

# A Pilot Study to Evaluate the Usefulness of an Innovative Digital Point-of-Care Information System for the Management of Multiple Chronic Conditions

Joseph Derry<sup>1</sup>, John Sandars<sup>2</sup>, Jeremy Brown<sup>2</sup>, Kieran Walsh<sup>3</sup>, Alison Quinn<sup>1</sup>

<sup>1</sup>Wrightington, Wigan and Leigh Teaching Hospitals NHS Foundation Trust, Wigan, United Kingdom, <sup>2</sup>Edge Hill University, Ormskirk, United Kingdom, <sup>3</sup>BMJ Publishing Group, BMA House, London, United Kingdom

## Abstract

A major challenge for junior doctors is preparedness for clinical management of acutely ill patients with associated multiple chronic conditions. Digital point-of-care information systems (POCIS) using mobile phone apps have the potential to enhance preparedness for managing these patients by providing useful evidence-based information at the time of management. We evaluated the usefulness of a new and specifically designed digital POCIS (BMJ Best Practice Comorbidities Manager) by using a semi-structured online questionnaire in a cohort of recently qualified junior hospital doctors. We found that 85% of participants obtained useful information from the new resource and 95% of participants considered that they could apply this information to provide evidence-based treatment. The usefulness of the resources was supported by free-text comments. Our evaluation suggests that the BMJ Best Practice Comorbidities Manager has the potential to enhance the preparedness of junior doctors by providing useful information at the point of care.

**Keywords:** Digital, multimorbidity, point-of-care information system

## INTRODUCTION

Many newly qualified junior doctors have low preparedness for clinical practice,<sup>[1]</sup> especially in the management of acutely ill patients.<sup>[2]</sup> An important aspect of this low preparedness is their decision-making uncertainty about the most appropriate clinical management,<sup>[2]</sup> with the additional challenge that many acutely ill patients have multiple chronic conditions.<sup>[3]</sup> The importance of this challenge for junior doctors is high, since approximately 1 in 3 hospitalized patients have 5 or more associated multiple chronic conditions,<sup>[4]</sup> and also a recent paper on Foundation Year (FY) doctors in the UK highlighted their lack of preparedness for managing this group of patients.<sup>[5]</sup> This article also identified that the FY doctors had a lack of experience in managing acutely ill patients who have multiple chronic conditions, a lack of teaching and clinical decision-making support, and that they would also value access

to digital point-of-care information systems (POCIS) to help them.

Digital POCIS have the potential to support junior doctors in the management of acutely ill patients with multiple chronic conditions by providing timely evidence-based information.<sup>[6]</sup> This timely access to information is an important consideration for the FY doctors in adopting the use of a digital POCIS.

BMJ Best Practice Comorbidities Manager (<http://bestpractice.bmj.com/info/comorbidities>) has been recently developed in response to the identified need for a specific digital POCIS for the support of junior doctors'

**Address for correspondence:** Dr. Kieran Walsh, BMJ, BMA House, Tavistock Sq, London WC1H 9JR, United Kingdom. E-mail: [kmwalsh@bmj.com](mailto:kmwalsh@bmj.com)

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management of patients with multiple chronic conditions. Unlike other available digital POCIS, it is the first to have a specific focus on acutely ill patients with multiple chronic conditions. It is available as an offline app for mobile phones to allow ease of access at the point of care, but it can also be accessed directly from the internet. The BMJ Best Practice Comorbidities Manager provides rapid access to a range of self-directed resources to act as a prompt when making clinical management decisions. The resource combines the main presenting condition of the patient, such as acute pneumonia, with one or more chronic conditions, such as hypertension, diabetes, and depression. The resource presents key relevant evidence-based information, including best practice guidelines, which highlights essential considerations for managing the patient, such as important warning signs of potential complications due to the multiple chronic health problems. The research evidence and guidelines are reviewed by an expert panel to ensure relevance and quality.

The aim of this pilot study was to evaluate the usefulness of the BMJ Best Practice Comorbidities Manager in providing relevant and useful information to support junior doctors' clinical management of acutely ill patients with multiple health conditions.

## MATERIALS AND METHODS

Junior doctors enrolled in the UK Foundation Programme based at Wrightington, Wigan, and Leigh Teaching Hospitals NHS Foundation Trust were invited by email to participate in the study. Following anonymous online registration, participants could download the BMJ Best Practice Comorbidities Manager app to their mobile phone. Participants were advised to use the digital POCIS during their usual clinical duties.

The BMJ Best Practice Comorbidities Manager was provided without charge to the junior doctors throughout the study. No financial inducements were paid to the participants.

An invitation to complete an online semi-structured questionnaire (JISC online surveys <https://www.onlinesurveys.ac.uk>) was sent to the participants, 12 weeks after receiving access (see attached questionnaire). Consent was implied by anonymous completion of the questionnaire. Quantitative data was collected using Likert-style responses and was analyzed using descriptive statistics. Template analysis was used to analyze qualitative data obtained from free-text comments in themes with illustrative quotations.<sup>[7]</sup>

The evaluation was approved by the Faculty Research Ethics Committee of the Faculty of Health, Social Care and Medicine at Edge Hill University and approved by the Research Department at Wrightington, Wigan, and Leigh Teaching Hospitals NHS Foundation Trust.

## RESULTS

A total of 30 junior doctors took part and 20 fully completed the questionnaire.

### (a) Quantitative results

17 (85%) participants had used the BMJ Best Practice Comorbidities Manager to help them to provide evidence-based care for acutely unwell patients with associated multiple chronic conditions.

15 (75%) participants either agreed (5) or strongly agreed (10) that they had obtained useful information from the BMJ Best Practice Comorbidities Manager, with 5 being ambivalent. In addition, 19 (95%) participants considered that they could apply the information obtained from the BMJ Best Practice Comorbidities Manager to provide evidence-based treatment, with 3 in strong agreement, 16 in agreement, and one ambivalent.

4 participants (20%) agreed (3) or strongly agreed (1) that were barriers to the use of the BMJ Best Practice Comorbidities Manager. 9 (45%) participants either strongly disagreed (3) or disagreed (6) that there were barriers, with 7 being ambivalent.

### (b) Qualitative data

The free-text comments are presented as themes and supported by illustrative comments.

There were 38 comments about how the digital POCIS was useful in obtaining ( $n = 15$ ) and applying ( $n = 13$ ) information on evidence-based treatment for acutely unwell patients with multiple chronic conditions. The themes were as follows:

#### (1) Focus on relevant information

“Directed my thoughts to the most relevant points that I needed to focus on and gave me the info that I needed.”

#### (2) Current information

“I liked that it linked to recently updated guidelines.”

#### (3) Information when required

“Handy and helps when in doubt.”

#### (4) Increased confidence

“Gave me the confidence that what I was doing was right until a senior was able to review.”

#### (5) Ease of use

“Good user interface and app to navigate information needed to apply.”

There were 11 comments about the barriers to using information on the digital POCIS. The themes were:

#### (1) Structured search required

“Need for specific differential to get management protocol.”

## (2) Required to navigate the information

“Sometimes the screen is a bit busy and advice is somewhat non-specific.”

## (3) Difficulties with internet connection

“Internet connection within the hospital.”

## DISCUSSION

The quantitative and qualitative data that we obtained from our pilot study show that junior doctors considered that the BMJ Best Practice Comorbidities Manager provided useful information and that this information could be applied to provide evidence-based treatment for the management of acutely ill patients with multiple chronic conditions. This suggests that a digital POCIS that has been specifically designed for junior doctors to support clinical decision-making for the management of acutely ill patients with multiple chronic conditions has the potential to enhance the preparedness of junior doctors in managing this group of patients, especially since our findings have noted the useful application of information to practice.

An important additional aspect of our evaluation was that we identified several barriers to using the BMJ Best Practice Comorbidities Manager. These have important implications for future implementation. The need to structure the search and help navigate the information could be easily resolved by more training. However, a poor Wi-Fi internet connection in the hospital raises concerns about the digital capability of hospitals in the UK. Improving internet access has to be a major priority for action if future clinical care is to be supported by online approaches.<sup>[8]</sup> The junior doctors may not have been aware that once the app had been downloaded on their mobile phone it could function offline and this highlights a specific training need that needs to be addressed for the future, especially since a similar lack of familiarity with technology has been identified in previous studies of digital POCIS in other contexts.<sup>[9]</sup>

The intention of a pilot study is to identify the usefulness of a future intervention before further research and wider implementation.<sup>[10]</sup> The main limitations of this study, which are similar to all pilot studies, are the small sample size and implementation at a single-center. In addition, the data is limited to a self-reported questionnaire and we did not have any objective outcome measures of impact on practice. However, we consider that our findings are of relevance for the future and wider implementation of the digital POCIS (BMJ Best Practice Comorbidities Manager) for junior doctors in other settings. We recommend further research, with a larger and more in-depth exploration of how the BMJ Best Practice Comorbidities Manager can contribute to enhancing the preparedness of junior doctors, especially in different

settings. It may also be useful to compare the effectiveness of BMJ Best Practice Comorbidities Manager with other digital POCIS.

Our evaluation has provided valuable insights that can inform the further implementation of the BMJ Best Practice Comorbidities Manager and similar digital POCIS in both the local site and also more widely in the UK and other contexts. The BMJ Best Practice Comorbidities Manager appears to be a useful and easy-to-use tool for junior doctors managing acutely ill patients with multiple chronic conditions. It also appears to have high potential for enhancing the preparedness of junior doctors in managing this group of patients by providing relevant and useful information. However, there are important barriers to implementation related to the digital capability of hospitals and training of users which need to be addressed for successful implementation.

## Ethical approval

The evaluation was approved by the Faculty Research Ethics Committee of the Faculty of Health, Social Care and Medicine at Edge Hill University and approved by the Research Department at Wrightington, Wigan, and Leigh Teaching Hospitals NHS Foundation Trust.

## Author contributions

JS, JB, and KW conceptualized the study and JD, JS, JB, KW, and AQ were involved in the design of the study and the acquisition of data. JD, JS, and JB conducted the data analysis. JD, JS, JB, KW, and AQ were involved in the writing of the manuscript and approved the final manuscript.

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Nil.

## Conflicts of interests

KW works for BMJ which produces BMJ Best Practice.

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