Reviewer’s report

Title: Economic benefits of safety-engineered sharp devices in Belgium - a budget impact model

Version: 1 Date: 14 May 2013

Reviewer: Simon Dixon

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The question is well defined and a high priority for health care providers.

Unfortunately, the methods and data underpinning the estimates of effectiveness are flawed. However, these problems are resolvable, such that more robust estimates can be produced, although even these would be indicative only (but useful). Even with these amendments, I question the wisdom of restricting the analysis to Belgium when so much of the data are not specific to it. A broader paper examining scenarios and thresholds-based on different prevalence and effectiveness estimates – which will vary between countries - may be more useful and of more interest to a wider readership.

Major Compulsory Revisions

• The five year time horizon will underestimate the costs associated with NSIs compared to a lifetime horizon (as you recognise on p10). However, it is incompatible with the method by which you have costed HIV infections. From what I can understand on page 9, you have taken an average annual treatment cost and applied this to the estimated number of infections. This fails to take into account the fact that treatment costs immediately following infection will be substantially less that those in people with more advanced disease (yet both of these will contribute to the average you have used). Estimates that are more reflective of the five year horizon should be used.

• The reduction in NSIs appears to be based on two surveys, one of which (Pellissier 2006) is purely cross-sectional. This is very low grade evidence and the limitations of using these data and their potential biases needs to be clearly spelt out. With such evidence, results can only be suggestive of possible effects; this is done in the conclusions (p15), but the abstract is less clear about the limitations. This needs to be made very, very, clear.

• More needs to be said about the disease transmission rates – what is the evidence that underpins reference 17? The rates look suspicious as each disease is a tenth the rate of the previous (33%, 3.3% and 0.33%), which suggests to me that there are some huge assumptions in there. The 33% for Hep B is also very high, suggesting that it refers to acute HepB, when the majority of patients in western European hospitals will have chronic Hep B which has a much lower transmission rate.

• The compensation costs per NSI comes from a single ase in the UK, which
involved gross negligence by the health care provider. As such, this will be a much higher figure than that typically seen. An alternative figures should be identified, otherwise, the inclusion of compensation should be in a scenario sensitivity analysis not the baseline estimate.

• There is no rationale for the bounds on the sensitivity analysis. Without this, it is virtually impossible to assess the relevance of the alternative figures. I can put a small bound on something important and say that it doesn’t effect it. The bound should represent the uncertainty surrounding the mean estimate with regard to the decision making context (i.e. Belgium). This will take into account sampling uncertainty around the estimates (e.g. confidence intervals), methodological uncertainty and generalisability to Belgium. You need to be much clearer about how these bounds were derived (as you do with the the Hep C vaccination rates). I suspect that alternative bounds are required.

• Prevalence seems to be missing from the sensitivity analysis, yet this is key and highly uncertain (as highlighted below).

Minor Essential Revisions

• Budget impact methodology should be briefly described and referenced, for example, are your methods compatible with ISPOR guidelines?

• In a couple of places, litigation and compensation claims are highlighted as costs. This will depend on the type of analysis and perspective of the analysis; in strict economic terms as should be the case within an economic evaluation such as a cost-effectiveness analysis, this would have zero cost as it represents a transfer payment (with negligible resource consumption associated with it). In a financial analysis, it would be included.

• The impact of undereporting on your estimates needs to be discussed.

• On Page 7 you talk about data from Becton, Dickinson and Company and an NHS utility. Who are these and why would we expect these estimates to be useful/accurate?

• How representative are the disease prevalence figures? They come from a University Hospital in a large city with a large immigrant population (Wicker 2008).

• On Page 9, you describe how macroeconomic figures are used in costing staff time. How? I would have thought that unit costs would have been sufficient (and also used).

• What are re-capping rates (p14)?

• You state that including outpatients would increase the scope for clincial and economic benefits. Whether it would be economically beneficial is not proven – this needs to be clarified.

Discretionary Revisions

• As mentioned previously, most of the data used in the estimates do not relate to Belgium and key parameters are highly uncertain (e.g. prevalence, reduction in NSIs, transmission rates, compensation costs, HIV treatment costs). An
analysis that examines cost-effectiveness based on reductions in NSI and prevalence, would be valuable. See for example, the two-sway sensitivity analysis undertaken in Shadick (The Cost-effectiveness of Vaccination Against Lyme Disease. Arch Intern Med. 2001;161(4):554-561); an analogous analysis to that would be ICER on the y-axis, reduction on the x-axis and curves describing the relationship between the two for a given prevalence multiplier on your baseline estimates from Germany..

**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