Editorial

Strategic considerations for improving the quality of eHealth research: we need to improve the quality and capacity of academia to undertake informatics research

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Our recent systematic overview of the eHealth literature, in common with others, has found that a vast gap exists between the theoretical benefits of eHealth technologies and what has been empirically demonstrated.[1,2] Although the benefits are promoted by enthusiasts and industry, the reality is that the strength of the evidence base in support of the effectiveness of these technological innovations remains weak. This reflects the paucity of experimental research in this area and, furthermore, the tendency for the research that has been conducted to be of low quality, both in relation to methodological rigour[3] and utility.[4] Also contributing to this lack of evidence is our as yet immature understanding of key socio-technical considerations relating to the design and deployment of eHealth technologies in a safe and sustainable manner. This lack of relevant high-quality evidence poses considerable difficulty for those responsible for making decisions on the commissioning of eHealth technologies as they are under increasing pressure to base such decisions on a robust evidence base.

England's National Health Service (NHS) National Programme for Information Technology (NPfIT) faces the challenge of how to provide electronic patient records for a service which is making substantial changes to the way that it delivers health care. Numerous opinion articles, editorials, news items and government and professional reports have been published about the programme, placing NHS Connecting for Health – the agency responsible for delivering NPfIT – in the unenviable position of trying to make the 'right' decisions in the absence of a secure evidence base. Given the continuing likely investments in technological solutions, it is important that this evidence vacuum is rapidly filled and in order to do this we believe it is vital that higher order strategic research considerations are prioritised.

Our detailed review of the literature has allowed us to identify a limited number of recent developments aiming to improve the quality, usefulness and transparency of reporting eHealth research.[5–7] Notable amongst these early developments are Guidelines for Best Evaluation Practices in Health Informatics (GEP-HI)[8] – which aim to present general and practical guidelines that provide evaluators with a set of structured, comprehensive and understandable rules for best evaluation practices – and the Statement on Reporting of Evaluation Studies in Health Informatics (STARE-HI)[9] – which aims to provide guidelines for writing and assessing evaluation reports in health informatics. These developments are important in that they are promoting the establishment of consensus on what constitutes high-quality eHealth research and its reporting, which is essential in strengthening the empirical

eHealth evidence base which has heretofore been relatively weak. Developments such as GEP-HI and the STARE-HI are therefore to be welcomed and will, we hope, prove useful to commissioners of research and to those conducting and publishing eHealth research.

There are a number of other methodological initiatives needed. One of the next logical developments, likely to be readily welcomed by peer reviewers, editors and users of research alike, is an instrument to help facilitate the critical appraisal of eHealth research. Critical appraisal is an integral component of evidence-based health care, performed as part of evidence synthesis exercises such as systematic reviews and health technology assessments. Experience suggest that generic critical appraisal tools for primary research in eHealth, such as Standards for the Reporting of Diagnostic Accuracy Studies (STARD)[10] and Strengthening the Reporting of Observational Studies in Epidemiology (STROBE),[11] are insufficiently sensitive to detect the methodological idiosyncrasies of conducting research in this field.[12,13] We have furthermore found that current critical appraisal tools for assessing the quality of secondary research, specifically systematic reviews, also have major limitations when used in relation to the eHealth literature. As a result, we have had to modify the Critical Appraisal Skills Programme[14] instrument for systematic reviews, for instance, to more explicitly incorporate the assessment of socio-technical and contextual considerations and we hope that this will also prove useful to colleagues undertaking related work in this area.[1] Clearly, however, this is an area in need of further development.

Once developed new tools will not improve the quality of eHealth research unless they are widely used. Thus far, the use of these tools by eHealth researchers has been limited, even according to recently published reports.

Why this is the case remains unknown. Some researchers may not agree that eHealth is 'different' arguing that it therefore does not warrant its own specific tools. This does not, however, appear to be a widely held view, as demonstrated by the conclusions of high profile methodological contributions to this field.[15–19] This research has shown that eHealth research has often not been conducted rigorously and/or has failed to assess some of the more contextual elements so important to understanding the nuanced nature of socio-technical factors, which are particularly useful to allow assessment of generalisability and local relevance.

Research toolkits for academics, commissioners of research and journal editors are thus needed, in relation to both primary and secondary research techniques. Although some resources exist, such as the web-based evaluation portal of the Working Group for Assessment of Health Information Systems of the European Federation for Medical Informatics,[20] many researchers remain unaware of these tools. We must therefore work to ensure that both commissioners and producers of research are made aware of these resources.

There is also the need to increase research capacity in this area: we recommend the creation of junior and senior fellowship opportunities to foster interdisciplinary expertise and the creation of multidisciplinary research networks to promote methodological advances.

The competence and capacity to conduct clinically relevant eHealth research are most likely to be realised by the development and use of new tools, combined with programmes to ensure that researchers and consumers of research make use of them. Only then are we likely to begin bridging the evidence gap between eHealth rhetoric and reality and start to fully realise its potential benefits for promoting the safety, quality and efficiency of health care.

NHS Connecting for Health Evaluation Programme (CFHEP) work package: 001[1]

The impact of eHealth on the quality and safety of healthcare

The report provides a comprehensive overview of fundamental informatics applications with a theoretical and empirical account of the benefits and risks associated with implementation. Additionally, implications for practice, policy and research are provided. Its multidisciplinary approach is particularly well suited to health informaticians providing a well rounded discussion on both the technical and psycho-social considerations of design, development and deployment of interventions.

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