Letter in Response to Evaluation of Xpert MRSA Gen 3 and BD MAX MRSA XT for meticillin-resistant Staphylococcus aureus screening in a routine diagnostic setting in a low-prevalence area. *Journal of Medical Microbiology*. 2017;66(1): 90–95

Title:

Xpert MRSA screening in surgical patient flow; time for a rethink for hub-and-spoke laboratory models?

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Dear Professor Fry/Professor Mathee,

Neilsen et al (1) suggest that despite laboratory costs being higher for rapid meticillin resistant *Staphylococcus aureus* (MRSA) polymerase chain-reaction (PCR) assays, once the costs of patient isolation are taken into account, these assays offer the potential for significant cost savings for the whole healthcare economy. In the context of surgical screening for patients undergoing same-day surgery however, different issues around utility, speed of results, and economic savings from MRSA PCR exist. We assessed the clinical impact of MRSA PCR on same-day surgery in the context of an off-site laboratory.

We performed a single-centre retrospective observational study among patients undergoing same—day surgery in a central London teaching hospital (April 2016-March 2017), identifying those who had MRSA PCR screening (via Cepheid® Xpert MRSA) sent on the morning of surgery (for patients who had missed/not had pre-assessment MRSA culture-based screening undertaken). Laboratory and demographic data was collected from Sunquest Gateway 7.3.1®, and clinical data was extracted from patient records.

56 patients (27 female/29 male) with a mean age of 42 years (range 16-82 years) were identified, of which 2 had positive MRSA PCRs. 17 were undergoing orthopaedic surgery, 7 gynaecological, 2 urological and 30 other. Sample-to-result MRSA PCR took a median of 5hrs 10 minutes. This included median sample-to-laboratory time of 1hr 30 minutes where samples were sent first thing in the morning as intended, but up to 22hrs 31 minutes when belatedly sent in the afternoon. For the two patients who had MRSA positive results, there were no changes in peri-operative antimicrobial therapy (specifically anti-MRSA antimicrobials were not administered). Deep clean of the theatre was not enacted after these two patients.

MRSA PCR for these patients was conducted at a cost of £1579, compared to culture-based techniques which would have costed £255. This equated to an opportunity cost of £1324 with no discernible impact on patient flow in this study. Nationally, surgical site infections contribute to 16% of healthcare associated infections, of which 4% are attributable to MRSA (2). Estimates for the attributable cost of such surgical site infections in England put the median at £5239 across surgical categories (3), and there is an associated higher mortality, longer hospital stays, and increased readmission rates (4).

Molecular microbiology diagnostics, such as PCR, are currently more expensive than culture-based methods but potentially offer a significantly faster, more precise diagnostic result, including being able to determine the presence of non-dividing bacteria (e.g. in those in biofilms). From a whole-healthcare economy perspective rapid determination of pre-operative carriage of pathogens which may cause surgical site infections may be beneficial. However, in the context of a hub-and-spoke model of laboratory services provision, we find pre-operative screening for MRSA with PCR on the morning of surgery does not provide a clinically useful sample-to-result time nor impact peri-surgical management of patients. When MRSA positive results were available, they were not utilised to change clinical decision making. Given the movement of UK pathology services towards consolidated laboratory hubs, the role of rapid molecular microbiology diagnostics, where they are sited, and their integration into patient pathways, needs to be carefully considered to optimise their utility. Clear formal cost-effectiveness analyses of these rapid diagnostics are needed, and must be considered in a variety of models of pathology service provision.

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