



EVIDENCE SYNTHESIS
IRELAND



Cochrane
Ireland

Evidence Synthesis Ireland Fellowship Scheme

Review Identification Form

Review Centre/Group

Miriam Brazzelli and Shaun Treweek, Aberdeen Centre for Evaluation, University of Aberdeen, UK

Review title

What is the clinical and cost-effectiveness of local antibiotics in patients undergoing surgery for open fractures?

Review type and methods

We aim to conduct a critical systematic review of the existing evidence on the clinical effectiveness and cost-effectiveness of local antibiotics in patients undergoing surgery for open fractures. Additionally, we aim to identify current research gaps to inform clinical decision-making, including providing insights to the Royal College of Surgeons, and to guide the design of future primary clinical studies.

Review methods: We will adhere to the PRISMA guidelines and the recommendations from the Cochrane Handbook for Systematic Reviews of Interventions.

We will search major electronic clinical databases (e.g., Medline, Embase, CINAHL, CENTRAL, Sciences Citation Index) using a combination of database index terms and text words. We will also search for ongoing clinical studies. Search strategies will be agreed upon with content experts and patient partners to ensure we are not missing relevant search terms. Two researchers will be involved in the screening of search results and data extraction. We will include quantitative studies focusing on the use of local antibiotics for open fractures to prevent infections. We will assess the methodological quality of the included studies using currently recommended tools (e.g. Cochrane risk of bias tool). Where appropriate, meta-analyses will be performed using a random-effects model. If meta-analysis is not feasible, a narrative synthesis will be conducted.

An economic model will be developed to assess the cost implications of using various antibiotic products (e.g., powders, antibiotic-coated nails, and implants) and to evaluate their impact on health outcomes, including length of hospital stay and reoperation rates. The analysis will focus

on estimating the incremental costs and health benefits associated with these interventions, providing results relevant to the NHS.

Findings will be published in peer-reviewed journals and presented to stakeholders, including clinicians, policymakers, and patient advocacy groups.

Please confirm that no existing review exists that addresses the review question

Although there are a few systematic reviews that focus on specific types of fractures or local antibiotic applications (e.g., antibiotic powders, antibiotic-coated nails), no prior systematic reviews have adopted a broader scope or included a comparative analysis of the costs associated with these products. This area of research has been recognised as a 'priority' in the recent James Lind Alliance Priority Setting Partnerships. Furthermore, a multi-stakeholder workshop held at the Royal College of Surgeons in 2022, attended by patients, commissioners and healthcare professionals, developed the specific research question for this review.

Review information

This systematic review is part of the research conducted by the Aberdeen Belfast Evidence Collaboration (ABEC) group, commissioned by the NIHR Evidence Synthesis Programme. The NIHR Evidence Synthesis Programme selects topics based on suggestions from relevant stakeholders. This particular topic was proposed by the James Lind Alliance, having been identified as a priority during the recent Priority Setting Partnership exercise.

Review details

In the UK, over 4,000 open fractures occur annually, with a notably high incidence among males aged 15–19 years due to high-energy injuries and females aged 80–89 years due to low-energy injuries. These injuries impose a significant burden on the healthcare system, with total annual costs estimated at approximately £56 million. Complications associated with open fractures - including superficial and deep surgical site infections, non-union, amputation, and complex regional pain syndrome (CRPS) - can severely impact patients' quality of life and lead to long-term disabilities.

There is growing interest in the use of local antibiotics (e.g., antibiotic powders) and antibiotic-coated implants (e.g., plates, screws, and nails) in surgeries for open fractures. These interventions have the potential to reduce infection rates and mitigate associated healthcare costs.

PICO criteria for the proposed review:

- **Patient Group:** Patients undergoing surgery for open fractures.

- **Interventions:** Local antibiotics and antibiotic-coated implants.
- **Comparator:** No agents or implants without antibiotics.
- **Outcomes:**
 - Primary outcomes: Infection rate, length of hospital stay, health-related quality of life measures (e.g., EQ-5D), and Lower Extremity Functional Scale (LEFS) - as defined in the core outcome set for lower limb open fractures - as well as costs associated with the use of different antibiotic products.
 - Secondary outcomes: Reoperation rates and incidence of other complications.

This review aims to assess the effectiveness and cost implications of these interventions, providing critical insights for clinical practice and optimising resource allocation. Recognised as a highly relevant topic for patient care and clinical decision-making, we anticipate that our findings will have a significant impact, influencing future research priorities and advancing the field. Notably, we will share our findings with the UK Royal College of Surgeons to ensure they directly contribute to improving standards in patient management and guiding the future research agenda.

Review current status

The scope of this review has been agreed upon with the representatives from the UK NIHR Evidence Synthesis Programme and the James Lind Alliance Priority Setting Partnerships. We are planning to develop a research protocol around Feb/March 2025.

Any specific/desirable requirements for fellow (e.g. clinical expertise, methodological expertise)

Some knowledge of quantitative research methods would be desirable.

Estimated start and completion dates

This systematic review is expected to start in February/March 2025 and to be completed within 12 months.

The Fellow will have the opportunity to contribute to every phase of this systematic review, including protocol development, screening search results, assessing the risk of bias, extracting data, interpreting findings, and disseminating results. Joining a dynamic, multidisciplinary research team, they will collaborate with information scientists, methodologists, statisticians, subject matter experts, and patient partners, gaining valuable experience at every stage of the research process.