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CASE STUDY

Patient-Reported Surgical Site Infection Surveillance in the NHS following Caesarean Birth

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1. Background

Surgical site infections (SSIs) are the third most common healthcare-associated infection, accounting for around 14.5% of hospital-acquired infections in the UK. Caesarean birth (CB) is the most common abdominal surgery, with more than 220,000 births by CB per year in England.

SSIs following CB are particularly concerning as they impact both the woman and their newborn. They can significantly impact maternal recovery, causing pain, delayed wound healing, reduced ability to breastfeed as antibiotics are usually required, and impaired bonding with babies. They can also increase the risk of complications in future Caesarean deliveries which are often required in subsequent pregnancies.

Despite these risks, SSI surveillance after CB is not mandatory in the UK. Most infections occur after discharge, as mothers go home on day 1 or 2, meaning that hospitals are unaware of the scale of the problem. Without systematic measurement, prevention strategies are inconsistent, and patients may face avoidable harm.

To address this gap, Health Innovation West of England (HIWE) partnered with five NHS maternity units and Cemplicity, to design and implement a digital SSI surveillance and improvement programme to understand true rates of infections, reduce infections, improve maternal safety, and deliver better value for the NHS.

2. Project Overview

This initiative addressed surgical site infections (SSI) following caesarean births across the West of England, where 7,000 procedures occur annually but post-discharge SSI data was largely unavailable. Recognising that most infections present after discharge, Health Innovation West of England (HIWE) collaborated with five maternity units and Cemplicity, supported by the Maternal Voices Partnerships (MVPs) and frontline clinicians including obstetricians, anaesthetists, midwives, infection prevention teams, procurement staff, and executive sponsors as well as digital and governance teams within each NHS Trust, to implement a scalable digital surveillance system.

This system utilised the validated UK Health Security Agency (UKHSA) Wound Healing Questionnaire, delivered via SMS/email 30 days post-surgery, enabling unprecedented real-time insight into patient outcomes and risk factors.

3. How the Project Was Run

- **Collaboration & Governance:** Agreements were secured with information governance and business intelligence teams in five Trusts, establishing safe data-sharing frameworks.
- **Digital Implementation:** The validated UKHSA questionnaire was digitised by Cemplicity to automate diagnosis of SSI based on the nationally specified criteria from UKHSA and this was validated by the HIWE clinical leads. The questionnaire was delivered via SMS/email, replacing resource-intensive telephone or paper surveys. Cemplicity integrated with each Trust's core patient systems to ensure all mothers were consistently contacted 30 days post CB, in a fully automated and secure way.
- **Co-Design with Patients:** Mothers and Maternal Voices Partnerships (MVPs) were engaged in co-design, contributing to questionnaire improvements, ethnicity data capture, and patient-facing wound care materials.
- **Clinical Engagement:** HIWE established an improvement collaborative with the 5 trusts and launched the PreCiSSIon project (Preventing SSI in Caesarean Births across a region). Obstetricians, anaesthetists, midwives, infection control, and theatre staff were involved in agreeing a PreCiSSIon care bundle element of 4 evidence based intervention. Each Trust had an executive sponsor to embed SSI prevention within infection control objectives, and clinical leads could review a dashboard specific to their trusts, which included patient specific data. The HIWE had a specific dashboard with all trusts non patient identifiable data, for review and tracking of the overall regional project.

- **Quality Improvement Approach:** Weekly drop-in sessions with Trusts ensured alignment on system design, data capture, and dashboards at initiation of the project to establish the SSI surveillance. Following this the IHI breakthrough collaborative model facilitated cross-Trust sharing of run chart data, challenges, and successes, with additional coaching and site visits from the HIWE leads to maintain momentum.
- **Responsive adaption:** At key stages throughout the project, questions were added to the survey to solicit feedback to gain insights on women's experience with and use of different care bundles.

4. Outcomes and Impact

- **Data & Insight:** Over 9,300 responses were collected, with a strong 61% response rate. Findings revealed an 18.5% baseline SSI rate, significant inter-Trust variation (13–25%), and the importance of targeting risk factors such as high BMI.
- **Evidence-Based Interventions:** The collaborative introduced a region-wide care bundle including 2% chlorhexidine skin prep with 2 minute drying time, antibacterial sutures, repeat-dose antibiotics for blood loss >1500mls, and wound protectors for BMI >40. Compliance exceeded 80%.
- **Innovation in Risk Groups:** Additional digital monitoring supported trials of negative pressure dressings for mothers with BMI of 35 or more, and glove change post-placental delivery for all patients.
- **Improved Outcomes:** By 2025, SSI rates reduced from 18.5% to 13.3% (25% reduction), preventing 364 infections annually across the region.
- **Improved Equity:** Variation between Trusts narrowed, building equity of care. The ability to build large reliable datasets with benchmarking across providers provides a strong tool for local quality improvement, as well as the ability to identify high performing surgical units so that their clinical practices can be emulated.
- **Patient Experience:** Reducing SSI will enable faster recovery, reduced pain, improved bonding, and reduced use of antibiotics, which is important to help prevent antimicrobial resistance. Analysis of qualitative feedback led to the development of a video for mothers, in addition to information leaflets and other local improvements.

5. Return on Investment (ROI)

- **Financial Impact:** Each SSI costs £20k–£37k. Preventing 364 infections saves £728k–£1.3m annually.
- **Cost Efficiency:** The digital system cost £18k over two years across five hospitals (approx. £150/month per Trust). A telephone-based system would have cost >£160k, making digital surveillance both cost-effective and operationally feasible.
- **Scalability:** The model is replicable across other surgeries and regions. Its use of a validated national survey standardises SSI surveillance and provides a blueprint for further NHS adoption.

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