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Validation of surgical site infection surveillance data in Scotland

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Summary Validation of surveillance data is necessary to ensure its scientific credibility, to identify methodological problems within the surveillance programme, to help increase compliance and participation in the surveillance programme, and to identify data quality issues at local level. Surgical site infection surveillance (SSIS) in Scotland has been implemented in collaboration between Health Protection Scotland (HPS) and staff in acute divisions in Scotland. A team at HPS carried out a study to validate the SSIS data reported to them. The aims of the validation study were: (i) to measure the completeness of the denominator data; (ii) to measure the accuracy of all SSIS data items reported to HPS; and (iii) to determine the sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) of the SSIs reported to HPS against the SSIs validated as part of this study. The methodology utilized for validation of SSIS data was based on an evaluation research approach. The evaluation research approach involves a range of investigative activities, aimed at judging the worth of a programme or practice, and measures SSIS in terms of structure, process and outcome. The completeness of the denominator and the means of identifying eligible patients was identified. Descriptive information about how SSIS data were collected and managed at hospital level was collated, and the accuracy and completeness of the reported SSIS data were measured by case note review of selected cases. SSIS data from 27 hospitals in 15 acute divisions and one special health board were validated. The results indicated that a total of 91% of the procedures carried out (denominator) during a specified three-month period were reported to HPS. The case notes validated over 90% of records reported to HPS; however, there was variation in data quality between hospitals. The sensitivity, specificity, PPV and NPV of the SSIs reported to HPS were 96.7, 99.0, 94.6

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and 99.4%, respectively. Where problems with data were identified at local level, hospitals have been offered guidance to improve their data. As a result of this study, HPS are confident that the Scottish SSIS data are reliable and robust.
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Introduction

The published literature states that the accuracy with which nosocomial infections are identified and reported varies considerably, and that experience, qualifications, training and awareness of surveillance staff affect the accuracy of infection reporting.[1] This emphasizes the need for staff to have a good working knowledge of a standard set of data definitions that are simple and easy to interpret. To achieve this, surveillance staff require training and access to these data definitions in a protocol. Therefore, this approach is adopted by Health Protection Scotland (HPS).

Surgical site infection surveillance (SSIS) in Scotland has been implemented in collaboration between HPS and staff in each of the 18 acute divisions and one special health board in Scotland. In order to obtain robust and comparable national data, surveillance in Scotland is conducted according to the HPS SSIS protocol,[2] with consistent adherence by all acute divisions to the standard data definitions within the protocol. Data collected at hospital level are transferred to HPS for national reporting.

Validation is the independent determination of data accuracy; this is essential for aggregated data from multiple data collectors.[3] Validation of surveillance data is necessary to ensure its scientific credibility and to help identify methodological problems within the surveillance programme. Validation assesses the accuracy of the data by determining the sensitivity, specificity and positive predictive value (PPV) of infection case finding by a trained independent observer.[3] The process of validation adds credibility to the surveillance system, can help to increase compliance and participation in the surveillance programme, and may identify local problems and issues at hospital level.[4,5]

The methodology utilized for validation of SSIS data in Scotland has relied on the approach taken by the Hospitals in Europe Link through Infection Control and Surveillance (HELICS) data validation study of the national surveillance of nosocomial infections in intensive care units (SIZ-IPH),[4] which has validated data from nosocomial pneumonia and bacteraemia surveillance in intensive care units. This framework has been adapted and expanded upon for validation of SSIS in Scotland.

The objective of this study was to validate SSIS data held by, and SSIs reported to, HPS. The primary aims of the study were: (i) to measure the completeness of the Scottish SSIS denominator data; (ii) to measure the accuracy of SSIS data reported to HPS; and (iii) to determine the sensitivity (SE), specificity (SP), PPV and negative predictive value (NPV) of the SSIS data reported to HPS against the validated SSIS data.

Methods

An evaluation research approach was used to validate SSIS in terms of the structures and processes in place for SSIS, and the outcome of SSIS. The evaluation research approach involves a range of investigative activities aimed at judging the worth of a programme or practice. The aim of evaluation research is to determine the ability of an intervention, such as surveillance, to achieve the intended effect, i.e. accurate SSI rates.[6] Evaluation research places an 'emphasis on the process by which outcomes are produced rather than merely judging the outcomes'.[7] Therefore, evaluation should involve the linking of process to outcome to make sense of data, as outcome might be somewhat sterile if process is not included.

Validation of SSIS data was carried out at 27 hospitals in 15 acute divisions and one special health board in Scotland. Three acute divisions were excluded due to their small data sets and remote geographic locality. Acute divisions in Scotland are required to carry out mandatory SSIS in at least two operative procedures, one of which must be an orthopaedic procedure with the exception of acute divisions that do not carry out orthopaedic procedures. Where a hospital carried out surveillance of orthopaedic surgery, this was chosen for SSIS validation; where a hospital did not

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