

**NHS SCOTLAND NATIONAL HAI
PREVALENCE SURVEY FINAL REPORT
VOLUME 2 of 2**

**NHS SCOTLAND NATIONAL HAI PREVALENCE
SURVEY PROTOCOL**

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*Prepared for Scottish Executive HAI Task Force
By Health Protection Scotland*

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1 INTRODUCTION

1.1 Introduction

Healthcare associated infections (HAI) are infections that were not present or in the pre-symptomatic phase at the time of admission to hospital, but which arise 48 hours or more after admission. There is ample evidence from several countries that HAI are avoidable (1) and costly to the health service and to patients (2). They are also a source of disability and distress to the individuals affected. In Scotland a Ministerial Taskforce on HAI led by the Chief Medical Officer is developing measures to reduce the burden of HAI. It requires good, representative baseline and trend information on the burden and cost of HAI overall in Scotland in order to assess the impact of the measures which have been put in place. This information should be collected in a rigorous and consistent manner.

Incidence and prevalence survey approaches have been considered by the HAI Task Force and after consideration of feasibility, cost and time delay to obtaining results, it has been agreed that a prevalence survey of adult in-patients in Scottish hospitals should be conducted using a repeatable methodology.

A number of targeted incidence surveys are being undertaken in Scotland as part of the Scottish Surveillance of Healthcare Associated Infection Programme (SSHAIP). These provide information on the incidence of major HAI e.g. MRSA bacteraemia, surgical site infection, catheter-associated urinary tract infections and pneumonias and bacteraemias in intensive care units. A prevalence survey clarifies the contribution of these infections to the overall HAI burden.

The prevalence of HAI in acute hospital patients reported in studies conducted in European countries since 1990 suggest an HAI prevalence of around 9.0% (2) though HAI case definitions used have varied and the accuracy and validity of data collection are unknown. A German survey, which was particularly rigorous in data collection methods and included only confirmed infections reported a prevalence of only 3.5% (3).

Two large prevalence surveys of HAI have been undertaken in the UK in the last 30 years. The first was a survey by Meers (8) in England and Wales between May and July 1979. The second National Prevalence Survey (9,10) by Emmerson et al was undertaken in the UK (Scotland, England, Wales and all Ireland) during 1993 and 1994. Current assumptions and planning for HAI are based on the findings of the second UK prevalence survey by Emmerson et al (9,10). In the time since these surveys were undertaken there have been many changes to healthcare practices that have affected the risk of HAI infection to patients. The prevalence of HAI in non-acute hospitals is not known.

The survey will be carried out between October 2005 and September 2006 and will survey all acute Scottish Hospitals and a representative group of community-based hospitals.

1.2 Aims and Objectives

The aim of the Scottish National Prevalence Survey is to provide the HAI Task Force with baseline information on the total prevalence of HAI in Scottish hospitals and its burden in terms of health service utilisation and costs. This information will be available to guide priority setting in the development of strategy and policy

In addition, a consistent methodology will be developed for prevalence surveys that can be repeated at intervals and utilised by local infection control teams. This will allow the impact of measures taken nationally and locally to reduce the burden of HAI to be evaluated through an analysis of trends over time.

The following questions will be addressed by the survey;

- What is the overall prevalence of HAI and what are the specific types of HAI in adult inpatients in acute and community hospitals in Scotland?
- What is the impact of HAI in terms of length of stay on NHS activity?
- What are the hospitals costs associated with HAI in Scotland and how much cost saving might be anticipated as a result of HAI control?
- Is it possible to use the prescription of antibiotics 48 hours after admission to hospital as predictor for HAI?
- How do incidence estimates obtained from measuring prevalence in this survey compare with the results of ongoing, targeted incidence surveys?
- What are the priority areas for targeted surveillance of incidence?
- What are the priority areas for interventions to prevent and control HAI?
- What is the acceptability, feasibility and cost of undertaking prevalence surveys in Scottish hospitals?
- What is a suitable methodology for repeated prevalence surveys that give comparable information?

1.3 Point Prevalence

The point prevalence of a disease is the number of individuals with a disease at a fixed point in time. A prevalence survey provides a snap shot of existing and new infections in a hospital at a single point in time, usually one day. The advantage of a prevalence survey is that it is rapid and cost effective way to estimate the magnitude of healthcare associated infections in a hospital. In addition, prevalence surveys allow inclusion of hospitals currently not eligible or involved in incidence surveillance.

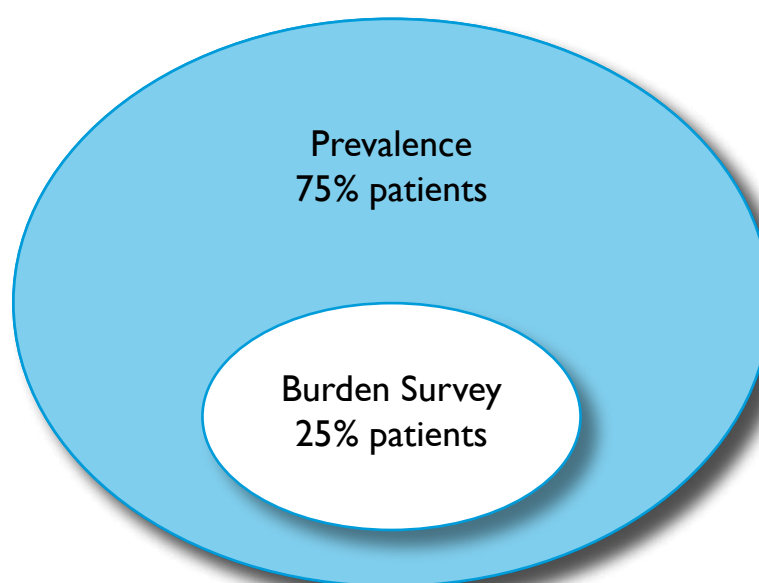
1.4 Training of Data Collectors

There are important lessons to be learned from previous studies, mainly the definition of HAI and the problems of inconsistent interpretation of the Centers for Disease Control criteria when using a large number of data collectors. To overcome these issues, concise data collection documentation has been prepared and training sessions will be held for data collectors at which the rationale for the survey and for the methodology will be discussed. Due to the importance of using consistent HAI case definitions throughout the survey, several training sessions for the data collectors will make use of cases studies (provided courtesy of Petra Gastmeier of the KISS Project, Germany) for training in the diagnosis of HAI according to the CDC definitions. Rigorous training sessions in the use of the data collection tool and a user manual will be provided to the data collectors.

1.5 Sampling

All acute hospitals and a randomly selected 25% of community hospitals will be included in the survey. All inpatient beds will be sampled in each hospital, 25% of beds for the 'burden' component of the survey and the remaining 75% for the 'prevalence' component. This means that 100% of eligible beds will be included in the survey.

Figure 1: Components of survey



1.6 Outline of survey

The survey has two components:

- Estimation of the burden of HAI (acute health service utilisation and costs) in Scottish Hospitals
- Prevalence survey, which, together with the data from the burden survey, will provide HAI prevalence rates for all hospitals in Scotland

1.6.1 The Burden Survey

For the *first component* ('burden') of the survey, detailed data will be collected on a random sample of wards in each hospital in Scotland to provide a sample of 25% of beds, including patients with and without prevalent HAI. This data will be used to estimate the additional burden (bed days used and cost) of HAI in Scotland. Length of stay (LOS) will be determined for all the patients in the sample and, using a modelling approach taking into account age, sex, speciality, admission type (planned or unplanned), main diagnoses, number of co-morbidities and month of admission to the hospital, the additional LOS due to HAI will be estimated. The additional cost of care for patients with HAI will be estimated from the additional length of stay for patients with HAI based on local Scottish health care costs and assumptions about relative components of cost as reported in the survey by Plowman et al (2). The avoidable and opportunity costs will be estimated and compared with the costs of prevention.

1.6.2 The Prevalence Survey

In the second component ('prevalence'), surveillance will be extended to collect data on a random sample of wards to provide an additional 75% of beds; detailed data will be collected on patients with HAI and a limited dataset on non HAI-infected inpatients. These data sets will be combined with those collected in the 'burden survey' to provide age/sex and speciality adjusted prevalence rates for all hospitals and for individual hospitals.

Data will be collected by external data collectors trained in the diagnosis of HAI according to the CDC definitions to ensure the validity and accuracy of the data. The external data collectors will be helped by local staff to collect the clinical information for HAI diagnosis. In addition, the survey will include validation of HAI diagnosis by data collectors and examination of the acceptability, feasibility and cost of undertaking a prevalence survey.

2 PROTOCOL

2.1 *Inclusion and Exclusion Criteria*

2.1.1 *Ward Level Criteria*

Inclusion criteria: All wards serving adult patients (16 years) except those that meet the exclusion criteria

Exclusion criteria: Wards serving paediatric patients
Wards considered to be residential care facilities in Acute hospitals
Wards serving private patients in NHS hospitals

2.1.2 *Patient Level Criteria*

Inclusion criteria: All adult patients except those who meet the exclusion criteria
Patients who are 'on pass' at the time of the survey

Exclusion criteria: Day patients
All patients under 16 years even if being treated in an adult ward
Patients admitted for one day for treatment or for diagnostic procedures
Patients transferred into the survey ward after the start time
Patients discharged from ward before being surveyed
Private patients on NHS wards

3 DATA COLLECTION METHODS

3.1 *Data Items*

The forms used for data collection are listed below. Every field in each form should be completed for every eligible patient.

- Patient details form
- Infection form
 - a. Criteria form
 - b. Microbiology form
- Surgery form
- Antibiotics form
- Invasive devices form

A full description of each data item is given in Appendix B.

3.2 Data Collection Protocol

Data is collected using a bespoke software system on a tablet PC. See Appendix A.

The data collector enters the data onto the database using the following standard procedure and the instructions given for each form.

3.2.1 Standard Operating Procedure for Data Collection

Upon entering the ward, the data collector should obtain;

- A list of patients currently occupying beds on the ward

- A list of patients that should be excluded from surveillance

- A list of patients likely to be discharged before the end of the ward survey

- The number of empty beds

- Information on the specialty of the ward

- The number of trained staff, untrained staff, agency staff and student nurses working on the shift at the present time.

For each patient, the data collector should obtain;

- Current nursing notes

- Current medical notes

- Temperature charts

- Drug charts

- Previous years medical notes

The ward name, health board, hospital and specialty should be recorded using the Add a new ward form.

The beds occupied with inpatients and ineligible patients, unoccupied beds, total available beds and staffing numbers should be recorded using the Ward Census form.

To complete the Patient Details form, the data collector should use the current nursing and medical notes.

To complete the Infection form, the data collector should use the current nursing and medical notes, temperature charts and laboratory results to determine whether the patient has developed an HAI. On diagnosis of an HAI, details of the infection type and criteria (including relevant microbiology results) should be recorded carefully using signs and symptoms identified in the notes.

To complete the Antibiotic form, the data collector should use the patient's drug charts.

To complete the Surgery form, the data collector should use the previous year's medical notes to determine whether the patient has had surgery with and without implants in the preceding year.

To complete the Invasive Devices form, the data collector should use nursing and medical notes and, if necessary, liaise with staff or observe the patient to determine the presence of invasive devices.

On completion of the survey, the data grid should be checked to ensure all forms have been completed.

'Beds occupied by inpatients at time of census' should be adjusted in the Ward Schedule to adjust for patients that were discharged before being surveyed or could not be surveyed for other reasons.

Notes

Once a survey has started on a ward, it should be continued until completion.

Patients likely to be discharged before the end of the ward survey should be surveyed first.

Unless otherwise advised, it is best to take only one or two sets of case notes at a time. Medical and nursing staff often require quick access to the notes.

It may be possible to complete the required data without the medical notes. An example of this would be when the patient has been an inpatient for less than 48 hours and cannot be diagnosed with an HAI.

Before arriving to survey certain wards, e.g. ICU, infectious disease wards, psychiatric wards, it is advisable to try to prearrange a time for the survey and to determine the infection control and safety procedures the charge nurse would like followed.

Wards with an outbreak of infectious disease should not be surveyed. HPS currently carry out incidence surveillance to monitor outbreaks and measurement of the prevalence of HAI in such wards would not accurately reflect the situation within the hospital.

3.2.2 Instructions for Completion of Patient Details Form

Introduction

To be completed for all eligible patients occupying beds within the ward on day of survey. Patients to be surveyed are those that are present on the ward at the time the data collector begins the survey.

Summary of content

Admission, specialty for patients care, date of birth, gender, transferred from, planned or unplanned.

Notes for Completion

If a patient is admitted to the ward after the survey begins they will not be included as prevalence is a snapshot in time. For the same reason, if a patient is discharged during the survey no

attempt will be made to follow up their notes after discharge. Nursing staff on the ward can identify lodgers or boarders. Patient ID number can be patient hospital number or CHI number. The admission type can be obtained from admission documentation. If the COPPISH code is available, the code for unplanned admission is 8. Women admitted to give birth or for elective section should be recorded as unplanned. The comments box can be used to record any additional notes or comments regarding the patient.

3.2.3 Instructions for Completion of Infection Form

Introduction

This form is completed for all patients and indicates whether the patient has an infection meeting one of the CDC criteria listed in Appendix C or is currently on treatment for an HAI and is still exhibiting one or more signs or symptoms.

Each patient's records (case notes, drug charts, temperature charts and nursing records) should be reviewed to determine whether an HAI is present. Clinical ward staff should be consulted and examination of patients by suitably qualified local ward staff undertaken if necessary. In some situations it may be necessary for the data collector to make limited enquiries from the patient in order to clarify the medical notes and prior permission should be obtained from local staff.

The diagnosis of HAI should be based on the signs and symptoms exhibited by the patient and these should be recorded by CDC criteria in the infection form. The decision should be based on these signs and symptoms rather than the fact that the patient is receiving treatment.

For patients that are not showing any CDC signs and symptoms of HAI and are not receiving antibiotics on the day of the survey, it is only necessary to review the previous seven days notes. For patients that are showing CDC signs and symptoms of HAI, it may be necessary to review much further back to determine the onset of the first sign of infection to ensure they meet the healthcare associated definition.

Definitions

An HAI is defined as one that arises **48 hours or more** after admission and which was not present or incubating on admission.

A **prevalent HAI** is one where the patient has signs and symptoms of such an infection and/or is being treated for such an infection and has at least one CDC sign or symptom.

Definitions of individual HAI are provided in Appendix D of this protocol and on the tablet PC.

Notes for Completion

An HAI is defined as one that arises 48 hours or more after admission and cannot be diagnosed in patients who have been in hospital for less than 48 hours. For the purposes of this study, 48 hours is calculated as day 3 after admission to hospital where day 1 is the admission date. HAI occurring in patients that have been admitted after transfer from another hospital do not meet the CDC definition of HAI if the infection was present on admission. An exception to

these rules is with a surgical site infection. All surgical site infections, including those present on admission, should be recorded. The 'readmission with SSI' button on the **Surgery** form identifies patients that have been admitted with these types of infection. Patients that are out of the ward on 'pass' are included in surveillance as they occupy a bed on the ward and their notes should be available for survey. If there are no current notes for the day of the survey, it should be assumed that the patient does not have an HAI as they have been fit to leave the ward. Infections developing in patients returning from pass, even those occurring within 48 hours of return to the ward, are considered to be healthcare associated.

The CDC criteria should be applied rigorously to all potential HAI; patients that are more susceptible to infection should be treated in the same way as immunocompetent patients. When recording the signs and symptoms of an HAI, the infection should be over-diagnosed i.e. if the patient is exhibiting any signs or symptoms they should be recorded and those infections meeting the full case definition will be identified in-house at HPS. If the notes do not contain reference to a specific sign or symptom, it can be assumed that the sign or symptom is not present and the 'No' options should be completed on the form. Infections in patients still undergoing treatment for an HAI are only considered prevalent if there is one or more CDC sign or symptom present. It can often be difficult to distinguish between the signs of symptoms of different types of infection in the same patient. The data collection tool is set up to allow the same patient to have multiple HAI and care must be taken when recording which signs and symptoms belong to which infection. Rarely, patients may have two separate infections of the same type i.e. two separate surgical site infections. The database will not allow this data to be collected and full details of the infection type and signs and symptoms must be recorded in the comments box on the **Patient Details** form.

Occasionally, patients with extensive infection will require surgery to help treat and/or prevent further spread of the infection. Patients having washout, debridement, amputation or other surgeries to remove infection are considered infection free after the surgery even if infection with the same organism persists after the surgery. Any new infections after such surgery should be recorded as surgical site infections if prevalent on the survey day.

3.2.4 Instruction for completing Microbiology form

Introduction

If one of the criteria involving microbiology cultures is met then a Microbiology form is displayed which allows the organism to be recorded. The list is displayed in alphabetical order. Organisms listed are clinically significant and should mirror organisms that are reported from the laboratories.

Summary of content

Organisms identified, isolated or cultured.

Notes for completion

Up to four organisms can be added to the microbiology form. If more than four organisms are present then the information should be recorded in the comments box in the patient details

page. If an organism is not present on the drop down list then it should be recorded in the other organism box. Some microbiology interpretation is required to distinguish between commensals, contaminants, colonisation and active infection. If a patient's sample has been sent for microbiological analysis and results have not yet been reported, this should be recorded as 'don't know' on the infection form. This then allows the awaiting microbiology results option to be selected. Awaited microbiology results should not be recorded as 'awaited' or 'specimen sent' on the microbiology form.

3.2.5 Instructions for Completion of Antibiotic Form

Introduction

The Antibiotic Therapy form has to be completed for all patients occupying beds within the ward on day of survey. This includes all anti-microbial drugs currently in use according to the BNF. The database can record up to 4 anti-microbial therapies for each patient.

Summary of content

Receiving antibiotic, type of antibiotic, date started, reason for prescribing antibiotic, antibiotics prescribed 48 hours after admission.

Purpose of the form

To monitor antibiotic prescribing rates and to assist in the diagnosis of HAI.

Notes for Completion

If more than 4 antibiotics are administered extra information should be recorded in the free text comments box on the patient details form. One off doses should not be recorded on this form. If a patient has a one off dose of antibiotics on Day 1 then begins a course of antibiotic treatment on Day 2 the start date for the course of antibiotics is day 2 as a one off dose of antibiotics is not described as an anti-microbial therapy. If a patient is prescribed IV antibiotic 'A' that is then changed to oral antibiotic 'A', the start date of the current antibiotic therapy is recorded as the date of the original IV dose as the antibiotic has not changed only the method of administration. However if a patient starts IV antibiotic 'A' on day 1 that is changed to oral antibiotic 'B' on day 4 then day 4 is the start date of the current antibiotic therapy as the antibiotic has changed. Use of antibiotic 'A' would not be recorded. For PRN administration, ensure antibiotics have been (or plan to be) administered on the day of the survey so that only current therapies are recorded. To determine if antibiotics have been administered 48 hours or more after admission, previous antibiotic prescriptions on the patients drug chart must be analysed. If the patient has been an inpatient for a long time, previous drug charts may or may not be available. Make a note in the comments box if the information cannot be obtained.

Definitions

Antibiotic or anti-microbial therapy is the use of substances to reduce the growth or reproduction of bacteria, viruses and fungi.

The definition of **therapeutic** treatment is: the use of anti-microbials to clear an infection by an organism. It is also used to describe a treatment where the anti-microbial has been prescribed to clear an organism that is colonising a patient but is not causing active infection. This includes eradication therapy.

The definition of **prophylactic** treatment is: the use of anti-microbials before, during, or after a diagnostic, therapeutic, or surgical procedure to prevent infectious complications. Also called preventive treatment.

The definition of **empirical** treatment is: the use of anti-microbials when the patient is suspected of suffering from an infection but with little evidence – the ‘just in case’ anti-microbials. This should be recorded as ‘other’ and an explanation added into the comments box in the patients details form.

The **other** option should also be selected when anti-microbials are used for purposes other than treating or preventing an infection. An example is the use of nebulised antibiotics to open the airways in cystic fibrosis patients.

3.2.6 Instructions for Completion of Surgery Form

Introduction

Data on previous surgical procedures are collected to measure the prevalence of HAI following surgery with and without an implant in the preceding year.

The Surgery form should be completed for all patients in the burden survey and HAI positive patients in the prevalence survey. The surgery types listed are based on the OPCS listing of operative procedures. Up to three operative procedures can be included without an implant and three with an implant.

Definitions

Definition of an operative procedure (4)

An operative procedure is carried out on patients undergoing treatment for the prevention, diagnosis, care or relief of disease or for the correction of deformity or deficit, including those performed for cosmetic reasons, or for reasons associated with pregnancy, childbirth or contraceptive or procreative management. The procedure requires a deliberate skin incision and not simply the insertion of a needle (of any diameter) through the skin and other tissues. An operative procedure usually involves performance in theatre by a surgeon (in training or career post) by aseptic measures under anaesthetic (general, spinal or epidural anaesthesia or infiltration with local anaesthetic).

Therefore by this definition, the insertion of chest drains, central lines, Hickman lines, tracheostomy or peg tubes are not classified as operative procedures.

Definition of an implant (5)

A nonhuman-derived implantable foreign body (e.g. prosthetic heart valve, hip prosthesis) that is permanently placed in a patient during an operative procedure and is not routinely manipulated for diagnostic or therapeutic purposes. Screws, wires and mesh that are left in place are considered implants. Implantable antibiotic beads left *in situ* after surgery are not classed as implants.

Notes for Completion

Surgeries that involve multiple procedures are regarded as the same surgery provided the procedures are undertaken under one anaesthetic record. Procedures with separate anaesthetic records should be recorded separately in the Surgery form. With multiple procedure surgeries, the main surgical procedure should be recorded to ensure that as much detail as possible is recorded about the surgery e.g. if a patient has a laparotomy and total hysterectomy, the surgery should be recorded as 'Total abdominal hysterectomy' and not 'Laparotomy'.

The form provides space for three surgeries without an implant and three surgeries with an implant. Some patients may have had many complex operations over the previous year and these may include more than three surgeries with and/or without an implant. In these cases, details of the procedure and date of surgery should be recorded in the free text comments box on the patient details form. If a procedure is encountered that does not fall within any of the categories provided in dropdown list it should be recorded as Other and the procedure name recorded in the free text box provided. Patients with complex medical issues may also have more than one volume of notes and although every effort must be made to accurately determine the dates of previous surgeries, it is occasionally not possible e.g. previous volumes are not held on the ward. Where it is not possible to ascertain the date of surgery, the default date of 01/01/9998 should be recorded.

The data will be used to determine the prevalence of patients with an HAI that underwent surgery with and without an implant in the previous year. As the presence of an implant is considered a risk factor for infection, surgery to remove an implant should be recorded in the 'surgery without implant' section unless the implant is removed and another inserted during the same operation.

The CDC criteria for surgical site infections include infections diagnosed within the first 48 hours of admission and patients transferred with from another hospital with a surgical site infection. For this reason, it is important to identify patients that have been admitted with a surgical site infection by checking the 'Re-admission with SSI' radio button.

3.2.7 Instructions for Completion of Invasive Devices Form

Purpose of the form

The invasive device data are collected to measure the prevalence of HAI in patients that currently have an invasive device in situ.

Invasive devices form should be completed for all patients in the burden survey and HAI positive patients in the prevalence survey. A selection of the most important types of invasive device in terms of HAI according to the literature has been selected. The invasive device should only be recorded if it is present at the time of the survey.

Definitions

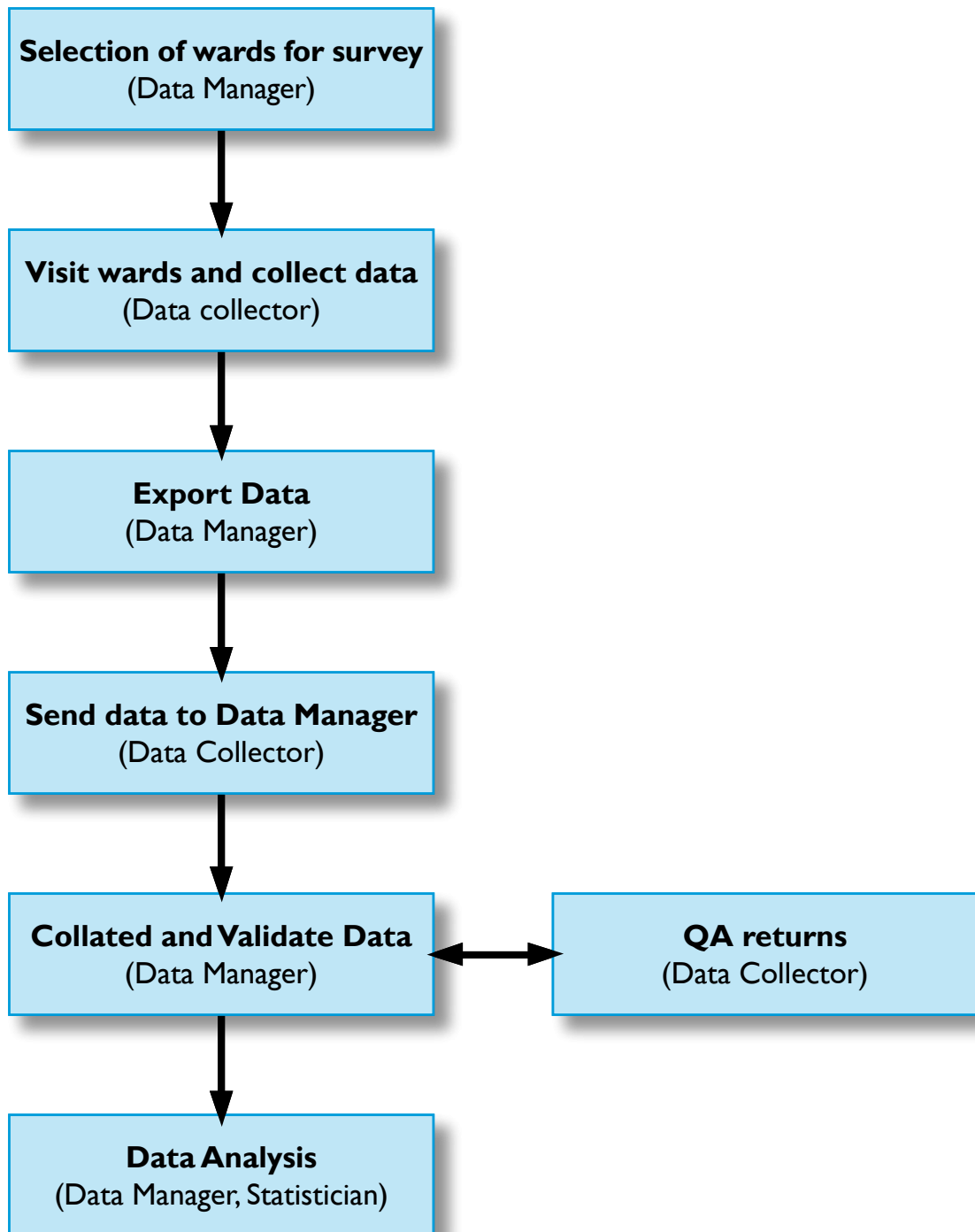
Any device which, in whole or part, penetrates the inside of the body, either through a natural body orifice or through the surface of the body. A body orifice is any natural opening in the body (including the external surface of the eyeball) or any permanent artificial opening such as a stoma. A list of invasive devices to be included is listed in appendix E.

Notes for Completion

Details of invasive devices that do not meet one of the four provided definitions should be recorded in the 'Other invasive device' text box.

Case notes often do not provide clear details of the presence/absence and number of invasive devices. In instances where the case notes are unclear, ward staff should be approached for input or the patient should be observed directly.

Figure 2: Data collection Flowchart



3.3 Data Management SOP

3.3.1 Introduction

This document is intended to function as a guide to the role of Data Manager on the HAI Prevalence Study. Steps taken to manage the database will remain in place until the studies conclusion and will be undertaken by following the instructions below.

There are several facets to the collection, validation and storage of data for this study. A team of data collectors will travel around hospitals in Scotland, collecting hospital and patient data and recording this on the Prevalence Survey Database. This database has been specifically designed for the Prevalence survey and is installed on each data collectors HPTCI 100 tablet computer. While the software has been written using Firebird, output from the database is in the format of Comma Separated Variable files (CSV). These files are imported into the MS Access database 'Main Study Database' (O:\HAI Prevalence\Data\MAIN STUDY) by the data manager, allowing data to be examined using queries and tables to be linked using relationships. The objective of the data manager is to ensure that all data in the database is valid and in a suitable format for statistical analysis.

3.3.2 Weekly Tasks

Weekly Communication

A 'Weekly Communication' is distributed to all data collectors via email. It should preferably be sent prior to the data collectors 'paper day'. The communication has four components:

1. Attach Ward Randomisation files. These Excel spreadsheets are specific to each hospital and list upcoming wards, specifying whether they are for Burden or Prevalence survey and providing data collectors with an indication of bed numbers (see later).
2. Attach quality assurance ('QA feedback') word documents for each data collector. This attachment should be sent every second week, between data requests, although there may be follow up issues in the following week (see Quality Assurance Validation later). In addition to the QA feedback documents, the data manager should comment on any data quality issues that have been identified and respond to issues that have been raised by the data collectors.
3. Request exported data from a specific time period (every second week). The data manager should specify the start date and end date during which data has been collected and include the export type that this should refer to i.e. Data export, Discharge data export or Infection Control Nurse (ICN) export (which is hospital specific, not date defined). This process occurs on a bi-weekly basis running from Wednesday to Tuesday. Patient data is currently the only export type required, while Discharge and ICN exports are not required as all discharge data collection is co-ordinated by the Data Manager. To save confusion, it is preferable that all data collectors submit data from the same period. Data collectors are expected to attach the exported data files (as CSV files) to a reply email on their paper day. There should be 10 files per data collector when a Data export is requested.

4. Request a progress update. Data collectors will keep a record of the ward name and date that they have visited each ward. This should be transferred to the Ward Randomisation spreadsheet specific to the hospital and emailed back to the data manager so that the Main Study Bed Numbers file (O:\HAI Prevalence\Bed numbers\Main Study) and Project Plan (O:\HAI Prevalence\Project Plan\Main Plan) can be updated. The returned Ward Randomisation files should be saved in the appropriate hospital file with the date appended to the end of the file name e.g. O:\HAI Prevalence\Hospitals\First Quarter Hospitals\Acute\Monklands\Monklands Ward Randomisation 06 | 205.

3.4 Fortnightly Tasks

Import Data into the Main Study Database

In response to the weekly communication, data collectors will export their data and email it to the data manager.

(Main Study Database located at O:\HAI Prevalence\Data\MAIN STUDY)

Open each email, go to the File menu, select Save Attachments and then save them to a new folder in the appropriate data collectors Raw Data folder. The new folder should be named using the date that is representative of the last day of data collection eg O:\HAI Prevalence\Data\MAIN STUDY\Andrew\Andrew Raw Data\261005.

Open the Last Import Data folder for each data collector (e.g. O:\HAI Prevalence\Data\MAIN STUDY\Andrew\AR Last Import Data) and delete the remaining CSV files that should have been imported into the database previously.

Open each CSV file from the new folder. This is important because the process of opening the CSV file alters all date fields so that they import into the Access database successfully.

Check each file to ensure the correct format of data is in each field. If return has been used in Comment fields (in the Ward Schedule and Patient Details files) the subsequent fields will not line up. Cut and paste until all data is in the correct column.

Select the TIMEOFCENSUS field in the Ward Schedule file. Go to the Format menu, select Cells, choose the time format hh:mm:ss.

Select Save As for each CSV file, remove the underscore and date from the file name (except for the Ward file which should keep the same name) and save in the appropriate Last Import Data folder e.g. 8_Ward_NoDate, 8_WardSchedule, 8_PatientDetails, 8_PatientInfection, 8_PatientAntibiotic, 8_PatientSurgery, 8_PatientInvasive, 8_PatientStaffContrib, 8_Definitions, 8_Microbiology. This process ensures that import macros in the Main Study Database (O:\HAI Prevalence\Data\MAIN STUDY) will be able to locate each file, recognise it, apply an Import Specification (which ensures each file is imported in the same way for each data collector) and put the data in the correct table.

Before the data is imported, copy the Main Study Database, paste it to a backup location e.g. H:\Backup Databases and rename it by adding the last date that data within the database refers to e.g. Main Study Database 261005. This is important because without this back up it becomes a laborious process to recover the original database once data is imported.

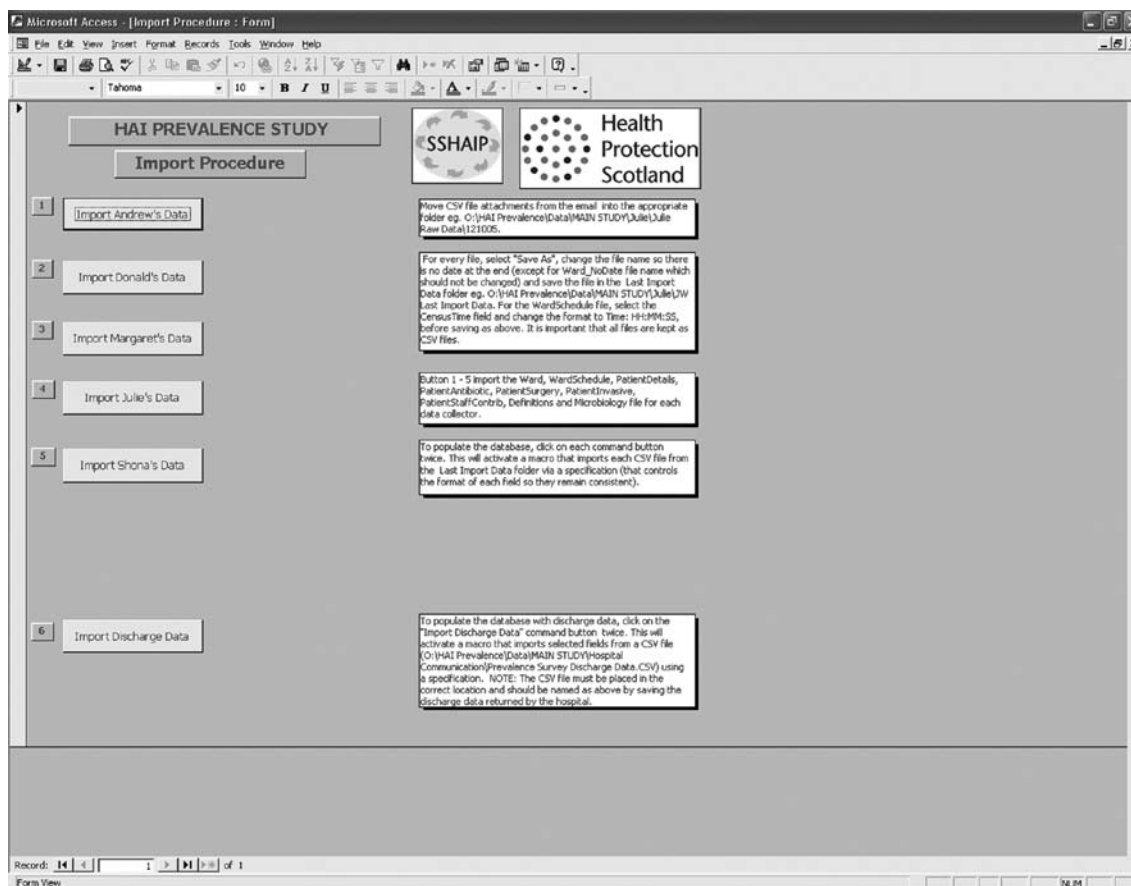
To open the Main Study Database, use the password 'survey'.

It is also useful to count the number of records in each table of the Main Study Database before importing each data collector's data. This makes it easier to interpret any error messages that occur unexpectedly during the import process e.g. when records not imported or 'lost'.

To action the import process, open the Import Procedure form of the Main Study Database (Figure 1). Double click on each button called 'Import X's Data' (button 1 – 4). This will run a macro containing 10 'TransferText' actions, each one to import a different CSV file from the Last Import Data folder. Records in the Ward table will have been previously imported (because there is no date specification) so this will cause a Dialog box to open advising that

records were not imported because they already existed – this is OK. Accept this message to proceed with the import. Records in all other tables should be new and therefore should not result in a dialog box.

Figure 3: Import Procedure form



Note: The Data Manager is responsible for following up discharge data with ICN's and uses a separate query and form in the Main Study Database to identify required data and import returned discharge data (see later).

3.4.1 Quality Assurance Validation

Open Access then open the Main Study Database and the QA form. This form has a tab for every table in the database, with queries inserted on each page that relate to specific tables. Each query should include the Hospital and Ward Name, and if the query relates to patients, will also include the PatientID. There will also be a QA field specifying that the records have not been validated previously (Figure 4).

Open the QA Feedback document (found at O:\HAI Prevalence\Data\Validation development\QA Feedback forms).

Highlight all records in each query of the QA form, copy and paste under the appropriate 'Issue' of the QA document.

When all records from every query are copied into the document, save the document as 'All QA ddmmy' in O:\HAI Prevalence\Data\MAIN STUDY\All QA, where the date in the file name refers to the day the data was imported into the database. Print this document for use when collecting individual data collector's responses.

Edit the All QA document so that records are specific for each data collector. Delete records that are clearly not errors.

Save each version as 'Initials QA ddmmy' in the appropriate Initials QA Sent folder e.g. O:\HAI Prevalence\Data\MAIN STUDY\Andrew\Andrew QA Feedback\AR QA Sent. This document can then be attached to the Weekly Communication email.

Figure 4: QA form

The screenshot shows a Microsoft Access window titled 'Microsoft Access - [QA form : Form]'. The menu bar includes File, Edit, View, Insert, Format, Records, Tools, Window, and Help. The toolbar contains various icons for navigation and editing. The main area displays a form with a table header. The table has the following columns: HOSPITAL, WARDNAME, WARDID, SPECIALITYC, SPECIALITYC, SPECIALITYC, SPECIALITYC, and WARDQA. The table body is empty. Below the table, there is a 'Record:' label with navigation buttons. The status bar at the bottom indicates 'Record: 1 of 1' and 'Form View'.

Data collectors are expected to look at the QA feedback document and respond by either recording that the data is or is not an error, by filling in a blank cell with the correct response or, in instances when the correct entry is no longer available, enter 'na'. For more complex issues, the correct outcome should also be explained under the table of data in question.

The data collectors will email the completed QA feedback document back to the data manager on their paper day. Currently, the procedure for amending the Main Study Database is to:

1. Transcribe the corrected data and comments from each data collectors QA feedback onto the All QA document.
2. Work through each record on the document validating the data in the database. Once a record in an issue has been checked, place a '/' on the All QA document next to the record. This is a reminder that you have viewed it on the database. Then mark records that are valid with a '\', forming a cross.
3. Select 'yes' in the QA field of the Ward, WardSchedule and PatientDetails tables of the Main Study Database for all records.
4. Work through each issue on the All QA document. If there is still a problem with data in a record, represented by '/' on its own, check the QA field, changing it back to 'no'. This will prevent the record from being exported into the 'Master for Analysis' database and will ensure the record continues to come up in future QA. Note that the PatientDetails QA field relates to each patients record, including the Antibiotic, Surgery, Invasive Device, Staff Contribution and Infection tables. Therefore, all aspects of a patient record must be complete and correct if the patient QA field is checked as 'y'.
5. The Discharge table has it's own QA field which should only be completed when the data has been returned from the hospital and populated in the database (see Discharge Data).

If new queries are added to the 'QA form' they should initially be run without specifying that records must have a 'y' in the QA field. In this way, the first run of the query will reveal any errors in data that was previously deemed valid.

3.4.2 Infection Diagnosis Validation

There are three approaches to validating HAI diagnoses in this study and each one can be undertaken by double clicking the appropriate button on the 'Diagnosis Validation' form of the Main Study Database.

1. Selecting the 'Run All CDC Queries' button runs queries to validate each record in the DefinitionsAdjDS2 table against Centre for Disease Control infection definitions. If the diagnosis is valid, the query appends it to the table 'CDC HAI'. This table does not permit duplicates so error messages will indicate when the symptoms selected by the data collector cause the infection criteria to be met several times. When the dialog box appears (as it will many times), select OK. Selecting the 'Run All CDC Queries' button will also automatically run an update query that populates the 'CDC HAI' field in the DefinitionsAdjDS2 table with '1' for each infection that meets CDC criteria.
2. Selecting the 'Run All UK Queries' button runs queries to validate each record in the DefinitionsAdjDS2 table against UK infection definitions. If the diagnosis is valid, the query appends it to the table 'UK HAI'. This table does not permit duplicates so error messages will indicate when the symptoms selected by the data collector cause

the infection criteria to be met several times. When the dialog box appears (as it will many times), select OK. This button also runs an update query that populates the 'UKHAI' field in the DefinitionsAdjDS2 table with 'I' for each infection that meets UK criteria.

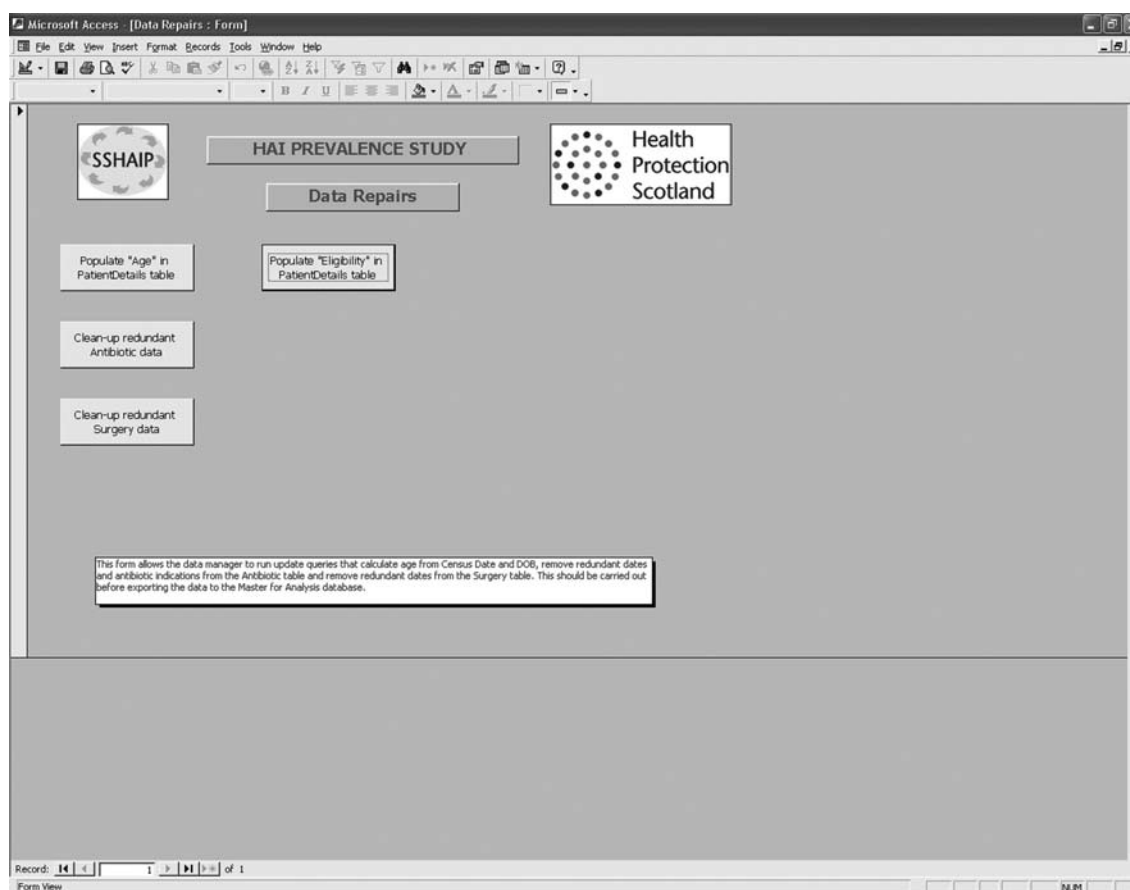
3. Selecting the 'Therapy Definition Query' button runs a query to append records from the DefinitionsAdjDS2 table when the patient meets the 'Therapy' criteria i.e. antibiotic 1, 2, 3 or 4 administered >2 days after patient admission and the antibiotic indication = 'Therapeutic'. Records are appended to the 'THERAPY HAI' table. This button also populates the 'Therapy HAI' field in the DefinitionsAdjDS2 table with 'I' for each patient that meets the therapy criteria.

3.4.3 Monthly Tasks

Data Repairs

The Main Study Database contains the 'Data Repairs' form, a final stage in the process of preparing the database for export to the Master for Analysis database (Figure 5).

Figure 5: Data Repairs form



There are currently four buttons on this form (although more may be added), each running macros that update fields in the database. They are:

‘Populate ‘Age’ in PatientDetails table’

This macro runs an update query that calculates the difference between the patient’s date of birth and the date of census, updating the Age field in the PatientDetails table with the patient’s age in years. This field aids the statistical analysis of clinical data when stratified by patient age groups.

‘Clean-up redundant Antibiotic data’

This macro runs four update queries to remove data that is generated in the Antibiotic table by default.

When a patient is not receiving Antibiotic Therapy, and this field is ‘n’, the Firebird database populates the four antibiotic start dates with ‘01/01/2001’ by default. The first query in the macro therefore removes these default dates based on the Antibiotic Therapy = ‘n’ criteria.

When a patient is on Antibiotic Therapy but receiving fewer than four separate antibiotics (the maximum number recordable), the unused antibiotic fields default, with the Antibiotic OPCS code = ‘0’, Antibiotic Start date = the date of census and Antibiotic indication = ‘Other’. The remaining update queries in the macro remove default antibiotic start dates and indications when the Antibiotic OPCS code defaults to ‘0’.

‘Clean-up redundant Surgery data’

This macro runs nine update queries to remove data that is generated in the Surgery table by default.

There are three Implant Surgery date fields and three No-Implant Surgery date fields and some or all of these will be populated with default dates at different times.

If the ‘HadSurgery’ field is ‘n’, all date fields are populated with 01/01/2001. These are removed with the first query.

If the ‘NoImplantSurgery’ field is ‘n’, all NoImplantOPCS date fields are populated with 01/01/2001. These are removed using an update query in the macro.

If the ‘ImplantSurgery’ field is ‘n’, all ImplantOPCSdate fields are populated with 01/01/2001. These are removed using an update query in the macro.

ImplantSurgeryOPCS and NoImplantSurgeryOPCS fields that are unused are populated with the default code ‘1’. Associated date fields are populated with the date of census as a default date. Queries will remove these default dates if the OPCS code = ‘1’.

‘Populate ‘Eligible’ in Patient Details table’

This button runs a macro that causes two update queries to populate the ‘Eligible’ field in the Patient Details table with either 1 (for eligible patients) or 0 (for ineligible patients). Eligibility is determined by how long a patient has been in hospital before they are surveyed. This field was created out of concern that the denominator used in calculating prevalence could include all patients surveyed in the hospital, when in fact, only those that had been in hospital for 48 hours or more should be properly diagnosed as HAI positive or negative. We do not record admission time for patients so to approximate the 48hr time lag, patients must have been surveyed > 1 day after they were admitted e.g. admitted on 1/12/05 but date of census

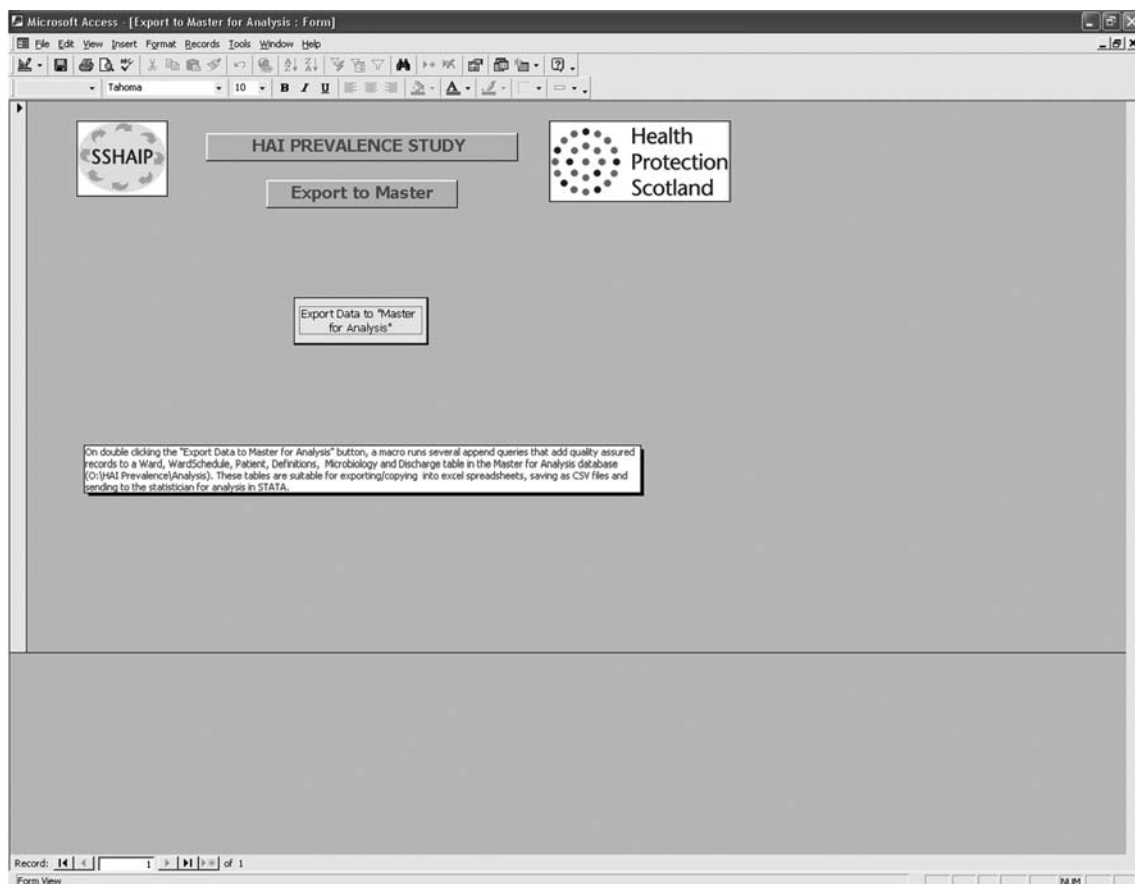
on 2/12/05 would be ineligible, but surveyed one day later on 3/12/05 would be considered eligible. In the worst-case scenario, this approximation will include patients that have only been in hospital for 33 hours e.g. admitted at 23:59 1/12/05 and then surveyed at 09:00 on 3/12/05.

3.4.4 Export to Master

Having completed the previous steps, the database is now ready to be exported to the 'Master for Analysis' Access database. This process should be run immediately before the data is sent to the statistician.

1. Prior to using the export button, copy the original Master for Analysis database and rename it so that the name includes the date of last import.
2. Delete all records in the original Master for Analysis. They will be replaced when the export process is run.
3. Select the 'Export to Master for Analysis' button on the Export to Master form in the Main Study Database (Figure 6). This runs a macro containing 6 append queries and will populate a Ward, WardSchedule, Patient, Definitions, Microbiology and Discharge table with valid records only. Note: The Patient Identifier and DOB fields are not exported to Master for Analysis to maintain patient confidentiality.

Figure 6: Export to Master form



3.4.5 Save tables as CSV files for analysis

1. For each table in the Master for Analysis database (O:\HAI Prevalence\Analysis), select Menu, then Export. Change the file type to Excel 97-2000 and then Save In a new folder in O:\HAI Prevalence\Analysis. Add the current date to the end of each file name and to the new folder name e.g. O:\HAI Prevalence\Analysis\Data Exchange 141205.
2. When all files have been exported, open each one. Convert the Time of Census field to hh:mm:ss format in the Ward Schedule table.
3. Select Save As for all files, then Save as Type 'CSV'. Use the same file name and folder and delete the original Excel 97-2000 files.
4. Email the statistician to advise them that the data is ready for analysis.

3.5 Hospital Specific Tasks

3.5.1 Ward Randomisation Files

Ward randomisation files must be created when each hospital has submitted an up-to-date list of their wards. The file should be distributed to the data collectors one week before they are due to survey the hospital by attaching it to the Weekly Communication email. The ward randomisation table should also be printed and sent out to each data collector attending the hospital (responsibility of Project Administrator). The process is:

1. Project Administrator forwards file/email to Data Manager with hospital wards listed
2. Hospital code, hospital name, ward names, respective specialities and bed numbers are entered into the appropriate fields of the Main Study Bed Numbers spreadsheet (O:\HAI Prevalence\Bed numbers\Main Study).
3. In conjunction with the Project Manager and Project Administrator, remove wards that fall outside the remit of the survey. These include Paediatric, Clinics, and Learning Difficulties wards.
4. In the Random Numbers field, select the function =RAND(). Drag this down to fill all new ward records. This is known as a volatile function and will change with further operations. To stop this, copy the new Random Numbers, select Paste Special and then Values only and paste back over the original numbers.
5. Highlight records that correspond to a specific hospital. Go to the Data menu and select Sort. Sort the records in ascending order on the Random Numbers field.
6. Enter 'Burden' in the Survey Type field for the 25% of wards with the lowest random number. If this does not equate to a whole number, round up. In the remaining 75%, enter 'Ext. Prevalence'.
7. Copy all records for the specific hospital and paste them to a new workbook. Insert column headings, remove the Random Number field and format the table so that it can be printed onto one sheet.
8. Save the new workbook in the Hospital folder under the specific hospital folder e.g. O:\HAI Prevalence\Hospitals\First Quarter Hospitals\Acute\Glasgow Royal Infirmary.

3.5.2 Discharge Data

To measure the burden imposed on hospitals by patients with HAI, the database also has a Discharge table where burden/HAI patients discharge date, ICD10 codes and status are recorded. This data typically becomes available after the initial census, so follow up this information ICN staff at each hospital will be contacted with a table of patients and asked to collect the data. Discharge data requests should be sent to the hospital approximately one month after the data collectors have completed their survey, and then followed up one month after that.

The process for providing this list and retrieving the data is outlined below:

Data Preparation

1. Open the Discharge Data form in the Main Study Database. It will immediately prompt you (twice) for the Hospital name that you need data for. You need only type enough letters to identify a specific hospital e.g. typing 'wis' would identify Wishaw General. Once entered, a select query table will show all patients that were surveyed in a burden ward, or have an HAI, in the specified hospital (Figure 7).
2. Highlight all records, select copy and then paste the records into the second row of the Data spreadsheet, in the excel file 'Discharge Data Template' (O:\HAI Prevalence\Data\MAIN STUDY\Hospital Communication). You will need the password 'survey' to open this file.
3. Delete the row containing the Access field names, leaving template column headings that will make sense to ICN staff.
4. Delete discharge dates (likely to be defaults) and ICD10 codes from the records in the spreadsheet.
5. Comments have been included because some contain CHI numbers that may assist the ICN in identifying the patient. Remove all other unrelated comments.
6. Create a new folder with the name of the hospital in O:\HAI Prevalence\Data\MAIN STUDY\Hospital Communication and then save the Excel file as 'Hospitals name' Prevalence Survey Discharge Data'.

Figure 7: Discharge Data form

Microsoft Access - [Discharge Data - Form]

HOSPITALCODE: Anil

SSHAIP HAI PREVALENCE STUDY Discharge Data Health Protection Scotland

Outstanding Discharge Data for Infection Control Nurse

HOSPITALCODE	HOSPITAL	WARDNAME	PATIENTIDEN	GENDER	DOB	PATIENTID	C
C313	Inverclyde Royal	1	_007627	m	24/07/1922 12_358	TC	
C313	Inverclyde Royal	1	_012925	f	21/02/1937 12_355	TC	
C313	Inverclyde Royal	1	_0211243000	f	02/11/1924 8_290	96464	
C313	Inverclyde Royal	1	_027917	f	17/03/1930 12_363	TC	
C313	Inverclyde Royal	1	_030454	f	29/10/1916 12_362	TC	
C313	Inverclyde Royal	1	_0402273044	f	04/02/1927 8_286	73307	
C313	Inverclyde Royal	1	_044319	f	23/11/1935 12_356	TC	
C313	Inverclyde Royal	1	_0503323462	f	05/03/1932 8_287	Transfer from Care unit in IRH 011539	
C313	Inverclyde Royal	1	_0507133307	f	05/07/1913 8_285		
C313	Inverclyde Royal	1	_0606273085	f	06/06/1927 8_288	64783	
C313	Inverclyde Royal	1	_065892	f	24/06/1932 12_365	TC	
C313	Inverclyde Royal	1	_070780	f	05/09/1919 8_295	0509193005 History of cystitis and re	
C313	Inverclyde Royal	1	_080503	f	04/11/1925 12_354	TC	
C313	Inverclyde Royal	1	_080809	m	24/12/1919 8_293	2412193037	
C313	Inverclyde Royal	1	_083890	m	28/02/1919 12_360	TC	
C313	Inverclyde Royal	1	_087286	f	27/11/1907 12_352	TC	
C313	Inverclyde Royal	1	_089514	f	12/05/1922 8_296	1205223045	
C313	Inverclyde Royal	1	_2011273048	f	20/11/1927 8_284	7441	

Records: 14 of 1064

Type in the Hospital Name to display all patient records from a hospital that require discharge information ie patient either has an HAI or is from a burden ward, and the record has not been validated. To import discharge data, see the Import Procedure form.

Form View

Communication with the Infection Control Nurse

1. Call the ICN to let them know that you are about to send out the data. Ideally, the ICN will have previously returned a form outlining their preferred format for the data i.e. paper, excel spreadsheet or Access database. If not, explain the options and ask for their preference. An excel spreadsheet is our preferred format because it controls data entry using drop down lists, is more secure (has a password) and includes instructions for data entry.
2. Use the Word file 'Discharge Data Introductions' (in O:\HAI Prevalence\Data\MAIN STUDY\Hospital Communication), as a template for an introductory email to the hospital's ICN contact. Attach the appropriate discharge data Excel file to the email. If the ICN would prefer paper correspondence, post the 'Discharge Data Introduction - Posted Data' letter, 'Discharge Data Instructions - Posted Data' document and a printed version of the excel table containing patient records. This should be double packaged, with the internal envelope marked 'Confidential'.
3. If the ICN has received the data via email, call them with the password to the 'Hospitals name' Prevalence Survey Discharge Data' workbook. The password is 'survey'.

3.5.3 Importing Discharge Data

If the ICN has returned an excel file containing completed Discharge Data:

1. Save a copy of the file in the hospital specific folder (e.g. O:\HAI Prevalence\Data\MAIN STUDY\Hospital Communication\Mackinnon Memorial), adding 'Returned' to the end of the file name.
2. Open the file and ensure that the fields are completed and in the correct format. If so, save the file in CSV format, named 'Prevalence Survey Discharge Data' and put the file in the 'Hospital Communication' folder (O:\HAI Prevalence\Data\MAIN STUDY\Hospital Communication). CSV files containing discharge data that has been imported previously should be removed from the Hospital Communication folder and filed in the appropriate hospital-specific folder.
3. Open the Import Procedure form of the Main Study Database (Figure 3). Double click on the 'Import Discharge Data' button. This will run a macro that imports data from the Prevalence Survey Discharge Data file and updates records in the PatientDischarge table.
4. Open the PatientDischarge table in the Main Study Database to ensure the data has been imported correctly.

If paper records have been returned from the ICN with discharge data, open the Patient Discharge table in the Main Study Database and key the data directly into the table.

Note: ICN's will use the comments field of the discharge data worksheet to explain missing data and comment on perceived inaccuracies in the data. It is not possible to determine whether these 'errors' are at our end or theirs, so existing data will not be amended in the Main Study Database.

Patients that are discharged to a care home should have their status recorded using the Home / Care Home option.

Validating Discharge Data

1. Open Access then open the Main Study Database and the QA form. This form has a tab for every table in the database, with queries inserted on each page that relate to specific tables. Each query should include the Hospital and Ward Name, and if the query relates to patients, will also include the Patient ID.
2. The discharge tab includes six select queries. Each interrogates a different aspect of the returned discharge data but can't be used to make changes. The queries include:
 - Discharge date precedes admission date.
 - Comments reported by ICN and record as yet un-validated
 - Discharge Status for patient does not match those on the drop down list
 - Status 'Still in Hospital' or blank but a discharge date is recorded
 - Status not 'Still in Hospital' but no discharge date is recorded

- Comment includes the word 'home', likely to mean that patient was discharged to a care home, which was not on early copies of the Discharge Status drop down list.
3. The Patient ID reported in these queries should be used to amend records in the Patient Discharge table.

Note: Although ICN's will report that data HPS has provided is incorrect, at no time should this be used to amend pre-existing data. Discharge data collection should be conservative, with potentially erroneous discharge status and dates omitted from the database.

4 HAI PREVALENCE STUDY SUBMISSION TO DATA STRATEGY GROUP

Approved at an extra-ordinary data strategy meeting on 25 May 2005.

A form D has been submitted as part of the HPS register of systems.

The following document presents evidence that the criteria are being met.

Amended for submission to Caldicott Guardians on Wednesday, 02 May 2007. This includes an explanation of the criterion that have to be met to conform to the requirements of the HPS Data Strategy Group.

Criterion:

Sections should be clear about why we need to have the data set including Patient Identifiable Information (PIIs)

Definition of public health benefit:

To provide the HAI Task Force with baseline information on the total prevalence of HAI in Scottish hospitals and its burden in terms of health service utilisation and costs. This information will be available to guide priority setting in the development of strategy and policy.

Definition of health protection function:

To develop a consistent methodology for prevalence surveys which when repeated at intervals will allow the impact of measures taken nationally to reduce the burden of HAI to be evaluated through an analysis of trends over time.

Criterion:

Sections should be clear about the use of individual PIIs in achieving objectives detailed in criterion 1

Listing of the PIIs

CHI number if implemented or Patient Hospital Record Number (whichever is being used by the hospital being surveyed)

System generated unique record identifier (Accession number)

Gender

Date of Birth

Definitions of how each will be processed

See attached Standard Operating Procedure (SOP) for the Prevalence Study.

The project will be managed using the SCIEH Information and Security Policy and SOPs for data management.

Definition of how each will be used in any output or data operations

The data collectors will use a patient identifier: CHI number (if implemented) or Patient Hospital Record Number - after initial data collection to record Date of discharge. The pilot study tested if this was sufficient information to allow all the discharge information to be recorded, because there were issues with some hospitals using a combination of CHI numbers and some using patient record numbers the addition of the date of birth enabled a validation if required. External Consultants undertaking statistical and economic analysis will not have access to this information. Once the survey is complete this data will be deleted.

System generated unique record identifier (Accession number) – this will be considered a PII for the length of the study because it will be linked on the tablet PCs to the CHI or Patient Hospital Record Number until all the discharge data has been collected. Once the survey is complete and the link between the accession number and Patient identifier is removed this will no longer be considered a PII.

Gender – this will be collected in order to provide sex adjusted prevalence rates for all hospitals and for individual hospitals. This will remain in the data set for analysis.

Date of Birth – this will be collected in order to calculate age in years and as a check to allow confirmation if there are any transcription errors in the CHI or patient hospital record number. Age in years is necessary for modelling for age adjusted HAI rates. This will allow for comments on the age distribution of the total population compared with previous studies.

Criterion:

Sections should limit the number of PIIs to those which serve the purposes

Clarification that each PII has a separate purpose

Patient Identifier: Required for quality checking and retrieval length of stay data

System generated unique record identifier (Accession number): Required for labelling distinct records

Gender: Required for modelling of rates adjusted for sex

Date of Birth: Required for modelling of rates adjusted for age

Definition of how each PII will enhance the objectives of criteria 1

Patient Identifier: Required for quality checking and retrieval length of stay data which will be used to evaluate the additional length of stay for HAI patients and the burden on NHS time and cost.

System generated unique record identifier (Accession number): Required for labelling distinct records. This is essential for data management and validation of the survey.

Gender: Required for modelling of rates. This will provide sex adjusted prevalence rates that can be compared with future studies.

Date of Birth: Required for modelling of rates. This will provide age adjusted prevalence rates that can be compared with future studies.

Criterion:

Section should limit access to PII to those who need to know

Listing of HPS or other staff who need to know

Project Manager

Data Manager

Data Collectors

Systems Developers

Clarification of grounds for including those on list

All staff on the list are subject to NHS confidentiality agreements and have signed and agreed to the HPS confidentiality agreement.

Project Manager will deliver the database and reports and conduct a validation study of the data collection process.

Data collectors will need to record the Patient Identifier (CHI number if implemented or Patient Hospital Record Number) in order allow the collection of discharge details.

Systems developers may need to make adjustments to the database during the study and in doing so may need to view the PII details.

Audit Trail

The tablet database is designed to record the time and date of the creation of an individual patient record. This will record information on which data collector has accessed the notes. In addition to this as a fail-safe a detailed project plan records each ward visited, what date the ward was visited and by whom.

Indication that there is a process for revising this preferably in the SOP

See attached SOP for Prevalence Study.

Listing of the procedures for access e.g. archiving and data handling

See attached SOP for Prevalence Study.

Indication of how those on the list receive training in data protection and security

Local HPS staff will provide basic training on data protection and security.

Criterion:

Sections should protect data from those who do not need to know accessing them

Listing of procedures for limiting access e.g. Password protection, archiving and data handling

Tablet PCs on which data is collected are stand-alone, password protected and password access is limited to the list shown. The database is also password protected and is limited to the list shown above. The passwords will be maintained in accordance with the SCIEH SOP 1 and The Prevalence Study SOP (see attached details archiving and data handling procedures).

5 HAI PREVALENCE STUDY INFORMATION SECURITY SOP

The SOP references refer to the HPS Information Security Standard Operating Procedure (11).

5.1.1 General

This Standard Operating Procedure (S.O.P) is to be implemented by all members of Health Protection Scotland (HPS) Prevalence Study staff to safeguard the confidentiality, integrity and availability of data held by the HPS Prevalence Study in computer systems and manual filing systems.

5.1.2 Passwords (In accordance with S.O.P.1 Passwords)

Passwords have been allocated to each tablet PC and to the Prevalence Study Database.

The system developer will ensure that when a person leaves HPS employment permanently, their password is changed within 24 hours of the person's departure. The password change is to remain in force for a maximum period of 30 days at which time the users account is to be removed from the system. Refer also to the HPS Exit Process held by the Personnel Department. The project manager will inform the systems developer when members of staff begin work or leave post. The tablet PC will be accessible only by the data collector and the system administrator.

5.1.3 Data Collection (In accordance with S.O.P.8 Confidentiality Rules and S.O.P. 10 Release of Named or Patient Identifiable Data)

Data will be collected on tablet PCs in the wards. All information sources available will be used. The survey will only record details relating to the patients HAI and the identifiable information will be the four items mentioned above. The Protocol for data collection contains a listing of all the data items and a description of the data item and a rationale for recording the item.

Data collection

This will be undertaken on a rolling basis by trained data collectors, two being allocated at any one time to one hospital. Data will be collected in each hospital over a period of days or weeks but all data collection in one ward must be completed within one day. Data collection will be undertaken on weekdays. Data will be entered into specially designed data collection proforma held on a tablet PC. Data items will be collected on the following data entry forms: ward, patient, infection, antibiotics, invasive devices, workload, surgery, and discharge forms. A record will be made of the time taken to complete the patient forms and of the staff involved

in data collection. The data collectors will be assisted in data collection by local clinical staff and/or members of the infection control or audit departments who are familiar with the methodology and with the clinical environment.

An infection will be considered to be present if the patient meeting the case definition is symptomatic or receiving treatment on the day of the survey. The final decision on whether an infection is present will rest with the project data collectors who will seek help from the project leader where they are in doubt. Data collected from the hospitals will be exported into a database held at HPS and managed by the data manager. The data collectors have RAS (Remote Access Server) accounts that allow them to remotely log on to their HPS accounts. These accounts are considered to be a secure network and data will be transferred by e-mail to HPS offices. Data will also be collected on the characteristics of the ward (ward type, bed numbers, staff numbers and types) on the day of data collection.

5.1.4 Training

The data collectors have undergone an initial period of training in diagnosis of HAI based on the use of a series of case studies prepared by the project leader. They have also had a pilot period under observation in a hospital, their diagnoses being checked against that of the project leader. Validation of data collection will be undertaken throughout the survey period in order to ensure consistency and accuracy of data collection. Data collectors will be given training on security and confidentiality. Throughout the survey monthly meetings will be undertaken to allow discussion of any issues which arise during the course of the survey and recording any decisions for inclusion in future protocols.

5.1.5 Informing Local Staff

A leaflet and poster has been produced which informs ward staff about what is involved in the data collection process. This will be sent one month before the survey to be distributed by the Infection Control Contact at the Hospital.

5.1.6 Informing Patients (In accordance with SOP7 - Patient Information Leaflets)

HPS have produced a leaflet for patients that explain the legal responsibilities of HPS and what their role is. These are available to inform patients of what happens to the data. They can also be given the staff information leaflet if they require further information about the survey.

5.1.7 Data management

This will be consistent with the Data Protection Act 1998. All databases will be password protected. Only members of the HPS Prevalence Study Project Team will have access to the data. The only PII recorded will be Patient identifier, gender and Database accession number and age.

5.1.8 Audit Trail

The tablet database is designed to record the time and date of the creation of an individual patient record. This will record information on which data collector has accessed the notes. In addition to this as a fail-safe a detailed project plan records each ward visited, what date the ward was visited and by whom.

5.1.9 Ethical approval and Confidentiality

Consultation with the Scottish Executive Health Department has indicated that Ethics Committee approval for the prevalence survey is not required. The confidentiality of the patient will be protected.

The only patient identifiers will be Patient identifier (CHI or Patient Hospital Record Number) that will be held on the patient record for the course of the data collection, an automatic accession number will be allocated to each patient record, which will be considered PII for the duration of the data collection. After data collection is complete the CHI or Patient Hospital Record Number will be deleted and the link between the accession number and the patient will be removed and this will no longer be considered PII. Age in years will be collected and not date of birth and is therefore not considered to be PII.

The master list linking patient identifier, necessary to collect length of stay and discharge diagnosis retrospectively, and to enable the checking of data items, will be held by and available only to the local staff. The data collection staff will sign confidentiality agreements in the hospitals before having access to any patient data. Permission to examine patients' notes has been sought from the Medical Director (Caldicott Guardian) of the hospital

Only the age in years and gender will be issued to the external consultants who will be performing the analysis. The Patient record numbers will be removed from the database as soon as length of stay data has been collected.

Length of Stay data will be requested from the Infection Control Teams by the data manager who will send a list of required patient identifiers to the hospital contact, once this data has been recorded the link between patient identifier and accession number will be permanently deleted.

5.1.10 Backups (In accordance with S.O.P.2 Backups)

HPS

Data held in HPS is to be the subject of a controlled backup procedure as detailed in SOP2 Backups.

Archived data and recovery data is to be accorded the same security as live data.

The backup procedure for the Prevalence Study Database is to be administered by the data collectors themselves and is to be taken nightly Monday to Friday. A USB stick will be used to collect the backup data and an automated method of backup from the database. Encrypted

USB sticks were procured for trial in the pilot study. The data is backed up onto encrypted USB sticks so that the data are saved and encrypted.

When the data is transferred to HPS the data will be backed up in accordance with the SCIEH/HPS backup procedure (Information and Security Policy and SOP2 Appendix 1). The role of the data manager is to coordinate and manage the collation of the data from the data collectors in the field. The collated database will be stored on the HPS/O:SSHAIP on SCIEHAP01/HAI Prevalence folder which is backed up nightly in accordance with SOP2 and Annex 1).

5.1.11 External Sites

The backup procedure for the Prevalence Study Database is to be administered by the data collectors themselves and is to be taken nightly Monday to Friday. A USB stick will be used to collect the backup data and an automated method of backup from the database. The USB sticks have been encrypted so that in the unlikely event of them being lost or stolen they will be password protected secure.

The USB Sticks will be securely stored separately from the tablet PCs.

6 REFERENCES

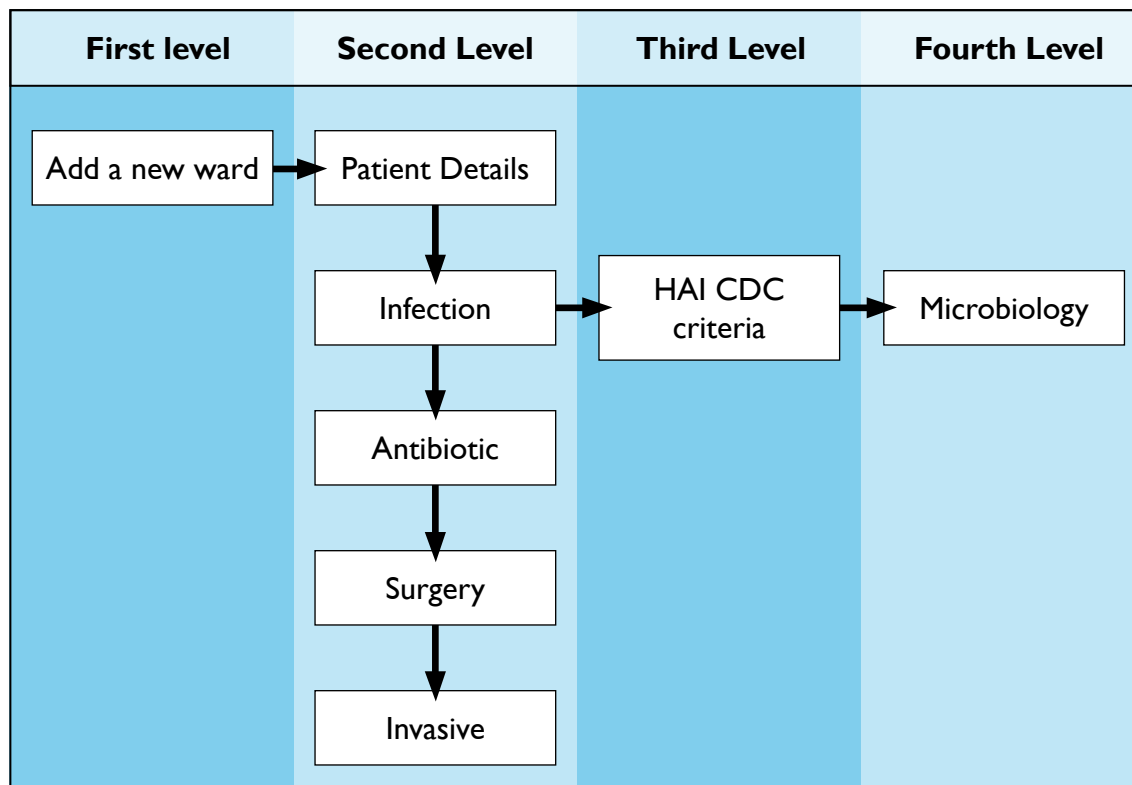
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APPENDICES

7 APPENDIX A - User Manual For Database

The database designed for data collection in the prevalence survey is a four level firebird database designed in house at HPS. Figure 8 shows the structure and levels of data entry. The data collection tool has been installed on individual tablet PCs. Each data collector will be responsible for the data entry and backup of information on their tablet PC. There will be a Windows username and password and a separate database username and password.

Figure 8: Structure of the database showing levels of data entry



7.1.1 Backup

Encrypted USB chips will be provided to the data collector; the database will be backed up onto these chips on a daily basis. The database includes an export button, which will allow the data to be exported from the data collection tool to a file on the USB chips.

7.1.2 Getting Started

An icon appears in the bottom left corner of the screen. The database is linked to this icon by a shortcut. The icon is named Shortcut to HAI SurveyMDI. A double tap using the tablet pen will open the database and present the Logon Screen.

7.1.3 Login

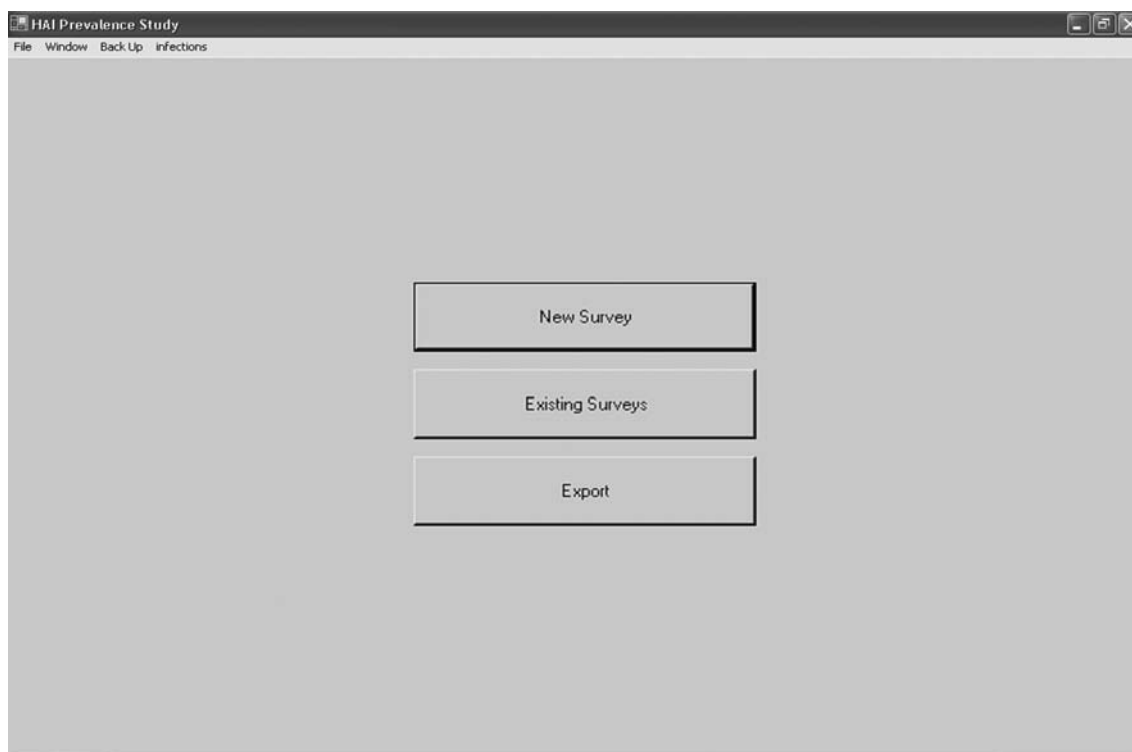
There are two items to be entered on this screen. A pre-set username will be added for each data collector. There is a drop down list that can be used to select the correct user. A password will be assigned for each data collector.

Figure 9: Login Screen



The HAI prevalence survey database is now open and ready to be used. If the tablet is left unattended at any time (which is not advised) the database must be shut down and the screen locked.

Figure 10: Opening Screen



You will be presented with the main screen with three buttons *New Survey*, *Existing Survey* and *Export*.

7.1.4 Add a new ward to the database

- From the main screen, press the new survey button
- Complete the first ward details form and click ok.
- Complete the second ward details form and click ok.

Figure 11: Ward level data entry form 1

The image shows a software dialog box titled "HAI Prevalence Study - [Add a New Ward]". It has a standard Windows-style title bar with minimize, maximize, and close buttons. Below the title bar is a menu bar with "File" and "Window" options. The main content area is divided into three sections, each with a label and a set of instructions:

- Name:** "Type the name of the ward below:" followed by a single-line text input field.
- Hospital:** "Select the hospital that contains this ward:" followed by a dropdown menu.
- Specialites:** "Choose up to 4 specialties that this ward covers:" followed by four numbered dropdown menus (1., 2., 3., 4.).

At the bottom of the dialog box are two buttons: "OK" and "Cancel".

Figure 12: Ward level data entry form 2

Ward Name: 2
Hospital: Borders General
Specialties of this ward: Orthopaedics - Trauma ort

Survey
Kind of Survey Ward Census is included in: Burden Extended prevalence

Census Information
Date of Census: 22/09/2005 Time of Census: 00:00:00

Beds Occupied by inpatients at Time of Census	-1
Beds Occupied by Patients Staying for <24 hours (Day Patients)	-1
Unoccupied beds at time of Census	-1
Total Available Beds at Time of Census	-1
Number of Trained NHS Nursing Staff	-1
Number of Untrained NHS Nursing Staff	-1
Number of Trained Agency Nursing Staff	-1
Number of Untrained Agency Nursing Staff	-1
Number of Student Nursing Staff	-1

Comments on Data Collection

Form Completed/Last Updated By dsauders

7.1.5 Add a new patient to a new ward schedule

- After adding a new ward to the data base a blank patient record automatically appears open at the patient detail form.
- Complete the patient detail form and click on the infection tab followed by ok to move to the infection form.
- Complete the infection form and click on the antibiotic therapy tab followed by ok to move to the antibiotic therapy form.
- Complete the antibiotic therapy form and click on the surgery tab followed by ok to move to the surgery form.
- Complete the surgery form and click on the invasive devices tab followed by ok to move to the invasive devices form.
- Complete the invasive devices form.
- Move between these completed forms if required by clicking on the relevant tab followed by ok.
- Click ok at the bottom right hand side of the patient record form to save and provide an option to add another patient.
- Click yes to open a new blank patient record or no if data collection is complete.

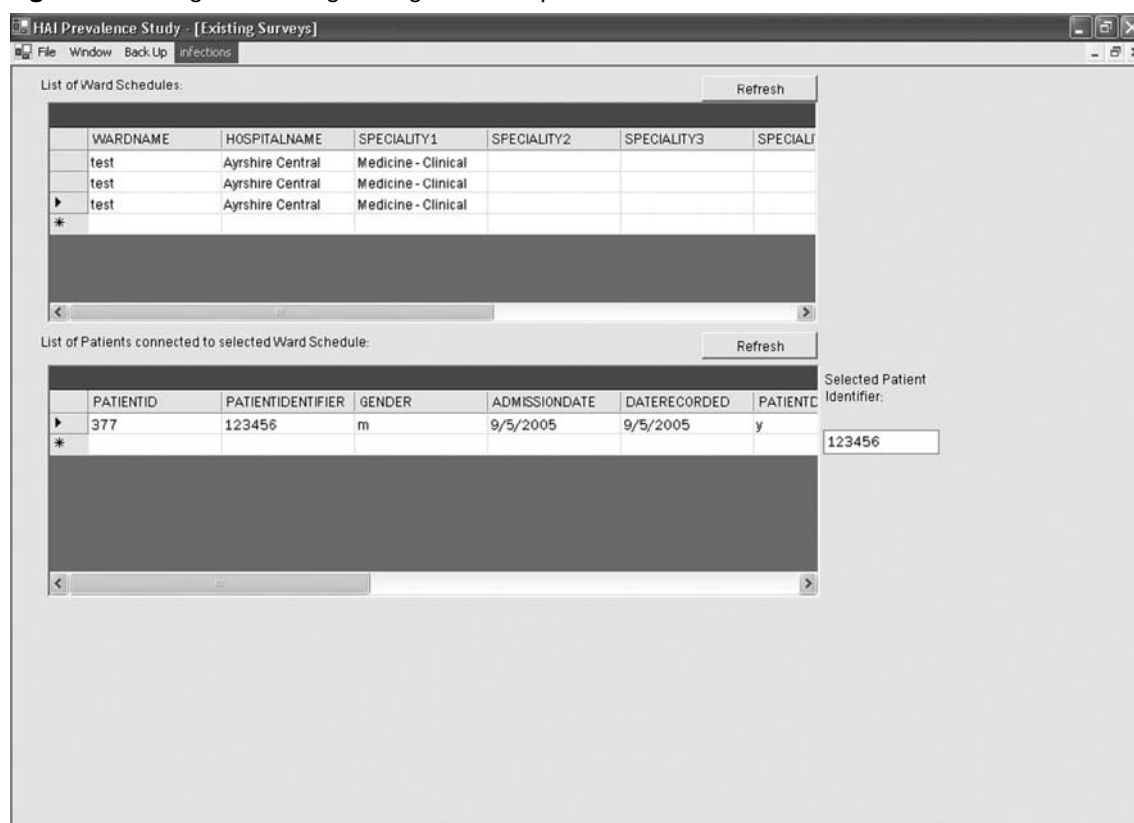
Figure 13: Patient level data entry form

The screenshot shows a software window titled "HAI Prevalence Study - [Patient Data Collection]". The window has a menu bar with "File", "Window", "Back Up", and "Infections". Below the menu bar is a tabbed interface with tabs for "Patient Detail", "Infection", "Surgery", "Antibiotic Therapy", "Invasive Devices", "Staff Contribution", and "Discharge Details". The "Patient Detail" tab is selected. The form contains several sections: "Lodger\Speciality" with a question "Is this Patient a Lodger on ward detailed above?" and radio buttons for "Yes" and "No", and a dropdown for "Hospital specialty responsible for patients care:". "Identifier" section has a text box for "Patient hospital number or code given to patient locally:". "Bed Number" section has a text box for "Patient's bed number:". "Age" section has a dropdown for "Patient's age in completed years:". "Gender" section has radio buttons for "Male" and "Female". "Date of Admission" section has a date picker for "Date patient was admitted to this hospital:" showing "9/ 5/2005". "Admission Type" section has radio buttons for "Planned" and "Unplanned". "Transfers" section has four questions with radio buttons for "Yes" and "No": "Patient was transferred from another hospital", "From Ward", "From ICU", and "Patient was transferred to ward from own ICU". "Patient was transferred from Care Home". "Comments" section has a large text area. At the bottom left, it says "Date recorded: 9/5/2005". At the bottom right, there are "Cancel" and "OK" buttons.

7.1.6 Add a new patient to an existing ward schedule

- From the main screen press the existing surveys button to bring up the list of wards that have been added and the patient information that has been added for each ward.
- To add a new patient select the ward, scroll along to the right and click on the new patient button.
- Complete the blank patient record form as above.

Figure 14: Data grid containing existing wards and patients



7.1.7 View an existing patient

- From the main screen press the existing surveys button to bring up the list of wards that have been added and the patient information that has been added for each ward.
- To edit a patient select the relevant ward, scroll along to the right and click on the view related patient button.
- This brings up a list of patients connected to that ward schedule.

7.1.8 Edit an existing patient

- From the main screen press the existing surveys button to bring up the list of wards that have been added and the patient information that has been added for each ward.
- To edit a patient select the ward, scroll along to the right and click on the view related patient button.
- This brings up a list of patients connected to that ward schedule.
- Select the relevant patient, scroll along to the right and click on edit.
- The completed patient form will appear and changes can be made.
- Click ok to save changes or cancel to reject changes.

7.1.9 Refreshing the Data Grid

If a ward or patient is been added to the database whilst the 'Existing Survey' screen is open, the record is not automatically added to the lists and it must be refreshed.

- To refresh the list of wards, press the Refresh button located at the top right hand side of the ward data grid.
- To refresh the list of patients, press the Refresh button located at top right hand side of the patient data grid.

7.1.10 Export Data from the Database

- From the file menu of the database chose Export.
- In the Export Box fill out the date of census boxes corresponding to the dates supplied by the data manager.
- Click export data followed by ok.
- Repeat step three nine times until all 10 files have been exported.
- These files are exported as excel files to C:\HAISurvey.

7.1.11 Data transfer to Data Manger

To transfer exported, collected data to the data manager for analysis and timely returns of QA, data is exported and emailed fortnightly.

- Export data as above when requested.
- Go to C:\HAISurvey and attach all 10 exported excel files onto an email and send to the data manager.
- Delete the files from C:\HAISurvey so the folder is empty ready for the next export.

7.1.12 Backing up the database

At the end of each working day the database should be backed up onto an encrypted USB stick.

- From the main database menu select backup.
- Go to C:\HAISurvey.
- Select the DB File.
- Copy the DB file and transfer onto the memory stick.
- Eject the memory stick safely using the stop USB storage device option.
- Remove memory stick and store safely away from the tablet PC.

8 APPENDIX B - Data Definitions

8.1 *Ward Selection form*

Data item	Ward name
Response	Alpha numeric
Classification	Required
Definition	Ward in which patient's bed is located
Choices	No choices
Rationale	Required to check sampling strategy is followed
Data item	Hospital name
Response	Alpha numeric
Classification	Required
Definition	Hospital where survey is taking place
Choices	No choices
Rationale	Required for reporting of hospital HAI rates
Data item	Official (administrative) speciality of ward 1,2,3,4
Response	Text from drop-down menu
Classification	At least one item required, four possible
Definition	Administrative speciality of ward/ Defined speciality/ies of patients in ward
Choices	Select from drop down list (see appendix B1, list 1 for choices)
Rationale	Required for description of ward Required to establish risk of HAI in ward
Source Hierarchy	Nurse in charge → other nursing staff on ward

8.2 Ward Census

Data item	Ward Name
Response	Text
Classification	Required but pulled from ward details
Definition	Ward in which survey being undertaken
Choices	Select from list of wards entered
Rationale	Required to check that hospital sampled

Data item	Hospital
Response	Text
Classification	Required but pulled from ward details
Definition	Hospital in which survey being undertaken
Choices	No choices
Rationale	Required to check that hospital is sampled

Data item	Speciality
Response	Text
Classification	Required but pulled from ward details
Definition	Speciality of ward in which survey being undertaken
Choices	Pulled from ward details
Rationale	Required to check that hospital sampled

Data item	Survey
Response	Radio Button
Classification	Required
Definition	Survey in which patient included i.e. <i>Burden or Extended Prevalence</i>
Choices	Burden Prevalence
Rationale	Required to signal which component of the survey the patient data will be analysed in and to ensure additional data for the burden survey is collected

Data item	Date of census
Response	Numerical Date frame
Classification	Required
Definition	Date on which survey undertaken in that ward
Choices	DD/MM/YYYY. If the information is not available the Default date is 01/01/9998, and will be excluded from analysis.
Rationale	Required record of date of survey in that ward

Data item	Time of census
Response	Numeric (24 hour clock)
Classification	Required
Definition	Time at which eligible In Patient (IP) beds are sampled
Choices	No choices
Rationale	Required to establish exact time beds in ward surveyed

Data item	Beds occupied by inpatients at time of survey
Response	Numeric
Classification	Required
Definition	Number of beds occupied by eligible patients
Choices	No choices
Rationale	Required to calculate HAI rates

Data item	Beds occupied by patients staying for <24 hrs
Response	Numeric
Classification	Required
Definition	Number of beds occupied by ineligible patients
Choices	No choices
Rationale	Required to calculate HAI rates

Data item	Unoccupied beds at time of census
Response	Numeric
Classification	Required
Definition	Number of beds unoccupied at time of census
Choices	No choices
Rationale	Required to check on calculation of HAI rates
Reply	Numeric

Data item	Total available beds at time of census
Response	Numeric – Should be equal to sum of 3 fields above
Classification	Required/Validation check
Definition	Bed complement of the ward. If ‘unfunded beds’ are sometimes used and are occupied by for example private patients who are potentially at risk then they should be included in the total.
Choices	No choices.
Rationale	Needed for calculation of HAI prevalence rate

Data item	Number of trained NHS nursing staff on duty
Response	Numeric
Classification	Required
Definition	Number of registered NHS nursing staff on duty for the shift (including bank staff employed by the hospital)
Choices	No choices
Rationale	Required to calculate patient/nurse ratio

Data item	Number of untrained NHS nursing staff on duty
Response	Numeric
Classification	Required
Definition	Number of unregistered NHS nursing staff on duty for the shift (including bank staff employed by the hospital)
Choices	No choices
Rationale	Required to calculate patient/nurse ratio

Data item **Number of trained agency nursing staff on duty**
Response Numeric
Classification Required
Definition Number of **registered** agency nursing staff on duty for the shift
Choices No choices
Rationale Required to calculate patient/nurse ratio

Data item **Number of untrained agency nursing staff on duty**
Response Numeric
Classification Required
Definition Number of **unregistered** agency nursing staff on duty for the shift
Choices No choices
Rationale Required to calculate patient/nurse ratio

Data item **Number of student nursing staff**
Response Numeric
Classification Required
Definition Number of **student nursing staff** on duty for the duration of the shift
Choices No choices
Rationale Required to calculate patient/nurse ratio

Data item **Comments on data collection**
Response Text field
Classification Not Required
Definition Data collectors comments on how data collection has gone in that ward and a chance to record additional information.
Choices No choices, free text field
Rationale To identify successes and difficulties in data collection and allow any additional patient information to be recorded

Data item	Form completed by
Response	Alphanumeric
Classification	Automatically assigned by username login
Definition	Name of data collector completing the Ward Form
Choices	No choices
Rationale	Required for development of methodology of survey

8.3 Patient Details

Data item	Is patient a Lodger on ward detailed above?
Response	Radio Button
Classification	Required
Definition	If patient is lodging in ward and is undergoing care from speciality different from normal speciality of ward
Choices	No choices
Rationale	Required for calculation of speciality specific rates

Data item	Hospital Speciality responsible for patient care
Response	Alpha numeric
Classification	Required
Definition	Speciality of consultant under whose care patient is <u>currently</u>
Choices	Select from drop down list created from new ward form Up to 4 possible choices
Rationale	Required for calculation of speciality specific rates
Source Hierarchy	Medical notes→ Nursing staff

Data item	Patient hospital number or code given to patient locally
Response	Alpha numeric
Classification	Required
Definition	Patient hospital number or code given to patient locally
Choices	No choices
Rationale	Required for quality checking and retrieval length of stay data

Data item	Patients Bed Number
Response	Numeric
Classification	Required
Definition	Patient's bed number as allocated by the hospital
Choices	No choices. Free text. R1B1 (room 1 bed 1) R1B2 (room 1 bed 2) R2B1 (room 2 bed 1) R2B2 (room 2 bed 2) and so on.
Rationale	Required to check on completeness of sampling

Data item	Patient date of birth
Response	Numeric Date Frame
Classification	Required
Definition	Patient's date of birth
Choices	DD/MM/YYYY. If the information is not available the Default date is 01/01/9998, and will be excluded from analysis.
Rationale	Required for age specific rate reporting and for modelling

Data item	Gender
Response	Radio Button
Classification	Required
Definition	Sex of patient
Choices	Male Female
Rationale	Required for modelling of rates

Data item	Date patient was admitted to this hospital
Response	Numeric Date frame If exact date is not documented record as 01/01/9998
Classification	Required
Definition	Date patient was admitted to <u>this</u> hospital
Choices	DD/MM/YYYY. If the information is not available the Default date is 01/01/9998, and will be excluded from analysis.
Rationale	Required to estimate duration of stay in Burden survey
Source Hierarchy	Admission forms→ward clerk→ward register→admissions register→medical notes

Data item	Patient was transferred from another hospital
Response	Radio Button
Classification	Required
Definition	Whether patient admitted from another hospital
Choices	Yes No
Rationale	To examine the frequency of HAI in transferred patients

Data item **From ward**
Response Radio Button
Classification Required
Definition Whether patient admitted from ward (not ICU) at another hospital
Choices Yes
 No
Rationale To examine the frequency of HAI in patients transferred into this hospital

Data item **From ICU**
Response Radio Button
Classification Required
Definition Whether patient admitted from ICU at another hospital
Choices Yes
 No
Rationale To examine the frequency of HAI in patients transferred from ICU at another hospital.

Data item **Transferred to ward from own ICU**
Response Radio Button
Classification Required
Definition Whether patient admitted to ward from own ICU or HDU if both in the same physical location
Choices Yes
 No
Rationale To examine the frequency of HAI in patients transferred from ICU

Data item **Patient was transferred from Care home**
Response Radio Button
Classification Required
Definition Whether patient admitted from residential or nursing home
Choices Yes
 No
Rationale To examine the frequency of HAI in transferred patients

Data item	Admission type
Response	Radio Button
Classification	Required
Definition	Whether admission planned or unplanned using the COPPISH codes.
Choices	Planned Unplanned
Rationale	To examine the proportion of infection by type of admission

Data item	Comments on data collection
Response	Text field
Classification	Not Required
Definition	To allow data collector to add individual comments/notes on each patient if required
Choices	No choices, free text field. <u>NB</u> do not use a hard return in this field.
Rationale	To allow data collector to record additional information on the patient or data collection.

Data item	Date
Response	Required but pulled from database
Classification	Required
Definition	Date record was recorded
Choices	No choices
Rationale	To record date record was entered on the database

8.4 Infection

Data items	HAI
Response	Single
Classification	Conditionally required
Definition	Type of HAI
Choices	Selection from drop down list (see appendix B I, list 2)
Infection Rationale	Required to calculate rates of individual HAI

8.5 Microbiology

Data item	Microbiology specimen(s) status
Response	Radio Button
Definition	Whether specimen sent for microbiological examination
Choices	Positive Awaited
Rationale	To examine microbiology of HAI

Data item	Organisms identified/isolated/cultured
Response	Alphanumeric code
Classification	Required (up to 4 can be entered)
Definition	Organism identified/isolated from that specimen
Choices	Selection from drop down list (see appendix B1, list 3)

Data item	Other organism
Response	Text
Classification	Conditionally required if organism not in drop down list
Definition	Organism for which antibody test is positive
Choices	User enters text
Rationale	To examine microbiology of HAI

8.6 Surgery

Data item	Has patient had surgery within the last year
Response	Radio Button
Classification	Required
Definition	Whether patient has had surgery in the last year
Choices	Yes No
Rationale	Required to detect HAI in patients who have undergone surgery

Data item	Has patient been readmitted with an SSI
Response	Radio Button
Classification	Required
Definition	Whether patient has been readmitted with an SSI
Choices	Yes No
Rationale	Required to detect post-operative HAI in patients who have undergone surgery

Data item	Patient has had surgery without implant in year preceding survey
Response	Radio Button
Classification	Required
Definition	Whether patient has had surgery without implant in preceding year
Choices	Yes No
Rationale	Required to detect post-operative HAI in patients without implants

Data item	OPCS Code
Response	Alphanumeric
Classification	Conditionally required (up to 3 operations can be added)
Definition	OPCS code of operation(s) performed
Choices	Selection from drop down list (see appendix B1, list 4)
Rationale	To examine relation between HAI and operation type

Data item	Date of surgery
Response	Alphanumeric Date frame
Classification	Required
Definition	Date operation(s) performed
Choices	DD/MM/YYYY. If the information is not available the Default date is 01/01/9998, and will be excluded from analysis.
Rationale	To record date of operation

Data item	Other OPCS Code
Response	Text
Classification	Conditionally required
Definition	OPCS code of operation(s) performed
Choices	User enters text

Data item	Surgery with implant in last year
Response	Radio Button
Classification	Required
Definition	Whether patient has had surgery with implant in the previous year
Choices	Yes No
Rationale	Required to detect post-operative HAI in patients with implant surgery

Data item	OPCS Code
Response	Alphanumeric
Classification	Conditionally required (up to 3 operations can be added)
Definition	OPCS code of operation(s) performed
Choices	Selection from drop down list (same as previous list)
Rationale	To examine relation between HAI and operation type

Data item	Other OPCS Code
Response	Text
Classification	Conditionally required if surgery not in drop down list
Definition	OPCS code of operation(s) performed
Choices	User enters text

Data item	Date of surgery
Response	Alphanumeric Date frame
Classification	Required
Definition	Date operation(s) performed
Choices	DD/MM/YYYY. If the information is not available the Default date is 01/01/9998, and will be excluded from analysis.
Rationale	To record date of operation

8.7 Antibiotics/Antifungals/Antivirals

Data item	Patient is Currently receiving Antibiotic Therapy
Response	Radio Button
Classification	Required
Definition	Whether the patient is <u>currently</u> on antimicrobial treatment.
Choices	Yes No
Rationale	To examine the prevalence of antibiotic treatment

Data item	Antibiotic
Response	Alphanumeric
Classification	Conditionally required
Definition	Name of antibiotic which patient is taking
Choices	Antibiotic names from drop down list (see Appendix B1, list 5)

Data item	Method of administration
Response	Alphanumeric
Classification	Conditionally required
Definition	Method of administration of antibiotic therapy
Choices	Method of administration from drop down list 1. Oral 2. Injection 3. Topical
Rationale	Required for detailed analysis of antibiotic prescriptions

Data item	Date Started
Response	Alphanumeric Date frame
Classification	Required
Definition	Date operation(s) performed
Choices	Calendar
Rationale	Required to test whether antibiotics prescribed ≥ 48 hours after admission are an indicator of HAI

Data item	Reason for prescribing this antibiotic
Response	Radio Button Single response
Classification	Conditionally required
Definition	Reason for prescribing antibiotic
Choices	Therapeutic Prophylactic Other
Rationale	Required to determine why antibiotic prescribed

N.B. For the purposes of the survey, the term ‘antibiotic’ refers to antibiotic, antifungal and antiviral therapy.

8.8 *Invasive devices*

Data item	Does patient have an invasive device in situ
Response	Radio Button
Classification	Required
Definition	Whether an invasive device is in situ
Choices	Yes No
Rationale	To assess the prevalence of external risk factors
Source Hierarchy	Medical/nursing notes→ view patient→ask staff→drug kardex→ IV fluid chart

Data item	Urinary catheter in situ
Response	Radio Button
Classification	Required
Definition	Whether urinary catheter in situ
Choices	Yes No
Rationale	To assess the prevalence of external risk factors

Data item	Peripheral vascular catheter in situ
Response	Radio Button
Classification	Required
Definition	Whether peripheral vascular catheter in situ
Choices	Yes No
Rationale	To assess the prevalence of external risk factors

Data item	Number peripheral vascular catheter in situ
Response	One digit number
Classification	Conditionally required
Definition	Number of peripheral vascular catheters in situ
Choices	Number selected from a drop down list
Rationale	Required to quantify risk of HAI

Data item **Central vascular catheter in situ**
Response Radio Button
Classification Required
Definition Whether peripheral vascular catheter in situ
Choices Yes
 No
Rationale To assess the prevalence of external risk factors

Data item **Number central vascular catheter in situ**
Response One digit number
Classification Conditionally required
Definition Number of peripheral vascular catheters in situ
Choices Number selected from drop down list
Rationale Required to quantify risk of HAI

Data item **Invasive mechanical ventilation in situ**
Response Radio Button
Classification Required
Definition Whether patient is being invasively mechanically ventilated
Choices Yes
 No
Rationale To assess external risk factor for HAI

Data item **Other invasive device in situ**
Response Text
Classification Required
Definition Devices inserted under non-surgical technique
Choices User enters text
Rationale To assess external risk factor for HAI

9 APPENDIX C - Controlled lists from database

9.1 *Hospital Specialties*

ABI	Care of the Elderly - Care of the Elderly
E12	Care of the Elderly - GP Other than Obstetrics
D4	Dentistry - Oral Medicine
D3	Dentistry - Oral Surgery
D5	Dentistry - Orthodontics
D6	Dentistry - Restorative Dentistry
F2	Gynaecology - Gynaecology
J4	Haematology - Haematology
A2	Medicine - Cardiology
AB	Medicine - Care of the Elderly
A3	Medicine - Clinical Genetics
A7	Medicine - Dermatology
A8	Medicine - Endocrinology
A9	Medicine - Gastroenterology
A1	Medicine - General Medicine
AA	Medicine - Genito-Urinary Medicine
A6	Medicine - Infectious Diseases
AD	Medicine - Medical Oncology
AH	Medicine - Neurology
AM	Medicine - Palliative Medicine
AP	Medicine - Rehabilitation Medicine
AG	Medicine - Renal Medicine
AQ	Medicine - Respiratory Medicine
AR	Medicine - Rheumatology
E11	Obstetrics - GP Obstetrics
T2	Obstetrics - Midwifery
F3	Obstetrics - Obstetrics
H2	Oncology - Clinical Oncology
H1	Oncology - Clinical Radiology
C8	Orthopaedics - Trauma & Orthopaedic Surgery
XSU	Other
J3	Pathology - Chemical Pathology
R11	Podiatry - Surgical Podiatry
G22	Psychiatry - Adolescent Psychiatry
G3	Psychiatry - Forensic Psychiatry

G1	Psychiatry - General Psychiatry
G4	Psychiatry - Psychiatry of Old Age
C2	Surgery - Accident & Emergency
C3	Surgery - Anaesthetics
C4I	Surgery - Cardiac Surgery
C4	Surgery - Cardiothoracic Surgery
C5	Surgery - Ear, Nose & Throat
C1	Surgery - General Surgery
C6	Surgery - Neurosurgery
C7	Surgery - Ophthalmology
C9	Surgery - Plastic Surgery
C42	Surgery - Thoracic Surgery
C12	Surgery - Vascular Surgery
CB	Urology – Urology

9.2 *Type of HAI*

UTI	Catheter Associated Urinary Tract Infection
UTI	Asymptomatic Urinary Tract Infection - Not Catheter Associated
UTI	Symptomatic Urinary Tract Infection - Not Catheter Associated
UTI	Other Infections of the Urinary Tract
ENT	Conjunctivitis
ENT	Eye Infection other than conjunctivitis
ENT	Oral cavity
ENT	Sinusitis
ENT	Otitis Externa
ENT	Otitis Media
ENT	Otitis Interna
ENT	Mastoiditis
ENT	Upper Respiratory Tract
PNEU	Pneumonia
LRI	Tracheobronchial
LRI	Other Lower
BSI	Laboratory Confirmed Bloodstream
BSI	Clinical Sepsis
GI	Gastroenteritis
GI	Gastro Intestinal Tract Infection
GI	Intra Abdominal Infection
GI	Viral Hepatitis
SST	Skin Infection
SST	Soft Tissue Infection
SST	Infected Burn
SST	Decubitus Ulcer
SST	Breast Abscess or Mastitis
BJ	Osteomyelitis
BJ	Joint or Bursa
BJ	Disc Space Infection
CNS	Meningitis or Ventriculitis
CNS	Spinal Abscess without Meningitis
CNS	Intracranial Infection
CVS	Arterial, Venous Infection
CVS	Mediastinitis
CVS	Endocarditis
CVS	Myocarditis or Pericarditis

RSI	Endometritis
RSI	Episiotomy Site Infection
RSI	Vaginal Cuff infections
RSI	Other Infections of the Male and Female Reproductive Tract
SYS	Disseminated Infection
SSI	Superficial Incisional Surgical Site Infection
SSI	Deep Incisional Surgical Site Infection
SSI	Organ\Space Surgical Site

9.3 *Organisms identified/cultures/isolated*

001	Acinetobacter spp.
002	Acinetobacter baumannii
003	Acinetobacter Iwoffii
004	Actinomyces spp.
005	Adenovirus
006	Aeromonas spp.
007	Alcaligenes spp.
008	Anaerobic cocci
009	Aspergillus spp.
010	Bacillus spp.
011	Bacteroides spp.
012	Bordetella pertussis
013	Bordetella parapertussis
014	Burkholderia (Pseudomonas) spp.
015	Burkholderia cepacia
016	Campylobacter spp.
017	Candida spp.
018	Candida albicans
019	Candida glabrata
020	Candida parapsilosis
021	Candida tropicalis
022	Chlamydia trachomatis
023	Chlamydophila spp.
024	Chlamydophila pneumoniae
025	Chryseomonas spp.
026	Citrobacter spp.
027	Citrobacter spp. - ESBL producer
028	Citrobacter diversus (koseri)
029	Citrobacter diversus (koseri) - ESBL producer
030	Citrobacter freundii
031	Citrobacter freundii - ESBL producer
032	Clostridium spp.
033	Clostridium difficile
034	Clostridium perfringens
035	Clostridium septicum
036	Coliform-lactose fermentor (LFC)
037	Coliform-non-lactose fermentor (NLFC)

- 038 Coliform (unspecified)
- 039 Coronavirus
- 040 Corynebacterium spp.
- 041 Corynebacterium jeikeium
- 042 Cryptococcus spp.
- 043 Cryptosporidium
- 044 Cytomegalovirus
- 045 Diphtheroids (unspecified)
- 046 Enterobacter spp.
- 047 Enterobacter spp - ESBL producer
- 048 Enterobacter cloacae
- 049 Enterobacter cloacae - ESBL producer
- 050 Enterococcus spp.
- 051 Enterococcus spp. (VRE) vancomycin-resistant
- 052 Enterococcus faecalis
- 053 Enterococcus faecalis (VRE) vancomycin-resistant
- 054 Enterococcus faecium
- 055 Enterococcus faecium (VRE) vancomycin-resistant
- 056 Enterovirus
- 057 Epstein-Barr Virus
- 058 Escherichia coli
- 059 Escherichia coli - ESBL producer
- 060 Escherichia coli 0157
- 061 Flavobacterium spp.
- 062 Fusobacterium spp.
- 063 Giardia lamblia
- 064 Haemophilus spp.
- 065 Haemophilus influenzae
- 066 Haemophilus parainfluenzae
- 067 Hafnia spp.
- 068 Helicobacter pylori
- 069 Hepatitis A Virus
- 070 Hepatitis B Virus
- 071 Hepatitis C Virus
- 072 Hepatitis E Virus
- 073 Herpes Simplex Virus
- 074 Human Immunodeficiency Virus
- 075 Influenza Virus A
- 076 Influenza Virus B

- 077 *Klebsiella* spp.
- 078 *Klebsiella* spp. - ESBL producer
- 079 *Klebsiella pneumoniae* (aerogenes)
- 080 *Klebsiella pneumoniae* (aerogenes) - ESBL producer
- 081 *Klebsiella oxytoca*
- 082 *Klebsiella oxytoca* - ESBL producer
- 083 *Legionella* spp.
- 084 *Legionella pneumophila*
- 085 *Listeria* spp.
- 086 *Listeria monocytogenes*
- 087 Measles Virus
- 088 *Micrococcus* spp.
- 089 *Moraxella* spp.
- 090 *Moraxella* (*Branhamella*) *catarrhalis*
- 091 *Morganella morganii*
- 092 Mumps Virus
- 093 *Mycobacterium* spp.
- 094 *Mycobacterium avium*
- 095 *Mycobacterium chelonae*
- 096 *Mycobacterium fortuitum*
- 097 *Mycobacterium tuberculosis*
- 098 *Mycoplasma* spp.
- 099 *Mycoplasma pneumoniae*
- 100 *Neisseria* spp.
- 101 *Neisseria meningitidis*
- 102 *Nocardia* spp.
- 103 *Nocardia asteroides*
- 104 Norovirus (Norwalk-like Viruses)
- 105 *Pasteurella* spp.
- 106 Parainfluenza Virus
- 107 Parvovirus
- 108 *Peptococcus* spp.
- 109 *Peptostreptococcus* spp.
- 110 *Prevotella* spp.
- 111 *Propionibacterium* spp.
- 112 *Proteus* spp.
- 113 *Proteus mirabilis*
- 114 *Proteus vulgaris*
- 115 *Providencia* spp.

- 116 Pseudomonas spp.
- 117 Pseudomonas aeruginosa
- 118 Respiratory Syncytial Virus
- 119 Rhinovirus
- 120 Rotavirus
- 121 Rubella Virus
- 122 Salmonella spp.
- 123 Salmonella enteritidis
- 124 Salmonella paratyphi
- 125 Salmonella typhi
- 126 Salmonella typhimurium
- 127 Sarcoptes scabies
- 128 SARS virus
- 129 Serratia spp.
- 130 Serratia liquefaciens
- 131 Serratia marcescens
- 132 Shigella boydii
- 133 Shigella flexneri
- 134 Shigella sonnei
- 135 Staphylococcus aureus
- 136 Staphylococcus aureus (MRSA) meticillin-resistant
- 137 Staphylococcus aureus (VISA/GISA) meticillin-resistant, vancomycin-intermediate
- 138 Staphylococcus, coagulase-negative (CNS)
- 139 Staphylococcus epidermidis
- 140 Staphylococcus haemolyticus
- 141 Staphylococcus hominis
- 142 Staphylococcus lugdunensis
- 143 Staphylococcus saprophyticus
- 144 Staphylococcus schleiferi
- 145 Stenotrophomonas (Xanthomonas) maltophilia
- 146 Streptococcus spp.
- 147 Group A Streptococcus (Streptococcus pyogenes)
- 148 Group B Streptococcus (Streptococcus agalactiae)
- 149 Group C Streptococcus (Streptococcus dysgalactiae subsp.equisimilis)
- 150 Group D Streptococcus (Streptococcus bovis)
- 151 Group F Streptococcus (Streptococcus milleri group or Streptococcus constellatus, Streptococcus intermedius and Streptococcus anginosus)
- 152 Group G Streptococcus (Streptococcus dysgalactiae subsp.equisimilis)
- 153 Streptococcus milleri

- 154 Streptococcus pneumoniae
- 155 Streptococcus 'viridans group'
- 156 Varicella-Zoster Virus
- 157 Yersinia spp.
- 158 Yersinia enterocolitica
- 159 Other Gram-negative bacteria
- 160 Other Gram-positive bacteria
- 161 Other anaerobes
- 162 Other bacteria
- 163 Other fungi/yeasts
- 164 Other parasites
- 165 Other viruses

9.4 OPCS Surgeries

02	Arteries and Veins	Varicose vein surgery
03	Arteries and Veins	Vascular surgery
04	Bones and Joints	Open reduction of fracture
05	Bones and Joints	Hip prosthesis
06	Bones and Joints	Knee prosthesis
07	Bones and Joints	Other musculo-skeletal surgery
08	Cardiovascular	CABG chest and leg/radial (donor incision)
09	Cardiovascular	CABG – chest only (donor incision e.g. mammary artery)
10	Cardiovascular	Cardiac Surgery
11	Cardiovascular	Heart valve replacement or repair of congenital defect
12	Cardiovascular	Other cardiovascular surgery
13	Digestive tract	Stomach surgery
14	Digestive tract	Small intestine surgery
15	Digestive tract	Large intestine surgery
16	Digestive tract	Cholecistectomy
17	Digestive tract	Appendectomy
18	Digestive tract	Other surgery of the digestive tract
19	Endocrine and Breast	Mastectomy
20	Endocrine and Breast	Thyroidectomy
21	Endocrine and Breast	Other surgery of the endocrine system
22	Eye	Cataract surgery
23	Eye	Other eye surgery
24	Female Genital	Vaginal hysterectomy
25	Female Genital	Abdominal hysterectomy
26	Female Genital	Other obstetric problem
27	Head	Surgery of the head and neck
28	Head	Surgery of the ear, nose or throat
29	Misc.	Limb amputation
30	Misc.	Other prosthetic surgery
31	Misc.	Any other surgical procedure intervention
32	Other abdominal surgery	Liver or pancreas surgery
33	Other abdominal surgery	Laparotomy
34	Other abdominal surgery	Repair of haemorrhoids
35	Other abdominal surgery	Herniorrhaphy
36	Other abdominal surgery	Splenectomy

37	Other abdominal surgery	Other surgery of the haem/lymph system
38	Other abdominal surgery	Organ transplant
39	Pregnancy	Caesarean section
40	Respiratory	Other respiratory system surgery
41	Skin	Skin graft
42	Skull and Spine	Craniotomy
43	Skull and Spine	Ventricular shunt
44	Skull and Spine	Other surgery of the CNS
45	Skull and Spine	Spinal fusion
46	Skull and Spine	Laminectomy
47	Soft Tissue	Other surgery of the integumentary system
48	Thoracic	Thoracic surgery
49	Urinary	Nephrectomy
50	Urinary	Prostatectomy
51	Urinary	Other surgery of the genitourinary system (except hysterectomy and CS)

9.5 *Antimicrobials*

001	Amikacin
002	Amoxicillin
003	Ampicillin
004	Azithromycin
005	Aztreonam
006	Benzylpenicillin
007	Capreomycin
008	Cefaclor
009	Cefadroxil
010	Cefalexin
011	Cefixime
012	Cefotaxime
013	Cefoxitin
014	Cefpirome
015	Cefpodoxime
016	Cefprozil
017	Cefradine
018	Ceftazidime
019	Ceftriaxone
020	Cefuroxime
021	Cefradine
022	Chloramphenicol
023	Ciprofloxacin
024	Clarithromycin
025	Clindamycin
026	Clioquinol
027	Clofazimine
028	Co-Amoxiclav
029	Co-Fluampicil
030	Colistin
031	Co-Trimoxazole
032	Cycloserine
033	Dapsone
034	Demeclocycline
035	Doxycycline
036	Ertapenem
037	Erythromycin

038	Ethambutol Hydrochloride
039	Flucloxacillin
040	Framycentin sulphate
041	Fusidic Acid
042	Gentamicin
043	Imipenem With Cilastatin
044	Isoniazid
045	Levofloxacin
046	Linezolid
047	Lymecycline
048	Meropenem
049	Methenamine hippurate
050	Metronidazole
051	Minocycline
052	Moxifloxacin
053	Mupirocin
054	Nalidixic
055	Neomycin
056	Netilmicin
057	Nitrofurantoin
058	Norfloxacin
059	Not Known
060	Ofloxacin
061	Oxytetracycline
062	Penicillin
063	Phenoxyethylpenicillin
064	Piperacillin
065	Pivmecillinam Hydrochloride
066	Polymyxin B Sulphate
067	Propamidine Isetionate
068	Pyrazinamide
069	Quinupristin with Dalfopristin
070	Rifabutin
071	Rifampicin
072	Streptomycin
073	Sulphadiazine
074	Tazocin
075	Teicoplanin
076	Telithromycin

077	Tetracycline
078	Ticarcillin
079	Tindazole
080	Tobramycin
081	Trimethoprim
082	Vancomycin
083	Amphotericin
084	Caspofungin
085	Fluconazole
086	Flucytosine
087	Griseofulvin
088	Itraconazole
089	Ketoconazole
090	Miconazole
091	Nystatin
092	Terbinafine
093	Voriconazole
094	Abacavir
095	Acyclovir
096	Adefovir Dipivoxil
097	Amantadine Hydrochloride
098	Amprenavir
099	Atazanavir
100	Cidofovir
101	Didanosine
102	Efavirenz
103	Emtricitabine
104	Enfuvirtide
105	Famciclovir
106	Fosamprenavir
107	Foscarnet Sodium
108	Ganciclovir
109	Indinavir
110	Inosine Pranobex
111	Interferon beta
112	Interferon beta-1a
113	Lamivudine
114	Lopinavir With Ritonavir
115	Nelfinavir

- 116 Nevirapine
- 117 Oseltamivir
- 118 Palivizumab
- 119 Ribavirin
- 120 Ritonavir
- 121 Saquinavir
- 122 Stavudine
- 123 Tenofovir disoproxil
- 124 Valaciclovir
- 125 Valganciclovir
- 126 Zalcitabine
- 127 Zanamivir
- 128 Zidovudine
- 129 Other Drugs

10 Appendix D - CDC Definitions

10.1 UTI: Catheter associated urinary tract infection

Definition

Catheter-associated urinary tract infection must meet one of the following criterion:

Criterion 1: *Patient has had an indwelling urinary catheter within 7 days before the culture*

and

Patient has a positive urine culture, that is, $\geq 10^5$ microorganisms/ml of urine with no more than two species of microorganisms

and

Patient has no fever ($>38^\circ$ C), urgency, frequency, dysuria, or suprapubic tenderness.

Criterion 2: *Patient has had an indwelling urinary catheter within 7 days before the culture*

and

at least one of the following:

- a. one urine culture $\geq 10^5$ microorganisms/ml of urine with no more than two species of microorganisms
- b. one positive urine culture with no more than two species identified and 10wbc/hpf
- c. one positive urine culture with $\leq 10^5$ colonies/ml of a single uropathogen in a patient currently on effective antibiotic treatment.
- d. Physician diagnosis of hospital acquired UTI

Comments

A positive culture of a urinary catheter tip is not an acceptable laboratory test to diagnose a UTI. Urine cultures must be obtained using appropriate technique, such as midstream specimen, clean catch collection or catheterisation

10.2 UTI: Asymptomatic urinary tract infection - not catheter associated

Definition

An asymptomatic bacteriuria not catheter associated must meet at least one of the following criterion:

Criterion: *Patient has not had an indwelling urinary catheter within 7 days before the first positive culture*

and

Patient has had at least two positive cultures, that is $\geq 10^5$ microorganisms/ml of urine with repeated isolation of the same microorganisms and no more than two species of microorganisms

and

patient has no fever ($>38^\circ\text{C}$), urgency, frequency, dysuria, or suprapubic tenderness.

Comments

A positive culture of a urinary catheter tip is not an acceptable laboratory test to diagnose a UTI. Urine cultures must be obtained using appropriate technique, such as midstream specimen, clean catch collection or catheterisation.

10.3 UTI: Symptomatic urinary tract infection - not catheter associated

Definition

A **symptomatic urinary tract infection** must meet at least one of the following criteria:

Criterion 1: Patient has at least one of the following signs or symptoms with no other recognised cause: fever ($>38^{\circ}\text{C}$), urgency, frequency, dysuria or suprapubic tenderness

and

patient has a positive urine culture, that is, $\geq 10^5$ microorganisms/ml of urine with no more than two species of microorganisms.

Criterion 2: Patient has at least two of the following signs or symptoms with no other recognised cause: fever ($>38^{\circ}\text{C}$), urgency, frequency, dysuria, or suprapubic tenderness

and

at least one of the following:

- a. positive dipstick for leukocyte esterase and/or nitrate
- b. pyuria (urine specimen with ≥ 10 wbc/ml or ≥ 3 wbc/high power field of unspun urine)
- c. organisms seen on Gram stain of unspun urine
- d. at least two urine cultures with repeated isolation of the same uropathogen (gram-negative bacteria or *S. saprophyticus*) with $\geq 10^2$ microorganisms/ml in non-voided specimens
- e. $\leq 10^5$ microorganisms/ml of a single uropathogen (gram-negative bacteria or *S. saprophyticus*) in a patient being treated with an effective antimicrobial agent for a urinary infection
- f. physician diagnosis of a urinary tract infection
- g. physician institutes appropriate therapy for a urinary tract infection.

Comments

A positive culture of a urinary catheter tip is not an acceptable laboratory test to diagnose a UTI

Urine cultures must be obtained using appropriate technique, such as midstream specimen, clean catch collection or catheterisation

10.4 UTI: Other infections of the urinary tract (kidney, ureter, bladder, urethra, or tissue surrounding the retroperitoneal or perinephric spaces)

Definition

Other infections of the urinary tract must meet at least one of the following criteria:

Criterion 1: *Patient has organisms isolated from culture of fluid (other than urine) or tissue from affected site.*

Criterion 2: *Patient has an abscess or other evidence of infection seen on direct examination, during a surgical operation, or during a histopathological examination.*

Criterion 3: *Patient has at least two of the following signs or symptoms with no other recognised cause: fever ($>38^{\circ}\text{C}$), localised pain, or localised tenderness at the involved site*

and

at least one of the following:

- a. purulent drainage from affected site
- b. organisms cultured from blood that are compatible with suspected site of infection
- c. radiographic evidence of infection, e.g., abnormal ultrasound, CT scan, magnetic resonance imaging (MRI), or radiolabel scan (gallium, technetium)
- d. physician diagnosis of infection of the kidney, ureter, bladder, urethra, or tissues surrounding the retroperitoneal or perinephric space
- e. physician institutes appropriate therapy for an infection of the kidney, ureter, bladder, urethra, or tissue surrounding the retroperitoneal or perinephric space

10.5 ENT: Conjunctivitis

Definition

Conjunctivitis must meet at least one of the following criteria:

Criterion 1: *Patient has pathogens cultured from purulent exudate obtained from the conjunctiva or contiguous tissues, such as eyelid, cornea, meibomian glands or lacrimal glands.*

Criterion 2: *Patient has pain or redness of conjunctiva or around eye*

and

at least one of the following:

- a. WBCs and organisms seen on Gram stain of exudate
- b. Purulent exudate
- c. Positive antigen test on exudate or conjunctival scraping
- d. Multinucleated giant cells seen on microscopic examination of conjunctival exudate or scrapings
- e. Positive viral culture
- f. Diagnostic single antibody titre (IgM) or fourfold increase in paired sera (IgG) for pathogen.

Reporting Instructions

Do not report conjunctivitis that occurs as part of a more widely disseminated viral illness

10.6 ENT: Eye infection other than conjunctivitis

Definition

An infection of the eye, other than conjunctivitis, must meet at least one of the following criteria:

Criterion 1: *Patient has organisms cultured from anterior or posterior chamber or vitreous fluid.*

Criterion 2: *Patient has at least two of the following signs or symptoms with no other recognized cause: eye pain, visual disturbance, or hypopyon*

and

at least one of the following:

- a. physician's diagnosis of an eye infection
- b. positive antigen test on blood
- c. organisms cultured from blood.

10.7 ENT: Oral cavity (mouth, tongue, or gums)

Definition

Oral cavity infections must meet at least one of the following criteria:

Criterion 1: *Patient has organisms cultured from purulent material from tissues of oral cavity.*

Criterion 2: *Patient has an abscess or other evidence of oral cavity infection seen on direct examination, during a surgical operation, or during a histopathological examination.*

Criterion 3: *Patient has at least one of the following signs or symptoms with no other recognised cause: abscess, ulceration, or raised white patches on inflamed mucosa, or plaques on oral mucosa*

and

at least one of the following:

- a. organisms seen on Gram stain
- b. positive KOH (potassium hydroxide) stain
- c. multinucleated giant cells seen on microscopic examination of mucosal scrapings
- d. positive antigen test on oral secretions
- e. diagnostic single antibody titre (IgM) or fourfold increase in paired sera (IgG) for pathogen
- f. physician diagnosis of infection and treatment with topical or oral antifungal therapy.

10.8 ENT: Sinusitis

Definition

Sinusitis must meet at least one of the following criteria:

Criterion 1: *Patient has organisms cultured from purulent material obtained from sinus cavity.*

Criterion 2: *Patient has at least one of the following signs or symptoms with no other recognised cause: fever ($>38^{\circ}\text{C}$), pain or tenderness over the involved sinus, headache, purulent exudate, or nasal obstruction*

and

at least one of the following:

- a. positive transillumination
- b. positive radiographic examination (including CT scan).

10.9 ENT: Otitis externa

Definition

Otitis externa must meet at least one of the following criteria:

Criterion 1: *Patient has pathogens cultured from purulent drainage from ear canal.*

Criterion 2: *Patient has at least one of the following signs or symptoms with no other recognised cause: fever ($>38^{\circ}\text{C}$), pain, redness, or drainage from ear canal*

and

organisms seen on Gram stain of purulent drainage.

10.10 ENT: Otitis media

Definition

Otitis media must meet at least one of the following criteria:

Criterion 1: *Patient has organisms cultured from fluid from middle ear obtained by tympanocentesis or at surgical operation.*

Criterion 2: *Patient has at least two of the following signs or symptoms with no other recognised cause: fever ($>38^{\circ}\text{C}$), pain in the eardrum, inflammation, retraction or decreased mobility of eardrum, or fluid behind eardrum.*

10.11 ENT: Otitis interna

Definition

Otitis interna must meet at least one of the following criteria:

Criterion 1: *Patient has organisms cultured from fluid from inner ear obtained at surgical operation.*

Criterion 2: *Patient has a physician's diagnosis of inner ear infection.*

10.12 ENT: Mastoiditis

Definition

Mastoiditis must meet at least one of the following criteria:

Criterion 1: *Patient has organisms cultured from purulent drainage from mastoid.*

Criterion 2: *Patient has at least two of the following signs or symptoms with no other recognised cause: fever ($>38^{\circ}\text{C}$), pain, tenderness, erythema, headache, or facial paralysis*

and

at least one of the following:

- a. organisms seen on Gram stain of purulent material from mastoid
- b. positive antigen test on blood.

10.13 ENT: Upper respiratory tract, pharyngitis, laryngitis, epiglottitis

Definition

Upper respiratory tract infections must meet at least one of the following criteria:

Criterion 1: *Patient has at least two of the following signs or symptoms with no other recognised cause: fever ($>38^{\circ}\text{C}$), erythema of pharynx, sore throat, cough, hoarseness, or purulent exudate in throat*

and

at least one of the following:

- a. organisms cultured from the specific site
- b. organisms cultured from blood
- c. positive antigen test on blood or respiratory secretions
- d. diagnostic single antibody titre (IgM) or fourfold increase in paired sera (IgG) for pathogen
- e. physician's diagnosis of an upper respiratory infection

Criterion 2: *Patient has an abscess seen on direct examination, during a surgical operation, or during a histopathological examination.*

10.14 PNEU: Pneumonia

Definition

Pneumonia must meet at least one of the following criteria:

Criterion 1: *Patient has rales or dullness to percussion on physical examination of the chest*

and

at least one of the following:

- a. new onset of purulent sputum or change in character of sputum
- b. organisms cultured from blood
- c. isolation of an etiologic agent from a specimen obtained by transtracheal aspirate, bronchial brushing or biopsy.

Criterion 2: *Patient has a chest radiographic examination that shows new or progressive infiltrate, consolidation, cavitation, or pleural effusion*

and

at least one of the following:

- a. new onset of purulent sputum or change in character of sputum
- b. organisms cultured from blood
- c. isolation of an etiologic agent from a specimen obtained by transtracheal aspirate, bronchial brushing, or biopsy
- d. isolation of virus from or detection of viral antigen in respiratory secretions
- e. diagnostic single antibody titer (IgM) or fourfold increase in paired sera (IgG) for pathogen
- f. histopathologic evidence of pneumonia

10.15 LRI: Tracheobronchial (bronchitis, tracheobronchitis, bronchiolitis, tracheitis, without evidence of pneumonia)

Definition

Tracheobronchial infections must meet the following criterion:

Patient has no clinical or radiographic evidence of pneumonia

and

Patient has at least two of the following signs or symptoms with no other recognised cause: fever ($>38^{\circ}\text{C}$), cough, new or increased sputum production, rhonchi, wheezing

and

at least one of the following:

- a. positive culture obtained by deep tracheal aspirate or bronchoscopy
- b. positive antigen test on respiratory secretions.

Reporting Instruction

Do not report chronic bronchitis in a patient with chronic lung disease as an infection unless there is evidence of an acute secondary infection manifested by a change in organism.

10.16 LRI: Other infections of the lower respiratory tract (LRT)

Definition

Other infections of the lower respiratory tract must meet at least one of following criteria:

Criterion 1: *Patient has organisms seen on smear or cultured from lung tissue or fluid, including pleural fluid.*

Criterion 2: *Patient has a lung abscess or empyema seen during a surgical operation or histopathologic examination*

Criterion 3: *Patient has an abscess cavity seen on radiographic examination of lung.*

Reporting Instructions

Report concurrent LRT infection and pneumonia with the same organisms as pneumonia.

10.17 BSI: Laboratory-confirmed bloodstream infection

Definition

Laboratory-confirmed bloodstream infection must meet at least one of the following criteria:

Criterion 1: *Patient has a recognised pathogen cultured from one or more blood cultures*

and

Organism cultured from a blood is not related to an infection at another site

Criterion 2: *Patient has at least one of the following signs or symptoms: fever (>38°C), chills, or hypotension*

and

signs and symptoms and positive laboratory results are not related to an infection at another site

and

at least one of the following:

- a. common skin contaminant (e.g., diphtheroids, *Bacillus* sp., *Propionibacterium* sp., coagulase-negative staphylococci, or micrococci) is cultured from two or more blood cultures drawn on separate occasions
- b. common skin contaminant (e.g., diphtheroids, *Bacillus* sp., *Propionibacterium* sp., coagulase-negative staphylococci, or micrococci) is cultured from at least one blood culture from a patient with an intravascular line, and the physician institutes appropriate antimicrobial therapy
- c. positive antigen test on blood

Reporting Instructions

Report purulent phlebitis confirmed with a positive semi-quantitative culture of a catheter tip, but with either negative or no blood culture as *vascular infection*

10.18 BSI: Clinical sepsis

Definition

Clinical sepsis must meet the following criterion:

Patient has at least one of the following clinical signs and symptoms with no other recognised cause:

fever ($>38^{\circ}\text{C}$), hypotension (systolic pressure ≤ 90 mm), or oliguria (<20 ml/hr)

and

blood culture not done or no organisms or antigen detected in the blood

and

no apparent infection at another site

and

physician institutes treatment for sepsis.

Reporting Instructions

Report culture-positive infections of the bloodstream as laboratory-confirmed bloodstream infection

10.19 GI: Gastroenteritis

Defintion

Gastroenteritis must meet at least one of the following criteria:

Criterion 1: *Patient has an acute onset of diarrhoea (liquid stools for more than 12 hours) with or without vomiting or fever ($>38^{\circ}\text{C}$) and no likely non-infectious cause (e.g., diagnostic tests, therapeutic regimen other than antimicrobial agents, acute exacerbation of a chronic condition, or psychological stress).*

Criterion 2: *Patient has at least two of the following signs or symptoms with no other recognised cause: nausea, vomiting, abdominal pain, fever ($>38^{\circ}\text{C}$) or headache*

and

at least one of the following:

- a. an enteric pathogen is cultured from stool or rectal swab
- b. an enteric pathogen is detected by routine or electron microscopy
- c. an enteric pathogen is detected by antigen or antibody assay on blood or faeces
- d. evidence of an enteric pathogen is detected by cytopathic changes in tissue culture (toxin assay)
- e. diagnostic single antibody titre (IgM) or fourfold increase impaired sera (IgG) for pathogen.

10.20 GI: Gastro intestinal tract infection (oesophagus, stomach, small and large bowel and rectum excluding gastroenteritis and appendicitis)

Definition

Gastrointestinal tract infections, excluding gastroenteritis and appendicitis, must meet at least one of the following criteria:

Criterion 1: *Patient has an abscess or other evidence of infection seen during a surgical operation or histopathologic examination.*

Criterion 2: *Patient has at least two of the following signs or symptoms with no other recognised cause and compatible with infection of the organ or tissue involved: fever ($>38^{\circ}\text{C}$), nausea, vomiting, abdominal pain, or tenderness*

and

at least one of the following:

- a. organisms cultured from drainage or tissue obtained during a surgical operation or endoscopy, or from a surgically placed drain
- b. organisms seen on Gram or KOH stain or multinucleated giant cells seen on microscopic examination of drainage or tissue obtained during a surgical operation or endoscopy or from a surgically placed drain
- c. organisms cultured from blood
- d. evidence of pathologic findings on radiographic examination
- e. evidence of pathologic findings on endoscopic examination

10.21 GI: Intraabdominal infection including gallbladder, bile ducts, liver (excluding viral hepatitis), spleen, pancreas, peritoneum, subphrenic or subdiaphragmatic space or other intraabdominal tissue or area not specified elsewhere

Definition

Intra-abdominal infections must meet at least one of the following criteria:

- Criterion 1:** Patient has organisms cultured from purulent material from intraabdominal space obtained during a surgical operation or needle aspiration.
- Criterion 2:** Patient has abscess or other evidence of intraabdominal infection seen during a surgical operation or histopathologic examination.
- Criterion 3:** Patient has at least two of the following signs or symptoms with no other recognised cause: fever ($>38^{\circ}\text{C}$), nausea, vomiting, abdominal pain or jaundice

and

at least one of the following:

- a. organisms cultured from drainage from surgically placed drain (e.g. closed suction drainage system, open drain, T-tube drain)
- b. organisms seen on Gram stain of drainage or tissue obtained during surgical operation or needle aspiration
- c. organisms cultured from blood and radiographic evidence of infection, e.g. abnormal findings on ultrasound, CT scan, magnetic resonance imaging (MRI), or radiolabel scans (gallium, technetium, etc) or on abdominal x-ray.

Reporting Instructions

Do not report pancreatitis unless it is determined to be infectious in origin

10.22 GI: Viral hepatitis

Definition

Hepatitis must meet the following criterion:

Patient has at least two of the following signs or symptoms with no other recognised cause: fever (38°C), anorexia, nausea, vomiting, abdominal pain, jaundice, or history of transfusion within the previous 3 months

and

at least one of the following:

- a. positive antigen or antibody test for hepatitis A, hepatitis B, hepatitis C, or delta hepatitis
- b. abnormal liver function tests (e.g., elevated ALT/AST, bilirubin)
- c. Cytomegalovirus (CMV) detected in urine or oropharyngeal secretions.

Reporting Instructions

Do not report hepatitis or jaundice of non-infectious or toxic origin (alcohol or other hepatotoxin) or as a result of biliary obstruction.

10.23 SST: Skin infection

Definiton

Skin infections must meet at least one of the following criteria:

Criterion 1: *Patient has purulent drainage, pustules, vesicles, or boils.*

Criterion 2: *Patient has at least two of the following signs or symptoms with no other recognised cause: pain or tenderness, localised swelling, redness, or heat*

and

at least one of the following:

- a. organisms cultured from aspirate or drainage from affected site; if organisms are normal skin flora (e.g., coagulase negative staphylococci, micrococci, diphtheroids) they must be a pure culture
- b. organisms cultured from blood
- c. positive antigen test performed on infected tissue or blood
- d. multinucleated giant cells seen on microscopic examination of affected tissue
- e. diagnostic single antibody titre (IgM) or fourfold increase in paired sera (IgG) for pathogen.

Reporting Instructions

Report infected *decubitus ulcers, burns, breast abscess or mastitis* separately and specifically and not as skin infections.

10.24 SST: Soft tissue infection (necrotising fasciitis, infectious gangrene, necrotising cellulitis, infectious myositis, lymphadenitis, or lymphangitis)

Definition

Soft tissue infections must meet at least one of the following criteria:

Criterion 1: *Patient has organisms cultured from tissue or drainage from affected site.*

Criterion 2: *Patient has purulent drainage at affected site.*

Criterion 3: *Patient has an abscess or other evidence of infection seen during a surgical operation or histopathologic examination.*

Criterion 4: *Patient has at least two of the following signs or symptoms at the affected site with no other recognised cause: localised pain or tenderness, redness, swelling, or heat*

and

at least one of the following:

- a. organisms cultured from blood
- b. positive antigen test performed on blood or urine
- c. diagnostic single antibody titre (IgM) or fourfold increase in paired sera (IgG) for pathogen.

10.25 SST: Infected burn

Definition

Burn infections must meet one of the following criteria:

Criterion 1: *Patient has a change in burn wound appearance or character, such as rapid eschar separation, or dark brown, black, or violaceous discoloration of the eschar, or oedema at wound margin*

and

histologic examination of burn biopsy shows invasion of organisms into adjacent viable tissue.

Criterion 2: *Patient has a change in burn wound appearance or character, such as rapid eschar separation, or dark brown, black, or violaceous discoloration of the eschar, or oedema at wound margin*

and

at least one of the following:

- a. organisms cultured from blood in the absence of other identifiable infection
- b. isolation of herpes simplex virus, histologic identification of inclusions by light or electron microscopy, or visualisation of viral particles by electron microscopy in biopsies or lesion scrapings.

Criterion 3: *Patient with a burn has at least two of the following signs or symptoms with no other recognised cause: fever ($>38^{\circ}\text{C}$) or hypothermia ($<36^{\circ}\text{C}$), hypotension, oliguria*

($<20\text{ ml/hr}$), hyperglycaemia at previously tolerated level of dietary carbohydrate, or mental confusion

and

at least one of the following:

- a. histologic examination of burn biopsy shows invasion of organisms into adjacent viable tissue
- b. organisms cultured from blood
- c. isolation of herpes simplex virus, histologic identification of inclusions by light or electron microscopy, or visualisation of viral particles by electron microscopy in biopsies or lesion scrapings.

Comment

Purulence alone at the burn site is not adequate for the diagnosis of burn infection.

Fever alone is not adequate for the diagnosis of a burn infection.

Burn infections include infections of: burn wound site, burn graft site, burn donor site, burn donor site-cadaver.

10.26 SST: Decubitus ulcer including both superficial and deep infections

Definition

Decubitus ulcer infections must meet the following criterion:

Patient has at least two of the following signs or symptoms with no other recognised cause: redness, tenderness, or swelling of decubitus wound edges

and

at least one of the following:

- a. organisms cultured from properly collected fluid or tissue (see below)
- b. organisms cultured from blood.

Comment

Purulent drainage alone is not sufficient evidence of an infection. Organisms cultured from the surface of a decubitus ulcer is not sufficient evidence that the ulcer is infected. A properly collected specimen from a decubitus ulcer involves needle aspiration of fluid or biopsy of tissue from the ulcer margin.

10.27 SST: Breast abscess or mastitis

Definition

A breast abscess or mastitis must meet at least one of the following criteria:

Criterion 1: *Patient has a positive culture of affected breast tissue or fluid obtained by incision and drainage or needle aspiration.*

Criterion 2: *Patient has a breast abscess or other evidence of infection seen during a surgical operation or histopathologic examination*

Criterion 3: *Patient has fever (>38°C) and local inflammation of the breast*

and

physician's diagnosis of breast abscess

Reporting Instruction

Breast abscess that occur within seven days after childbirth should be considered nosocomial.

10.28 BJ: Bone infection - osteomyelitis

Definition

Osteomyelitis must meet at least one of the following criteria:

Criterion 1: *Patient has organisms cultured from bone*

Criterion 2: *Patient has evidence of osteomyelitis on direct examination of the bone during a surgical operation or histopathologic examination*

Criterion 3: *Patient has at least two of the following signs or symptoms with no other recognised cause: fever ($>38^{\circ}\text{C}$), localised swelling, tenderness, heat or drainage at suspected site of bone infection*

and

at least one of the following:

- a. organisms cultured from blood
- b. positive blood antigen test
- c. radiographic evidence of infection

10.29 BJ: Joint or bursa infection

Definition

Joint or bursa infection must meet at least one of the following criteria:

Criterion 1: *patient has organisms cultured from joint fluid or synovial biopsy*

Criterion 2: *patient has evidence of joint or bursa infection seen during a surgical operation or histopathologic examination.*

Criterion 3: *patient has at least two of the following signs or symptoms with no other recognised cause: joint pain, swelling, tenderness, heat, evidence of effusion or limitation of motion*

and

at least one of the following:

- a. organisms and white blood cells seen on Gram stain of joint fluid
- b. positive antigen test on blood, urine or joint fluid
- c. cellular profile and chemistries of joint fluid compatible with infection and **not** explained by an underlying rheumatologic disorder
- d. radiographic evidence of infection e.g. abnormal findings on X-ray, CT scan, MRI or radiolabel scan.

10.30 BJ: Disc space

Definition

Vertebral disc space infection must meet at least one of the following criteria:

Criterion 1: *Patient has organisms cultured from vertebral disc space tissue obtained during a surgical operation or needle aspiration.*

Criterion 2: *Patient has evidence of vertebral disc space infection seen during a surgical operation or histopathological examination.*

Criterion 3: *Patient has fever ($>38^{\circ}\text{C}$) with no other recognised cause or pain at the involved vertebral space*

and

Radiographic evidence of infection, e.g., abnormal findings on x-ray, CT-scan, magnetic resonance imaging (MRI), radiolabel scan with gallium or technetium

Criterion 4: *Patient has fever ($>38^{\circ}\text{C}$) with no other recognised cause and pain at the involved vertebral disc space*

and

Positive antigen test on blood or urine

10.31 CNS: Meningitis or Ventriculitis

Definition

Meningitis or ventriculitis must meet at least one of the following criteria:

Criterion 1: Patient has organisms cultured from cerebrospinal fluid (CSF).

Criterion 2: Patient has at least one of the following signs or symptoms with no other recognised cause: fever ($>38^{\circ}\text{C}$), headache, stiff neck, meningeal signs, cranial nerve signs, or irritability

and

at least one of the following:

- a. increased white cells, elevated protein and/or decreased glucose in CSF
- b. Organisms seen on Gram stain of CSF
- c. Organisms cultured from blood
- d. Positive antigen test of CSF, blood or urine
- e. Diagnostic single antibody titre (IgM) or fourfold increase in paired sera (IgG) for pathogen

and

if diagnosis is made ante mortem, physician institutes appropriate antimicrobial therapy

Reporting Instructions

Report CSF shunt infection as *SSI-meningitis* if it occurs \leq 1 year of placement; if later or after manipulation report as *meningitis*.

Report meningoencephalitis as *meningitis*.

Report spinal abscess with meningitis as *meningitis*.

10.32 CNS: Spinal abscess without meningitis

Definitions

An abscess of the spinal epidural or subdural space, without involvement of the cerebrospinal fluid or adjacent bone structures, must meet at least one of the following criteria:

Criterion 1: *Patient has organism cultured from abscess in the spinal epidural or subdural space*

Criterion 2: *Patient has an abscess in the spinal epidural or subdural space seen during a surgical operation or at autopsy or evidence of an abscess seen during a histopathologic examination*

Criterion 3: *Patient has at least one of the following signs or symptoms with no other recognised cause: fever (>38°C), back pain, focal tenderness, radiculitis, paraparesis, or paraplegia*

and

at least one of the following:

- a. organisms cultured from blood
- b. radiographic evidence of a spinal abscess eg., abnormal findings on myelography, ultrasound, CT scan, magnetic resonance imaging (MRI), or other scans (gallium, technetium etc)

and

if diagnosis is made ante mortem, physician institutes appropriate antimicrobial therapy.

Reporting Instruction

Report spinal abscess with meningitis as *meningitis*.

10.33 CNS: Intracranial infection (brain abscess, subdural or epidural infection encephalitis)

Definitions

Intracranial infection must meet at least one of the following criteria:

Criterion 1: Patient has organisms cultured from brain tissue or dura

Criterion 2: Patient has an abscess or evidence of intracranial infection seen during a surgical operation or histopathologic examination

Criterion 3: Patient has at least two of the following signs or symptoms with no other recognised cause: headache, dizziness, fever ($> 38^{\circ}\text{C}$), localising neurological signs, changing level of consciousness or confusion

and

at least one of the following:

- a. organisms seen on microscopic examination of brain or abscess tissue obtained by needle aspiration or by biopsy during a surgical operation or autopsy
- b. positive antigen test on blood or urine
- c. radiographic evidence of infection, e.g. Abnormal findings on ultrasound, CT scan magnetic resonance imaging (MRI), radionuclide brain scan, or arteriogram
- d. diagnosis single antibody titre (IgM) or fourfold increase in paired sera (IgG) for pathogen

and

if diagnosis is made ante mortem, physician institutes appropriate antimicrobial therapy.

Reporting Instruction

If meningitis and a brain abscess are present together report the infection as *intracranial*.

10.34 CVS: Arterial or venous infection

Definition

Arterial or venous infection must meet the following criteria:

Criterion 1: *patient has organisms cultured from arteries or veins removed during an operation*

and

blood culture not done or no organisms cultured from blood

Criterion 2: *patient has evidence of arterial or venous infection seen during a surgical operation or histopathologic examination*

Criterion 3: *Patient has at least one of the following signs and symptoms with no other recognised cause: fever ($>38^{\circ}\text{C}$), pain, erythema, or heat at involved vascular site*

and

more than 15 colonies cultured from intravascular catheter tip using semi-quantitative culture method

and

blood culture not done or no organisms culture from blood.

Criterion 4: *patient has a purulent discharge at involved vascular site*

and

blood culture not done or no organisms cultured from blood

Reporting instructions

Report infections of an arteriovenous graft, shunt, or fistula or intravascular cannulation site without organisms cultured from blood as *arterial or venous*.

Report intravascular infections with organisms cultured from blood as laboratory-confirmed bloodstream infection

10.35 CVS: Mediastinitis

Definition

Mediastinitis must meet at least one of the following criteria:

Criterion 1: *patient has organisms cultured from mediastinal tissue or fluid obtained during a surgical operation or needle aspiration*

Criterion 2: *patient has evidence of mediastinitis seen during a surgical operation histopathologic examination*

Criterion 3: *patient has at least one of the following signs and symptoms with no other recognised cause: fever ($>38^{\circ}\text{C}$), chest pain or sternal instability*

and

at least one of the following:

- a. purulent discharge from mediastinal area
- b. organisms cultured from blood or discharge from mediastinal area
- c. mediastinal widening on x-ray

Reporting Instructions

Report mediastinitis following cardiac surgery that is accompanied by osteomyelitis as SSI – mediastinitis rather than SSI- bone.

10.36 CVS: Endocarditis

Definition

Endocarditis of a natural or prosthetic heart valve must meet at least one of the following criteria:

Criterion 1: *patient has organisms cultured from valve or vegetation*

Criterion 2: *patient has two or more of the following signs or symptoms with no other recognised cause: fever ($>38^{\circ}\text{C}$), new or changing murmur, embolic phenomena, skin manifestations (i.e. petechiae, splinter haemorrhages), congestive heart failure or cardiac conduction abnormality*

and

at least one of the following:

- a. organisms cultured from two or more blood cultures
- b. organisms seen on Gram stain of valve when culture is negative or not done
- c. valvular vegetation seen during a surgical operation or autopsy
- d. positive antigen test on blood or urine
- e. evidence of new vegetation seen on echocardiogram

and

if diagnosis is made antemortem, physician institutes antimicrobial therapy

10.37 CVS: Myocarditis or Pericarditis

Definition

Myocarditis or **Pericarditis** must meet at least one of the following criteria:

Criterion 1: *patient has organisms cultured from pericardial tissue or fluid obtained by needle aspiration or during a surgical operation*

Criterion 2: *patient has at least two of the following signs or symptoms with no other recognised cause: fever ($>38^{\circ}\text{C}$), chest pain, paradoxical pulse, or increased heart size*

and

at least one of the following:

- a. abnormal ECG consistent with myocarditis or pericarditis
- b. positive antigen test on blood
- c. evidence of myocarditis or pericarditis on histologic examination of heart tissue
- d. fourfold rise in type-specific antibody with or without isolation of virus from pharynx or faeces
- e. pericardial effusion identified by echocardiogram, CT, MRI or angiography

Comment

Most cases of post-cardiac surgery or post-myocardial infarction pericarditis are not infectious.

10.38 RSI: Endometritis

Definition

Endometritis must meet at least one of the following criteria:

Criterion 1: *Patient has organisms cultured from tissue or fluid from endometrium obtained during surgical operation, by needle aspiration, or by brush biopsy.*

Criterion 2: *Patient has at least two of the following signs and symptoms with no other recognised cause: fever ($>38^{\circ}\text{C}$), abdominal pain, uterine tenderness, or purulent drainage from uterus.*

Reporting Instructions

Report postpartum endometritis as HAI unless the amniotic fluid is infected at the time of admission or the patient was admitted 48 hours after the rupture of the membrane.

10.39 RSI: Episiotomy site infection

Definiton

Episiotomy infections must meet at least one of the following criteria:

Criterion 1: *Postvaginal delivery patient has purulent drainage from the episiotomy*

Criterion 2: *Postvaginal delivery patient has an episiotomy abscess*

Reporting Instructions

Episiotomy is not considered an operative procedure in the NNIS system.

10.40 RSI: Vaginal cuff infections

Definition

Vaginal cuff infections must meet at least one of the following criteria:

Criterion 1: *Post hysterectomy patient has purulent drainage from the vaginal cuff*

Criterion 2: *Post hysterectomy patient has an abscess at the vaginal cuff*

Criterion 3: *Post hysterectomy patient has pathogens cultured from fluid or tissue obtained from the vaginal cuff*

10.41 RSI: Other infections of the male or female reproductive tract (epididymis, testes, prostate, vagina, ovaries, uterus, or other deep pelvic tissues, excluding endometritis or vaginal cuff infections)

Definition

Other infections of the male or female reproductive tract must meet at least one of the following criteria:

Criterion 1: *Patient has organisms cultured from tissue or fluid from affected site.*

Criterion 2: *Patient has an abscess or other evidence of infection of affected site seen during a surgical operation or histopathologic examination.*

Criterion 3: *Patient has two of the following signs or symptoms with no other recognised cause: fever (>38°C), nausea, vomiting, pain, tenderness, or dysuria*

and

at least one of the following:

- a. organisms cultured from blood
- b. diagnosis by physician

10.42 *SYS: Disseminated infection*

Definition

Disseminated infection is infection involving multiple organs or systems, without an apparent single site of infection, usually of viral origin, and with signs or symptoms with no other recognised cause and compatible with infectious involvement of multiple organs or systems.

Reporting Instructions

Report viral infections, exanthems or rash illness involving multiple organ systems e.g. measles, mumps, rubella, varicella, erythema infectiosum) as disseminated infection. These infections are often identified by clinical criteria alone. For infections with multiple metastatic sites e.g. bacterial endocarditis the primary site should be reported.

10.43 SSI: Superficial incisional SSI

Definition

A superficial SSI must meet the following criterion:

1. Infection occurs within 30 days after the operative procedure
2. And involves only skin and subcutaneous tissue of the incision
3. And patient has at least one of the following:
 - Purulent discharge from the superficial incision
 - Organisms isolated from an aseptically obtained culture of fluid or tissue from the superficial incision
 - At least one of the following signs or symptoms of infection: pain or tenderness, localised swelling, redness, or heat and superficial incision is deliberately opened by surgeon unless incision is culture negative
 - Diagnosis of superficial incisional SSI by a surgeon or trained healthcare worker*

Reporting Instructions

The following are not reported as superficial incisional SSI:

Stitch abscess (minimal inflammation and discharge confined to the points of suture penetration)

Infected burn wound

Incisional SSI that extends into the fascial and muscle layers (deep incisional SSI)

An infection at an episiotomy site which is reported as *episiotomy*

A localised *non-surgical* wound infection which is reported as a skin or soft tissue infection depending on its depth

Classify infection that involves both superficial and deep incision sites as deep incisional SSI.

**Trained healthcare worker is defined as a qualified nurse or doctor who has been trained in the national definitions for SSI*

10.44 SSI: Deep incisional SSI

Definition

A deep incisional SSI must meet the following criterion:

1. Infection occurs within 30 days after the operative procedure if no implant is left in place or within one year if implant is in place and the infection appears to be related to the operative procedure
2. And involves deep soft tissues (e.g. fascial and muscle layers) of the incision
3. And patient has at least one of the following:
 - Purulent discharge from the deep incision but not from the organ/space component of a surgical site
 - A deep incision spontaneously dehisces or is deliberately opened by a surgeon when the patient has at least one of the following signs or symptoms: fever ($>38^{\circ}\text{C}$) or localised pain or tenderness, unless incision is culture negative
 - An abscess or other evidence of infection involving the deep incision is found on direct examination, during re-operation, or by histopathological or radiological examination
 - Diagnosis of a deep incisional SSI by a surgeon or trained healthcare worker

10.45 SSI: Organ/space SSI

An organ/space SSI involves any part of the body, excluding the skin incision, fascia, or muscle layers that is opened or manipulated during the operative procedure. Specific sites are assigned to organ/space SSI to further identify the location of the infection. An example is an appendectomy with subsequent diaphragmatic abscess, which would be reported as an organ/space SSI at the intra-abdominal specific site.

Definition

An organ/space SSI must meet the following criterion:

1. Infection occurs within 30 days after the operative procedure if no implant is left in place or within one year if implant is in place and the infection appears to be related to the operative procedure
2. And infection involves any part of the body, excluding the skin incision, fascia, or muscle layers that is opened or manipulated during the operative procedure.
3. And at least one of the following:
 - Purulent discharge from a drain that is placed through a stab wound into the organ/space
 - Organisms isolated from an aseptically obtained culture of fluid or tissue in the organ/space
 - An abscess or other evidence of infection involving the organ/space that is found on direct examination, during re-operation, or by histopathological or radiological examination
 - Diagnosis of an organ/space SSI by a surgeon or trained healthcare worker

Reporting Instructions

Occasionally an organ/space infection drains through the incision. Such an infection generally does not involve re-operation and is considered a complication of the incision. Therefore, it is classified as a deep incisional SSI.

Organ/Space SSI Infection sites

Bone	Osteomyelitis
Breast	Breast abscess or mastitis
Heart	Myocarditis or pericarditis
Disc	Disc space
Ear	Ear or mastoid
Endometrium	Endometritis
Endocardium	Endocarditis
Eye	Eye other than conjunctivitis
GI Tract	GI Tract
Intra-abdominal	Intra-abdominal NEC
Intracranial	Intracranial, brain abscess or dura
Joint	Joint or bursa
Lung	Other infections of LRT
Mediastinum	Mediastinitis
Meninges/Ventric Cavity	Meningitis/ventriculitis
Oral	Oral cavity (mouth, tongue or gum)
Other reproductive site	Other male or female reproductive cavity
Spinal	Spinal abscess without meningitis
Sinus	Sinusitis
Upper Respiratory tract	URT
Vascular	Arterial or venous
Vaginal cuff	Vaginal cuff

11 List of Hospitals

Table 1: The following hospitals will be surveyed in the Scottish National HAI prevalence survey:

NHS Board	Hospital Name	Hospital Type
Ayrshire & Arran		
A111	Crosshouse Hospital	Acute Large
A210	Ayr Hospital	Acute Medium
A103	Ayrshire Central	Acute Medium
A201	Ailsa Hospital	Community Large
A208	Biggart Hospital	Community Medium
A105	Kirklandside Hospital	Community Small
A208	Davidson Hospital	Community Very Small
Borders		
B120	Borders General	Acute Medium
B114	Kelso Hospital	Community Very Small
Argyll & Clyde		
C418	Royal Alexandria Hospital	Acute Large
C313	Inverclyde Royal	Acute Medium
C206	Vale of Leven District	Acute Medium
C121	Lorn & Islands District Hospital	Acute small
C403	Dykebar Hospital	Community Large
C101	Argyll & Bute Hospital	Community Small
Fife		
F805	Queen Margaret Hospital	Acute Medium
F704	Victoria Hospital Kirkcaldy	Acute Medium
F701	Cameron Hospital	Community Small
F705	Forth Park Hospital	Acute Obstetrics Small
Highlands		
H202	Raigmore Hospital	Acute Large
H103	Caithness General	Acute Small
H212	Belford Hospital	Acute Small
H217	Ross Memorial	Acute Small
H214	Mackinnon Memorial	Acute Small
H223	The New Craigs	Community Medium

NHS Board	Hospital Name	Hospital Type
H106	Lawson Memorial	Community Very Small
Lanarkshire		
L308	Wishaw General	Acute Large
L106	Monklands Hospital	Acute Large
L302	Hairmyres Hospital	Acute Large
L203	Cleland Hospital	Community Small
Grampian		
N102	Woodend Hospital	Acute Medium
N411	Dr Gray's Hospital	Acute Small
N198	Royal Cornhill	Community Large
N161	Aberdeen Maternity Hosp	Acute Obstetrics Small
N101	Aberdeen Royal Infirmary	Acute Teaching Large
Lothian		
S308	St John's Hosp at Howden	Acute Large
S114	Royal Victoria Hospital	Community Small
S209	Liberton Hospital	Community Medium
S314	Royal Infirmary of Edinburgh	Acute Teaching Large
S116	Western General Hospital	Acute Teaching Large
Orkney		
R101	Balfour Hospital	Acute Small
Tayside		
T202	Perth Royal Infirmary	Acute Medium
T107	Royal Victoria Hospital Dundee	Community Medium
T312	Stracathro Hospital	Acute Small
T215	Murray Royal Hospital	Community Medium
T101	Ninewells Hospital	Acute Teaching Large
Western Isles		
W107	Western Isles Hospital	Acute Small
W108	Uist and Barra Hospital	Community Very Small
Dumfries & Galloway		
Y104	Dumfries & Galloway R.I.	Acute Medium
Y111	Garrick Hospital	Acute Small
Y103	Crichton Royal Hospital	Community Small

NHS Board	Hospital Name	Hospital Type
Forth Valley		
V201	Stirling Royal Infirmary	Acute Medium
VI02	Falkirk & District R.I.	Acute Medium
VI05	Bo'ness Hospital	Community Very Small
V202	Bannockburn Hospital	Community Small
Shetland		
Z102	Gilbert Bain Hospital	Acute Small
Z103	Montfield Hospital	Community Very Small
Glasgow		
G405	Southern General Hospital	Acute Large
G306	Victoria Infirmary Glasgow	Acute Medium
G505	Gartnavel General Hospital	Acute Large
G307	Victoria Manse House Geriatric Unit	Community Small
G109	Lightburn Hospital	Community Small
G108	Princess Royal Maternity	Acute Obstetrics Small
G515	Queen Mother's Hospital	Acute Obstetrics Small
G516	Western Infirmary	Acute Teaching Large
G107	Glasgow Royal Infirmary	Acute Teaching Large
G207	Stobhill Hospital	Acute Teaching Large
National Hospital		
D102	Golden Jubilee Nat. Hosp.	Acute Small

12 Invasive devices

Table 2: The following devices are classed as invasive devices and will be recorded as invasive devices.

Urinary Catheter	Peripheral Venous Catheter	Central Venous Catheter	Pacing wires	Other invasive devices
Urinary catheter	Venflon	Hickman line	Ventricular pacing wires	Epidural
Suprapubic Catheter	Arterial line	Peripherally inserted central catheter (PICC)	Pacemaker wires	Epidural catheter
	AV Shunt	Portacath	Temporary pacing line	Epidural line
		Permanent catheter		Peritoneal dialysis catheter
		Permanent catheter for dialysis		Paracentesis catheter

Table 3: The following devices are not classed as invasive devices and will not be recorded as invasive devices

Drains	Feeding tubes
Abdominal drain	Jejunostomy tube
Pancreatic drain	Gastrostomy tube
Ascitic drain	PEG tube
Chest drain	
Robinson drain	
Intercostal drain	
Pleural tap	
Surgical drain	
Wound drain	
Vacuum drain	

