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Top Research Priorities in Healthcare-Associated Infections in the United Kingdom

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Summary

Background: There is a mismatch between research questions, which are considered to be important by patients, carers, and healthcare professionals and the research performed in many fields of medicine. We found no relevant studies which have assessed research priorities in healthcare-associated infections that have involved patients' and carers' opinions.

Aim: The Healthcare-Associated Infections (HCAI) Priority Setting Partnership was established to identify top research priorities in the prevention, diagnosis, and treatment of HCAI in the UK, taking into account the opinions of all these groups.

Methods: The methods broadly followed the principles of James Lind Alliance (JLA) priority setting activity.

Findings: 259 unique valid research questions were identified from 221 valid responses to a consultation of patients, carers and healthcare professionals after seeking their opinions for research priorities. The steering committee of the Partnership rationalised these to 50 unique questions. A literature review established that for these questions there were no recent high-quality systematic reviews, high-quality systematic reviews which concluded that further studies were necessary, or the steering committee considered that further research was required despite the conclusions of recent systematic reviews. An interim survey ranked the 50 questions and, from the top 32, 10 top research priorities were identified by consensus at a final priority setting workshop of patients, carers and healthcare professionals using group discussions.

Conclusions: A priority-setting process using JLA methods and principles involving patients, carers and healthcare professionals was used to identify top 10 priority areas for research related to HCAI. To address these uncertainties basic, translational, clinical, and public health research would be required.

Keywords: Healthcare-associated infection, research priorities, patients, carers

Introduction

Healthcare-associated infections (HCAIs) can develop either as a direct result of healthcare interventions such as medical or surgical treatment (in secondary care), or from being in contact with a primary healthcare setting [1]. The estimated prevalence of HCAI in Europe is about 6% [2]. Overall, an estimated 2.6 million new HCAI occur every year in Europe [3] and can affect many parts of the body [2]. More than 500 disability-adjusted life years are lost for every 100,000 of the population annually in Europe due to HCAI [3]. In the USA, the total cost of five major HCAIs was approximately $US 10 billion per year [4].

Failure to address treatment uncertainties through research and implementation can lead to significant suffering and deaths [5]. It is important that research in any field of medicine takes into account the shared interests of patients, carers and healthcare professionals [6]. However, there is a mismatch between research questions which are considered important jointly by patients, carers, and healthcare professionals and the research performed in many fields of medicine [7, 8]. The James Lind Alliance (JLA) exists to help address this mismatch [6] . This is achieved by forming 'Priority Setting Partnerships' (PSPs) between patients, carers, and healthcare professionals [6]. Formal prioritisation of research topics jointly by patients and healthcare professionals has led to increased research on the topic [9, 10].

The 'Global infection prevention and control priorities 2018–22' provides details of the priorities in infection prevention and control (IPC) [11], but not the research priorities. In the only published study on research priorities in prevention and control of HCAI, only infection prevention experts were involved [12]. Furthermore, this study identified the broad categories of research priorities rather than specific research questions which could be considered to be research priorities. We believe there has been no formal research prioritisation process involving patients, carers, and healthcare professionals in the field of HCAI.

The aims and objectives of the Healthcare-associated Infections Priority Setting Partnership were to work with patients, their carers, and healthcare professionals tasking them (termed 'stakeholders'), to identify evidence uncertainties about the diagnostic tests and effects of prevention and treatments for HCAI; to agree by consensus a prioritised list of those evidence uncertainties or questions for research; to publicise the results and process; and to take the results to research commissioning bodies, to be considered for funding and researchers, to encourage them to submit grant applications addressing these uncertainties.

Methods

The methods used for this priority setting activity broadly followed the principles and methods as set out in the JLA Guidebook [13]. The broad steps involved the following and are summarised in Figure 1.

1. Formation of the partnership: the final prioritisation to identify the Top 10 priorities for HCAIs was agreed at a priority setting workshop that included 30 stakeholders with a approximately equal mix of patients, carers and clinicians representing organisations and people affected by HCAI, their carers, and healthcare professionals treating people who have had an HCAI. A partnership was formed between PW representing University College London Hospitals NHS Foundation Trust, MC representing MRSA Action UK, and the Healthcare-

Associated Infection Service Users Research Forum (SURF), United Kingdom. A steering committee was formed. The members of the steering committee who participated in the complete process were PW, KG, RM, SB, JB, DB, MC, MK, DL, CM, MM, BO, PT, and AT.

2. Establishment of the scope: the steering committee members discussed and decided that the scope should include all aspects of HCAI including prevention, diagnosis, and treatment. The protocol was published on the JLA website.
3. The process to identify evidence uncertainties or unanswered questions from patients, carers and healthcare professionals was undertaken using online surveys (Google forms and Survey Monkey) and face-to-face surveys. This process gathered deliberately open-ended responses to the consultation, was accessible to a wide range of stakeholders, and respondents were able to say what mattered to them.
4. The next step in the process was to refine and categorise the broad open-ended responses from narrative into more thematic unique questions for research. This process produced a long list of thematic questions.
5. Interim prioritisation: in order to reduce the long list of questions to a shorter list to be discussed at a face-to-face final prioritisation workshop, members of the steering committee were each asked to select 20 questions which they thought required further research. In order to ensure both patient, carer and clinician points of view were considered, only questions identified by at least one healthcare professional and a patient representative of the steering committee, as an important research priority, were included in the interim set of 50 questions. If there were less than 50 questions identified as important by at least one healthcare professional and one patient representative, further questions which obtained the highest total ranks from the steering committee members (which were converted to scores: for rank 1, it was 20; for rank 2, it was 19; for rank 3, it was 18 and so on) were identified to constitute the top 50 research questions.
6. In order to ensure that only 'unanswered' questions were included in the prioritisation process, i.e. excluding those that had already been answered by research, we checked the existing evidence. Questions were considered 'answered' when recently published (within the last three years) and when high-quality systematic reviews (based on low risk of bias studies) concluded that further research was not required. We considered them unanswered when there were no recent high-quality systematic reviews, when high-quality systematic reviews concluded that further studies were necessary, or when the steering committee considered that further research was required despite the conclusions of recent systematic reviews. These unanswered research questions were classified as 'uncertainties'.
7. To reduce this list of 50 uncertainties down to 32 to be discussed in the final workshop, we conducted an online survey (Google form) and face-to-face survey. The participants were asked to identify the top 10 priorities based on their experience. The questions were selected on the basis of the number of times they were identified as top 10 uncertainties by the respondents.
8. Final prioritisation by consensus
    a. The top 10 questions were identified by small group and large group discussions in the final workshop involving 30 participants (15 healthcare professionals and 15 patients, carers, and public representatives). The healthcare professionals included microbiologists, infection nurse specialists, intensive care unit specialists, surgeons, and clinical researchers in the field of HCAI.

b. The participants in the final workshop were divided into three small groups with roughly equal representation of healthcare professionals and patients, carers, and public representatives.
c. Each small group was facilitated by a neutral, trained JLA facilitator. Each participant in each discussion group was asked to identify their top three and bottom three research questions (of the 32 research questions discussed in the final workshop) and provide the reasons for their choice. The questions were then compiled into the following five groups: top research questions without featuring in the bottom three of any participant; bottom research questions without featuring in the top three of any participant; featuring more in the top than bottom; featuring more in the bottom rather than top; and not featuring in the top or bottom. The main discussion was around where the last three groups fitted: towards the top group or bottom group. During a two hour discussion, participants were allowed to view the rank of the question based on the number of times a question featured in the top 10 in the interim survey of 50 questions. Consensus was reached by discussion. Following the first set of small group discussions, the questions were ranked in order based on the aggregate results of the first set of small group discussions.
d. This was followed by a short large group session in which the aggregate results from all the first group sessions were presented, clearly indicating the similarities and differences in the ranking between the different small groups.
e. This was then followed by a second set of small group discussions (after mixing the groups, ensuring equal representation of healthcare professionals and patients, carers, and public) lasting about 45 minutes. As in the case of the first set of small group discussions, each small group discussion was led by a JLA facilitator. The second set of small group discussions involved discussing any questions that the group felt were not ranked correctly and revising the ranks by consensus.
f. Following the second set of small group discussions, the aggregate ranking from the second set of small group discussions was summarised. After this, large group discussions were carried out to arrive at a consensus on the top 10 priorities. In the large group discussions, decisions were also made about combining the questions and rewording the questions to improve clarity following discussion and consensus.

Ethical approval was not deemed necessary for online surveys because no personal identifiable information was collected, and the questions being asked of healthcare professionals, patients and their carers were not considered sensitive questions. In addition, we had the full support of patient organisations with involvement of patient representatives throughout the whole process rather than patients visiting the hospitals. For face-to-face surveys conducted at University College London Hospitals NHS Trust, we obtained ethical approval from NHS Research Ethics Committee (South West - Frenchay Research Ethics Committee (REC); REC number: 16/SW/0208).

Patient and Public Involvement

Patients and the public were involved in all aspects of this project. In line with the principles of the JLA, the views of patients and carers, i.e. those with lived experience, were given equal weighting to healthcare professionals. For example, patients and carers were part of the steering committee and were involved in the definition of the scope, methodology used for the prioritisation process, identification of further patients and public representatives, participated in the interim prioritisation

and final workshop, and reviewed the draft report. They will be involved in the dissemination of the findings through patient websites, patient forums, and to research funders.

Results

Identification and refining of research uncertainties

134 patients, carers, and those at risk of developing HCAI, and 87 healthcare professionals provided valid research questions which fell under the scope of this prioritisation process in the first survey that was conducted between April 2015 and June 2017. This survey resulted in 259 unique valid research questions. The complete list of 259 unique valid research questions in no particular order is available in Online Supplement Appendix 1. This has been converted to the population, intervention, control, and outcomes (PICO) format whenever possible.

Interim priorities

To identify an interim shortlist of questions (from the list of 259 questions) that were to be considered for the next step, 43 research questions were identified on the basis of being selected by at least one patient or carer and healthcare professional of the steering committee and an additional seven questions were identified on the basis of obtaining the highest ranks among the members of the steering committee. This process was conducted between June 2017 and August 2017. The list of 50 questions identified as interim priorities is available in Online Supplement Appendix 2. The interim ranking of the 50 questions to 32 questions was carried out between January 2018 and September 2018. 44 valid responses were obtained during this period. The list of 32 questions that were discussed in the final workshop, the conclusions from any recent systematic reviews (published in the previous three years), the number of times it was identified in the top 10 priorities, and comments on interpretation by systematic review authors are available in Online Supplement Appendix 3.

Final workshop

The final workshop took place in February 2019. The rankings of the questions in the different small groups facilitated by the three JLA Advisers are listed in Online Supplement Appendix 4 and Online Supplement Appendix 5 respectively. The final ranking of the 32 questions following the small group discussions is listed in the Online Supplement Appendix 6. Two pairs of questions were combined and two questions were revised to improve the clarity. The final list of top 10 priorities in the order of ranking is listed in Table I.

Discussion

This, we believe, is the first research priority setting partnership on Healthcare-Associated Infections involving patients and carers. This included a wide range of HCAIs and 259 unique research questions were identified that met the scope of this priority setting partnership. By both small and larger group discussions, consensus was reached on the top 10 research priorities.

In general, the research priorities were broad: most of the top 10 priorities could include different patient populations, interventions, and controls. The research questions for primary research may have to be decided by existing or new systematic reviews and/or group discussions among researchers, clinicians, and patients to identify the patient groups and interventions which are most likely to result in clinical benefit.

There are several potential limitations to our priority setting process. The first one is selection of the steering committee. We selected a steering committee with representation from different types and specialities of healthcare professionals as well as patients and carers. Except for the interim prioritisation which required shortlisting from 259 questions to 50 questions, non-steering committee members were involved in the remaining processes. This might have decreased any bias due to the research interests of the steering committee members. The second one is the use of open discussions to achieve consensus. There can be perceived or real power imbalances in such open discussions, particularly when a group of stakeholders consider another group of stakeholders as being more knowledgeable. However, the involvement of neutral JLA facilitators in the final priority setting workshop meant that the principles of the JLA were upheld. They aimed to ensure that the viewpoints of those with lived experience were equal to those from people professional backgrounds. Their role in the workshop was to ensure that all voices around the table were given equal opportunity to input and provide their perspectives. Therefore, the impact of perceived knowledge imbalance is likely to be small. The third potential limitation is the subjectivity of the process. There were some major differences in the first round of small group discussions; however, by the second round of small group discussions the differences had decreased, and in the third round, consensus was reached. This might have been because of shifting views of people based on discussions, but could also be due to fear of opposing general views because of lack of anonymity. However, these are all recognised limitations in this form of priority setting partnership process. These potential limitations were minimised in our research priority setting partnership.

The steering committee was constituted of representatives from England only. Most of the participants in the small and large group discussions belonged to England. However the findings are likely to be applicable in countries with a similar spectrum of HCAI and similar treatment options available.

Conclusion

In summary, there are significant uncertainties in the prevention, diagnosis, and treatment of HCAI. Further high-quality research is necessary to address these uncertainties, which may require programmes of basic, translational, clinical, and public health research. For issues with diverse and unproven treatment options, randomised controlled trials may be the only mechanism for identifying the most effective treatment and the treatments that represent good value for money for the NHS.

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Contribution of Authors

Peter Wilson – lead microbiologist of the steering committee, funded and supervised the researcher performing the face-to-face surveys, organised the final workshop, revised the manuscript based on the feedback from co-authors, and completed some sections of the tables

Kurinchi Gurusamy – converted the questions to 'PICO' (participant, intervention, control, outcome format), designed online surveys, was methodological lead of steering committee, and wrote the first draft of the manuscript

Richard Morley – Steering committee, lead JLA advisor

Caroline Whiting and Beccy Maeso – provided JLA-related advice on the process and manuscript

Graham FitzGerald – collected face-to-face data

Susan Bennett, Jennifer Bostock, David Brealey, Maria Cann, Martin Kiernan, David Leaper, Catherine McKenzie, Michael Moore, Beryl Oppenheim, Patrick Thompson, Alison Tingle – Steering committee members and suggested revisions to the manuscript

Conflicts of Interest

PW: Roche Drug Safety Monitoring Group, MSD paid lectures

DL: Chair NICE Guideline Development Group on Surgical Site Infection, paid consultant advisor for Johnson & Johnson.

SB: Guideline development group EPIC3

BO: Consultant Microbiologist now working for Cepheid.

MK: Now working for GAMA Healthcare, UK

All other authors none declared.

Data Sharing Agreement

All data is available in the manuscript or in the supplementary file.

Table I. Top 10 research priorities in healthcare-associated infections

1	How can infections be identified early?
2	How can we change the behaviour of healthcare professionals to follow best practices in preventing and controlling HCAI?
3	Can rapid point-of-care testing (bedside testing) for infections decrease antibiotic use, decrease community antibiotic resistance, and improve patient outcomes in primary and secondary care?
4	What is the most effective cleaning agent, technique, and systems to prevent multi-drug resistant organisms?
5	Can antibiotic stewardship policies (including decreased antimicrobial use by health professionals) decrease antibiotic resistance, and do they cause any harm to the patients?
6	How can we educate patients to look for clinical signs of HCAI?
7	What is the role of change of bacteria in patients or the environment in the development of infection in hospital?
8	In people with antibiotic resistant bacteria, what is the impact of single room isolation compared with open-ward care in the overall care and mental health of the person with antibiotic resistance and in preventing transmission of infections to others?
9	Does infection prevention and control training of patients and carers help in the prevention of infection in patients at high risk of infections being cared for in their own homes?
10	How can the development and severity of urinary tract infections in elderly be decreased?

Notes

Priority 3: Rapid point of care testing has the potential to identify people with infection and initiate the appropriate antibiotic. This will avoid giving ineffective antibiotics to people with infection and also avoid unnecessary antibiotics to those who do not have infection. This has the potential to decrease antibiotic resistance. Primary care indicates early diagnosis of infection by the General Practitioner; secondary care indicates early diagnosis of infection in the hospital.

Priority 4: 'Prevention' refers to the acquisition of multi-drug resistant organisms.

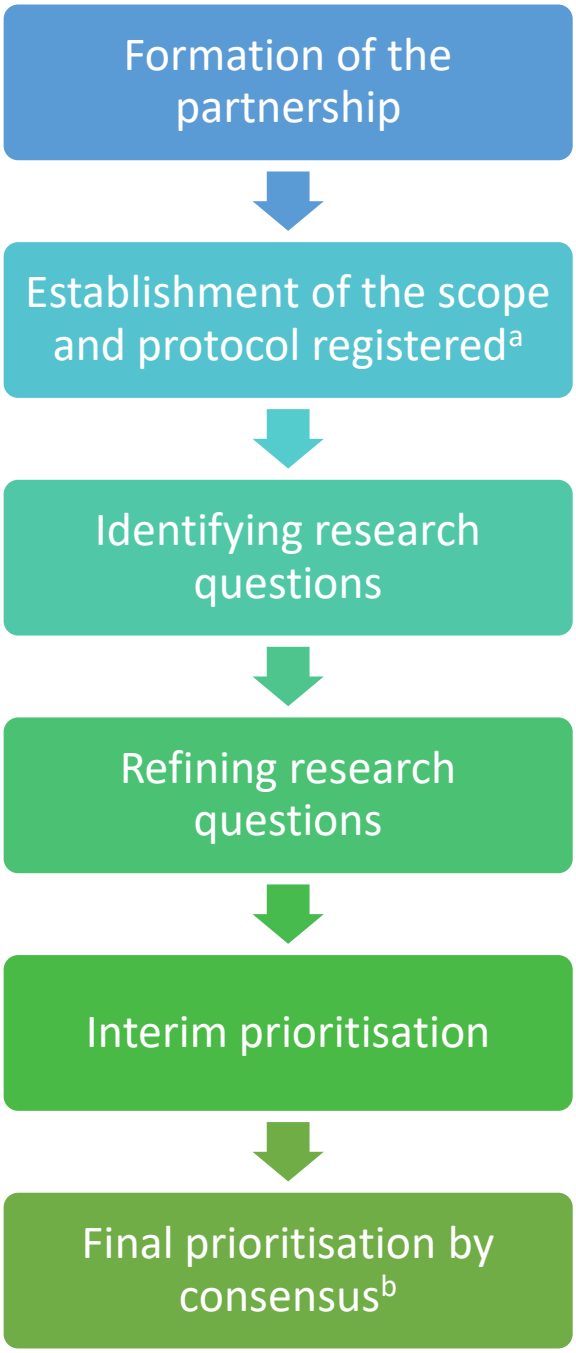
*Priority 7: '*Change of bacteria' refers to the microbiomes in the environment and in the patient

Figure 1: Research prioritisation steps

The steps in the research prioritisation are shown in the figure.

[a]The protocol was agreed and published on the JLA website.

[b] The final prioritisation to identify the Top 10 priorities for HCAIs was agreed at a priority setting workshop that included up to 30 patients, carers and clinicians.



References

[1] NHS Improvement. Healthcare-associated infections. https://improvement.nhs.uk/resources/healthcare-associated-infections/ 2017 [accessed on 6 April 2019].

[2] European Centre for Disease Prevention and Control. Point prevalence survey of healthcare-associated infections and antimicrobial use in European acute care hospitals 2011–2012. https://ecdc.europa.eu/sites/portal/files/media/en/publications/Publications/healthcare-associated-infections-antimicrobial-use-PPS.pdf 2013 [accessed on 6 April 2019].

[3] Cassini A, Plachouras D, Eckmanns T, Abu Sin M, Blank HP, Ducomble T, et al. Burden of Six Healthcare-Associated Infections on European Population Health: Estimating Incidence-Based Disability-Adjusted Life Years through a Population Prevalence-Based Modelling Study. PLoS Med 2016;13:e1002150.

[4] Zimlichman E, Henderson D, Tamir O, Franz C, Song P, Yamin CK, et al. Health care-associated infections: a meta-analysis of costs and financial impact on the US health care system. JAMA Intern Med 2013;173:2039-2046.

[5] Chalmers I. Confronting therapeutic ignorance. BMJ 2008;337:a841.

[6] James Lind Alliance Priority Setting Partnerships. About the James Lind Alliance. http://www.jla.nihr.ac.uk/about-the-james-lind-alliance/ 2018 [accessed 6th April 2018].

[7] Crowe S, Fenton M, Hall M, Cowan K, Chalmers I. Patients', clinicians' and the research communities' priorities for treatment research: there is an important mismatch. Research Involvement and Engagement 2015;1:2.

[8] Tallon D, Chard J, Dieppe P. Relation between agendas of the research community and the research consumer. The Lancet;355:2037-2040.

[9] James Lind Alliance Priority Setting Partnerships. Tinnitus PSP: What's happening to address the priorities more than 4 years later? http://www.jla.nihr.ac.uk/news/tinnitus-psp-whats-

happening-to-address-the-priorities-more-than-4-years-later/5299 2017 [accessed on 2 December 2018].

10. National Institute for Health Research. Adding value in research 1: Identifying important research topics. https://www.nihr.ac.uk/about-us/documents/pillar-1-identifying-research.pdf 2018 [accessed on 2 December 2018].

[11] Allegranzi B, Kilpatrick C, Storr J, Kelley E, Park BJ, Donaldson L, et al. Global infection prevention and control priorities 2018-22: a call for action. Lancet Glob Health 2017;5:e1178-e1180.

[12] Dettenkofer M, Humphreys H, Saenz H, Carlet J, Hanberger H, Ruef C, et al. Key priorities in the prevention and control of healthcare-associated infection: a survey of European and other international infection prevention experts. Infection 2016;44:719-724.

[13] James Lind Alliance Priority Setting Partnerships. JLA guidebook. http://www.jla.nihr.ac.uk/jla-guidebook/ 2018 [accessed 6th April 2018].