Reviewer's report

Title: How does healthcare worker handwashing behaviour impact upon the transmission of MRSA between patients? : an analysis using a Monte Carlo model

Version: 1 Date: 7 February 2009

Reviewer: Ronan Murray

Reviewer's report:

Discretionary Revisions (which are recommendations for improvement but which the author can choose to ignore)

Quite a few missing full-stops in the manuscript.

Minor Essential Revisions (such as missing labels on figures, or the wrong use of a term, which the author can be trusted to correct)

The terms MRSA, S. aureus, staphylococci and pathogenic staphlyococci are used interchangeably through the manuscript – the terminology should be made consistent (ie refer only to MRSA)

Similarly, the terms “hand hygiene”, “hand washing” and “hand cleansing” are also used interchangeably – this should be changed to one term only

Major Compulsory Revisions (which the author must respond to before a decision on publication can be reached)

Methods

• The use of gloves and other personal protective equipment is common with patients with exudative wounds, drains, tracheostomies etc etc whether or not they are known to be colonised with multiresistant organisms. Was the use of intermittent PPE factored into the assumptions? If not, then this should be stated.

• The term “efficiency” is used initially when referring to hand cleansing process, however the term “efficacy” is used in table 1 – as these have different meanings, it needs to be made clear which is meant.

Results

• Using this simulation model, the average probability / risk of MRSA transmission from patient A to B with no hand cleaning is 4%. Whilst accepting that this is lower than a single exposure to a highly communicable disease (eg varicella, measles), in the setting of healthcare transmission of bacteria, that risk is in my opinion quite high, rather than “relatively low”, particularly as several HCWs may make the patient A-to-B journeys on numerous occasions in a shift,
which would increase this risk in the real-life setting.

• Re: The statement: “The intervention of the hand cleansing process is clearly visible for six of these inpatient movements in figure 1©, whereas on 6 occasions the fact that the HCW did not wash his/her hands is evident” - I take this to mean that the 6 interactions with the probability of transmission of 1 are the ones where the authors claim that hand cleansing didn’t occur – but given the efficacy of hand cleansing is not 100%, how can you be sure that the probability of 1 in these events is due to the lack of hand cleansing (ie that transmission occurred because the hand cleansing was performed but was ineffective)? Perhaps insert the word “effectively” before “wash his/her hands” to make it clearer?

Discussion

• Due to the number of assumptions made in the model, there should be a paragraph outlining the limitations of the applicability of the data to clinical practice (eg the lack of control for patients likely to be at risk of higher transmission such as those with exudative wounds and pneumonitis, inability to adjust for intermittent PPE use, environmental contamination effects not considered)

• Similarly, I think the first line of the first paragraph should be ‘tempered’ to reflect the fact that this is a mathematical modelling exercise based on a number of assumptions, rather than a longitudinal hospital/patient-based study of colonisation risk. Additionally, it should be clear that the results shouldn’t be extrapolated to other “healthcare associated bacterium” (eg C. difficile, Acinetobacter spp, Pseudomonas) where environmental niches and transmission patterns are likely to be different to MRSA.

• Re: the line “Indeed, as high risk events become more infrequent, other factors, such as the admission of colonized patients onto wards, tend to become more dominant” suggest inert the words “MRSA” between “of” and “colonised”.

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

**Quality of written English:** Acceptable

**Statistical review:** Yes, but I do not feel adequately qualified to assess the statistics.

**Declaration of competing interests:**

I declare that I have no competing interests.