A trust set up a programme to monitor surgical site infection that had developed after patient discharge to identify the risk factors and assess compliance with best practice.

**Surveillance of surgical sites in primary care**

**Benefits of post-discharge surgical site infection surveillance**
- **Characteristics of a surveillance programme**
- **How to set up an active SSI surveillance programme**

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**Abstract**


A surgical site surveillance programme with post-discharge follow-up and dedicated staff can have many benefits. This article describes the development of a surveillance programme and offers advice on setting up such programmes.

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**Rates of surgical site infections (SSIs) and SSI surveillance**

In 2009, the House of Commons Public Accounts Committee (2009) criticised the absence of post-discharge surveillance for SSIs, saying this made it impossible to know the scale of infections or the risks to patients.

The US has already introduced punitive measures against hospitals whose patients develop SSIs; from 2011-12 in the UK, if patients are readmitted with an infection within 30 days of discharge, hospitals will not be paid for further treatment (Turner and Powell, 2011).

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**The Leicester programme**

Concern about the increased use of vacuum-assisted dressings among colorectal patients led us to implement an SSI surveillance programme.

We used the surgical site infection surveillance service (SSISS) – the national SSI surveillance programme led by the Health Protection Agency (HPA, 2008) – for mandatory orthopaedic surveillance. This collects data on inpatients, and some post-discharge data on readmissions or outpatient visits.

However, we were interested in SSIs treated in primary care that had developed after patient discharge. We wanted to identify risk factors for these, and investigate compliance with best practice.

A five-month pilot of an active, post-discharge SSI surveillance programme began in 2008, for colorectal and breast surgery patients, with the surveillance nurse contacting each patient on days 10, 20 and 30 after discharge. If any SSIs were suspected, the nurse would visit the patient to observe the wound.

Infection rates were more than twice those published by the national surveillance programme, with almost half the SSIs in both colorectal patients and breast surgery patients identified in the community.

This is supported by other studies of active post-discharge surveillance, which show that inpatient and readmission data underestimate the incidence of SSIs (Scottish Surveillance of Healthcare Associated Infection Programme, 2003).

**Cost of SSIs**

UK studies show additional costs of between £1,000 and £10,000 for each patient with an SSI (Tanner et al, 2009; Plowman, 1999), although few studies include primary care costs. Identifying the cost of treating an SSI is not part of a standard surveillance programme, but it provides valuable justification for funding programmes or demonstrating the cost-effectiveness of interventions to prevent SSIs.

The simplest method of identifying the costs of treating patients with SSIs is to compare these with costs of treating patients with no infections. Our pilot study showed the average cost of treating a colorectal patient with an infection was £10,300.

The biggest cost resulted from an increased length of stay – infected patients stayed in hospital for around eight days longer than non-infected patients. District nursing was the second largest; one patient with a leaking wound was visited at home twice a day for 30 days. Most surveillance...
**5 key points**

1. A surveillance programme needs support from many staff and directorates.
2. A standard surgical site infection definition allows comparisons with SSI rates from other organisations.
3. The period of surveillance should be at least three months and at least 100 patients should be included.
4. Specific surgical procedures should be surveyed, as SSI rates vary between procedures.
5. Having healthcare assistants collect surveillance data can minimise costs.

**Programmes do not collect data from primary care, which means that the considerable cost of district nursing is not included when calculating SSI costs.**

The pilot programme cost £10,400 for five months, challenging the view that post-discharge surveillance is prohibitively expensive (Taylor, 2003). Staffing is the largest cost, but can be minimised by using band 3 healthcare assistants for data collection. Other costs are for phone calls, travel to visit patients at home and data analysis. Surveillance staff also need a base from which to work.

### Setting up a post-discharge programme

The following practical guide to setting up a post-discharge surveillance programme is based on our experience.

### Steering group

Representatives from relevant directorates and staff groups must be involved in setting up the surveillance programme so that data collected is credible and can be used to inform practice.

A steering group should include surgeons, anaesthetists, microbiologists and nurses, as well as representatives from theatres, infection control, tissue viability and the trust board. A representative from primary care can help facilitate communication between acute and primary care. A senior manager, such as the director for infection prevention and control, should chair the meeting. A senior member of the infection control team is best placed to take on the management of the programme.

The steering group may need to meet frequently at the start of the programme, but eventually it can be wound down and SSI reports incorporated into other monitoring processes.

### Continuous or rolling surveillance

Conducting surveillance continuously among one group of patients allows SSI rates to be fed back to staff regularly. It might be useful to know SSI rates for several patients’ groups. A better use of resources is to conduct rolling surveillance - following up one group of patients then moving to another.

Assessing the effectiveness of interventions to reduce SSIs can be done by repeating the surveillance. There is no evidence to show SSIs are seasonal, so surveillance does not have to be repeated at the same time of year.

Based on our experience, the surveillance period should include at least 100 patients; smaller numbers may not be representative and could give misleading SSI rates. The SSISS suggests a three-month minimum period for surveillance (HPA, 2008).

### Selecting surgical procedures

Specify the surgical procedures to be included in the surveillance, as SSI rates vary between procedures (HPA, 2009). A surgical specialty with a suspected problem could be targeted, or you could focus on cardiac or joint replacement surgery, where the consequences of SSIs are most costly.

It might be beneficial to select one of the categories included in the SSISS programme, so that data can be submitted to SSISS (HPA, 2008). This will become increasingly important if surveillance for that category becomes mandatory. Ideally, surveillance should be conducted on all patients having that procedure during the surveillance period.

### Post-discharge follow-up

Following up all patients who have had a specific procedure will provide the most reliable data. However, this may not be possible where there is high patient throughput, so it may be necessary to follow up a random selection. In our experience, a surveillance staff member can survey 60-70 patients a month.

Methods for following up patients after discharge include:

- Patient self-assessment questionnaires;
- Patient telephone calls;
- Direct observation in outpatient clinics;
- Notification by primary care staff.

Each of these methods has merits, but a review of them did not find one the most effective overall (Petherick et al, 2006). Trusts should choose the method or combination of methods most suitable to them.

### Self-assessment questionnaires:

After discharge, patients can be given a questionnaire to complete and return if they suspect an SSI, or are diagnosed with one in primary care. Questionnaires require the fewest resources, but the return rate can be low (Edwards et al, 2002). They also rely on patients’ ability to identify their own SSI; research shows conflicting findings on this (Petherick et al, 2006).

### Telephone:

Surveillance staff can telephone patients at home using a validated questionnaire to identify potential infections. This can produce more accurate findings, but is resource-intensive; workload analysis at
Leicester shows 15% of surveillance staff time is spent telephoning patients. In the pilot programme and first six months of the permanent programme, patients were contacted on days 10, 20 and 30 after surgery. An evaluation of the first six months of the programme found the majority of SSIs were identified between days 10 and 20, so we now contact patients on days 15 and 30 only.

**Direct observation:** Surveillance staff or surgeons could observe wounds at outpatient clinics. This requires less staff time and, if all patients visit outpatient clinics, should capture all patients. However, this method depends on the timing of the appointment in relation to the 30-day cut-off and when infections present. It is commonly thought that SSIs present 3–6 days after surgery, but extended patient follow-up has found presentations at nine and 10 days (Smith et al, 2004; Barrett et al, 2000). In our pilot, the average for both colorectal and primary breast surgery was 12 days (Tanner et al, 2009).

**Daily activities** Surveillance staff identify each patient having a specific procedure from admission and theatre lists; they obtain basic data from hospital systems and additional information from patients’ operation notes, anaesthetic charts, medical notes, nursing charts or drug charts. A data sheet is made for each patient.

Patients are followed up by the surveillance lead nurse until the 30-day cut-off, or earlier if they develop an SSI or meet any of the exclusion criteria outlined in the SSISs protocol (HPA, 2008). Finally, the surveillance nurse notes whether the patient meets the defined criteria for an SSI.

**Lead surveillance nurse** A senior infection control nurse should act as the surveillance lead. This involves managing and providing clinical support to surveillance staff, performing quality control on data entry, writing reports and assisting with rapid surveillance feedback. The lead nurse also advises clinical directorates of areas where practice can be improved.

**Notification by primary care:** GPs or district nurses could notify the surveillance team when they treat a patient with an SSI. Although this may be the best long-term way to capture post-discharge data, it requires considerable training, communication and collaboration.

**Surveillance staff** Staff who collect surveillance data are usually junior nurses or senior HCAs. Nurses need less training as they already have most of the required skills and knowledge, such as being able to read case notes, access hospital information systems and understand medical terminology. However, they may not find data collection challenging so turnover could be high. HCAs may need more training, but could be more likely to see a surveillance post as a career move.

A band 5 nurse conducted surveillance for our pilot. Analysis of her activities showed this level of clinical judgement was not required, so we employed band 3 HCAs for the permanent programme. However, a nurse was appointed for ventilator-associated pneumonia surveillance in intensive care as the pilot showed considerable clinical knowledge was required.

**Feedback** Feedback to staff is effective in reducing SSI rates (Geubbels et al, 2006), particularly to surgeons, anaesthetists and nurses working in theatres and surgical wards. A top-down approach is the simplest way of feeding back surveillance data, complemented by posting monthly SSI rates on ward noticeboards or in theatre coffee rooms. Rapid feedback information requires only simple analysis and should be presented in a format where individual staff are not identifiable.

**Conclusion** This pilot surveillance programme enabled us to evaluate our practice and led to major changes throughout the trust.

These included the implementation of a trustwide surveillance service and clinical practice interventions which saw SSI rates fall by a third. It is unlikely that any improvements in practice would have occurred without evidence to show the true rates and cost of surgical site infection.

**References**


