

Training package for the prevention of surgical site infection – caesarean birth



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Development of Guidance & Acknowledgements

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Version 1	2015	Document created by Welsh Healthcare Associated Infection Programme (WHAIP) in partnership with Caesarean section steering group	2015
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This document was developed with the Caesarean Birth training document Task and Finish group (chaired by Consultant Nurse HCAI, HARP, PHW) and contribution from the Caesarean Birth Steering Group and the Health Boards in Wales.

1. Introduction

This training document has been written by the **Healthcare Associated Infection, Antimicrobial Resistance & Prescribing Programme (HARP), Public Health Wales in collaboration with** Caesarean Birth (C-birth) Steering Group and the Health Boards in Wales. **This document is based on the latest National Institute for Health and Clinical Excellence (NICE)^{1,12} guidance and provides** information in conjunction with the training presentation on wound care and management of wounds post C-births.

The HARP team developed and supported the implementation of surveillance following C-birth procedures undertaken in NHS hospitals in Wales, which was a mandatory process by Welsh Government from January 2006. Surgical Site Infection (SSI) is an important area for surveillance and remains a complication of surgery where human and financial costs are high. This document provides updated information and guidance (based on NICE) on how to minimise infection and how to determine an infection post C-birth surgery.

Note: This report contains data relating to Caesarean Births among women and pregnant people. Where the term woman/women are used throughout the text, it is intended to be inclusive of all pregnant people.

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2. Surgical site infection (SSI):

This section covers surgical site infection (SSI) after a C-birth.

2.1 What are SSIs?

SSIs occur in a wound after an invasive surgical procedure. The infection typically occurs within 30 days of the operative procedure or up to 90 days or greater with implants^{1,2}. When an infection occurs, it is dependent on the number of bacteria introduced to the wound³. There are different types of infections, depending on where the infection occurs (section 2.2). Approximately 0.5% to 3.0% of all surgical patients will develop an SSI⁴. It is important to recognise that SSIs can range from a relatively trivial wound discharge with no other complications, to a life-threatening condition.

- They are mostly preventable infections¹.
- These infections cause excess morbidity and mortality².
- SSIs increase the cost to the NHS in terms of additional treatment, increased length of hospital stay and, occasionally, readmission to hospital⁵. Serious patient consequences can result from SSIs. Consequences include pain, suffering and on some occasions, additional surgical interventions.
- SSIs are one of the most common infections following a C-birth, in a group of patients that are generally considered to be fit, young and well females^{6,7}.
- Other clinical outcomes of SSIs include scars that are cosmetically unacceptable, persistent pain and itching, restriction of movement, particularly when over joints, and a significant impact on emotional wellbeing⁸.

2.2 Types of SSIs

There are three different types of SSIs – superficial incisional, deep incisional and organ/space as noted by The Centres for Disease Control and Prevention (CDC)².

- Superficial incisional: Affecting only the skin and subcutaneous tissue at the incision site.
- Deep incisional: Involving the deeper tissues, such as muscles and fascia, beneath the incision site.
- Organ/space: Can occur in any part of the body other than the skin, muscle, and surrounding tissue, including organs or spaces between organs, within the surgical site.

These infections must occur within 30 days of surgery (90 days for an implant).

3. C-birth Wound Care Pathway

3.1 What is the wound care pathway?

To reduce the risk of infection to an absolute minimum, the pathway should be adopted for those women undergoing an elective C-birth in line with NICE guidance^{1,12}. The NICE guidelines^{1,12} outline three phases of the care process: pre-operative, intra-operative and post-operative action. The care pathway has been structured to align with these three phases. The care pathway can be utilised as a standalone resource or integrated into any existing C-birth pathway currently in practice (see appendix A).

3.1.1 Pre-operative phase

Screening and decolonisation

There is evidence to suggest that there is a reduction in Methicillin-Resistant *Staphylococcus aureus* (MRSA) infections when MRSA screening is carried out¹, where women have been screened and found positive, ensure decolonisation takes place before surgery^{1,9}.

Hair removal

No routine hair removal should be undertaken pre-operatively^{1,16}, as it increases the risk of an SSI. Specifically, there should be no hair removal 7 days prior to surgery, ensure this is discussed with the woman and the discussion documented to provide an audit trail.

If hair removal is required before surgery, use electric clippers with a single-use head. Do not use razors, as they increase the risk of SSI^{1,12} due to micro-abrasions that razors can cause, potentially leading to the multiplication of microorganisms at the surgical site¹⁰. Where hair removal is required, ensure that it is undertaken as close to the time of surgery as possible (clipping on the day of surgery may be preferable)^{1,12}.

Pre-operative showering

When skin is incised, micro-organisms that colonise the surface of the skin can contaminate the exposed tissues and subsequently proliferate, leading to an infection. Implementing interventions to reduce the microbial load on the skin surrounding the incision site can significantly decrease the risk of an SSI. Microorganisms on the skin are often acquired by touch and easily removed by washing with soap. It is advised women shower or

have a bath (or to help women to shower, bathe or have a bed bath) using soap or chlorhexidine washes either the day before, or on the day of, surgery^{1,12,16}. Ensure that women know to pay particular attention to axillae, groin, perineum and skin folds as this is where microorganisms may accumulate.

The pathway advises that, in addition to the pre-operative showering, patients wash daily from 7 days prior to surgery¹

3.1.2 Intra-operative phase

Interventions in the intra-operative stage are covered by the World Health Organisation (WHO) checklist¹¹.

Antibiotic prophylaxis

Antimicrobial prophylaxis is recommended in caesarean birth and should be administered before skin incision (except for co-amoxiclav, which should be administered after skin incision)¹². For antimicrobial choice, please follow local health board guidelines, available via the local antimicrobial prescribing App or health board website.

Skin preparation

Skin preparation is crucial so that the transient and residential flora on the skin is removed. Skin should be prepared at the surgical site immediately before incision using an alcohol-based chlorhexidine or alcohol-based solution of povidone-iodine if chlorhexidine is contraindicated¹

It is important that the skin is allowed to air dry and there is no specific time for this process, it is entirely dependent on the amount and load used and the product used (please refer to manufactures guidance). Also, If diathermy is to be carried out use evaporation to dry antiseptic skin preparations and avoid pooling of alcohol-based preparations^{1,12}

Normothermia

Maintain the body temperature of women to above 36°C in the peri-operative period.

Further advice on this topic can be found under NICE guidance – Inadvertent Peri-Operative Hypothermia Guideline¹³ – which includes advice such as the warming of intravenous (IV) fluids.

Glucose control

A C-birth provides additional risks of developing an SSI for women with diabetes. The Department of Health High Impact Intervention¹⁴ recommends that a glucose level of <11mmol/l should be maintained in women with diabetes.

Wound closure

Wounds should be closed using sutures rather than staples¹² and when using sutures consider using antimicrobial triclosan-coated sutures. For further direction, please see NICE guidance¹.

At the end of the operation, the surgical incision should be covered with an appropriate interactive dressing¹. These dressings should be designed to promote the wound healing process through the creation and maintenance of a local, warm, moist environment underneath the dressing, when left in place for a period indicated through a continuous assessment process and also based on manufactures guidance.

3.1.3 Post-operative phase

Throughout the period of care, Standard infection prevention and control precautions should be utilised [NIPCM - Public Health Wales](#)

Hand hygiene

The WHO has developed a 5 point process – 5 Moments for Hand Hygiene www.who.int/publications/m/item/five-moments-for-hand-hygiene that defines the key moments for hand hygiene, overcoming misleading language and complicated descriptions¹⁵. It aligns with the evidence base concerning the spread of health care associated infections (HCAI) and is interwoven with the natural workflow of care. It is designed to be easy to learn, logical and applicable in a wide range of settings. These are suggested actions that are aimed at helping to protect the patient, yourself and the health-care environment from any harmful germs:



- 1) Before **patient contact** - clean your hands before touching a patient when approaching him/her (examples: shaking hands, helping a patient to move around, clinical examination)
- 2) Before **an aseptic task** - Clean your hands immediately before any aseptic task (examples: oral/dental care, secretion aspiration, wound dressing, catheter insertion, preparation of food, medications)
- 3) After **body fluid exposure risk** - Clean your hands immediately after an exposure risk to body fluids and after glove removal (examples: oral/dental care, secretion aspiration, drawing and manipulating blood, clearing up urine, faeces, handling waste)
- 4) After **patient contact** - Clean your hands after touching a patient and the immediate surroundings, when leaving the patient's side (examples: shaking hands, helping a patient to move around, clinical examination)
- 5) After **contact with patient surroundings** - Clean your hands after touching any object or furniture in the patient's immediate surroundings, when leaving - even if the patient has not been touched (examples: changing bed linen, perfusion speed adjustment).

Healthcare workers should be bare below the elbow which will assist with adequate hand hygiene practices. It is recommend using an aseptic non-touch technique (ANTT) for changing or removing surgical wound dressings.

ANTT is a comprehensive Practice Framework for aseptic technique used for all invasive procedures from major surgery to maintenance of invasive devices, with the Association for Safe Aseptic Practice and in conjunction with Public Health Wales and NHS Wales, [ANTT New - Public Health Wales](#).

Surgical dressing

Using sterile waterproof dressings, women may shower as soon as they feel up to it. Alternatively, when the wound is clean and dry, and no further dressing is required, they may shower.

Advise women that the wound should not be touched as this increases the risk of infection and ensure they are aware of the importance of hand hygiene for example before and after using the toilet. Ensure that women know the importance of paying particular attention to axillae, groins, perineum and skin folds as this is where micro-organisms may accumulate.

NICE^{1,12} when using a standard wound dressing after caesarean birth take into account that:

- No type of wound dressing has been shown to be better than another at reducing the risk of wound infections.
- There is no difference in the risk of wound infection when dressings are removed 6 hours postoperatively, compared with 24 hours postoperatively.¹

NICE^{1,12} recommends negative pressure wound therapy after caesarean birth for women with a BMI of 35 kg/m² or more at booking to reduce the risk of wound infections. The clinical application and ongoing care and management of negative pressure wound therapy requires specialist training and should only be undertaken by staff who have undertaken this. Staff should refer to local guidance as to how to access this service, for example by contacting the tissue viability team.

4. Wound infection

Please refer to the latest [Microbiology Resources](#). Microbiology wound care guidance resources include swabbing techniques and wound infection management.

Note: please use sterile water or saline to moisten swab prior to taking a wound swab.

5. HARP C-Birth SSI surveillance

The definition of surveillance is the 'ongoing systematic collection, analysis and interpretation of health data'. The surveillance scheme for following SSIs in C-births was made mandatory in Wales in January 2006 and uses internationally recognised definitions². Therefore, Welsh data can be compared with and incorporated into other international databases. It should also be noted that the potential to improve infection rates by carrying out surveillance has been demonstrated. Surveillance of SSI with feedback of appropriate data to surgeons has been shown to be an important component of strategies to reduce SSI risk².

5.1 What is the purpose of the surveillance?

The aim of the SSI surveillance programme for C-births is to:

- Collect surveillance data following C-birth surgery to assess the impact of risk factors and enhance understanding of their role in the development of SSIs among hospitalised patients.
- Analyse and report c-birth SSI surveillance data and describe trends in infection rates.
- Provide timely feedback of c-birth SSI rates to assist surgical units in minimising the occurrence of SSI.

Health Boards can obtain an insight into their local infection rates through participation in the surveillance scheme and use this as a basis for further investigations.

5.2 How is the surveillance undertaken?

The HARP team distributes a blank template for the electronic data collection form before the start of each calendar year. This form is used to collect both inpatient (IP) and post-discharge (PD) data. An instructions tab is included to guide users in filling out the data accurately. Additionally, there is a tab outlining the reporting schedule, which all hospitals are asked to follow. Hospitals have one month after the last day of the reporting month to submit their data to allow for follow-up. For the procedure to be considered valid, the NHS number, procedure date, (IP)SSI, hospital discharge date, and PDSSI columns must be completed for each procedure.

Surveillance in Wales follows the CDC² definition of SSIs with additional criteria required to meet the definition. These include signs or symptoms of infection. A list of options for defining an SSI for surveillance purposes in Wales include the following:

Option 1:

Purulent drainage from the incision (i.e. pus visible or present from the wound)

Option 2:

Microbiology swab result (swab results accepted: *Staphylococcus aureus*, Methicillin Sensitive *Staphylococcus aureus* (MSSA), Methicillin Resistant *Staphylococcus aureus* (MRSA) and two clinical signs and symptoms of infection (choose from pain, heat, redness, swelling / oedema, fever)

Option 3:

Diagnosis by a surgeon / clinician / GP / midwife / nurse and two clinical signs and symptoms of infection (choose from pain, heat, redness, swelling / oedema, fever)

Option 4:

The incision is deliberately opened by the surgeon to manage the infection and at least one of the following signs or symptoms (pain / tenderness, localised swelling, redness, heat)

5.3 Who is responsible for the surveillance?

Surveillance primarily involves clinical staff at each hospital or Health Board and includes infection prevention and control teams as support. It is overseen by HARP, who act as a point of contact for queries.

The local SSI surveillance group should include representation of some or all the following:

Surgeons (from relevant disciplines)

Midwives

Theatre staff

Ward Nurses

Surveillance Nurses

Clinical Nurse Specialists

Infection Control Nurses

Health board/hospital epidemiology

Community staff

Infection Control Doctors/Microbiologists

Managers

Clinical Effectiveness Teams

Clinical Audit staff

IT staff

Clerical and Secretarial staff

Tissue Viability Nurse

Healthcare Epidemiologist

5.4 Data management

HARP centrally manage the surveillance data that is collected by each hospital. It is then imported into a c-birth database which is held centrally and managed by HARP. HARP also perform quality checks of completed forms, data entry and analysis. Locally, forms should be collected and collated, and data quality checks should be undertaken as well as infection rates monitored. Data is reported to stakeholders in Wales including, health boards, PHW, NHS Wales Performance and Improvement (including an update to Welsh government through this route).

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Appendix A – Wound Care Pathway

Below is a full version of the Wound Care Pathway, to be used across Wales.

PRE-OPERATIVE PHASE

	Signature	Date Discussed
Gestation 32-34 weeks		
1) Mother receives a local wound care leaflet?		/ /
2) Mother is screened for MRSA as per NICE guidelines? if screened and mother is found positive, decolonise using local protocol prior to surgery)		
7 days prior to planned section		
3) NO further removal of pubic hair – check on day of surgery.		/ /
4) Daily showers/baths using soap/chlorhexidine washes (paying attention to axillae, groins, perineum and skin folds) – check on day of surgery.		/ /
Day of surgery		
5) Bath/Shower preoperatively using soap/chlorhexidine washes, paying attention to axillae, groins, perineum and skin folds.		/ /

INTRA-OPERATIVE PHASE

	Yes	No	n/a
1) Remove hair if required – using clippers with a disposable head (not by shaving). Time as close to the operating procedure as possible.			
2) Administer antibiotics within 60 minutes prior to incision. Only repeat if there is excessive blood loss or prolonged operation.			
3) Patient skin is prepared using an alcohol-based chlorhexidine skin prep and allowed to air dry .			
4) Maintain body temperature above 36°C in the peri-operative period.			
5) Maintain a glucose level of < 11mmol/l in diabetic patients.			

POST-OPERATIVE PHASE

	Yes	No
1) Cover wound with an sterile interactive dressing at the end of surgery.		
2) Advise mother on post-operative wound care: a) Don't touch the wound unless necessary b) Ensure that hands are regularly washed, particularly before and after using the toilet c) If infection is suspected, contact local maternity unit (not GP)		
3) Remove standard, interactive dressing as NICE guidance ^{1,12} after the procedure. Alternatively, if non-standardised dressing (e.g. negative pressure wound therapy.) consult manufacturer's guidance.		
4) Assess wound for signs of infection. a) If the wound is clean and dry no further dressing is required and the patient may shower (or if using a sterile transparent waterproof dressing, the patient may shower when they feel ready to). b) If the wound is displaying signs of infection (such as redness, in addition to swelling or pus) a wound swab must be taken aseptically and a fresh dressing applied daily. All assessments should be documented in the patient's record.		
5) Aseptic, non-touch techniques must be used when the wound is being redressed ⁹ .		
6) Complete HARP SSI surveillance form		
a) on discharge from hospital		
b) Up to 14 days post operatively		

NB Throughout the period of care hands must be decontaminated before and after each episode of patient contact using the correct hand hygiene technique.

*C Birth NICE guidelines recommend that the dressing should be removed 6-24 hours after the c section¹². Ensure that the dressing manufacturer's guidelines are adhered to for non-standard dressings such as Negative pressure wound therapy

*See ANTT training for Wales - [ANTT New - Public Health Wales](#)