Author's response to reviews

Title: Methods For Identifying Surgical Wound Infection After Discharge From Hospital: a systematic review

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Author's response to reviews: see over
To the Editor,

Re: MS: 1223656836934427 - Methods For Identifying Surgical Wound Infection After Discharge From Hospital: a systematic review.

We thank the reviewers for their comments and have responded to each of them in turn below.

**Donald Fry**

Discretionary revisions

“The authors should consider whether it really matters whether it matters that every infection or wound complication is reported, but rather only those that require additional health resources to be utilized! If a wound complication requires cultures, antibiotics, additional physician visits, or re-hospitalization, then it is clinically significant and can be tracked.”

The reviewer makes a useful point and he is correct that most clinically important infections would be identified by health professionals. What “matters” depends on the purpose of the surveillance; it may be important to identify wound infections at an early stage for treatment purposes, but timeliness is less important for performance/outcomes monitoring. The variables suggested are markers of resource use but not all validated markers of infection; ordering of cultures, additional physician visits – even antibiotic prescribing - are highly subject to local practice variation and could not be regarded as markers of SSI. Hence the need for operationalisation of a standard definition such as the CDC definition into a surveillance system. Furthermore, reliance on data about antibiotic prescriptions or microbiological culture results depends upon an integrated health record system and such integrated systems do not currently exist in the UK and thus do not provide a viable alternative at this time.

We have added the following paragraph to the discussion section of the manuscript

The nature of the surveillance method depends on its purpose. If the purpose of the surveillance is to detect and treat SSIs in a timely manner after discharge then the system requires a mechanism for rapid alerting of healthcare professionals, probably instigated by the patient, based on a standard definition of infection (such as the CDC definition). However, if the primary purpose is performance/outcomes monitoring then timeliness is less important than accuracy and thoroughness of data capture. Currently there is no mechanism in the UK for capturing these data from a single source; data would need to be collected from primary care practice, nursing records, and hospital clinics and pooled (whilst taking steps to avoid double counting).

**Richard Platt**

Major compulsory revisions

“I believe this review will be more helpful if it attends to these points --

1) It characterizes the prior findings of the referenced Bruce review, and then integrates the Bruce conclusions with the new studies that have been published in the interim. I believe this will make the review substantially more useful because the Bruce review
covers a larger number of publications on this topic. Many of these publications are still relevant.”

We have added more information regarding the findings of the Bruce review. Specifically we have included more information regarding the scope and the findings of the Bruce review in the introduction section of the paper.

A previous systematic review addressed a broad range of questions relating to the measurement and monitoring of adverse events of surgery, including SSIs [1]. This review identified common and potentially avoidable surgical adverse events and examined whether they could be reliably and validly measured. The review concluded that there was: inconsistency in the quality of reporting of postoperative adverse events, limiting comparison of rates over time and between institutions [1].

The reviewer misunderstands, and perhaps we didn’t make it sufficiently clear, that all papers from the Bruce review are included here if they examined the validation of systems of post discharge surveillance (we have now made it clearer). Whilst there are other papers in the Bruce review that are broadly relevant, if they did not directly address the validity of post-discharge surveillance or compare methods of PDS, they are not included in this review.

2) “It discusses how useful the CDC definition, the recommended gold standard, can be in actual practice. The fact that the definition includes unstandardized elements (e.g., surgeon's/physician's diagnosis of infection), variable practices in submitting wound specimens for microbiologic analysis, and unknown completeness of documentation of clinical findings in the post-discharge – mostly ambulatory, non-hospital, clinical care environment.”

We have removed reference to the CDC definition of surgical site infection from the methods section of our review as it is not directly relevant to the review or the audit and as the reviewers have indicated, it is contentious. We have included this definition in the Background as an exemplar definition of “surgical site infection”. We have added further discussion of the shortcomings of the CDC definition of wound infection in the Discussion.

Thus, a system based on a standard definition (such as that of the CDC), with a minimum of subjective criteria, needs to be developed. We know that there is wide variation in, and limited agreement between health professional judgement regarding the presence of wound infection which limits the comparability of estimates based on subjective judgement.

Mary-Louise McLaws
Major compulsory revisions

Firstly we hope that we have now made the aims of the paper clearer, which were as much concerned with the outlining a research agenda as identifying the most valid and reliable methods of PDS.

“However, the use of QUADAS should be minor (the PDS papers have already been peer reviewed and most have past the important critical appraisal items) and this section
over shadows the actual aims of the review. Replace Table II and replace it with one that answers the important thrust of the paper.”

It has long been accepted that publication of research in peer reviewed journals does not mean that papers are valid. Table 3 demonstrates the methodological (and reporting) shortcomings underlying these papers and reinforces the message that future research should avoid these pitfalls therefore we have retained this Table. On the advice of this reviewer we have added Table 2 which provides a concise overview of the features of the included studies and greater detail regarding the methods used in the studies, patient populations etc.

1) “what were the actual in-hospital surveillance and PDS methods used for each hospital that used?”

We do not understand the point about in-hospital surveillance since this study was limited to the evaluation of post discharge surveillance methods only. We have included more study detail in Table 2.

2) “Were the methods used in-hospital and post-discharge similar - if not what effect does this have on assessing the level of PDSSI rate (the methods will have to be different as there is no hospital that could use routinely a ICN/ICP to make home visits hence there has to always be a proxy method”).

This study was limited to the evaluation of post discharge surveillance methods only. We agree with the reviewer that there should be a uniform approach to surveillance methodology and classification both in-hospital post-operatively and post-discharge. However, authors of the included studies failed to document what their in-hospital methods of wound infection surveillance consisted of; which personnel were responsible for making a diagnosis; the criteria used to classify a wound as infected and in turn how this correlated with the post-discharge surveillance programmes. These shortcomings are highlighted with a view to advising researchers to avoid them in future research.

3) “Did the in-hospital and PDS use a reasonable definition of SSI (it doesn’t always have to be CDC as it is not yet considered the universal definition of SSI, the most important issue in surveillance is consistency first then validity - surgeons still claim CDC is not valid for many procedures including knee and LSCS), was the follow-up period sufficiently long to enable the manifestation of an infection.”

We have removed the reference to the CDC definition of surgical site infection being the gold standard since it is largely irrelevant to our review and audit of practice which examined studies which used any definition of wound infection. What was important to us as reviewers of this research literature however was that researchers should be clear in their reporting of the definition of infection used so that it can be interpreted/replicated by others. No matter how comprehensive or reasonable a definition used by the study authors may be, failure to adequately report the definition used will render readers unable to replicate such a PDS programme in their own setting.

We have now incorporated information regarding the follow-up period in Table 2, so that readers will be better able to judge for themselves the appropriateness of the time period post operatively that the surgical wound infection rate was measured.
4) “How practical was the PDS method (it may be valid but far too costly - there has to be a balance)?”
To some degree the practicality of any of the post-discharge surveillance methods described will vary according to local infrastructure and existing data collection systems. It is impossible for us as authors to make judgements about the relative practicality of the described methods as they will be dependant on local infrastructure. What is practical in one setting may be impractical in another and our audit of current PDS practice in the UK demonstrates that there are wide variations in the programmes currently being undertaken. We have included further details of the PDS surveillance undertaken in the studies reviewed in Table 2.

5) “Which procedure works in a PDS as it is not suited for all surgical patients (why did the authors only use selected surgical patient - and if they focused on one was this to accommodate the patients participation in PDS?)”
We concur with the reviewer that in the majority of studies that were evaluated there was scant detail provided on why a particular type of surgery was chosen to be followed up with PDS. When we conducted our search for studies, we did not place any restrictions on the study population that received PDS. We have incorporated further details of the study population selected in Table 2.

6) “PDS is not easy and the majority of highly resourced hospitals still do not perform PDS because it is unreliable and expensive, but what was unique about the study that can be built on to move forward towards a reliable, reasonably valid and reasonably inexpensive method of PDS?”
It is precisely because PDS is expensive and difficult that authors considering performing further studies in this area should be made aware of the methodological difficulties and take steps to address these in further studies, and also to be aware of the requirements when reporting the methods that they have undertaken. In many cases problems may be related to the reporting of the study than any methodological shortcomings in the actual conduct of the studies. Our aim is that this paper makes these issues clear for future research.

“Their assertion that an appropriate clinical spectrum of patients should be represented can be challenged on the grounds of economics and prevalence.”
In the discussion section of the paper we will incorporate further detail regarding the need for any surveillance programme to adequately target the population with the greatest risk of developing an SSI. In addition we have provided details of ongoing work that is further developing the knowledge base of the effect of risk adjustment models on the conduct of PDS which will further assist in the development of cost-effective PDS programmes.

“Assertion that the CDC definition should be used is unfounded”
We have removed the reference to the CDC definition of surgical site infection as the gold standard.

Minor essential revisions

A correlation of 0.73 is considered substantial not fair.
Now described as substantial.
Sensitivity and specificity properties of a test (i.e. ICN test) are taken into account when you are deciding whether to use the test or not use it. Once a test is to be used then it is of little help.

We have described the problems with the interpretation of the positive predictive value for the purposes of external validity. This is due to considerable variability in underlying incidence rates of infection between hospitals and in the specific patient groups that are chosen to undergo surveillance. We still feel that for the purpose of our review that sensitivity and specificity of the tests would be the most useful to report for external audiences.

Thank you again for your comments. If you have any further questions please do not hesitate to contact me.

Regards,

Emily Petherick.