Institution: University of West London

Unit of Assessment: UOA 3 - Allied Health Professions, Dentistry, Nursing and Pharmacy

Title of case study: Driving best practice in preventing healthcare associated infection by informing policy

Period when the underpinning research was undertaken: 2000 to 2020

Details of staff conducting the underpinning research from the submitting unit:

Name(s):	Role(s) (e.g., job title):	Period(s) employed by submitting HEI:
Heather Loveday	Professor of Evidence-based Healthcare	1994 - to present
Jennie Wilson	Professor of Healthcare Epidemiology	2005 - to present
Robert Pratt	Professor of Nursing	1994 –2011 [retired]
Alison Tingle	Research Development Lead	2006 – to present
Carole Pellowe	Principal Lecturer	1994 – 2011
Simon Jones	Lecturer	2002 – 2009
Peter Harper	Senior Lecturer	1994 – 2010 [retired]

Period when the claimed impact occurred: August 2013 to December 2020

Is this case study continued from a case study submitted in 2014? No

1. Summary of the impact (indicative maximum 100 words)

Healthcare workers need to know how they should deliver care to protect their patients from healthcare-associated infections. A series of guidelines on evidence-based practice in infection control (epic) have been produced by a research team led from and largely based at the University of West London. These NICE-accredited guidelines synthesised the best quality evidence into simple recommendations. They are a principal source of evidence for national quality standards; are widely utilised by infection control specialists; and feature in local NHS Trust policies. Practitioners in other countries, including Romania and Australia, have used them to underpin their own policy and practice. The latest iteration of the guidelines (epic3), alongside additional UWL research, have led to further improvement initiatives, such as on non-sterile glove use at Great Ormond St. Hospital and on the design of patient hand hygiene products by GAMA Healthcare Ltd.

2. Underpinning research (indicative maximum 500 words)

National evidence-based guidelines for preventing healthcare-associated infections (HCAI) in NHS hospitals in England were commissioned by the Department of Health and developed by a nurse-led multi-professional team of researchers and specialist clinicians led from and largely based at the University of West London (UWL).

These guidelines – epic (evidence-based practice in infection control) – were first published in 2000 and updated by the UWL research team in 2007 (epic2) and 2013 (epic3). [R1, R2 and R3]

A cardinal feature of evidence-based guidelines is that they are subject to timely review in order that new research evidence and technological advances can be identified, appraised and, if shown to be effective for the prevention of HCAI, incorporated into amended guidelines.

The evidence for the guidelines was identified by multiple systematic reviews of experimental and non-experimental research and expert opinion as reflected in systematically identified professional, national and international guidelines, and formally assessed through an appraisal process validated by the National Institute for Health and Care Excellence (NICE).

The original guidelines described the precautions healthcare workers should take in three areas: standard principles for preventing HCAI, which include a) hospital environmental hygiene, hand

hygiene, the use of personal protective equipment, and the safe use and disposal of sharps; b) preventing infections associated with the use of short-term indwelling urethral catheters; and c) preventing infections associated with central venous catheters.

A critical assessment of the updated evidence in 2004 indicated that the original epic guidelines remained robust, relevant and appropriate but that adjustments needed to be made to some guideline recommendations. These updated national guidelines (epic2), published in 2007, continued to provide comprehensive recommendations for preventing HCAI in hospitals and other acute care settings based on the best currently available evidence.

A second update was commissioned by the Department of Health in 2012 and published in December 2013. The epic3 guidelines included 19 new guidance recommendations on supporting patient hand hygiene, the removal of personal protective clothing, aseptic technique and on systems to support the timely removal of urethral catheters and intravenous devices.

The UWL team also conducted related research on the implementation of epic3 guideline recommendations. This established that there was a widespread problem in the misuse of non-sterile gloves in acute care settings with potential risks of cross-contamination and significant avoidable costs. They therefore developed a validated method of measuring potential cross-contamination associated with gloves. [R4]

The team extended this work to explore the attitudes of healthcare workers towards gloves as this was important to understand barriers to change and strategies for improving practice. They used these findings to develop a novel framework, underpinned by human factors and ergonomics theory, aimed at driving improvement in glove use. [R5]

A new recommendation in epic3 was that patients and relatives should be provided with information about the need for hand hygiene and how to keep their own hands clean to protect them from acquiring pathogens during their hospital stay. Research, conducted with the support of a commercial organisation (GAMA Healthcare Ltd) that makes clinical wipes, tested a practical approach to supporting patient hand hygiene based on use of hand wipes in an acute elderly care setting. [R6]

3. References to the research (indicative maximum of six references)

R1. Pratt RJ, Pellowe C, Loveday HP, Robinson N, Smith GW, Barrett S, Davey P, Harper P, Loveday C, McDougall C, Mulhall A, Privett S, Smales C, Taylor L, Weller B, Wilcox M; Department of Health (England). The epic project: developing national evidence-based guidelines for preventing healthcare associated infections. Phase I: Guidelines for preventing hospital-acquired infections. Department of Health (England). J Hosp Infect. 2001 Jan;47 Suppl:S3-82. doi: 10.1053/jhin.2000.0886.

R2. RJ Pratt, CM Pellowe, JA Wilson, HP Loveday, PJ Harper, SRLJ Jones, C McDougall, MH Wilcox (2007), epic2: National Evidence-Based Guidelines for Preventing Healthcare-Associated Infections in NHS Hospitals in England, Journal of Hospital Infection, Volume 65, Supplement 1, Pages S1-S59, https://doi.org/10.1016/S0195-6701(07)60002-4.

R3. Loveday, Heather, Wilson, Jennie, Pratt, Robert, Golsorkhi, Mana, Tingle, Alison, Bak, Aggie, Browne, Jessica, Prieto, Jacqui and Wilcox, Mark (2014) epic3: national evidence-based guidelines for preventing healthcare-associated infections in NHS hospitals in England. Journal of Hospital Infection, Volume 86, Supplement 1, Pages S1-S70, https://doi.org/10.1016/S0195-6701(13)60012-2

R4. Wilson, Jennie, Prieto, Jacqui, Singleton, Julie, O'Connor, Vivienne, Lynam, Siobhan and Loveday, Heather (2015) The misuse and overuse of non-sterile gloves: application of an audit tool to define the problem. Journal of Infection Prevention, 16 (1). pp. 24-31. https://doi.org/10.1177/1757177414558673

R5. Wilson, Jennie, Bak, Aggie and Loveday, Heather (2017) Applying human factors ergonomics to the misuse of non-sterile clinical gloves in acute care. American Journal of Infection Control, 45 (7). pp. 779-786. https://doi.org/10.1016/j.ajic.2017.02.019

R6. Loveday, Heather, Tingle, A and Wilson, Jennie (2020) Using a multi-modal strategy to improve patient hand hygiene. American Journal of Infection Control, Published: December 19, 2020 https://doi.org/10.1016/j.ajic.2020.12.011

Quality Statement:
All outputs have been published in peer-reviewed journals. The process used by UWL to produce the epic3 guidelines was accredited by NICE. R1 and R2 were submitted to RAE 2008 by UWL (then known as Thames Valley University). R3 was submitted to REF2014 by UWL in UOA 3. R5 has been submitted to REF2021 by UWL in UOA 3.

Major Grants:

a. PI: Robert Pratt-2008 Heather Loveday 2008-2014; HCAI Research Network; Dept of Health, Policy Research Programme; 2006-14; £820,000

b. PI; Heather Loveday; Evaluation of MRSA target; Dept of Health Policy Research Programme; 2009-10; £90,000

c. PI: Heather Loveday; Healthcare Economy Evaluation; Dept of Health Policy Research Programme; 2010; £55,000

d. PI: Heather Loveday; Patient experience of MRSA screening; Dept of Health Policy Research Programme; 2012-2013; £65,000

e. PI: Heather Loveday, Epic3. Dept of Health Policy Research Programme; 2012-13; £115,000

f. PI: Jennie Wilson; Patient hand hygiene; GAMA Ltd; 2018; £34,000.

4. Details of the impact (indicative maximum 750 words)

Healthcare associated infections are estimated by Public Health England to affect 6% of patients admitted to hospital in the UK and are associated with significant morbidity and mortality, whilst the treatment of HCAI consumes considerable NHS resources. Many of these infections occur because healthcare workers transfer pathogens on their hands from one patient to another or to the healthcare environment. In addition, invasive devices commonly used to treat patients provide a mechanism for pathogens to enter the body unless care is taken to protect them.

Healthcare workers need to know how they should deliver care to protect their patients from HCAI. Epic guidelines synthesised the best quality evidence into simple recommendations which healthcare providers have used to develop evidence-based policy and enable their staff to apply best practice.

This case study focuses on new impact achieved since August 2013 associated with epic3 and with the related research conducted by the UWL team, although there are also on-going benefits from the previous editions of the guidelines.

Accreditation and professional use of epic3
The epic3 guidelines were accredited by the National Institute for Health and Care Excellence (NICE). This means that NICE have assessed the guideline development process as meeting international standards and this accreditation ensured that they were recognised as a trusted source by all NHS Trusts in England.

The updated guidelines were published in a leading UK healthcare associated infection journal and by December 2020 Plumx metrics showed over 530 citations, 1300 captures and 75 social media mentions. Dame Sally Davies, then Chief Medical Officer, wrote the foreword to epic3, saying:

> In March 2013, my Annual Report on 'Infection and the rise of antimicrobial resistance' highlighted the need for healthcare professionals to understand and put into practice the principles of infection prevention and control in order to improve patient outcomes. These updated guidelines underpin and provide the knowledge base to inform this understanding, and I commend them to you.

Evidence of the widespread professional usage of epic3 was demonstrated in a survey undertaken in 2018 by NHS Improvement as part of their work to reduce Gram-negative bloodstream infection.

The stakeholder survey generated 221 responses from across the health and care sector, more than half of whom were infection and prevention control (IPC) specialists. When asked "How do you currently access IPC guidance documents (or other documents in your clinical profession e.g., urology, hydrations, continence, surgery)?", 55% of the respondents said they did so via epic3. The only sources more frequently used were NICE, Google searches and the NHS Improvement Gram-negative resource website. [S1, pp.8-9]

A testimonial provided on behalf of the Healthcare Infection Society said that:

> EPIC guidelines are an important and standard resource for all hospital practitioners. They have influenced infection prevention and control policy and have been pivotal in underpinning guideline production by HIS. [S2]

Contribution to national quality standards

Epic3 was used by the NICE Quality Standards Advisory Committee as one of the four evidence sources for the development of the Quality Standard for Infection Prevention and Control QS61 (updated April 2014 QS610). [S3, p.34] These standards define expected practice in the NHS, and are used to support measurement and drive quality improvement.

Epic3 also underpinned the approach to clinical practice and patient management used for *The Health and Social Care Act 2008, Code of Practice on the prevention and control of infections and related guidance* (Dept of Health, July 2015) [S4, p77] and the Care Quality Commission Regulation 12 (defined by QS61) which forms the basis for inspection and assurance of safety in relation to infection prevention and control in all health and social care organisations in England.

National HCAI policies

The epic3 guidelines have been used to support a wide range of national policies on the prevention and control HCAI. In 2017, NHS Improvement included the guidelines as a critical component of prevention strategies for the control of Gram-negative bacteraemia which are now emerging as a major cause of HCAI. [S5]

The guidelines are also part of the Antimicrobial Resource Handbook published by Public Heath England in 2017 and used across the NHS in response to the national initiative to reduce antimicrobial resistance led by the Chief Medical Officer for England. [S6, p.12]

Local HCAI policies

Prior to the publication of these guidelines, local practice related to HCAI prevention varied widely. Epic3 has ensured that healthcare organisations are able to update their local policies with the most recent, reliable evidence, implement change in practice locally and disseminate evidence to their staff. As these are a recognised and accredited national guideline, all NHS Trusts include them in their local policies; corroborating examples listed here are those from Mid Essex Hospital Services NHS Trust and Gateshead Health NHS Foundation Trust. [S7]

International take-up of epic3

There has also been take up of the epic3 guidelines in other countries. This includes infection prevention guidelines in European countries which do not have their own guideline development systems. The President of the Asociatia pentru Prevenirea si Controlul Infectiilor (APCI), a national multi-disciplinary organisation for healthcare professions working in infection prevention and control in Romania, has written:

> We have limited resources for the production and systematic synthesis of the evidence to underpin practice in our health system. Following an ECDC visit to Romania in 2016 which made a range of recommendation, APCI have adopted and adapted different international and national guidelines (including EPIC3) to underpin infection prevention and control policies in hospitals. The recommendations also provide an evidence-based approach to staff education and training in infection prevention and control. The information provided in this document helped our medical system to evolve and offer high quality and safer health service to patients and develop better policies for the future. [S8]

Recent specific guidance on the management of vascular devices in Australia quoted epic3 as one of the earliest examples of guidelines recommending that criteria for the removal of peripheral

intravenous catheters should shift from a time-based policy to one based on clinical criteria. [S9, pp 1-2]

Changes in healthcare practice and products following epic3

The research team's findings on the overuse and misuse of gloves and their recommendations have contributed to the adoption of initiatives by healthcare organisations to address this issue. In one instance, a project to improve non-sterile glove use at Great Ormond Street Hospital for Children in 2018 built on their evidence. The published outcomes from the project said there were demonstrable cash savings of £90,000 in one year from reducing glove purchases; an 18-tonne reduction in waste; and no increase in the number of staff reporting skin problems. [S10]

The findings from the UWL research on supporting patient hand hygiene in hospital settings have informed the design of hand wipes and their packaging by GAMA Healthcare Ltd, who manufacture infection prevention and control products. The research has shown that systems for healthcare staff to offer patients the opportunity to wash their hands were not readily available, and that an alternative solution was required for this infection control measure. It had also found that in real-world clinical settings, single patient hand wipes were mostly discarded unopened because patients did not know what they were for, and that wipes were difficult for older people to open. These findings enabled GAMA to address practical problems they faced with pack design such as pack closures that prevent wipes drying out, package messaging that makes the purpose of the wipes clear, and the ideal pack size for use in clinical settings. [S11]

5. Sources to corroborate the impact (indicative maximum of 10 references)

S1. NHS Improvement, Stakeholder Review, Evidence, guidance and examples of practice to reduce Gram-negative bloodstream infections, results of the survey. March 2019.

S2. Letter from Healthcare Infection Society, dated 16/10/20.

S3. NICE, Infection Prevention and Control, Quality standard 61, Published: 17 April 2014 www.nice.org.uk/guidance/qs61

S4. Dept. of Health, The Health and Social Care Act 2008 Code of Practice on the prevention and control of infections and related guidance, July 2015 and https://www.cqc.org.uk/guidance-providers/regulations-enforcement/regulation-12-safe-care-treatment#hide13

S5. https://improvement.nhs.uk/resources/fundamental-standards-and-legislation-england/

S6. Public Health England, Antimicrobial Resistance Resource Handbook, March 2017.

S7. Mid-Essex Hospitals Services NHS Trust, Policy for Standard Infection Prevention Precautions, Clinical Guideline, Implementation date: 12th February 2018. Gateshead Health Standard Precautions for the Prevention and Control of Infection. Implementation date 01 September 2019.

S8. Letter from President of APCI - Asociatia pentru Prevenirea si Controlul Infectiilor, Romania dated 01/03/2021

S9. Takashima M, Cooke M, DeVries M, et al. An Implementation Framework for the Clinically Indicated Removal Policy for Peripheral Intravenous Catheters [published online ahead of print, 2020 Aug 18]. J Nurs Care Qual. 2020;10.1097/NCQ.0000000000000507. doi:10.1097/NCQ.0000000000000507.

S10. H. Dunn, A programme to cut inappropriate use of non-sterile medical gloves, Nursing Times, Sept 2019 (Vol 115, issue 9). https://www.nursingtimes.net/clinical-archive/infection-control/programme-cut-inappropriate-use-non-sterile-medical-gloves-20-08-2019/

S.11 Letter from Joint CEO & Co-Founder, GAMA Healthcare Ltd, dated 15/3/21.