

Infectious disease outbreaks: how online clinical decision support could help

Kieran Walsh

Correspondence to

Dr Kieran Walsh, BMJ Publishing Group, London WC1H 9JR, UK; kmwalsh@bmj.com

Received 14 June 2018

Revised 25 June 2018

Accepted 30 June 2018

Published Online First 21 July 2018

ABSTRACT

This paper describes an evaluation of how doctors might use an online clinical decision support tool to improve the care that they would provide to patients with infectious disease and what features they would expect in such a clinical decision support tool. Semistructured interviews were conducted by telephone with doctors to evaluate the utility of a clinical decision support tool in helping them to improve the care that they would provide to patients with infectious disease and to assess the features that they would value in such a tool. The doctors were primarily interested in how they could use the tool to improve care. They were short of time and so needed to be able to access the content that they needed really quickly. They expected content that was both evidence based and current, and they used a range of devices to access the content. They used desktops, laptops, mobiles and sometimes mobile apps. Doctors view the utility of clinical decision support in the management of rare infectious diseases from a number of perspectives. However, they primarily see utility in the tools as a result of their capacity to improve clinical practice in infectious diseases.

INTRODUCTION

Infectious diseases are a threat to human health around the world. In recent years, there have been a growing number of outbreaks of rare infectious diseases. These include outbreaks of Ebola, Zika and influenza.^{1,2} These infections pose special challenges to learners and educators alike in medical education. Under normal conditions they are rare and so it is difficult to dedicate too much time or resources to them in undergraduate or postgraduate curricula. However, the situation can quickly change to that of an epidemic. In these circumstances, doctors and other healthcare professionals need instant education and support. It is in these circumstances that online clinical decision support could play a major role in controlling outbreaks of infectious diseases.

Online clinical decision support provided must be aligned to the needs of the healthcare professional learners.³ In this regard, it is clear that, under normal circumstances, healthcare professionals need certain features in clinical decision support. They need decision support tools that provide evidence-based knowledge and that will also work at the point of care. The clinical decision support also needs to be continually updated. Clinical decision support must be intuitive to use and must fit with the clinical workflow of the healthcare professional. They must also work on whatever device the

healthcare professional is using—this might be on a desktop, mobile device or an app.

However, it is not clear how doctors might use clinical decision support in the context of an epidemic. They will likely be busy during an epidemic—this might mean that they will want even faster answers. Medical advice can change continually throughout an epidemic—this might mean that they would place even more value on updated content. In this paper, we describe an evaluation of how doctors might use a clinical decision support tool—BMJ Best Practice—to improve the care that they would provide to patients with a rare infectious disease and what features they would expect in this tool.

METHODOLOGY

BMJ Best Practice is the online clinical decision support tool of the BMJ. Doctors who are part of a user group at BMJ were asked by email to take part in an evaluation as to the utility of BMJ Best Practice in helping them to improve the care that they would provide to patients with a rare infectious disease and as to what features they would expect in BMJ Best Practice. Those who responded to the email were asked to use BMJ Best Practice to help them solve a clinical problem involving a patient who had been working in Liberia and who had clinical features and risk factors that were suggestive of Ebola or its differentials (ie, other serious infectious diseases). Semistructured interviews were then conducted by telephone with the doctors according to a schedule which was founded on existing literature in this field.^{3,4} Interviews lasted approximately 20 min. Detailed field notes were taken during the interviews. Notes were analysed using thematic analysis.⁵ This was used to allow new concepts and themes to emerge from the data. Interviews were continued until data saturation was achieved—this was defined as two successive interviews in which no new themes emerged.⁶

RESULTS

Eighteen learners took part in the semistructured interviews. Four key themes emerged from the interviews.

Theme one: improving clinical practice as a result of clinical decision support

The learners were primarily interested in how they could use the tool to improve care. They felt that the tool would change their practice or at the very least confirm that their practice was correct. The learners were most interested in improving their



© Author(s) (or their employer(s)) 2019. No commercial re-use. See rights and permissions. Published by BMJ.

To cite: Walsh K. *BMJ Stel* 2019;5:218–220.

Box 1 Themes from the interviews**Theme 1: improving clinical practice as a result of clinical decision support****Learner comments**

'I found it quite directive and it would have helped me in clinical care. I would have known what to do in management—or at least the first steps. Having the steps laid out in algorithms is helpful'.

'It would definitely change my practice—if there was a need to change but often it is more about confirming that my practice is correct which is reassuring and worthwhile also'.

'I found the resource fairly easy to use. I quickly made the diagnosis of Ebola using it'.

'I put fever headache and the other symptoms into the search box and got sensible answers—like Ebola and influenza'.

'I entered the data into the search and came up with Lassa, Ebola and Marburg. The search box worked'.

Theme 2: Time is of the essence**Learner comments**

'I am always quite short of time so I am not sure that I would have much time to read the entire content or even a section of it. It needs to be easy to read and search and find'.

'Speed of using the resource is vital—seconds do count when you are short of time'.

Theme 3: Content needs to be evidence based and continually updated**Learner comments**

'I would expect the content to be continually updated—especially the treatment sections as this changes all the time. So, the latest research should be taken into consideration in the content—that would be highly valued by me'.

'The evidence base of the resources is very important to me. The content must be validated. Lots of references add credibility. Some guidelines are too long so it is great to have short summaries but these summaries must be evidence based'.

Theme 4: content needs to be accessible**Learner comments**

'I used my laptop to look it up in this case—but I usually use my desktop computer. I didn't notice that there was an app—but an app is great as I am often offline'.

'Being able to use the content on a mobile phone is great. A downloadable app is also valuable as there are lots of environments where you can't get any type of signal'.

practice with regard to diagnosis and differential diagnosis. Some users felt that it would also help them improve their clinical management—for example, in isolating the patient. However, there was concern that the advice from a clinical decision support tool in management might not be compatible with that of a local hospital guideline. After using the tool to solve the clinical scenario, 17 of the 18 learners correctly thought that Ebola or another viral haemorrhagic fever was the most likely diagnosis or a priority differential that needed to be ruled out.

Comments related to this theme are shown in [box 1](#).

Theme 2: time is of the essence

The learners were short of time and so needed to be able to access the content that they needed really quickly. They needed content that was concise and easy to search and navigate. Learners needed to have answers to their questions ideally within seconds and at most within minutes. The need for immediate access to

clinical knowledge partly depended on the exact context that they were acting in. Sometimes this was when they were with a patient—in which case they needed an answer very quickly. But sometimes they were looking things up after they had seen the patient—in this circumstance they had more time.

Comments related to this theme are shown in [box 1](#).

Theme 3: content needs to be evidence based and continually updated

The learners expected content that was both evidence based and current. This was especially true of the sections that guide treatment. Learners were concerned about the currency of the content as they realised that this can be a rapidly changing field of healthcare—particularly in the midst of an outbreak. The learners realised that their patients would be looking things up and so wanted to be as least as updated as their patients were. Different learners had different views on exactly what currency of knowledge meant. Some thought that it meant updated within the last 2 years; some thought that it meant the content should be updated more frequently; and some thought that it depended on the precise context. Learners realised that sometimes there was a weak underlying evidence base and that in these circumstances expert consensus opinion was the next best alternative. Learners appreciated lots of references and links to other resources—they felt that this would add credibility. The learners did not have time to look at all the evidence themselves and so needed to be able to trust the provider to do this for them. Comments related to this theme are shown in [box 1](#).

Some learners pointed out the fact that there can be a conflict between the currency and the evidence-based credentials of a resource—in that the most recent updates to content might not be completely evidence based.

Theme 4: content needs to be accessible

Learners used a range of devices to access the content. They used desktops, laptops, mobiles and sometimes mobile apps. Some of the users did not always have access to a desktop computer or to a wifi network and so especially appreciated the mobile app. They had high expectations of the interfaces and thought that they should have an equally good experience regardless of the device that they were using. Some learners used different devices to access the content—depending on the context in which they were using the site. Many users commented that in the future they expected to use their mobile more frequently and that younger generations of learners were more likely to want to use the mobile site. Comments related to this theme are shown in [box 1](#).

CONCLUSIONS

Learners view the utility of *BMJ Best Practice* in the management of rare infectious diseases from a number of perspectives. They see utility in the tool as a result of their ability to improve clinical practice in infectious diseases—however, they feel that they will only be able to exploit clinical decision support if the content is evidence based and continually updated and accessible in a timely manner in a range of different clinical devices.

There are limitations to this evaluation. All the learners were users of online resources—they may not represent users who do not use online resources. However, the growing ubiquity of online resources means that the number of learners who do not use these resources grows smaller year by year. All were users of a single clinical decision support tool: once again they may not be representative of users of other tools. This was a small

evaluation—however, it used a protocol that allowed the operationalisation of data saturation to achieve an adequate sample size.

In recent years, infectious disease outbreaks have increased in frequency and severity. In the future it will be impossible to educate all healthcare professionals to manage infectious disease outbreaks using conventional face to face means. New methods such as clinical decision support tools will be needed. However, for these tools to be used, they will need to be current, evidence based and accessible and will need to be designed to help doctors achieve their primary outcome—improving the care that they deliver to patients. They will also need to be quick to access—time is of the essence when caring for patients during a serious outbreak of infectious disease.

Contributors KW conceived and carried out this work; wrote up the manuscript and approves this final version. He is accountable for all aspects of the work.

Funding The authors have not declared a specific grant for this research from any funding agency in the public, commercial or not-for-profit sectors.

Competing interests KW works for BMJ, which produces BMJ Best Practice. This provides clinical decision support in a range of infectious and non-infectious diseases.

Provenance and peer review Not commissioned; internally peer reviewed.

REFERENCES

- 1 Beeching NJ, Fenech M, Houlihan CF, *et al* *BMJ* 2014;349:g7348.
- 2 Petersen LR, Jamieson DJ, Powers AM, *et al* *N Engl J Med* 2016;374:1552–63.
- 3 Kwag KH, González-Lorenzo M, Banzi R, *et al*. Providing doctors with high-quality information: an updated evaluation of web-based point-of-care information summaries. *J Med Internet Res* 2016;18:e15.
- 4 Beeler PE, Bates DW, Hug BL. Clinical decision support systems. *Swiss Med Wkly* 2014;144:w14073.
- 5 Joffe H, Yardley L. Content and thematic analysis. In: Marks DF, Yardley L, eds. *Research methods for clinical and health psychology*. London: Sage Publications, 2004:56–68.
- 6 Francis JJ, Johnston M, Robertson C, *et al*. What is an adequate sample size? Operationalising data saturation for theory-based interview studies. *Psychol Health* 2010;25:1229–45.