply in your case] - see below

3. With 17 (?16) studies you have nearly enough to create a funnel plot which would demonstrate the volume effect. Here you will see that the spread of prevalence is of more interest than is the single summary mean prevalence.

This calibration occurs by the following five step method. First, a benchmark of VAP incidence needs to be derived from systematic reviews of VAP incidence in observational groups from studies of patients receiving mechanical ventilation (MV) without any study intervention. 5, 6 Second, the systematic reviews of the various VAP prevention methods are used as the source of both the studies and the data on which the calibration is based. 10-23 Sourcing the VAP incidence data from the systematic reviews rather than from the original studies serves two purposes. The systematic reviews serve to define not only the studies that constitute the evidence base but also they provide an objective and transparent source of VAP incidence for the studies. A new literature search can be undertaken as an additional optional step. Any additional studies found outside the systematic reviews can provide a further sensitivity test to determine the robustness of the calibration. In this regard, there is no systematic review that contains the studies of VAP prevention methods with non-concurrent controls, these have been sourced by this author using a previously described search strategy. 25

Third, the VAP incidence proportions are transformed to logits. This step serves two purposes. On the logit scale the 95% confidence interval for proportions are symmetrical and are confined within the interval of 0 to 100%. Also, the derivation of logits and logit variances enables the inferential property of the proportion to be retained. By example, the inference of the proportion 4/10 is different from the proportion 400/1000 in that the proportion with the larger denominator has greater precision as reflected in a smaller variance.

Next, using these logits and logit variances, summary logits and associated summary 95% confidence intervals (CI’s) can be derived by meta-analysis with the ‘metan’ command in STATA (release 12.0, STATA Corp., College Station, TX, USA) which in turn are back transformed onto the percentage scale. 39-40 The benchmark range of VAP incidence is the summary and 95% CI’s derived in this way using the observational groups. Likewise a summary and 95% CI of VAP incidence can be derived for each of the various categories of control and intervention groups from the systematic reviews. In this step range random effects are used. The 95% confidence interval derived with random effect methods are more conservative (wider) than those derived by fixed effect methods. 41 With random effects the underlying assumption is that the observed proportions (logits) used in estimating the benchmark range are simply a random sample from a potentially infinite set of such proportions (logits) that could have been sampled. The alternative is the fixed effects presumption with an expectation that the underlying proportion is uniform across all studies, which is implausible here.

Finally, this benchmark is used as the basis for the calibration of the VAP
incidence in control and, separately, intervention groups from studies of the various methods to prevent VAP. This is done most simply as a display of summary mean and 95% CI’s derived from the various categories of control and intervention groups (figure 2). Additionally it is possible to estimate the numbers of outlier groups in a scatter plot (figure 3) or a funnel plot,25 to visually assess symmetry in a caterpillar plot, 37 and to compare group level factors as coefficients in a random effects meta-regression. 42, 43

Additional descriptions of this method available in


Level of interest: An article whose findings are important to those with closely related research interests

Quality of written English: Acceptable

Statistical review: Yes, and I have assessed the statistics in my report.

Declaration of competing interests:

I declare that I have no competing interests