Reviewer's report

Title: Why Technology Matters as Much as Science in Improving Care

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Reviewer: Andrew Cook

Reviewer's report:

_Overall_

I found this an interesting read, in an area - the translation of scientific knowledge into usable technologies of benefit to patients - which is an essential part of the development of health care, and should be of interest to every practicing clinician and to those who manage health services.

_Major Compulsory Revisions_

The authors have a very USA focus- and consequently miss the significant body of government reports and research funders, which have recognised the various translational gaps in medical research - and the governments and organisations which have acted upon that recognition.

Given the audience for this journal is international, I'd have expected to see some acknowledgement or consideration of how at least one other country has addressed these issues. The obvious reference for me would be the UK set up, influenced by the 2006 review by Cooksey (A review of UK health research funding - http://www.hm-treasury.gov.uk/d/pbr06_cooksey_final_report_636.pdf ) which led to a significant reconfiguration of health research funding in the UK to address identified translational gaps. It's entirely possible that the UK approach would be inappropriate in the USA, but I'd expect to see the authors at least identify, and preferably consider, models which have already been tried to address the problem they identify.

(1) Add some consideration of how this problem has been tackled outside the USA, and some reflection on how those approaches may be applicable to the US context.

(2) Recognise that in almost all cases in this paper, consideration is limited to the USA context, or explain how these US based observations and problems are of more general applicability.

At the end of the first paragraph go the background there is an appeal to 'conventional wisdom'. Sitting outside the USA I can believe this statement, but would like to see a reputable reference, as 'conventional wisdom' is often incorrect - and is this statement is incorrect the need for the rest of the piece falls down.

(3) Add references or discussion to justify that this 'conventional wisdom' is
correct - or at least correct enough to make the rest of this paper relevant.

In the section 'Funding for Translational Research', the statement is made (and repeated in 'Increasing the application of scientific knowledge) that the absolute level of funding for technology development must be increased, but this is not evidenced. I'd like to see either some independent reference to support this, or the authors investigating other options (such as a redirection of current funds) and showing why they are not viable. The authors claim that $1Bn a year of public funding is available for translational research and complain about how it is focussed - they do not show why changing the focus is not a sufficient intervention.

(4) Add references or discussion to justify the requirement of more funds for translational research, and consider what the other options may be.

_Minor Essential Revisions_
None

_Discretionary Revisions_

The argument about the performance landscape is a good way to portray the challenges in evolving vs designing a health care system, though I feel that the chosen reference - which discusses the evolution of RNA - is possibly carrying the analogy a bit too far. The authors may like to consider a reference to Dawkins' Climbing Mount Improbable (see http://en.wikipedia.org/wiki/Climbing_Mount_Improbable) which address the same concept in a more accessible way (In surprised the Pitt paper doesn’t reference Dawkins which predates it by over 20 years).

(5) Consider whether the Dawkins reference may be more applicable than the Pitt reference for the audience likely to read this paper.

In the illustrative example the authors suggest that health care system performance appears to have reached a plateau. I think they probably have the US system in mind when they say this, and in their further discussion of this phenomenon they miss the context that the US system sits in - e.g. the obesogenic US social environment, the market driven health system with poor access to care for much of the population etc. Many of the challenges facing the US health care system particularly are socially and politically driven rather than a defect in health technology.

(6) Consider exploring the limitations of how useful health technology development may be in the US health care context, given the social and political drivers and limitations.

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

**Quality of written English:** Acceptable
Statistical review: No, the manuscript does not need to be seen by a statistician.

Declaration of competing interests:

I am employed by the NIHR Evaluation, Trials and Studies Coordinating Centre (http://www.netscc.ac.uk), which manages a number of research programmes on behalf of the Departments of Health of the various UK governments and administrations. Publication of work showing the need for further translational research may result in an expansion of the work commissioned from my employer.