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Research article

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ABSTRACT

Background There is currently limited guidance for hospitals to implement ePrescribing systems and we have developed an ePrescribing Toolkit designed to support ongoing implementation, adoption and optimisation of efforts. This work was part of an independent evaluation of the introduction of ePrescribing systems into National Health Service (NHS) England, funded by the National Institute for Health Research (NIHR).

Aim To investigate the perceived usefulness, reported use and areas for further development of the Toolkit by ePrescribing implementers in English hospitals. Methods Questionnaire-based survey of hospitals that has or is interested in implementing ePrescribing systems.

Results We received responses from a total of 78 individuals representing 49 English NHS Trusts (out of 82 different Trusts who were emailed the survey, 60% response rate). The overwhelming majority of respondents (92%) were familiar with the ePrescribing Toolkit and 66% reported using it to guide their ongoing implementation efforts. The majority of ePrescribing Toolkit users (85%) viewed it as a helpful resource. Implementers particularly valued the case studies describing lessons learnt from hospitals that had already implemented ePrescribing systems. Suggestions for improvement included more information in relation to the progress of hospitals implementing systems, the names of key contacts in these sites, a list of available systems and the contact details of ePrescribing vendors. Respondents also highlighted the need for more information on optimisation and specialist prescribing.

Conclusions Interactive elements and learning lessons from early adopter sites that had accumulated experiences of implementing systems were viewed as the most helpful aspect of the ePrescribing Toolkit. The Toolkit now needs to be further developed to facilitate the continuing implementation/optimisation of ePrescribing and other health information technology across the NHS.

INTRODUCTION

There is an international drive to implement ePrescribing systems in hospitals to improve quality, safety and efficiency associated with the prescribing and administration of medicines.[1–5] However, there is limited experience in the National Health Service (NHS) on how to procure, implement and optimise these systems.

In order to address this gap, we have, as part of an independent evaluation of the introduction of ePrescribing systems in NHS hospitals funded by the National Institute for Health Research (NIHR), developed an ePrescribing Toolkit (henceforth referred to as the Toolkit), which aims to help hospitals with key decisions throughout the implementation journey (see Figure 1).[6,7] This online site provides advice and information to support conceptualisation, procurement, implementation and optimisation. Resources include key considerations throughout each step, example case studies, lessons learnt and sample documents (e.g. surrounding procurement and business case development). The Toolkit is aimed at NHS managers, Information Technology specialists, doctors, nurses, pharmacists, allied health professionals and patients. The first version went live in 2013, after a year of developmental work. It is regularly expanded based on the most recent available evidence and experiences from early implementers, fast followers and users.[8,9] Feedback and usage to date have been very encouraging with 2,000 plus views a month from across the world.[10] The high number of users and informal feedbacks has indicated that our resource has been useful in facilitating ongoing ePrescribing systems implementations in England and beyond.

Although we have received positive feedback, the impact of the Toolkit to date has been anecdotal, and we wished to assess to what extent it has been used and how it has impacted on ongoing implementation efforts. The aim of this work was therefore to explore Toolkit use and usefulness amongst implementers in English hospitals and identify which aspects were perceived as particularly helpful and what could be improved. Our focus was not on exploring the use of specific ePrescribing systems.

METHODS

We developed a questionnaire-based survey in order to gain insights into a wide range of experiences from as many English NHS Trusts as possible. The questionnaire was deliberately kept brief in order to minimise the time for completion.[11] The work was part of a larger NIHR-funded Programme of research, which was classed as a service evaluation by the National Research Ethics Service Committee London City and East in August 2012.

Development of the questionnaire

We used Survey Monkey to design the questionnaire that consisted of a combination of six open and closed questions (see Box 1).[12] We enquired about the background of participants, their experiences of using the Toolkit and aspects that were particularly helpful as well as areas for improvement.

The design went through several iterations, refined collaboratively by the authors, in order to improve relevance, flow and ease of use for respondents. It was accompanied by a definition of ePrescribing, a brief introduction to the Toolkit and an outline of the aims of the study (see Box 1).

Sampling and data collection

The questionnaire was distributed by email providing a website link to the wider NIHR-funded research programme and a link to the Toolkit. The invitation to participate was sent out to those known to have implemented or being in the process of acquiring ePrescribing systems (representing a total of 82 different Trusts).[13] These contained contacts details of a range of implementers from the majority of English NHS Trusts.

Box 1 Survey ePrescribing Toolkit use

Six quick questions about the NHS ePrescribing Toolkit use at your hospital

Many thanks for taking part in this brief confidential survey, which is aimed at ePrescribing system implementers. It will take only a couple of minutes to complete. The purpose is to scope Trusts' use of our NHS ePrescribing Toolkit. Your responses will be treated in the strictest confidence.

We define 'ePrescribing' as: 'The utilisation of electronic systems to facilitate and enhance the communication of a prescription or medicine order, aiding the choice, administration and supply of a medicine through knowledge and decision support and providing a robust audit trail for the entire medicines use process'. ePrescribing is also sometimes known as Hospital Electronic Prescribing and Medicines Administration.

This work is part of a national programme of research organised by the University of Edinburgh in collaboration with the University of Nottingham, Harvard School of Public Health and the University of Birmingham. It is an independent evaluation of the introduction of ePrescribing systems in the NHS that is funded by the NIHR.

For further information, please visit our website under http://www.cphs.mvm.ed.ac.uk/projects/eprescribing

1. **Which hospital do you work for and what is/ was your role in relation to ePrescribing system implementation?**
2. **Are you familiar with the ePrescribing Toolkit for NHS Hospitals (http://www.eprescribingtoolkit. com/)?**
   Yes
   No
3. **If 'yes', have you used it for planning your ePrescribing implementation?**
   Yes
   No
4. **If 'yes', has it been a helpful resource?**
   Yes
   No
5. **What has been particularly helpful about the Toolkit?**
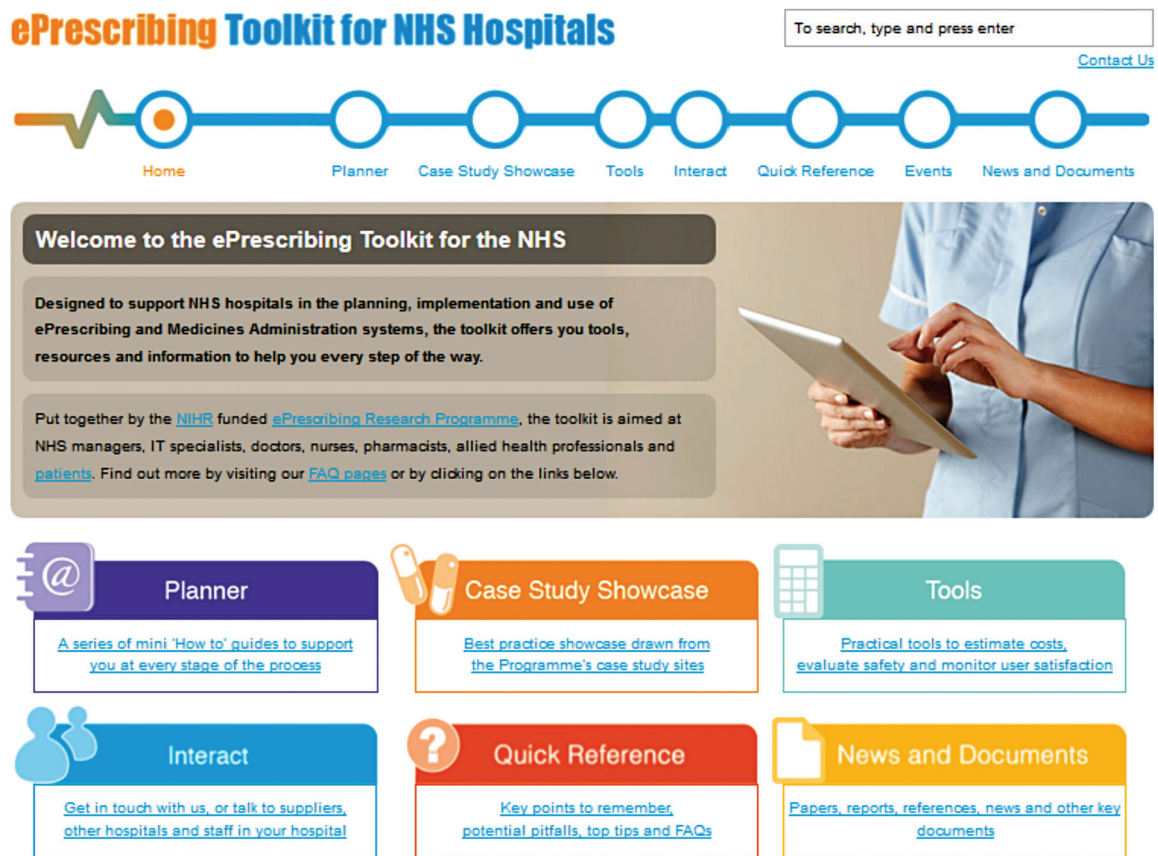6. **What could be improved in relation to the Toolkit?**

Figure 1 Toolkit screenshot

It was live for two weeks with a reminder sent after one week. Potential participants were assured that their responses would be treated in the strictest confidence, highlighting that their input would help the team to assess how useful their outputs have been to the NHS to date and also what future work should be done to maximise the usefulness of included resources to facilitate the implementation, adoption and use of ePrescribing systems in England.

Data handling and analysis

We used the analysis tool provided by Survey Monkey to compute descriptive statistics of the closed questions (Questions 2, 3 and 4) and conducted a thematic analysis of the open-ended questions (Questions 1, 5 and 6), facilitated by inductively extracting common themes across responses in NVivo10 software.[14] Qualitative themes were selected for inclusion in the results based on frequency of occurrence, i.e. they were included in the section on results if they were mentioned by the majority of respondents.

RESULTS

Respondent sample

We obtained 78 responses overall, with participants representing a total of 49 different English NHS Trusts out of 82 who were emailed the survey, resulting in a response rate of 60%. The majority of responses (n = 44) were received from acute Trusts. Respondents were pharmacists (48%), clinical (nursing and medical) leads (18%), technical leads (17%) and project managers (17%).

Familiarity with and use of Toolkit

92% of respondents were familiar with the Toolkit, and 66% of these had used it to inform the ongoing implementation of ePrescribing systems in their hospital. Of these who had drawn on it to inform their implementation efforts (n = 55), 85% found it to be a helpful resource. We had nine Trusts with more than one respondent and respondents in three of these gave discordant answers. If taking only the most negative respondent into account from each hospital to avoid clustering in the data, this conservative assessment still indicated that 84% found the toolkit to be a helpful resource.

Sharing experiences amongst implementing sites

Qualitative analysis indicated that respondents appreciated the Toolkit as a centralised collection of comprehensive resources surrounding the implementation of ePrescribing systems in NHS hospitals.

> 'I recommend the toolkit because it provides a wide range of resources for all stages of implementation in one place'. (Respondent 19, Pharmacy Informatics Advisor)

However, respondents raised some issues surrounding usability, suggesting that the search function of the website could be improved in order to access the required information quicker.

> 'I personally find the format of the website hard to find what I am looking for - there is so much useful information but I am not always sure where to find it'. (Respondent 27, ePrescribing Pharmacist)

The most helpful feature was perceived to be the use of case studies to disseminate experiences and lessons learnt from hospitals who had already implemented. Here, benefits realisation plans (including academic publications supporting these), job descriptions, change management strategies and examples of business cases were viewed as particularly helpful. These were used as templates and tailored to local circumstances, saving hospitals planning for implementation significant time and effort.

'It is a good set of resources that I have used for assessing our ePrescribing system and building a new business case'. (Respondent 52, Lead Nurse)

The ability to draw on the experiences of other hospitals was viewed as a welcome opportunity to prevent common pitfalls and network with colleagues who had faced, or were facing, similar challenges.

'Making contacts, lots of useful presentations, numerous documents of various types. I use the toolkit very often and often refer to it when I feel a bit 'stuck''. (Respondent 16, ePrescribing Pharmacist)

The need for more active networking opportunities

Respondents also suggested a number of areas for improvement and further development. These mainly related to the wish for more active networking opportunities and sharing of experiences amongst NHS hospitals. Although the nature of the Toolkit as a written repository of information somewhat prohibited this, respondents suggested that it could be expanded to include a list of hospitals that had or were implementing ePrescribing systems and key contacts, vendors and updates of progress to address this issue (if necessary as a function requiring log-in to protect confidentiality).

'It would be useful to have an up to date list of all the currently live [ePrescribing] systems, links to the vendor, and at what stage of deployment each Trust using that system is at'. (Respondent 52, Lead Nurse)

Some also suggested including an increased number of recordings from ongoing seminars and discussion forums and more promotion/use of the discussion forum feature.

Continuously expanding repository of information and maintenance

As the Toolkit was seen as a central repository of information, several suggestions for additional material were made. Some raised the need for more information on benefits realisation, optimisation of systems, maintenance, transitions to business as usual, re-procurement and ePrescribing in specialist areas (such as in critical care and oncology).

'As more organisations take on [ePrescribing], it would be useful to expand the resources beyond implementation and focus a little more on getting the most out of [ePrescribing] in a 'business as usual' state'. (Respondent 31, Lead Pharmacy Technician)

Others suggested that the Toolkit could be more specifically tailored to different stakeholders, including healthcare professionals, informatics teams and suppliers. A list of 'pros and cons' of existing systems was also desired.

'A section on pro's and con's of the various systems available, completed by system users would be helpful during procurement'. (Respondent 58, ePrescribing Pharmacist)

Overall, a frequent updating of existing resources and continued maintenance of the website were seen as essential for the Toolkit to remain useful.

'Keep reviewing to ensure it remains current as [ePrescribing] progresses'. (Respondent 9, Project Manager)

DISCUSSION

The results of this survey suggest that the ePrescribing Toolkit has been (and continues to be) used by NHS hospitals across England to support the ongoing implementation of ePrescribing systems. As a national centralised resource of information, it appears to have contributed to the dissemination of learning through case studies of hospitals that have over time accumulated experience with implementing these complex systems.

This important foundation now needs to be built upon to further accelerate learning and implementation efforts around ePrescribing systems and potentially other types of health information technology (HIT), as the lack of sharing lessons learnt can be a major barrier to progress and result in significant potentially avoidable costs in the NHS.[15,16] Such efforts are particularly timely, given the recent announcement of centralised NHS funding of £4.2 billion to accelerate the digitisation of the NHS and position the UK as a leader in this respect.[17] Our work has provided key insights into how such efforts may be conceptualised, namely, through promoting the use of documentary templates (e.g. business cases and management plans) that can be tailored to individual settings, active sharing of experiences through open discussion and networking opportunities to promote contacts across NHS hospitals, and a focus on optimisation activities as technological capabilities and implementation experience evolve over time. Such work will require the allocation of necessary resources that should now be made available to ensure that the content of the Toolkit remains current and is constantly expanded and tailored to the progressing needs of the NHS.

Despite obtaining important insights in relation to the impact and potential further development of the Toolkit, our approach also had several limitations. First, there is a need to be careful about the interpretation of the results presented, given the response rate. Second, not all invited participants responded, which meant that not all English hospitals were represented in our sample. Third, the survey was deliberately kept short in order to maximise the chances that busy NHS teams would respond; this prohibited asking more detailed questions and made the questionnaire relatively weak. It also did not allow investigating the use of specific systems. Fourth, the list of contacts we used to invite participants may not have been as comprehensive as we would have liked – we targeted individuals as opposed to organisations and these may have moved on over the course of our research meaning that their contact details might have been outdated.

CONCLUSIONS

It is encouraging that the ePrescribing Toolkit, which was developed as part of an NIHR research Programme of applied research, has positively contributed to the national implementation efforts of ePrescribing systems in English hospitals. In addition to providing insights into how this work may now be taken forward to continue supporting learning and ongoing implementation/optimisation of HIT in the NHS, we have shown that academic research can have real-time impact on health service delivery.

Contributorship

Aziz Sheikh and Ann Slee conceived this work. Kathrin Cresswell is employed as a researcher on this grant and led on the data collection, analysis and write-up, with Ann Slee and Aziz Sheikh commenting on drafts of the manuscript. Aziz Sheikh is the guarantor.

Competing interests

All authors declare that they have no competing interests.

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