Point Prevalence Survey of

Hospital-Acquired Infections

&

Antimicrobial Use

in European Acute Care Hospitals

ALL-IRELAND PROTOCOL 2017

Version 1.0

(Adapted from the original © ECDC Protocol: v5.3)

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1.0 Background

Ireland & Northern Ireland first participated in a point prevalence survey (PPS) of healthcare-associated infections (HCAI) in acute hospitals in 2006. This survey of over 75,000 patients, organised by the Hospital Infection Society, was also conducted in England, and Wales. In Ireland, 88% of acute hospitals participated in the survey, during which 7,541 patients were surveyed and 369 patients (4.8%) were reported to have a HCAI. In Northern Ireland, 3,644 patients were surveyed and 198 patients (5.4%) were reported to have a HCAI.

In 2008, the dedicated surveillance network for European HCAI surveillance was transferred to the European Centre for Disease Prevention and Control (ECDC). ECDC undertook to develop an agreed EU protocol for a European PPS of hospital-acquired infection (HAI) and antimicrobial use in acute hospitals during 2011 and 2012. Both Ireland and Northern Ireland participated in the PPS during 2012 adopting an 'all-Ireland' study protocol and performing detailed analysis of data collected from both countries, in addition to returning data to ECDC for inclusion in the EU-wide analysis and final report. In total, 33 administrative areas in 29 EU Member States provided data on 231,459 patients in 947 hospitals. The European HAI prevalence was 6% and antimicrobial use prevalence was 35%. In Ireland, the HAI prevalence was 5.2% and antimicrobial use prevalence was 34%. In Northern Ireland, the HAI prevalence was 4.2% and antimicrobial use prevalence was 29.5%.

The PPS protocol provides a standardised methodology to EU Member States and hospitals to respond to article II.8.c of Council Recommendation 2009/C 151/01 of 9 June 2009 on patient safety, including the prevention and control of healthcare-associated infections. It also integrates the main variables of the European Surveillance of Antimicrobial Consumption (ESAC) hospital-PPS protocol, thereby also providing support to Council Recommendation 2002/77/EC of 15 November 2001 on the prudent use of antimicrobial agents in human medicine.

The second EU-wide PPS will take place during 2016 and 2017. Ireland and Northern Ireland will perform the PPS during May 2017.

2.0 Objectives

1. Measure the overall prevalence of HAI, types of HAI, HAI causative pathogens and key antimicrobial resistance profiles

2. Measure the overall prevalence of antimicrobial use, types of antimicrobial prescribed, as well as compliance with local guidelines

3. Identify priority areas for future interventions to prevent and control HAI, for antimicrobial stewardship and for future targeted incidence surveillance of HAI

4. Contribute data from Ireland and Northern Ireland to the European report

5. Disseminate the PPS results to those who need to know at local, regional, national and EU level to identify problems and set up priorities accordingly

3.0 PPS Timescales

a) **Training Dates**: Seven training days for PPS data collectors will be held around Ireland during April 2017
b) **PPS Dates**: In Ireland, the PPS will be conducted in all participating hospitals between Tuesday May 2nd and Wednesday May 31st 2017
c) **Completion of on-line data entry**: In Ireland, the deadline for completion of data entry using the secure on-line data entry system will be Friday June 23rd 2017
d) **Hospital reports** will be available once all data submitted by participating hospitals has been validated and analysed – Estimate that local hospital reports will be available in Q3 2017
e) Data from all participating hospitals will be submitted to ECDC for inclusion in the European Report by September 2017
f) **PPS National Report** is expected in Q4 2017
g) **Final European PPS report** publication date is yet to be confirmed by ECDC

4.0 Key Protocol Changes 2017 versus 2012

1. Ward specialty code list is shorter
2. Inclusion of ward level process indicators to be gathered for each ward
3. Requirement for the local PPS team to gather ward level process indicators for inclusion on each ward list
4. Hospital size = total beds minus exclusive day beds. Day beds were not excluded from hospital size in 2012 PPS
5. Requirement for local PPS team to gather hospital level data on blood culture sets and faeces specimens tested for *C. difficile* processed on inpatients in previous year
6. Additional questions on antimicrobial pharmacist, registered nurses and healthcare assistant WTE resources for hospital and for ICU(s)
7. Additional questions on airborne infection isolation room capacity
8. Additional questions on IPC plan and report, weekend access to microbiology tests and results, availability of multi-modal strategies in hospital and ICU(s) for prevention of certain HAI types and for antimicrobial stewardship
9. Addition of birth weight in grams for neonates <4 weeks old by PPS date
10. Addition of infective exacerbation of CF, broadening of skin soft tissue and bone and joint as diagnosis sites for treatment of infection
11. Addition of start date for current antimicrobials prescribed to treat infection
12. Requirement to evaluate antimicrobials prescribed to treat infection to ascertain whether there has been a change in treatment choice or route during an infection episode and if yes, to determine what the reason for the change was and when the treatment was initiated
13. Addition of information on antimicrobial dosing
14. Addition of information on date patient admitted to current ward, to determine whether HAI acquired on current ward
15. Change in coding of key antimicrobial resistance patterns – 0, 1, 2, 9 system switched to S, I, R, UNK
16. Relaxing of the requirement for two CXR or CTs in patients with cardiac or pulmonary disease to meet PN surveillance definition. One CXR or CT will suffice provided there is a prior CXR or CT taken within the past year with which to compare it

5.0 Protocol

5.1 Where will data be collected?

The following hospitals, wards and patients are included in the survey;

Hospital Level

- All acute care hospitals

Ward Level

- All acute wards
- Admitted patients who remain in the Emergency Department (ED) at 8am awaiting transfer to a bed on the ward and admitted patients who remain in wards attached to ED or who have been admitted and transferred to a day ward at 8am

EXCEPT

- Day units/wards
- Patients attending the ED who have not been admitted to hospital
- Labour/delivery suites
- Operating theatres
- Outpatient department
- Outpatient dialysis
- Units specifically designated as residential care units or long-term care wards within an acute hospital. Patients admitted to acute hospital wards who await transfer to a long-term care facility are included, as the ward is designated as an acute care ward

Patient Level

- All patients admitted to the ward at 8am on the morning of the survey, with the exception of day patients

- Patients transferred into the ward after 8am or transferred out/discharged after 8am and before the start of the survey are excluded

- Mothers and babies should have a separate form completed each, provided the infant was present on the ward at 8am

EXCEPT

- Day patients
- Patients attending the ED who have not been admitted to hospital at 8am
- Outpatient department patients
- Outpatient dialysis patients

Data Collection Methods

The data collection team membership should be multidisciplinary. All data collectors are required to attend a PPS protocol training day during April. It is recommended that the local team be comprised of at least four members to collect data. Specialist input from the infection prevention and control team, clinical microbiologist and antimicrobial pharmacist will be required.
The nursing, midwifery and medical staff based on each ward, should also be involved in the PPS, as their knowledge of the patient's medical history, underlying disease prognosis, indications for

antimicrobial therapy and symptoms and signs of HAI will be of critical importance to the local PPS team. An algorithm to assist with collection of data is provided in Figure 1 below.

5.2 What data will be collected?

Anonymous denominator data are collected for each patient.
Numerator data are collected for each patient having an active hospital-acquired infection (HAI) and/or receiving a systemic antimicrobial agent [antibacterial and/or antifungal] at the time of the survey.

For this PPS, HAI relates to **infection acquired during, or as a consequence of, an acute care hospital stay**.

- A patient may develop HAI in the hospital where the survey is being conducted, attributable to that hospital

  OR
- A patient may be transferred to the hospital where the survey is being conducted with a HAI which developed in another acute care hospital

  OR
- A patient may be readmitted to a hospital within two days of discharge from that acute hospital or another acute hospital with a HAI other than *Clostridium difficile* infection

  OR
- A patient may be readmitted to a hospital within 28 days of discharge from that acute hospital or another acute hospital with *Clostridium difficile* infection
- A patient may be readmitted to hospital within 30 days of surgery for any category of surgical site infection (SSI) or within 90 days of implant surgery with deep/organ space categories of SSI

This PPS is not collecting data on healthcare-associated infections (HCAI) which may develop in long-term care facilities, rather infections which are acquired during, or as a consequence of, admission to the acute hospital setting.

5.3 When should data be collected?

- In Ireland, the survey will commence on Tuesday May 2nd and end on Wednesday May 31st 2017
- Data should be collected in a single day for each ward/unit (e.g., all data for 'ward A' must be collected in the same working day)
- The total time frame for data collection for all wards of a single hospital should ideally be completed within two weeks
- For surgical wards, data collection should take place between Tuesdays and Fridays. This will optimise collection of surgical antimicrobial prophylaxis information for elective surgical admissions on Mondays
- Paper data collected during the survey must be transcribed onto a secure web-based data entry system by the data collection team in each participating hospital
- The complete dataset for each hospital must be uploaded to the secure web-based data entry system by a **FINAL** deadline of Friday June 23rd 2017

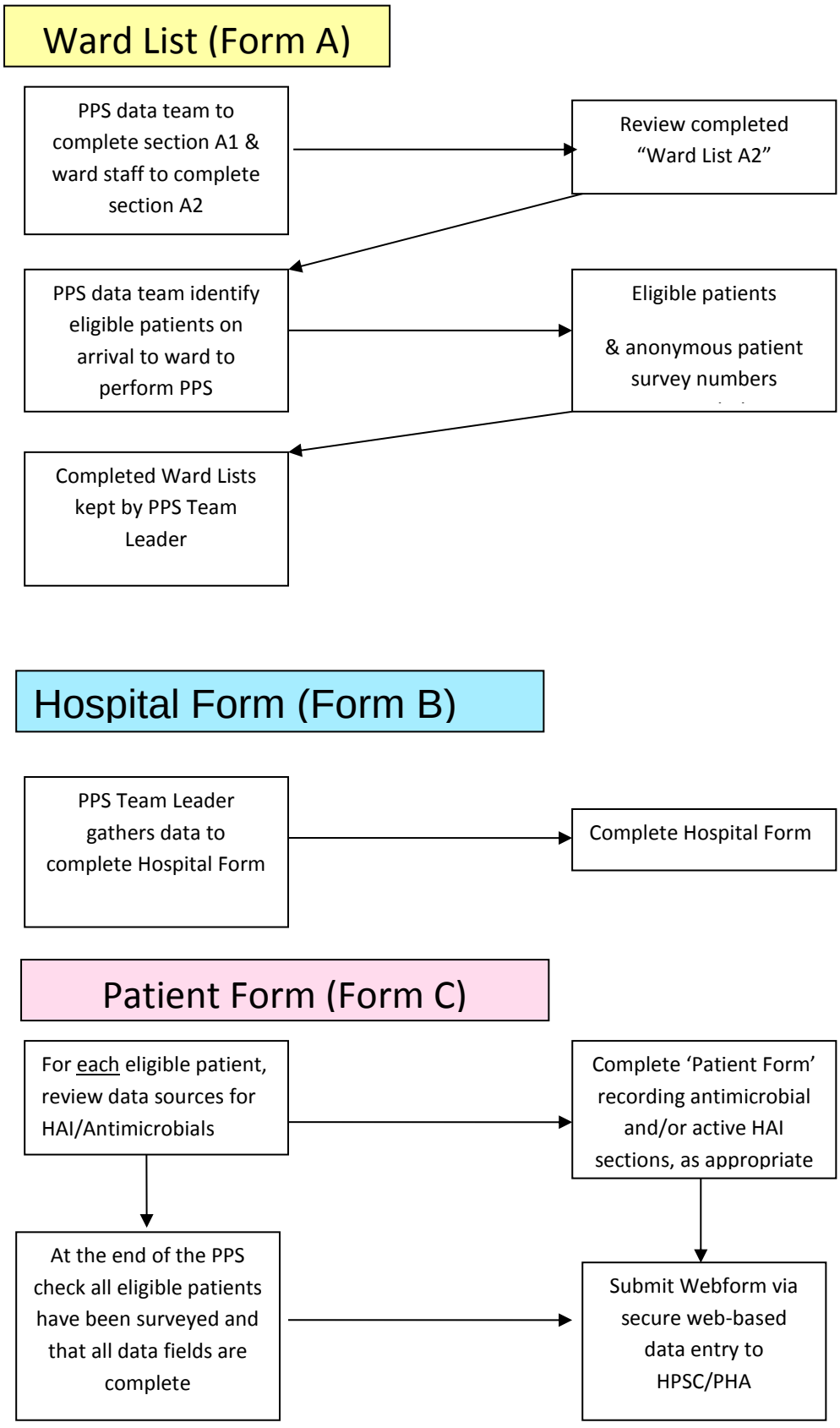


Figure 1: Data collection algorithm

5.4 Completion of the Ward List (Form A)

The local PPS team leader plans the timetable of wards to be covered each day of the PPS in the hospital. The local PPS team will need to obtain some information and can begin recording some data on the ward list (A1) ahead of the PPS date. Ward list (A2) given to each ward manager for ward nursing or midwifery staff to complete on the scheduled date.
The local PPS team leader should communicate with the Director of Nursing or Midwifery and Hospital Manager/Chief Executive Officer in advance of the PPS, to ensure that nursing or midwifery staff on each ward will be requested by their line manager to facilitate and assist with the data collection process on the date that the PPS is conducted on each ward.

- One Ward List (Form A) per ward should be completed. ED is not a ward – Do not ask ED staff to complete a Ward List A2 – PPS team should identify admitted patients at 8am

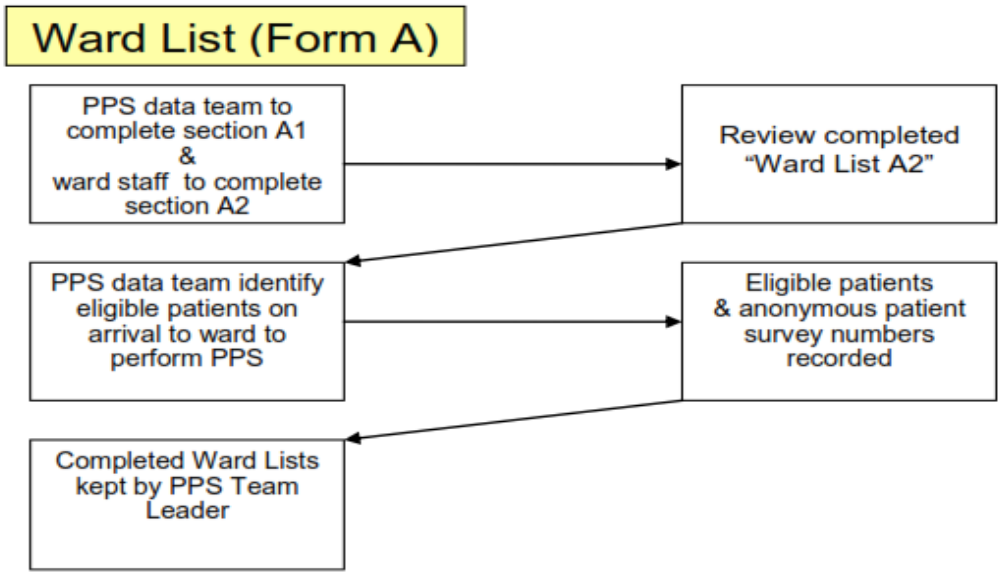
- Most of the Ward List (section A1) can be completed ahead of the survey day, by the PPS team leader, in conjunction with the ward clinical nurse or midwifery manager. Two questions 'Number of beds occupied on the day of PPS' & 'Total number of patients included in the PPS' are completed once the PPS team arrives on the ward

- Data on **EVERY** patient present on the ward before/at 8am on the date of the survey should be collected and recorded on the Ward List (section A2)

- Ward List (section A2) should be filled in by the night shift nursing or midwifery staff before 8am on the date of the survey on that ward. The day shift nursing and midwifery staff will be requested to make themselves available to assist the data collection team with any clinical questions that may arise on data collection day

- The two remaining questions on section A1 can now be completed once the PPS team arrives on the ward and reviews the completed section A2 – 'Number of beds occupied on the day of the PPS' and 'Total number of patients included in PPS'

- The completed ward list for each ward must be retained by the local PPS team leader



2017 SURVEY OF HOSPITAL-ACQUIRED INFECTIONS AND ANTIMICROBIAL USE

Ward List A1

Ward name for internal use [not recorded on WebForm] _____

Please record details below for each Ward.

Completed Ward Lists should be returned to PPS Team for entry to Web System

Hospital & Ward code — Hospital code [ ][ ][ ] Ward code [ ][ ]

Ward specialty [ ]

Survey date [D][D] / [M][M] / [Y][Y]

On this ward, is a review performed on the appropriateness of antimicrobials within 72 hours from the initial order? ☐ Yes ☐ No

[ ][ ] Total number of beds

[ ][ ] Number of beds occupied on the day of PPS

[ ][ ] Number of beds with functioning AHR dispensers at point of care

[ ][ ] Number of patient rooms in ward

[ ][ ] Number of single patient rooms

[ ][ ] Number of single patient rooms with *en suite* bathroom, i.e. toilet & shower/bath

[ ][ ] Total number of patients included in PPS

Figure 2a: Ward list (Section A1)

Notes for completion of Ward List (Section A1)

Data Item	Description
Ward name for internal use	The usual name of the ward in the hospital
Hospital code	Unique hospital code assigned by the national PPS coordinating centre (Maximum three digits) *The answer to this question should be assigned in advance by the local PPS team*
Ward code	Abbreviated ward code assigned to every ward in the hospital (Maximum two digits – 02, 11 etc.) *The answer to this question should be assigned in advance by the local PPS team*
Ward specialty	The main specialty of the ward should be selected from the 11 options 'ward specialty list' **(Appendix A Table 1)** *The answer to this question should be assigned in advance by the local PPS team, in consultation with the ward clinical nurse or midwifery manager* **'SUR'** or **'MED'** should be chosen for the majority of acute adult medical or surgical wards and HDUs to which patients with a variety of medical (cardiac, respiratory, gastrointestinal etc..) or surgical conditions (vascular, colorectal, upper gastrointestinal etc..) are generally admitted Only select specialty wards if >80% of patients admitted to the ward belong to a single specialty (e.g., **GER** = geriatrics or medicine for the elderly, **PSY** = psychiatry, **RHB** = rehabilitation) If <80% of patients belong to a single specialty but there are only two specialties of patients admitted to the ward, record as '**MIX'** e.g. combined haematology and oncology ward '**GO'** should be chosen for maternity, obstetric and gynaecology wards '**ICU**' should be chosen for adult ICU only – Do not categorise HDU in ICU category. Instead code HDU as either MED or SUR **'PED'** should be chosen for paediatric ward and paediatric ICU **'NEO'** should be chosen for neonatal ward and neonatal ICU
Survey date	The date the PPS was performed on the ward = DD/MM/YY
Review performed on the appropriateness of antimicrobials within 72 hours from the initial order?	Select 'Yes' or 'No' Yes = There is a formal, documented process/procedure to review the appropriateness of an antimicrobial within 72 hours of its prescription, including review procedures addressing broad spectrum or restricted antimicrobials. This is performed by a person or team other than the treating physician at a minimum of twice weekly on the ward. Routine reassessment of the prescription performed by the admitting team does not meet the definition of formal post prescription review. *The answer to this question should be assigned in advance by the local PPS team, in consultation with the clinical microbiologist and antimicrobial pharmacist*

Total number of beds on the ward	Total numbers of beds on the ward, that are normally open for admissions and **excluding beds solely designated as day beds** *The answer to this question should be assigned in advance by the local PPS team, in consultation with the ward clinical nurse or midwifery manager*
Number of beds occupied on the day of the PPS	Total number of beds on the ward that are occupied by patients on the day of the PPS *The answer to this question should be assigned by the local PPS team once the completed section A2 has been reviewed*
Number of beds in ward with functioning AHR dispensers at the point-of-care	Count up the **TOTAL** number of beds in the ward with functioning alcohol-based hand rub (ABHR) dispensers available at the point-of-care (i.e., not broken and contains ABHR). The point-of-care is within the patient zone and should be within arm's reach of where patient care is delivered, as defined by the '2009 WHO Guidelines on Hand Hygiene in Healthcare'. ABHR dispensers at the entrance to the patient room are not considered at the point-of-care *The answer to this question should be assigned in advance by the local PPS team, in consultation with the infection prevention and control team*
Number of patient rooms	Count up the **TOTAL** number of rooms on the ward, which are available for occupancy by patients. If rooms are closed and not available for occupancy, they should not be counted. This includes the number of single rooms, each of which is counted as one room **PLUS** the number of multiple-occupancy rooms/bays (e.g., a bay shared by two or more patients is counted as one room) *The answer to this question should be assigned in advance by the local PPS team, in consultation with the ward clinical nurse or midwifery manager*
Number of single patient rooms	Count up the **TOTAL** number of single rooms, which are available for occupancy by one patient. If rooms are closed and not available for occupancy, they should not be counted. A single room is defined as a room available for isolation. It may not necessarily be in use as an isolation room at the time of the survey *The answer to this question should be assigned in advance by the local PPS team, in consultation with the ward clinical nurse or midwifery manager*
Number of single patient rooms with *en suite* bathrooms (i.e., individual toilet and washing facilities)	Count up the **TOTAL** number of single rooms with an *en suite* bathroom (i.e., separate toilet and washing facilities for the use of one patient) Do not include a single room with a hand wash basin and a commode in this category *The answer to this question should be assigned in advance by the local PPS team, in consultation with the ward clinical nurse or midwifery manager*
Total number of patients included in PPS	Total number of eligible patients on the ward included in the PPS *The answer to this question should be assigned by the local PPS team once the completed section A2 has been reviewed*

Public Health Agency

Ward List A2

↓ Ward details should be completed by Ward contact/manager and PPS team lead in advance of survey ↓

Ward name ____________________________

Hospital Code | | | | Ward code | | | Ward specialty | |

COMPLETED BY WARD STAFF FOR ALL PATIENTS ON THE WARD													COMPLETED BY PPS DATA TEAM	
		M/F	Years or Months	Neonate < 4 weeks	DD/MM/YY	+	+	+	+	+	+	+	+	
Bed number	Patient name	Gender	Age Or month <2	Birth weight	Admission date	Surgery since admission	Surgery in last 24 hrs	Central vascular catheter	Peripheral vascular catheter	Urethral Catheter	Intubation	Patient on antimicrobial	Eligible patient	Patient Study Number
												Total		

Note: If there are more than 20 beds on ward please continue on another Ward List – Completed Ward Lists to be retained by the PPS team leader

Figure 2b: Ward list (Section A2)

Notes for completion of Ward List (Section A2)

Data Item	Description
Ward name	The usual name of the ward in the hospital (same as entered on A1)
Hospital code	Unique hospital code assigned by the national PPS coordinating centre (Maximum three digits) (same as entered on A1)
Ward code	Abbreviated ward code assigned to every ward in the hospital (Maximum two digits – 02, 11 etc.) (same as entered on A1)
Ward specialty	The main specialty of the ward (same as entered on A1) (See Appendix A Table 1)
Bed number	Consecutive bed number as it is usually categorised on the ward (e.g., 1, 2, 3 OR 1a, 1b, 1c, 1d etc.) If a bed is vacant and available for occupancy, enter the bed number, but leave the remainder of the row blank, as there is no patient in the bed

Patient name	Patient name is recorded on the ward list, solely to enable the data collection team to identify who is eligible for inclusion in the PPS. Patient name **will not** be permitted to be entered on the patient data paper form nor on the web-based version of the form On **maternity wards** both the mother and the neonate should be counted as separate patients provided both are present on the ward at 8am. If the mother was admitted to the ward at or before 8am and the baby was born after 8am, only the mother is included
Gender	Enter patient gender as M or F
Age or months <2	If ≥2 years = Record age in years = 02….79…..98 etc. If <2 years = Record age in months followed by M = 01M….07M….22M If <1 month (neonate <4 weeks) record age = 00
Birth weight	Enter birth weight in grams (gm) for neonates who are aged less than 4 weeks old (i.e., Age coded as 00) on the PPS date Birth weight = weight at time of birth not weight on PPS date
Admission date	Date of patient's admission to the current hospital For babies born in the current hospital – date of birth = date of admission If the patient was transferred in from another hospital, the date of transfer to the **current hospital** should be recorded as the date of admission Record as **DD/MM/YY**
Surgery since admission	Enter **+** in the appropriate box if the patient has undergone surgery during this hospital admission. Leave blank if no surgery during this hospital admission. Review patient notes to determine whether the patient has undergone surgery on the current admission. This information can be found in surgery/operation notes. Surgery is defined as a procedure where an incision is made (not just a needle puncture), with breach of mucosa and/or skin – not necessarily in the operating theatre. The purpose of surgery should be primarily therapeutic. Note that the following procedures are **NOT** regarded as surgical procedures: ▪ Endoscopic procedures (OGD, colonoscopy, ERCP, bronchoscopy) ▪ Percutaneous angioplasty (coronary, cerebral or peripheral vascular) ▪ Percutaneous drainage of a collection (e.g., in interventional radiology) ▪ Insertion of a central vascular catheter ▪ Insertion of an intra-aortic balloon pump ▪ Insertion of an intercostal tube drain or chest drain ▪ Insertion of a percutaneous nephrostomy
Surgery in the last 24 hours	Enter **+** in the appropriate box if the patient has undergone surgery in the past 24 hours. Leave blank if no surgery in the past 24 hours This question will be checked by the PPS team to identify patients who may have received surgical antimicrobial prophylaxis in the 24 hours prior to 8am on the date of the survey

Central vascular catheter (CVC)	Enter **+** in the appropriate box if the patient has a central vascular catheter (CVC) ***in situ* at the time of survey** Leave blank if no CVC *in situ* A CVC is a vascular catheter that terminates at or close to the heart or in one of the **great vessels.** The following are considered great vessels: Aorta, pulmonary artery, superior vena cava, inferior vena cava, brachiocephalic veins, internal jugular veins, subclavian veins, external iliac veins, common iliac veins, common femoral veins and in neonates, the umbilical artery or vein. A CVC is used for infusion, withdrawal of blood, or hemodynamic monitoring and includes – central venous catheter, vascath, portacath, permcath, peripherally inserted central catheter (PICC) and midline Neither the insertion site nor the type of device may be used to determine if a catheter qualifies as a central vascular catheter. An introducer is considered a central vascular catheter. Pacemaker wires and other devices without lumens inserted into central blood vessels or the heart are <u>not</u> considered central vascular catheters, because fluids are not infused, pushed, nor withdrawn through such devices
Peripheral vascular catheter (PVC)	Enter **+** in the appropriate box if the patient has a peripheral venous or arterial vascular catheter (PVC) ***in situ* at the time of survey** Leave blank if no PVC *in situ*
Urethral catheter	Enter **+** in the appropriate box if the patient has an indwelling **urethral** catheter ***in situ* at the time of survey** Leave blank if no urethral catheter *in situ* Note – suprapubic, condom, self-intermittent catheterisation (SIC), urostomy or nephrostomy are **NOT** urethral catheters and should not be recorded
Intubation	Enter **+** in the appropriate box if the patient is intubated with or without mechanical ventilation (endotracheal tube or tracheostomy) **at the time of survey** Leave blank if the patient is not intubated Please note that non-invasive ventilation (e.g., CPAP) is not regarded as intubation
Patient on antimicrobials	Enter **+** in the appropriate box if the patient is receiving antimicrobials as recorded in the notes/medication chart Leave blank if the patient is not on antimicrobials Patient is prescribed at least one systemic antimicrobial agent [antibacterial or antifungal] via enteral (oral or rectal), parenteral (intravenous or intraocular injection) or inhaled route at the time of the survey (including intermittent treatment) Patients who receive surgical prophylaxis before 8am on the day of the survey **and** after 8am on the day before the survey should be recorded as on antimicrobials ▪ Topical antimicrobials are excluded ▪ Antivirals, anti-protozoals and anti-helminthics, are excluded ▪ Treatment of tuberculosis (TB) is excluded

Eligible patient	**THIS WILL BE COMPLETED BY THE PPS TEAM AND SHOULD BE LEFT BLANK BY THE WARD NURSING OR MIDWIFERY STAFF**
Patient study number	**THIS WILL BE COMPLETED BY THE PPS TEAM AND SHOULD BE LEFT BLANK BY THE WARD NURSING OR MIDWIFERY STAFF** **The anonymous consecutive number of eligible patients present on the ward and included in the study**
Total	**THIS WILL BE COMPLETED BY THE PPS TEAM, WHO WILL CALCULATE THE TOTAL NUMBER OF ELIGIBLE PATIENTS ON THE WARD WHO HAVE BEEN ASSIGNED A PATIENT STUDY NUMBER – THIS IS THE ANSWER TO THE FINAL QUESTION IN SECTION A1**

5.5 Completion of the Hospital Form (Form B)

One Form B to be completed for each hospital. The **PPS team leader** in each hospital is responsible for completing and returning Form B on behalf of the hospital.

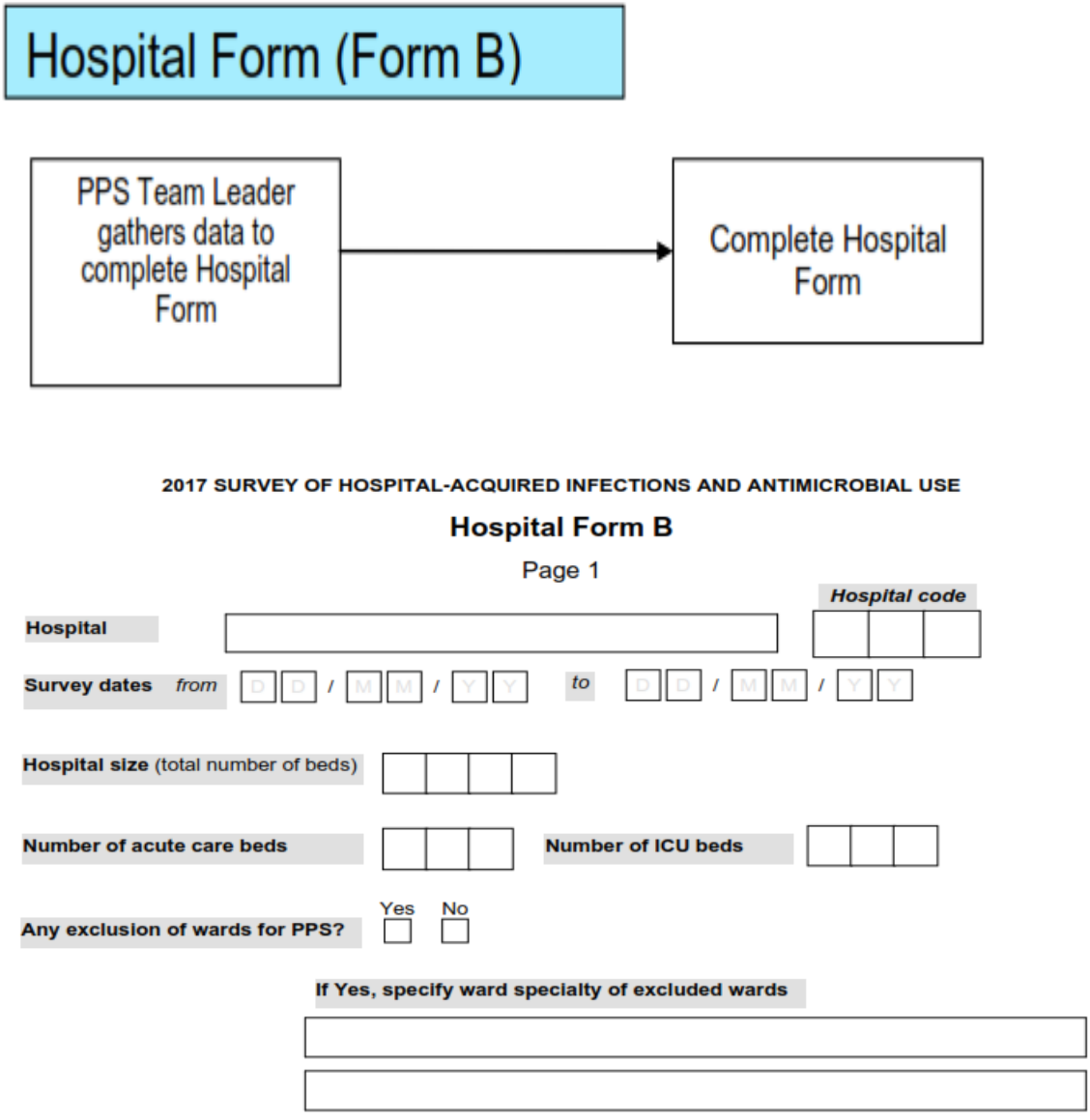


Figure 3a: Hospital Form (Form B)

Notes for completion of Form B

Data Item	Description
Hospital code	Unique hospital code assigned by the national PPS coordinating centre = three digits
Survey dates	Start and end date for the PPS in the entire hospital; end date is the date the data were collected on the last ward **DD/MM/YY**
Hospital size	Total number of beds in the hospital, excluding beds which are exclusively used for day cases
Number of acute care beds	If there are no permanently designated long-term care/nursing home beds in the hospital, total beds equals number of acute care beds If there are permanently designated long-term care/nursing home beds in the hospital, number of acute care beds is calculated by subtracting the number of beds that are permanently designated as long-term care/nursing home beds from the total number of beds Note, beds on acute wards occupied by patients who are otherwise fit for discharge and awaiting transfer to long-term care are not considered as permanently designated long-term care/nursing home beds and are counted as acute care beds
Number of ICU beds	Number of intensive care unit beds in the hospital. If there is no ICU then number of ICU beds = zero (0)
Ward exclusion	Were any wards excluded for the PPS in your hospital? Answer = **Yes** or **No** Recommended that all eligible acute wards are included
Specify specialty of excluded wards	Only answered if **Yes** to above question. Specify which wards where excluded for the PPS. See 'ward specialty code list' **Appendix A Table 1**

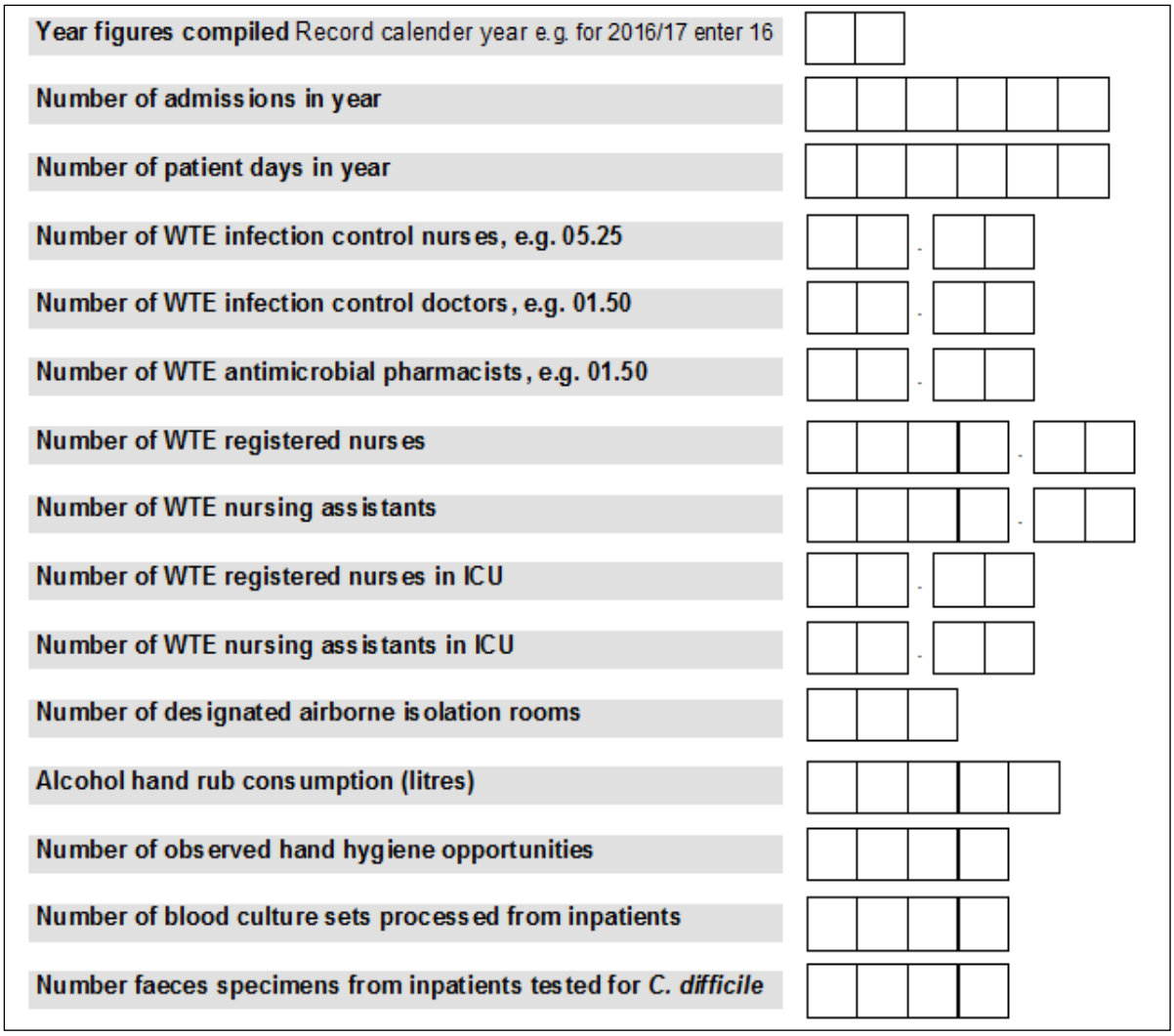


Figure 3b: Hospital Form (Form B)

Notes for completion of Form B

Data Item	Description
Year figures compiled	Record the latest full year for which the figures are provided; e.g., 2016 data = 16
Number of admissions in year	Total number of admissions for the hospital in latest year for which data is available
Number of patient days or bed days in year	Number of patient days or bed days for the hospital in latest year for which data is available
Number of whole-time equivalent (WTE) infection prevention and control nurses (IPCN) in the hospital	Number of WTE IPCN currently working in the hospital IPCN = nurse with specialised training in infection control/hospital hygiene and usually responsible for infection control/hospital hygiene tasks, such as training of hospital employees in infection control, elaboration and implementation of infection control procedures, management (implementation, follow-up, evaluation) of an infection control work plan and projects, audits and evaluation of performance, procedures for disinfection of medical devices
Number of WTE infection prevention and control doctors in the hospital	Number of WTE infection prevention & control doctors currently working in hospital

Number of WTE infection prevention and control doctors in the hospital continued	Infection prevention and control doctor has specialised training in infection control/hospital hygiene and usually responsible for infection control/hospital hygiene tasks such as identification and investigation of outbreaks, analysis and feedback of infection control data, elaboration of an infection control work plan and projects, design and management of surveillance systems, elaboration of infection control procedures The IPC role should be part of the doctor's job description. If a portion of the doctor's hours are spent on IPC, as part of a wider remit, record the proportion of time devoted to IPC duties (e.g., one day per week = 0.2 WTE)
Number of WTE antimicrobial pharmacists in the hospital	Number of WTE antimicrobial pharmacists currently working in the hospital Antimicrobial pharmacist is a pharmacist employed to provide specialised advice on antimicrobials and is a member of the antimicrobial stewardship team, participating in delivering core evidence-based interventions for antimicrobial stewardship
Number of WTE registered nurses in the hospital	Total number of WTE registered nurses currently working in the hospital Includes all registered nursing staff headcount, regardless of whether they are permanent, temporary or agency posts. Do not breakdown the proportion of each employee's clinical versus non-clinical/managerial commitment Excludes student nurses who are not yet registered by NMBI
Number of WTE nursing assistants or healthcare assistants (HCA) in the hospital	Total number of WTE healthcare assistants (HCA) or nurse aides or multi-task attendants or carers currently working in the hospital Includes all HCA/nurse aide/multitask attendant/carer headcount, regardless of whether they are permanent, temporary or agency posts Excludes students, volunteers or other allied health professionals (e.g., physiotherapist, dietician, occupational therapist, speech and language therapist)
Number of WTE registered nurses in the ICU	Total number of WTE registered nurses currently working in the ICU. If the hospital has >1 ICU, provide the total for all ICUs combined Includes all registered nursing staff headcount, regardless of whether they are permanent, temporary or agency posts. Do not breakdown the proportion of each employee's clinical versus non-clinical/managerial commitment Excludes student nurses who are not yet registered by NMBI
Number of WTE nursing assistants or healthcare assistants (HCA) in the ICU	Total number of WTE healthcare assistants (HCA) or nurse aides or multi-task attendants or carers currently working in the ICU. If the hospital has >1 ICU, provide the total for all ICUs combined Includes all HCA/nurse aide/multitask attendant/carer headcount, regardless of whether they are permanent, temporary or agency posts Excludes students, volunteers or other allied health professionals (e.g., physiotherapist, dietician, occupational therapist, speech and language therapist)
Number of airborne infection isolation rooms (AIIR)	Total number of designated airborne infection isolation rooms (AIIR) in the hospital. An AIIR is defined as a room with negative pressure ventilation and an ante room

Alcohol based hand rub (ABHR) consumption	Total number of litres of ABHR used in the hospital in latest year for which data is available (2016)
Observed hand hygiene opportunities	Total number of observed hand hygiene opportunities in the hospital in latest year for which data is available Please note that the recorded compliance with the opportunities is not needed, just the number of opportunities observed
Number of blood culture sets processed from inpatients	Total number of blood culture sets received from the hospital and incubated by the microbiology laboratory in latest year for which data is available Please note that microbiology laboratories that process blood cultures from >1 hospital will need to breakdown and provide the total number of blood culture sets processed per PPS hospital, not the total number of sets processed for all hospitals combined
Number of faeces specimens from inpatients tested for *C. difficile*	Total number of inpatient faeces specimens received from the hospital and tested for *C. difficile* by the microbiology laboratory in latest year for which data is available Please note that microbiology laboratories that process faeces specimens from >1 hospital will need to breakdown and provide the total number of inpatient faeces specimens tested for *C. difficile* per PPS hospital, not the total number processed for all hospitals combined The microbiology laboratory should exclude faeces specimens from non-inpatients (e.g., outpatients, day care, primary care, long-term care facilities)

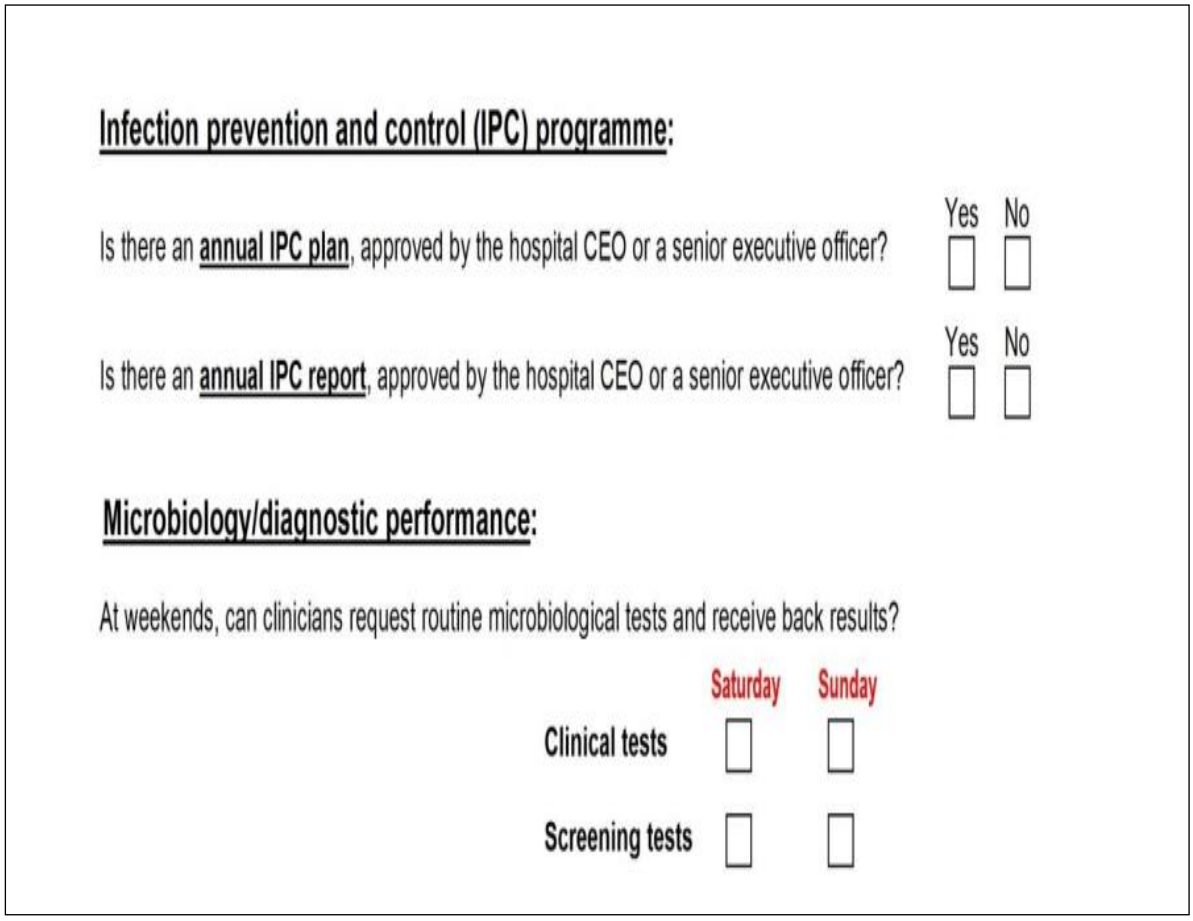


Figure 3c: Hospital Form (Form B)

Notes for completion of Form B

Data Item	Description
Annual IPC plan	Yes or No Is there an annual IPC plan (e.g., work plan, service plan), approved by the Hospital CEO or senior management team member? If the Hospital's infection control committee is chaired by the CEO or senior management team member, can answer 'yes' to this question
Annual IPC report	Yes or No Is there an annual IPC report, approved by the Hospital CEO or senior management team member? If the Hospital's infection control committee is chaired by the CEO or senior management team member, can answer 'yes' to this question
Weekend microbiology services for clinical specimens	Can clinicians request routine microbiology testing of clinical specimens (e.g., blood cultures, CSFs, tissue, pus, wound swab for culture, faeces, urines) and expect to routinely get results on clinical specimens in your hospital within a standard turnaround time? on Saturdays (tick box if 'yes' applies) on Sundays (tick box if 'yes' applies)
Weekend microbiology services for screening specimens	Can clinicians request routine microbiology testing of screening specimens or active surveillance specimens (e.g., MRSA screening swabs, VRE screening swabs/faeces, ESBL screening swabs/faeces, CRE screening swabs/faeces) and expect to routinely get results on screening specimens in your hospital within a standard turnaround time? on Saturdays (tick box if 'yes' applies) on Sundays (tick box if 'yes' applies)

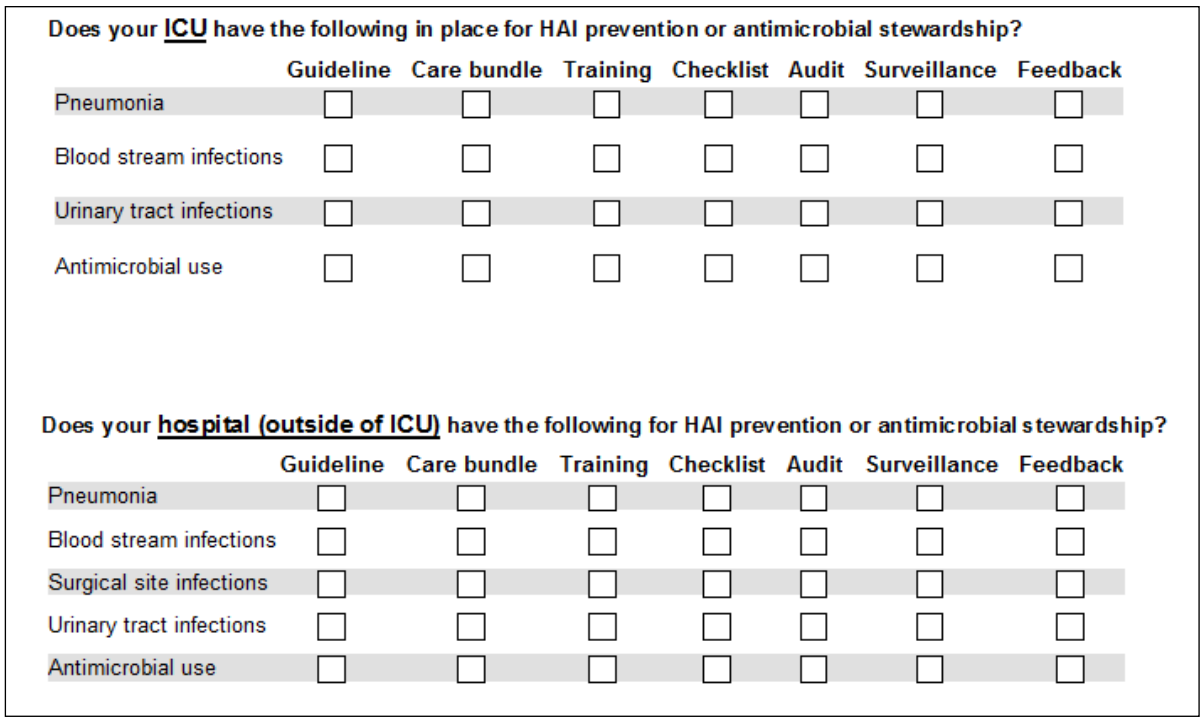


Figure 3d: Hospital Form (Form B)

Notes for completion of Form B

Data Item	Description
Definitions used for multi-modal strategies	• **Multi-modal strategy** = Intervention aimed at improving practice and offering education and training at multiple levels and it must be underpinned by written guidelines and endorsed by the hospital management as a hospital programme • **Guideline** = written document available at ward level • **Care bundle** = 3-5 evidence-based practices when performed collectively and reliably are proven to improve outcomes • **Training** = At least an annual training course on the intervention • **Checklist** = Completed by the healthcare worker undertaking the intervention • **Audit** = Evaluation of the implementation of the intervention by someone other than the healthcare worker undertaking the intervention • **Surveillance** = Formal surveillance of the HAI type or antimicrobial stewardship intervention (e.g., consumption, compliance with quality prescribing indicators) – Can be local, regional or national surveillance • **Feedback** = At least an annual written feedback on audit and/or surveillance results for the HAI type or antimicrobial stewardship intervention to frontline healthcare workers
Multi-modal strategies for prevention of HAI in the ICU(s)	For each of the three HAI types (Pneumonia, BSI, UTI), tick the components of a local multi-modal preventative strategy that are in place in your ICU. If your hospital has >1 ICU, tick the components that apply to at least one of the ICUs in your hospital. See above for the definitions of each component: • Guideline • Care bundle • Training • Checklist • Audit • Surveillance • Feedback
Multi-modal strategies for antimicrobial use in the ICU(s)	Tick the components of a local multi-modal antimicrobial stewardship programme that are in place in your ICU. If your hospital has >1 ICU, tick the components that apply to at least one of the ICUs in your hospital. See above for the definitions of each component: • Guideline • Care bundle • Training • Checklist • Audit • Surveillance • Feedback
Multi-modal strategies for prevention of HAI in the hospital (wards other than ICU)	For each of the four HAI types (Pneumonia, BSI, SSI and UTI), tick the components of a local multi-modal preventative strategy that are in place in your hospital. *They don't have to be present on every ward. Implementation on at least one ward outside of ICU is sufficient.* See above for the definitions of each component:

Multi-modal strategies for prevention of HAI in the hospital (wards other than ICU) continued	• Guideline • Care bundle • Training • Checklist • Audit • Surveillance • Feedback
Multi-modal strategies for antimicrobial use in the hospital (wards other than ICU)	Tick the components of a local multi-modal antimicrobial stewardship programme that are in place in your hospital. *They don't have to be present on every ward. Implementation on at least one ward outside of ICU is sufficient.* See above for the definitions of each component: • Guideline • Care bundle • Training • Checklist • Audit • Surveillance • Feedback

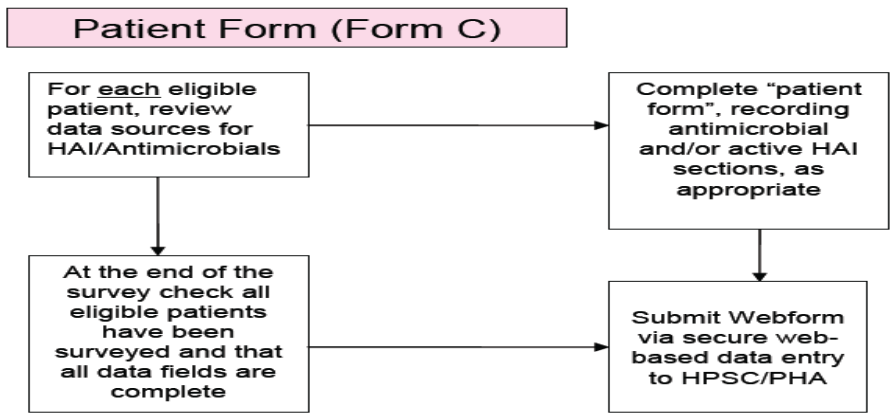
5.6 Completion of the Patient Form (Form C)

One patient form (Form C) should be completed for **every eligible patient** present on the ward before/at 8am on the day of that ward's survey and who has not been discharged from the ward by the time the survey starts on that ward. For a patient who is deemed eligible but temporarily off the ward (in radiology, theatre or rehabilitation), if the patient's healthcare record and medication chart are not available, please highlight that patient for review later in the day, upon his or her return to the ward. **The majority of data on each patient can be transcribed directly from the completed Ward List (Section A2).**

For each patient, the data collection team should review;

- Current nursing notes
- Current healthcare record/medical notes
- Observation charts
- Drug charts/medication prescription and administration record
- Surgery/operation notes
- Laboratory reports e.g. microbiology results
- Other relevant records e.g. wound charts, stool charts, care plans

If the required information is not clear from the notes, the data collection team should discuss with an available member of ward staff for clarification.



SURVEY OF HOSPITAL-ACQUIRED INFECTIONS & ANTIMICROBIAL USE

2017 PPS - PATIENT FORM C v1.0

1. Patient details

Hospital code | Ward code | Patient ID

Unique identifier

Consultant specialty

Age in years (if <2 enter "00")

Age in months if < 2 years old (for neonates <4-weeks, enter '00')

If neonate, birth weight in grams

Admission date to this hospital D D / M M / Y Y

Gender ☐ Male ☐ Female

2. Risk factors

Surgery since admission ☐ No ☐ Yes → Surgical procedure

Central vascular catheter ☐ No ☐ Yes

Peripheral vascular catheter ☐ No ☐ Yes

Uretheral catheter ☐ No ☐ Yes

Intubation ☐ No ☐ Yes

Underlying disease prognosis ☐ None/non-fatal disease ☐ End of life prognosis ☐ Life limiting prognosis ☐ Not known

3. Condition of interest

Patient has active HAI ☐ No ☐ Yes

Patient on antimicrobials ☐ No ☐ Yes

4. Hospital-acquired infection data (HAI) ...If more than 1 HAI use extension sheet Page 4

HAI 1

Infection

If SSI, record procedure

If BSI record source

Date admitted to current ward D D / M M / Y Y

Relevant device in situ before onset ☐ Yes ☐ No

HAI Present at admission ☐ Yes ☐ No

Origin of infection ☐ Current hospital ☐ Other acute hospital ☐ Other origin

Date of onset D D / M M / Y Y

Microorganism 1 | Resistance 1

Microorganism 2 | Resistance 2

Microorganism 3 | Resistance 3

Figure 4a. Patient Form (Form C) Page 1

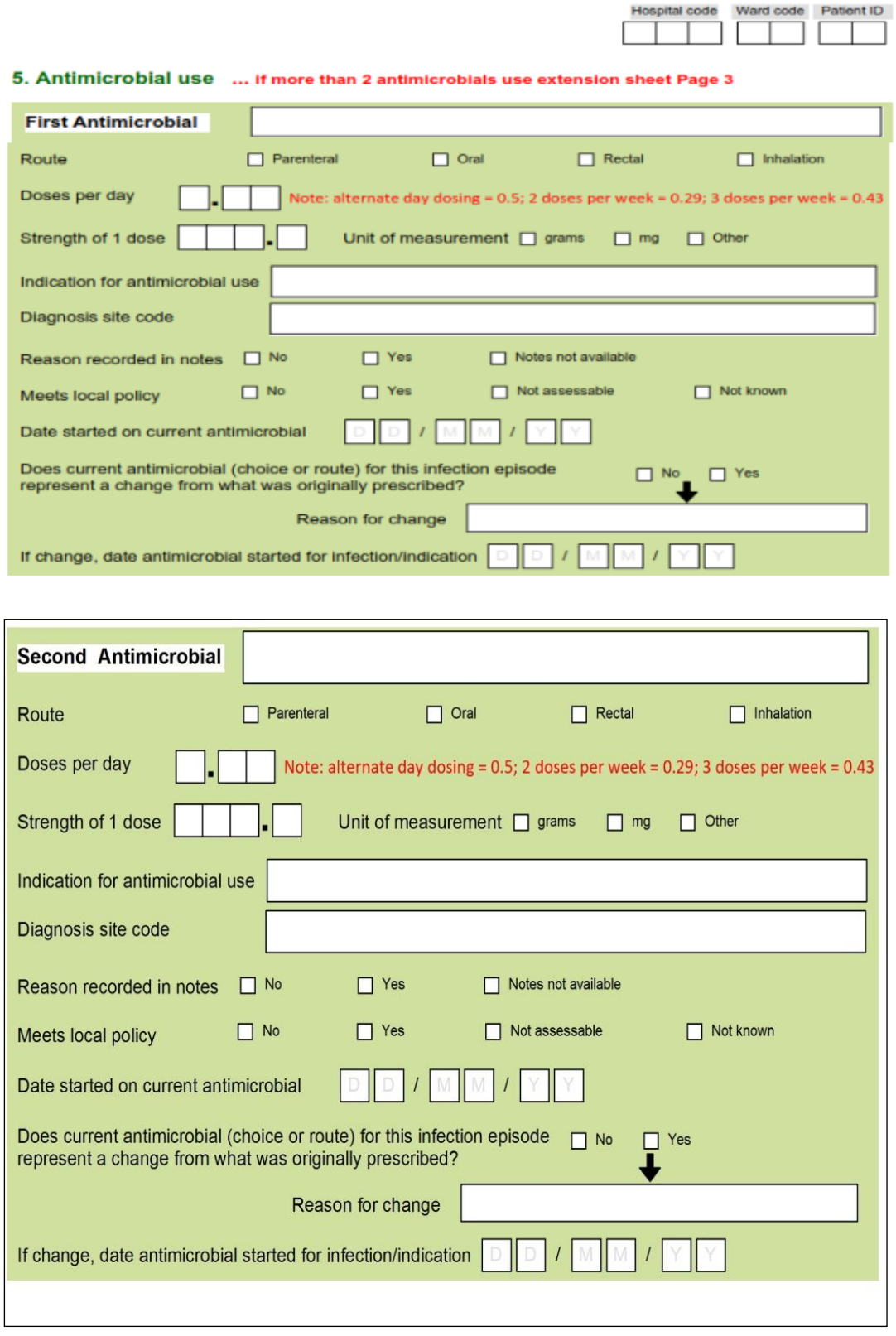


Figure 4b. Patient Form (Form C) Page 2

Pages 3 & 4 can be printed as extension sheets for patients with >1 HAI & patients prescribed >2 antimicrobials

5.6.1 Patient details: Section 1 (Form C)

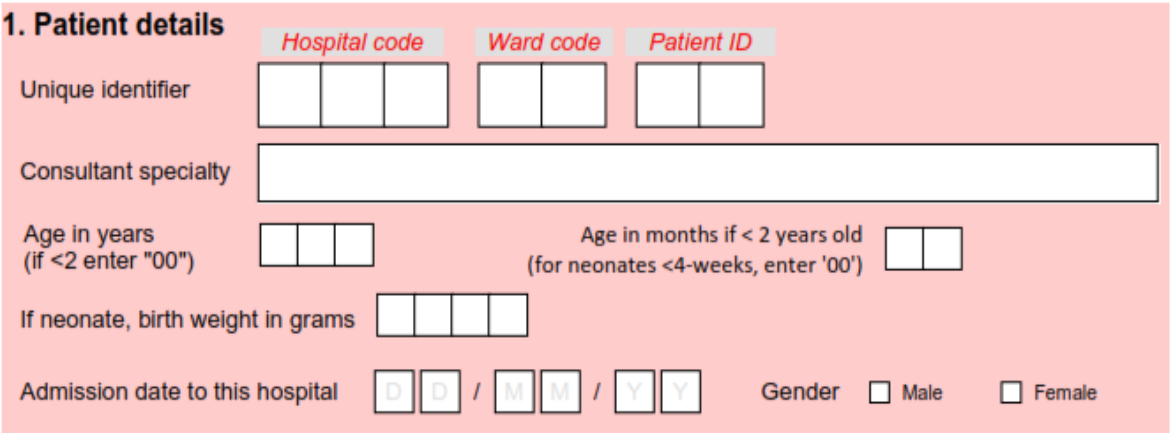


Figure 5: Patient Form (Form C) – Section 1: Patient Details

Notes for completion of patient details – Section 1

Data Item	Description
Unique identifier	Unique three-part identifier used to link the data collected to the patient on the ward. It has no meaning outside of the hospital and it ensures that the patient data during the PPS collected remains anonymous: 1) **Hospital code**: Unique hospital code assigned by the national PPS coordinating centre (Maximum three digits) 2) **Ward code**: Abbreviated ward name assigned in advance by the local PPS team leader to every ward in the hospital (Maximum two digits). Enter as recorded on the completed Ward List 3) **Patient ID**: The consecutive two digits 'patient study number' in the final column of the Ward List, assigned by the PPS team to each eligible patient on the PPS date (01, 02, 03....11, 12.....20, 21 etc.)
Consultant specialty	**The consultant specialty and the ward specialty may be different** Record the coded specialty of consultant under whose care the patient is admitted (Maximum 9 characters). This should be selected from the 'admitting consultant's specialty code list' **(Appendix A Table 2)** ▪ If a patient with pneumonia is admitted 'on-call' under the care of a physician who has a dual-specialisation (e.g., general medicine and rheumatology), count the admitting consultant's specialty as MEDGEN rather than MEDRHEU ▪ However, if a rheumatology patient is admitted under the same clinician, count the admitting consultant's specialty as MEDRHEU for accuracy ▪ For healthy neonates on maternity ward, register admitting consultant specialty as GOBAB ▪ For healthy neonates on the paediatric ward, register admitting consultant specialty as PEDBAB ▪ Admitting consultant specialty for sick neonates will be categorised as PEDNEO or ICUNEO if admitted to NICU

Age in years	If ≥2 years = Record age in years = 02….79…..98 etc. If <2 years = Record age in years = 00
Age in months completed only if <2 years old	For patients <2 years (i.e., 00 entered for age in years), round age to the nearest month = 06, 22 For neonate less than 4 weeks/one month, record age in months = 00
If neonate, birth weight	Enter birth weight in grams (gm) for neonates who are aged less than 4 weeks old (i.e., Age coded as 00) on the PPS date Birth weight = weight at time of birth not weight on PPS date
Admission date to this hospital	Enter as recorded on the completed Ward List Date of patient's admission to the current hospital If the patient was transferred in from another hospital, the date of transfer to the **current hospital** should be recorded as the date of admission. Record as **DD/MM/YYYY**
Gender	Enter as recorded on the completed Ward List Enter patient gender as **Male** or **Female**

5.6.2 Patient risk factors: Section 2 (Form C)

If the presence of a device is not clear, the data collector should approach a member of ward staff or review the patient for clarification.

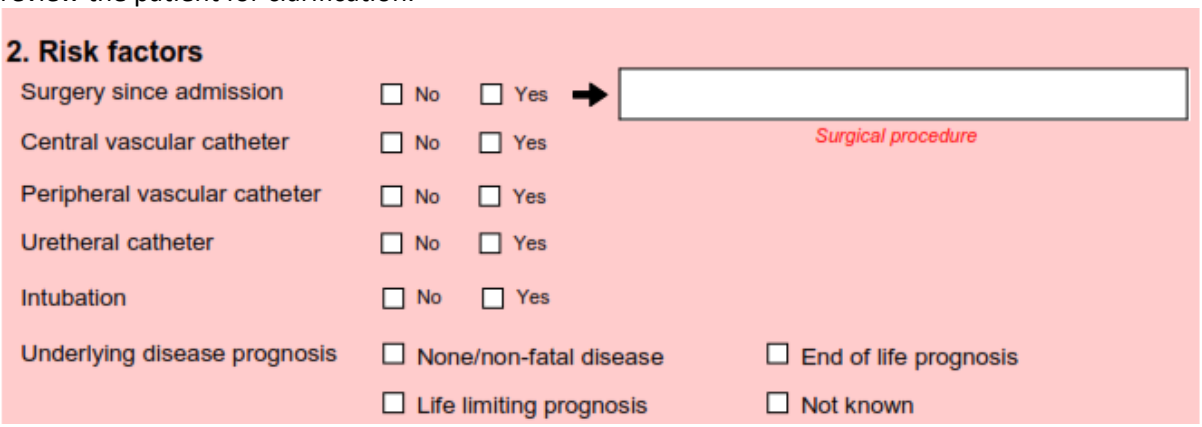


Figure 6: Patient Form (Form C) – Section 2: Risk Factors

Notes for completion of risk factors – Section 2

Data Item	Description
Surgery since admission	Check the completed Ward List. For patients who have been marked as **+** = Yes for surgery, the patient's case notes should also be reviewed to confirm that the patient has actually undergone surgery during the current admission. This information can be found in surgery/operation notes. If the patient has not undergone surgery on this admission = 'No' Surgery is defined as a procedure, where an incision is made (not just a needle puncture), with breach of mucosa and/or skin – not necessarily in the operating theatre. The purpose of surgery should be primarily therapeutic.

Surgery since admission continued	Insertion of a device or line is not considered to be a surgical procedure. If you think that the patient has undergone surgery on this admission, cross check the procedure performed as documented in the patient notes with the 'surgery list' **(Appendix A Table 3)** If the surgical procedure performed is listed in **Appendix A Table 3** – Tick the box 'Yes' Note that the following procedures are **NOT** regarded as surgical/minimally invasive procedures: ▪ Endoscopic procedures (OGD, colonoscopy, ERCP bronchoscopy ▪ Percutaneous angioplasty (coronary, cerebral or peripheral vascular) ▪ Percutaneous drainage of a collection (e.g. in interventional radiology ▪ Insertion of a central vascular catheter ▪ Insertion of an intraaortic balloon pump ▪ Insertion of an intercostal tube drain or chest drain ▪ Insertion of a percutaneous nephrostomy
Surgical Procedure	A list of surgical procedures is provided in **Appendix A Table 3** If a surgical procedure has been performed, write the corresponding name of the surgical procedure as it appears in the column shaded in grey in the box 'Surgical Procedure'
Central vascular catheter	Select 'Yes' or 'No' based on completed Ward List: **+** = 'Yes', blank = 'No' A CVC is a vascular catheter that terminates at or close to the heart or in one of the **great vessels**. The following are considered great vessels: Aorta, pulmonary artery, superior vena cava, inferior vena cava, brachiocephalic veins, internal jugular veins, subclavian veins, external iliac veins, common iliac veins, common femoral veins and in neonates, the umbilical artery or vein A CVC is used for infusion, withdrawal of blood, or hemodynamic monitoring and includes: central venous catheter, vascath, portacath, permcath, peripherally inserted central catheter (PICC) and midline Neither the insertion site nor the type of device may be used to determine if a catheter qualifies as a central vascular catheter An introducer is considered a central vascular catheter Pacemaker wires and other devices without a lumen inserted into central blood vessels or the heart are **not** considered central vascular catheters, because fluids are not infused, pushed, nor withdrawn through such devices
Peripheral vascular catheter (PVC)	Select 'Yes' or 'No' based on completed Ward List: **+** = 'Yes', blank = 'No' Yes = the patient has a peripheral venous or arterial vascular catheter (PVC) ***in situ*** **at the time of survey**

Urethral catheter	Select 'Yes' or 'No' based on completed Ward List: **+** = 'Yes', blank = 'No' This question should only be answered 'Yes' if the patient has an indwelling **urethral** catheter ***in situ*** **at the time of survey** Note – suprapubic, condom, self-intermittent catheterisation (SIC), urostomy or nephrostomy are **NOT** urethral catheters and should not be recorded
Intubation	Select 'Yes' or 'No' based on completed Ward List: **+** = 'Yes', blank = 'No' Yes = patient is intubated with or without mechanical ventilation (endotracheal tube or tracheostomy) **at the time of survey** Please note that non-invasive ventilation e.g., CPAP is not regarded as intubation
Underlying disease prognosis	An algorithm is provided in Figure 7 below to assist with completion of this section This is designed to classify the severity of the underlying medical condition for each patient. In the event that a patient is being treated for an acute infection, including HAI, the influence of the acute infection on the patient's underlying disease should be disregarded. The underlying disease prognosis should only be estimated based on the patient's overall condition, before this acute infection episode began. Input from the staff caring for the patient will be required to ensure correct application of the underlying disease prognosis. **Non-fatal:** The patient is otherwise healthy **OR** the patient has one of the following non-fatal conditions: ▪ Diabetes mellitus (not requiring limb amputation) ▪ Non-metastatic carcinoma ▪ Inflammatory disorders ▪ Chronic gastrointestinal conditions ▪ Chronic genitourinary conditions ▪ Obstetrics ▪ Previously healthy trauma patient ▪ Patient classified as having non-severe chronic obstructive pulmonary disease (COPD) or non-severe ischaemic heart disease (IHD) **Life-limiting:** Recorded if answer is YES to any of the following: Patient has one of the following severe life-limiting conditions: ▪ Chronic leukaemia, myeloma, lymphoma ▪ Metastatic carcinoma ▪ Motor neurone disease ▪ Multiple sclerosis – not responding to treatment ▪ Alzheimer's disease or other cause of dementia ▪ Diabetes mellitus requiring limb amputation ▪ Patient classified as having severe chronic obstructive pulmonary disease (COPD) or severe ischaemic heart disease (IHD) **End-of-life**: Recorded if answer is YES to any of the following questions.

Underlying disease prognosis continued	▪ Is the patient documented as 'not for resuscitation/do not resuscitate (DNR)'? ▪ Is the patient being reviewed by the palliative care team? ▪ Does the patient have an end-stage organ failure (left heart failure with ejection fraction <20%, right heart failure/cor pulmonale, end-stage liver disease or haematological malignancy (unsuitable for transplantation)? ▪ Is the patient admitted to critical care unit with multi-organ failure? **Not known:** Patient's healthcare record is unavailable and there is no healthcare worker caring for the patient available to provide this information **OR** patient is a neonate with a condition which is currently undescribed or yet to be diagnosed

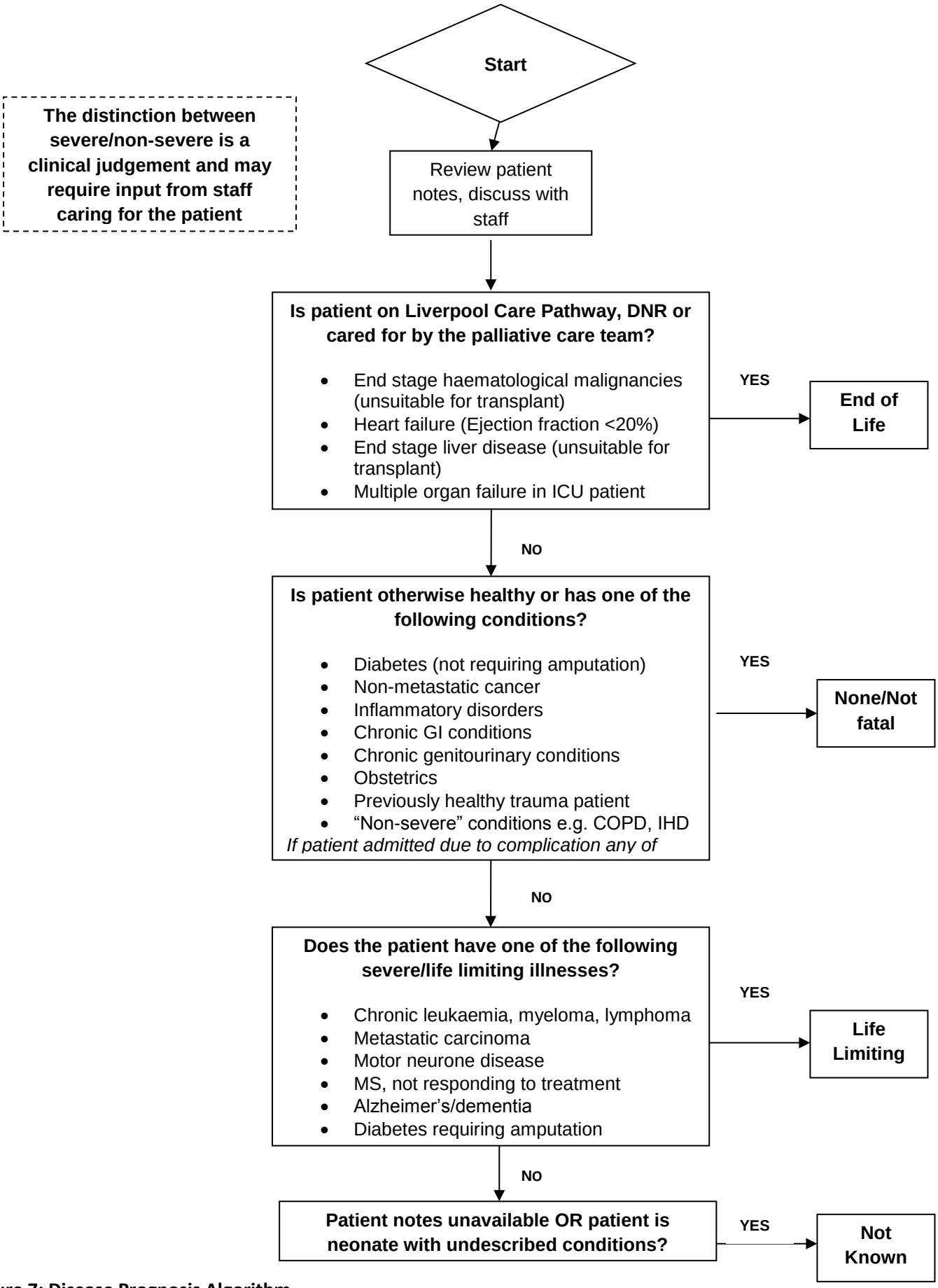


Figure 7: Disease Prognosis Algorithm

5.6.3 Condition of interest: Section 3 (Form C)

Figure 8: Patient Form (Form C) – Condition of interest data: Section 3

Notes for completion of condition of interest data: Section 3

Data Item	Description
Patient has active hospital-acquired infection (HAI)	'Yes' or 'No' as appropriate, based on review of Ward List plus review of medication prescription and administration record and healthcare record The answer to this question is decided by the PPS team, in conjunction with the staff working on the ward, based on the definitions of active and hospital-acquired infection provided below An algorithm to assist with identification of a HAI is provided in Figure 9 below While the vast majority of HAI will be detected based on the fact that a patient is prescribed antimicrobials, in some cases, the patient may have a HAI which is not treated by an antimicrobial (e.g. viral infection, such as norovirus) or the patient's signs and symptoms may just have developed and there has not yet been an opportunity for the clinical team to review the patient and commence antimicrobial therapy. Do not rely solely on the medication chart to identify patients with HAI. Other data sources should also be consulted: nursing or midwifery staff and clinicians caring for the patient and infection prevention and control staff A hospital-acquired infection (HAI) is **active** when signs and symptoms of the infection **are** present on the survey date **or** there is documentation that signs and symptoms **were** present in the past and the patient continues to receive antimicrobial therapy for that infection on the survey date. The presence of symptoms and signs should be verified back to the start date of antimicrobial therapy, in order to determine whether the treated infection matches one of the case definitions for a HAI Infections originating in healthcare facilities that are not acute hospitals (e.g., long-term care facilities, care homes or nursing homes) should **NOT** be included as hospital-acquired infections (HAI) If the answer to the question 'patient has active HAI' is **'No'**, section 4 on HAI does not need to be completed If the answer to the question 'patient has active HAI' is **'Yes'**, section 4 on HAI should be completed

Patient on antimicrobials	Select 'Yes' or 'No' as appropriate, based on review of Ward List plus review of medication prescription and administration record and healthcare record If the answer to the question is not clear, the data collector should approach a member of ward staff for clarification. The question on the Ward List (Form A2) – 'Surgery in last 24 hours' should also be reviewed, if that question is answered **+**, the PPS team should also check the patient's chart, surgical and anaesthetic operative notes for evidence of surgical prophylaxis administered in the 24 hours prior to 8am on the date of the survey. **Include:** ▪ Patient prescribed at least one systemic antimicrobial agent [antibacterial and/or antifungal] via enteral (oral or rectal), parenteral (intravenous or intraocular injection) or inhaled route at the time of the survey (including planned intermittent treatment) ▪ Patient who received surgical prophylaxis before 8am on the day of the survey **and** after 8am on the day before the survey ▪ Treatment for infection caused by non-tuberculous mycobacteria (NTM)/mycobacteria other than tuberculosis (MOTT)/atypical mycobacteria **Exclude:** ▪ Any topical antibacterial/antifungal/antiviral ▪ All antivirals, anti-protozoal or anti-helminthic agents ▪ Any agent prescribed for treatment of *Mycobacterium tuberculosis* (TB) If the answer to the question 'patient on antimicrobials' is **'No'**, section 5 on antimicrobial use does not need to be completed If the answer to the question 'patient receives antimicrobials' is **'Yes'**, section 5 on antimicrobial use should be completed

Onset of HAI		Case Definition
All HAI types *Day 3 onwards*		Meets the case definition on the day of survey
OR		
All HAI types *Admission, day 1 or day 2 AND patient discharged from hospital, acute or non-acute, in preceding 48 hours*		
OR		OR
Surgical Site Infection *Admission, day 1 or day 2* *An SSI is defined as any SSI type which occurs within 30 days of infection of the operation date. In the case of surgery involving an implant, deep or organ space SSI arising up to 90 days after surgery is also considered and the patient either has symptoms that meet the case definition and/or is on antimicrobial treatment for infection.*	AND	Patient is receiving antimicrobials AND HAI has previously met the case definition between day 1 of antimicrobial treatment and survey day
OR		
***Clostridium difficile* infection** *Admission, day 1 or day 2 AND patient discharged from hospital, acute or non-acute, in preceding 28 days*		
OR		
Device associated infection *Relevant invasive device* in situ placed on day 1 or day 2, resulting in a HAI onset on day 1 or day 2* **Intubation, vascular catheter (PVC/CVC) or urinary catheter*		
OR		
Neonatal infection *Count any active infection arising after birth while infant remains in hospital*		

Figure 9: Algorithm to assist with identification of HAI

5.6.4 Hospital acquired infection (HAI) data: Section 4 (Form C)

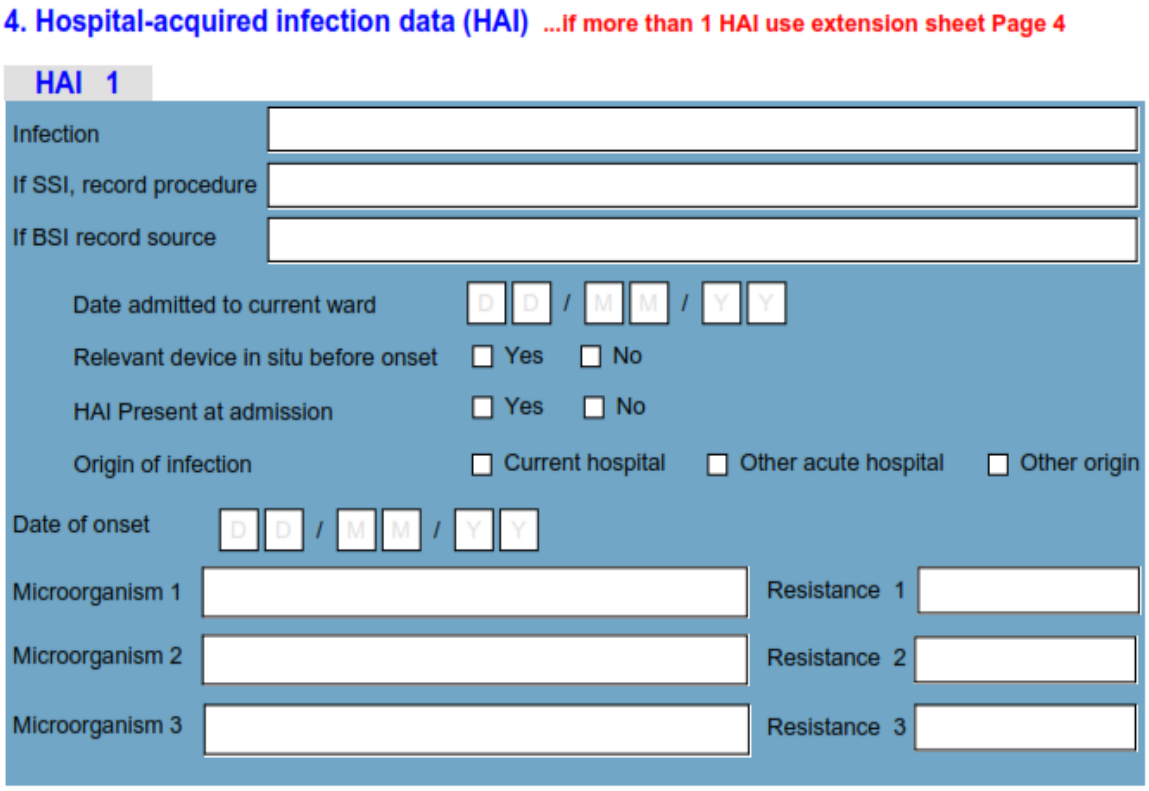


Figure 10: Patient Form (Form C) Hospital-acquired infection (HAI) data - Section 4

Notes for completion of HAI data: Section 5

Data Item	Description
Infection (HAI)	The HAI type is recorded selecting the relevant code **(See Appendix A Table 6 'overview of HAI case definition codes' and Appendix B – HAI case definitions)** Only active HAI that meet the HAI case definition should be recorded. A patient may have more than one active HAI at any one time. There is space to record up to three separate HAI – Use extension sheet to record 2nd and 3rd HAI types if they are active and meet the relevant surveillance definition Results of laboratory tests/radiology or other examinations that are not yet available on the survey date should **not** be completed after the survey date, nor taken into account retrospectively to establish whether the HAI case definition criteria are fulfilled. This will result in a few true HAI present on the survey date not being counted. A hospital-acquired bloodstream infection is always registered as a separate HAI with specification of the source in a separate field: Peripheral, arterial or central vascular catheter Other infection site – Pulmonary (PUL), urinary tract infection (UTI), digestive tract infection (DIG), surgical site infection (SSI), skin and soft tissue infection (SST), other (OTH)

Infection (HAI) continued	The only exceptions are: Catheter related infection (CRI3) = catheter-related bloodstream infection with microbiological documentation of the relationship between the vascular catheter and the BSI – i.e. positive catheter tip culture with significant growth of same organism as that isolated from blood or positive exit site swab culture with growth of same organism as that isolated from blood Neonatal bloodstream infections. Neonatal bloodstream infections should be reported as neonatal laboratory confirmed bloodstream infection caused by organisms other than coagulase negative staphylococci (NEO-LCBI) or neonatal laboratory confirmed bloodstream infection caused by coagulase negative staphylococci (NEO-CNSB), together with the origin of the bloodstream infection. CRI3 and neonatal BSIs should not be reported twice in the point prevalence survey (see case definitions). The **neonatal HAI case definitions** should be used for babies admitted to ward specialty code NEO only The **general HAI case definitions** should be used for all other patients including adults, babies, children in paediatric wards and where a specific neonatal HAI case definition does not exist, a general HAI case definition may be applied
If SSI, record procedure	If the patient's HAI meets the case definition for a surgical site infection (SSI) **(See Appendix B Section 1.5 SSI)**, the surgical procedure for which the SSI applies should be recorded here See **Appendix A Table 3** for the list of surgical procedures
If BSI, record source	If the patient's HAI meets the definition for a laboratory-confirmed bloodstream infection (BSI), specify the BSI source: **Primary catheter-related BSI**: Primary BSI due to infection of either a peripheral vascular catheter (PVC) or central vascular catheter (CVC) When the same microorganism was cultured from both the blood and the vascular catheter tip or exit site, this is microbiologically confirmed catheter-related BSI (CRI3): CRI3-PVC or CRI3-CVC (See CRI definitions) When the patient has positive blood cultures without microbiological confirmation of the same organism from the vascular catheter tip or exit site swab and the patient's symptoms improve within 48 hours after removal of the catheter, this is clinically-diagnosed catheter-related BSI, without microbiological confirmation linking the blood culture to the vascular catheter (C-PVC or C-CVC) **Primary BSI of unknown origin (UO)**: Primary BSI of unknown origin. Not related to vascular catheter infection and not meeting definition of secondary BSI below. Decision to classify as BSI-UO has been verified during the PPS, as no identifiable source was found for that BSI on review of all available information

If BSI, record source continued	**Secondary BSI:** BSI arising secondary to infection elsewhere in the body. When the same micro-organism was cultured from both the blood and another infection site or strong clinical evidence exists that the patient's BSI developed secondary to another infection site, invasive diagnostic procedure or foreign body. Pulmonary infection resulting in BSI **(S-PUL)** Urinary tract infection resulting in BSI **(S-UTI)** Digestive tract infection resulting in BSI **(S-DIG)** Surgical site infection resulting in BSI **(S-SSI)** Skin and soft tissue infection resulting in BSI **(S-SST)** Other infection not covered by those categories above resulting in BSI **(S-OTH)** **BSI Source Unknown (UNK):** No information available about the BSI source or information missing. **Note: Secondary BSI are reported as a separate HAI, in addition to reporting the primary infection, provided the primary infection matches the relevant HAI case definition** Select the relevant BSI source code from **Appendix A Table 7** (maximum 4 characters)
Date admitted to current ward	Record the date that the patient was admitted to the current ward: DD/MM/YY HAI with onset day three onwards following admission to a ward may be associated with that ward, whereas patients with HAI may be moved between wards based on clinical need (e.g., requirement for critical care) or for isolation (e.g., CDI) and the HAI may not be associated with the ward to which the patient is currently admitted
Relevant device *in situ* before onset	HAI which occurs in a patient with a relevant device that was used within a defined period before the onset of clinical signs or symptoms of infection (even intermittently). Tick appropriate box **'Yes'** or **'No'** The term 'device-associated' is used only for the following HAI: 1. Pneumonia, where the relevant device is intubation and the endotracheal tube was *in situ* within **48 hours** of the onset of signs and symptoms of pneumonia 2. BSI where source is CVC or PVC and where the relevant device is PVC or CVC which was *in situ* within **48 hours** of the onset of signs and symptoms of catheter related infection 3. NEOLCBI or NEOCNSB where source is CVC or PVC and where the relevant device is PVC or CVC which was *in situ* within **48 hours** of the onset of signs and symptoms of catheter related infection 4. Urinary tract infection, where the relevant device is urinary catheter and the urinary catheter was *in situ* within **seven days** of the onset of signs and symptoms of infection

Relevant device *in situ* before onset continued	If the interval between removal of an endotracheal tube or vascular catheter and onset of symptoms or signs of pneumonia or catheter related infection is longer than 48 hours, there must be compelling evidence that the infection was associated with the use of that device. Note that other HAI related to devices (e.g., ventriculitis due to external ventricular drain) are recorded as HAI, but are not recorded as device-associated
HAI present at admission	Patient had active HAI on admission to hospital: Tick appropriate box: '**Yes'** or '**No'** The following HAI may be present on admission to hospital: ▪ Any HAI type diagnosed in a patient admitted to this hospital having been discharged from an acute hospital in the preceding 48 hours ▪ Surgical site infection diagnosed in a patient admitted to this hospital with SSI of any category (S,D,O) related to a non-implant surgery performed within 30 days prior to admission or SSI related to implant surgery and SSI category D or O performed within 90 days prior to admission ▪ *Clostridium difficile* infection diagnosed in a patient discharged from an acute hospital in preceding 28 days prior to admission to this hospital
Origin of infection	Tick appropriate box: HAI is associated with: 1) Current hospital 2) Another acute hospital 3) Other origin HAI present at admission may be associated with a previous stay in this hospital **OR** when patient is transferred from another acute care hospital with active HAI. The category 'other origin or unknown' refers **ONLY** to infections arising after day 3 (meeting definition for HAI), where the local PPS team disagrees/disputes that the infection is truly a HAI (e.g., patient develops pneumonia on day 3 of admission with *Streptococcus pneumoniae* isolated from sputum). It would be exceptionally rare to choose this option, as the overwhelming majority of HAI arising after day 3 would be acquired either in the current or another acute hospital **Current Hospital** ▪ HAI with onset on day 3 or later of admission to current hospital ▪ Patient was admitted with HAI (or HAI presented on day 1 or 2) and the patient was discharged from the current hospital in preceding 48 hours ▪ Patient was admitted with CDI (or CDI presented on day 1 or 2) and was discharged from the current hospital in the preceding 28 days ▪ Patient was admitted with SSI (or SSI presented on day 1 or 2) and SSI of any category (S,D,O) where patient had non-implant surgery in current hospital within 30 days prior to admission or SSI category D or O for implant surgery, within 90 days prior to admission

Origin of infection continued	**Other Acute Hospital (independent/private or public)** • Patient was admitted with HAI (or HAI presented on day 1 or 2) and was discharged from another acute hospital in preceding 48 hours • Patient was admitted with CDI (or CDI presented on day 1 or 2) and was discharged from another acute hospital in the preceding 28 days • Patient was admitted with SSI (or SSI presented on day 1 or 2) and SSI of any category (S,D,O) where patient had non-implant surgery in another acute hospital within 30 days prior to admission or SSI category D or O for implant surgery, within 90 days prior to admission It may not always be possible to determine a single origin of infection. For example, in a patient admitted with CDI who had been admitted to both the current hospital and another acute hospital in the preceding 28 days
Date of onset	Date of first signs or symptoms of infection; **DD/MM/YY** This should only be recorded if the HAI was **not present on admission** to hospital. If signs and symptoms of HAI developed after admission to hospital, but the exact date of onset is not known, the date treatment started or the date first diagnostic sample was taken should be recorded as date of onset Leave this blank if the patient has signs and symptoms of HAI on admission to hospital
Microorganism code	For each HAI recorded, the laboratory information system should be checked for relevant positive microbiology laboratory specimen results available for that patient at the time of PPS and relating to the HAI infection episode under treatment (See **Appendix B - HAI definitions** for more information regarding the relevant microbiology results for each HAI type) Note that specimens may have been sent to microbiology in the days prior to initiation of antimicrobial therapy. Cross-check the date that antimicrobial therapy was commenced for an active HAI when reviewing microbiology results for each patient. Do not enter microbiology results retrospectively and do not wait for final microbiology reports that were incomplete at the time of PPS. For each HAI, there is room to specify up to **THREE** different causative microorganisms. For example, a patient meeting the case definition for intraabdominal infection (GI-IAB) may have a polymicrobial infection. Record the microorganism(s) isolated from the relevant positive clinical specimen sent to the microbiology laboratory using the relevant six-letter MO-code. Microorganisms should be selected from the 'microorganism code list by category' **(Appendix A Table 8)**

Microorganism code continued	If there are no positive microbiology results for the HAI, one of the following codes may be selected: **NONID**: Evidence exists that a microbiological examination has been done, but the micro-organism cannot be correctly classified **NOEXA**: No diagnostic sample taken, no microbiological examination done **STERI**: Microbiological examination(s) has (have) been done and the culture was sterile/organisms not detected **NA**: Results of the microbiological examination are not yet available or cannot be accessed
Resistance Code	If the microorganism isolated belongs to one of the key groups below, also specify the relevant antimicrobial resistance (AMR) test result in the section titled 'Resistance code'. The AMR results are: ○ **S** = Sensitive ○ **I** = Intermediate ○ **R** = Resistant ○ **UNK** = Unknown antimicrobial susceptibility test result for that micro-organism Key microorganisms for which resistance codes should be recorded. Select the appropriate resistance code from 'antimicrobial resistance markers and codes **(Appendix A Table 9)** • *Staphylococcus aureus* • *Enterococcus* spp. • *Enterobacteriaceae* • *Pseudomonas aeruginosa* • *Acinetobacter baumannii* **resistance data are not required for any other organisms – If microorganism identified does not belong to key microorganisms listed above, leave 'resistance code' box blank If a microorganism is tested against more than one antimicrobial in the same class, with different results, assign the priority code to the more resistant antimicrobial R>I>S e.g., *E. cloacae* resistant to ertapenem = R, meropenem = S => Record *E. cloacae* as carbapenem = R

5.6.5 Antimicrobial use data: Section 5 (Form C)

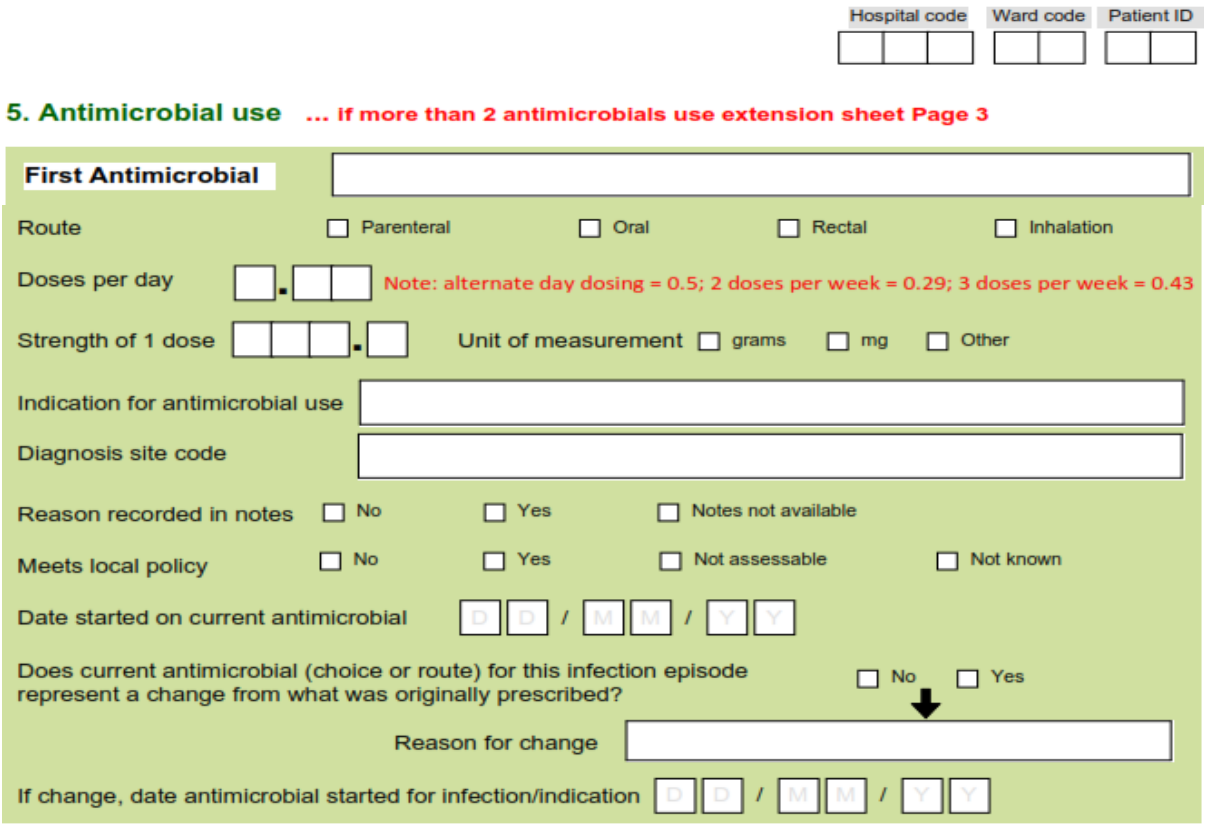


Figure 11: Patient Form (Form C) antimicrobial use data – Section 5

Data on up to five separate systemic antimicrobial prescriptions can be recorded. As the majority of patients receiving systemic antimicrobials will receive only one or two antimicrobials, section 5 allows recording of two antimicrobials. An extension sheet can be printed for the small number of patients who may receive >2 antimicrobials.

Systemic antimicrobials are defined as antibacterial or antifungal agents prescribed at the time of the survey for:

1. Treatment of infection
2. Medical prophylaxis against infection
3. Surgical antimicrobial prophylaxis

In certain circumstances, prescribed antimicrobials may not be administered on the date of survey (e.g., patient with renal impairment receiving alternate day dosing of antimicrobial therapy/medical prophylaxis or re-dosing as per results of therapeutic drug monitoring). The patient is included as receiving antimicrobials as the antimicrobial is prescribed and scheduled to be administered.

Surgical antimicrobial prophylaxis is defined as prophylaxis given between 8am on the date before the survey and 8am on the date of survey. Surgical antimicrobial prophylaxis commenced after 8am on the date of the survey is not included.

The section on antimicrobial use aims to record details of the antimicrobial(s) prescribed and to find out what the prescriber thinks they are treating. This section does not aim to discuss or determine whether or not the antimicrobial prescribing is appropriate.

Notes for completion of antimicrobial use data: Section 5

Data Item	Description
Antimicrobial generic name and ATC5 code	If the patient is receiving antimicrobials [antibacterials and/or antifungals], the antimicrobial prescribed and the correct route (where an option is provided for route) should be selected from the 'generic antimicrobial & ATC5 code list' **(Appendix A Table 4a or 4b)** **BOTH** the generic name **AND** the corresponding ATC5 code for each antimicrobial prescribed should be recorded. Do not use trade names **Include:** ▪ Patient prescribed at least one systemic antimicrobial agent [antibacterial and/or antifungal] via enteral (oral or rectal), parenteral (intravenous) or inhaled route at the time of the survey (including planned/intermittent/alternate day treatment or medical prophylaxis) ▪ Alternate day or intermittent dosing regimens should be included even if the patient is not scheduled to receive a dose on the date of the survey ▪ Patient who received surgical prophylaxis before 8am on the day of the survey **and** after 8am on the day before the survey ▪ Treatment for infection caused by non-tuberculous mycobacteria (NTM)/mycobacteria other than tuberculosis (MOTT)/atypical mycobacteria ▪ Erythromycin when prescribed as a prokinetic agent **Exclude:** ▪ All topical antibacterial/antifungal/antiviral agents ▪ All antivirals, anti-protozoals and anti-helminthics ▪ Any agent prescribed for treatment of *Mycobacterium tuberculosis* (TB)
Route	Method of administration of the antimicrobial prescribed Tick the appropriate box: ▪ Parenteral = intravenous (IV) or intramuscular (IM) or intraocular injection or intraventricular administration ▪ Oral route = enteral or oral (PO) or via nasogastric/jejunal/PEG/RIG tube ▪ Rectal route (PR) ▪ Inhalation route **NOTE – ALL TOPICAL AGENTS ARE EXCLUDED**
Doses per day of the current antimicrobial	Report dosage for current antimicrobial, as prescribed in the medication chart or anaesthetic sheet: • Number of doses per day For antimicrobials administered on alternate day dosing regimen, record 0.5 for doses per day For antimicrobials administered intermittently, as per therapeutic drug monitoring results (e.g., vancomycin in patients on dialysis), determine the number of doses per week (e.g., 2 doses = 2/7 = 0.29, 3 doses = 3/7 = 0.43) For example: Intermittent vancomycin given twice per week = 0.29

Strength of one dose of the current antimicrobial	Report dosage for all antimicrobials as prescribed in the medication chart or anaesthetic sheet: • Prescribed dose
Unit of measurement of the current antimicrobial	Report unit of measurement for the prescribed dose of each antimicrobials, as prescribed in the medication chart or anaesthetic sheet: • Unit of measurement: milligrams, grams or other (e.g., international units (IU))
Indication	Check the completed Ward List column titled 'surgery in the last 24 hours'. If the patient has had surgery in the last 24 hours, surgical prophylaxis may have been administered depending on the procedure Patient receives systemic antimicrobials for the following reason according to documentation in medical notes or upon questioning the prescriber: Select the appropriate 'indication code' from the list below: <u>Treatment intention for infection:</u> ▪ **CI** = Community-acquired infection ▪ **LI** = Infection acquired in long-term care facility (nursing home) ▪ **HI** = Hospital-acquired infection **<u>SP 1,2 or 3</u>** <u>= Surgical prophylaxis</u>**<u>:</u>** ▪ **SP1** = Single dose prescribed once only ▪ **SP2** = >1 dose but prescribed for 24 hours or less ▪ **SP3** = Prescribed for more than 24 hours Check if any SP administered from 8am on the day before the PPS day until 8am on PPS day – if yes, check back to see if also given on day before yesterday or on day of the survey to determine if duration exceeds one day Remember to check the operative note and anaesthetic sheet as single dose surgical prophylaxis may have been recorded on these documents if not recorded on the medication chart **<u>MP</u>** <u>= Medical prophylaxis</u> (e.g. co-trimoxazole for PCP prophylaxis, intrapartum benzylpenicillin or erythromycin for PPROM, azithromycin used for prevention of COPD exacerbation) **<u>O</u>** <u>= Other indication</u> (e.g. erythromycin used as a pro-kinetic agent) **<u>UI =</u>** <u>Unknown indication/reason:</u> No one knows why the patient is on antimicrobials and there is no documentation of reason in the patient notes or medication chart and the fact that no one knows has been verified with the ward staff **<u>UNK</u>** <u>= Unknown or missing information</u> Indication information was not verified during the survey
Diagnosis site code for treatment indication	The clinician may be treating an infection which is community-acquired or which does not match the protocol case definition of a HAI. Therefore, the diagnosis site list for antimicrobial use differs from the HAI case definition list

Diagnosis site code for treatment indication continued	The prescriber's diagnosis/site for antimicrobial treatment of infection should be selected from the 'prescriber's diagnosis site code list for antimicrobial use' **(Appendix A Table 5)** (maximum 6 characters allowed). Choose the site that fits best with the clinical information available on the PPS date For example, the prescriber suspects the patient has infection, but the site is not clear at the time of the empiric prescription: • If there is still no further information or relevant positive microbiology result by the time the PPS takes place, select CSEP • By the time the PPS takes place the patient has had a significant positive blood culture result – select BAC rather than CSEP, as the current diagnosis is a bloodstream infection It is not the objective to relate the use of an antimicrobial to the information on hospital-acquired infection (such as microorganisms). Both types of data are collected separately and the prescriber's intention may not always be the same as the data collector's application of HAI Diagnosis site is recorded as not applicable (NA) in the Diagnosis site box, where the prescriber's indication for antimicrobial use is recorded as SP, MP, O, UI or UNK Therefore, a diagnosis site code should only be applied if the prescriber's indication is treatment of infection – CI, LI, HI The "**UND**" code should only be used if there is no clear evidence of infection or inflammation This list of diagnoses/sites is **NOT** the same as the list of HAI case definitions. This diagnosis field is used for all prescriptions including those prescribed for community acquired infection
Reason recorded in notes	The reason/rationale for prescription is documented in the patient's medical notes, operating theatre note or prescription chart: Tick the appropriate box 'Yes' or 'No' or 'Notes not available' The medical notes should be reviewed to check whether the prescriber recorded the reason for prescription at the time of prescribing. If the information regarding the prescriber's indication and diagnosis (site) could only be obtained after discussion with clinical staff on the ward on the date of PPS or by review of the nursing or pharmacist notes, the 'No' option should be selected The 'Notes not available' option should only be used in the event that the patient's medical notes are not available to review
Meets local policy	An algorithm to assist with determining compliance with local policy is provided in Figure 12 below.

Meets local policy continued	The **choice of agent meets local policy** for empirical prescribing, surgical prophylaxis or the prescription has been rationalised or is based on relevant recent microbiology culture and antimicrobial susceptibility results: **No** = Non-compliant with local empiric antimicrobial treatment recommendation for that infection **OR** non-compliant with local surgical antimicrobial prophylaxis recommendation for that surgical procedure **OR** restricted antimicrobial prescribed without approval of an infection specialist (microbiologist or ID physician) **Yes** = Compliant with local empiric antimicrobial treatment recommendation for that infection **OR** compliant with local surgical antimicrobial prophylaxis recommendation for that surgical procedure **OR** restricted antimicrobial prescribed on the advice of an infection specialist (microbiologist or ID physician) **Not assessable** = If any of the following apply: ▪ Reason for antimicrobial prescription cannot be determined from review of the patient's notes and/or discussion with staff caring for patient ▪ Medical prophylaxis ▪ Use of erythromycin as a pro-kinetic agent ▪ A local prescribing policy is not available for the specific infection being treated ▪ A local surgical antimicrobial prophylaxis policy is not available for the specific surgical procedure that the patient has undergone ▪ Patient has a documented antimicrobial allergy which would prevent compliance with local policy **Not known** – This should only be chosen if the patient's healthcare record is not available for review
Date started on current antimicrobial formulation for this infection episode	Date on which the current antimicrobial formulation was started for this infection episode (i.e., prescriber indication = CI, LI or HI) If the antimicrobial was already started prior to admission (e.g., via GP or a referral hospital), record the date of admission as the start date Do not record start dates for indications: MP, SP, O, UI or UNK
Does current antimicrobial (choice, formulation or route) for this infection episode represent a change from what was originally prescribed?	Take note of patients with longer length-of-stay who may have more than one medication chart. If the medication chart has been rewritten, there may be important antimicrobial information on the older medication chart which will help determine whether the patient continues treatment for an initial infection or the patient has begun treatment for different infection. Where the patient completed treatment for one infection episode and then commenced treatment for a different infection episode, this is not recorded as a change, because it represents a different episode. Careful review of the sequence of events in the healthcare record, medication

Does current antimicrobial (choice, formulation or route) for this infection episode represent a change from what was originally prescribed? continued	chart(s) and from discussion with staff caring for the patient will be required to determine this information. Where there has been no change in the antimicrobial choice and route since start of treatment for this infection episode: Select **No = No change** Where there has been a change either to the antimicrobial choice or the route since the start of treatment for this infection episode, select **Yes = Change**
Reason for change: **If 'Yes' answer for 'current antimicrobial (choice, formulation or route) for this infection episode represents a change from what was originally prescribed'**	If the antimicrobial choice, formulation or route has changed during the treatment of this infection episode, the data collector should record the reason for the change. Where there has been more than one change in antimicrobials for the current infection episode, report the reason for the most recent change: **E = Escalation:** Escalation takes place either on clinical or microbiological grounds. The initial antimicrobial prescribed at the start of this infection episode was escalated OR additional antimicrobial was added OR same antimicrobial was switched from oral to IV route **D = De-escalation:** De-escalation takes place either on clinical or microbiological grounds, whereby the initial empiric antimicrobial prescribed at the start of this infection episode was de-escalated to a narrower spectrum agent **S = IV to oral switch:** The antimicrobial prescribed at the start of treatment of this infection episode has been switched from the IV to oral route. Note that a switch from oral to IV should be recorded as 'E' **A = Adverse effects:** An observed side effect or adverse event attributed to the initial antimicrobial prescribed at the start of treatment of this infection episode resulted in change to a different antimicrobial **OU = Other or undetermined reason:** The initial antimicrobial prescribed at the start of treatment of this infection episode was changed, but the reason cannot be determined on review of records **OR** the reason does not fit into the categories outlined above • Select this option for patient who has been changed to a different antimicrobial just to facilitate OPAT, where clinical and microbiological factors have not influenced the decision (e.g., switch from cefotaxime to ceftriaxone or meropenem to ertapenem) • Select this option for the patient who has been changed to a different antimicrobial due to a concern about potential interaction or contraindication (e.g., methotrexate and β lactams, nitrofurantoin and reduced creatinine clearance, rifampicin and warfarin, fluorquinolone and antiepileptic medication) **U = Unknown:** The initial antimicrobial prescribed at the start of treatment of this infection episode was changed but the patient's healthcare record is not available for review to determine the reason

Start date of the initial antimicrobial treatment for this infection episode	Enter this information only for patient who is prescribed antimicrobial for indication treatment of infection (CI, LI, HI) **AND** has had a change in the initial antimicrobial prescribed at the start of treatment of this infection episode (i.e., you have selected E, D, S, A, OU or U answer for previous question) Where there has been more than one change in antimicrobials for the current infection episode, report the start date for the first antimicrobial (i.e., the antimicrobial chosen at the start of this infection episode)

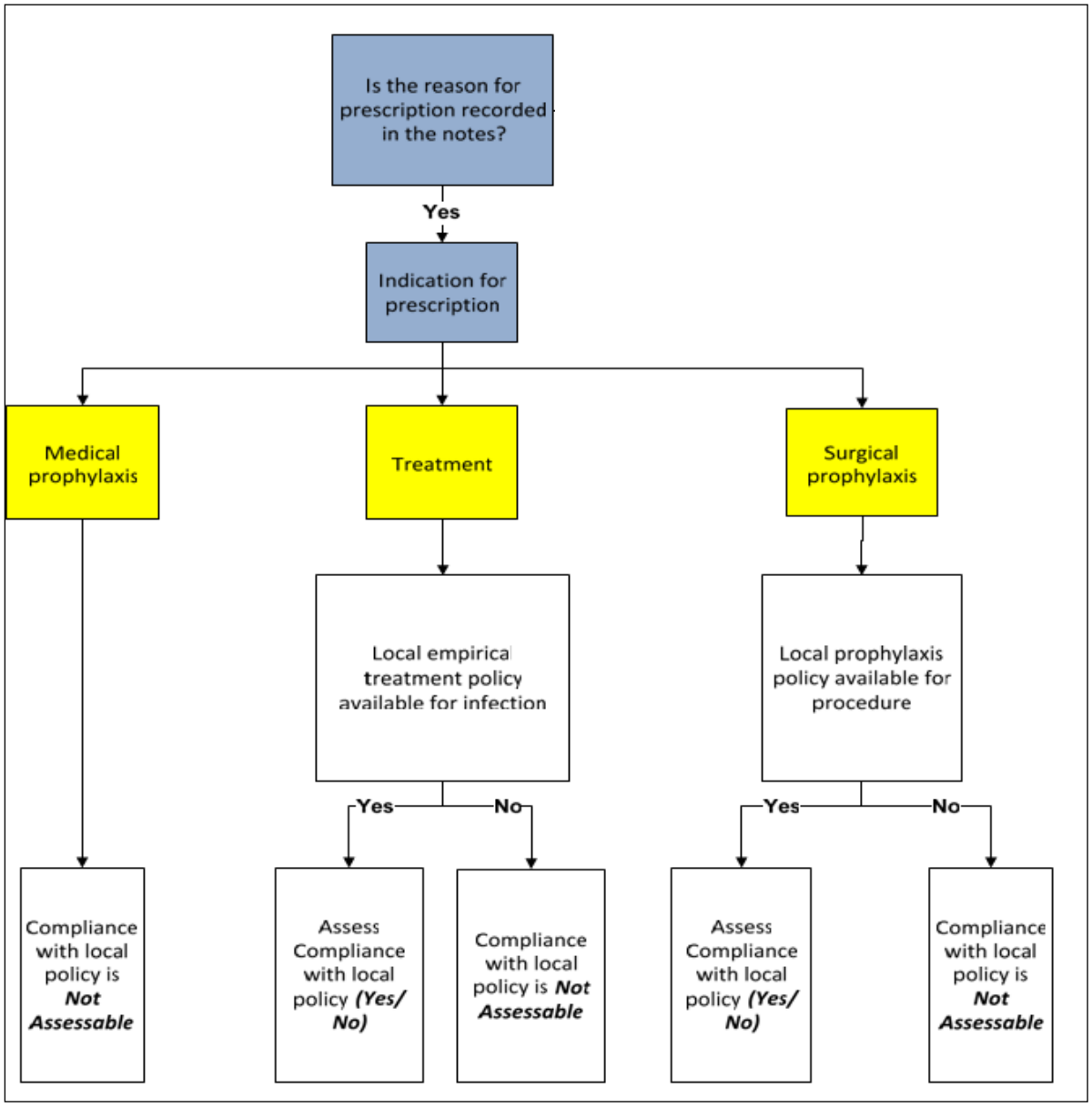


Figure 12. Algorithm to assist in determining compliance with local policy

Appendix A - Tables

Table 1: Ward Specialty Code List

Ward specialty codes	Categories (ward specialty)
SURGERY – SUR	Choose for majority of acute surgical wards or high dependency units (HDU) to which patients with a variety of surgical conditions are generally admitted
MEDICINE – MED	Choose for the majority of acute medical wards or HDU to which patients with a variety of medical conditions are generally admitted
INTENSIVE CARE – ICU	Intensive care unit for adult patients Remember NICU is coded as NEONATAL and PICU is coded as PAEDIATRICS High dependency unit (HDU) is not coded as ICU – Choose SUR or MED instead
GYNAECOLOGY/OBSTETRICS – GO	Choose if >80% of patients on the ward belong to the GYNAECOLOGY/OBSTETRICS specialties
PAEDIATRICS – PED	Paediatrics including Paediatric ICU (PICU)
NEONATAL - NEO	Neonatology including Neonatal ICU (NICU)
GERIATRICS/CARE OF THE ELDERLY – GER	Geriatrics or medicine for the elderly – Choose if >80% of patients on the ward belong to the GERIATRICS/CARE OF THE ELDERLY specialty
PSYCHIATRY – PSY	Choose if >80% of patients on the ward belong to the PSY specialty
REHABILITATION –RHB	Choose if >80% of patients on the ward belong to the RHB specialty
OTHER	Choose if <80% of patients on the ward belong to a single specialty, but there are mixed medical and surgical patients admitted to the ward Choose for admitted patients who remain in the ED or who are accommodated on a Day ward as admitted patients
MIXED WARD	Mixed – Choose if <80% of patients on the ward belong to a single specialty but there are only two specialties of patients admitted to the ward (e.g., haematology & oncology)

Table 2: Admitting Consultant's Specialty Code List

Ward specialty codes	Consultant specialty name	Consultant specialty code
SUR = Surgical specialties	General surgery	SURGEN
	Digestive tract surgery	SURDIG
	Orthopaedics	SURORTO
	Cardiac surgery	SURCARD
	Vascular surgery	SURVASC
	Thoracic surgery	SURTHO
	Neurosurgery	SURNEU
	Paediatric general surgery	SURPED
	Transplantation surgery	SURTRANS
	ENT	SURENT
	Ophthalmology	SUROPH
	Maxillo-facial surgery	SURMAXFAC
	Burns care	SURBURN
	Urology	SURURO
	Plastic and reconstructive surgery	SURPLAS
	Other surgery	SUROTH
MED = Medical specialties	General medicine	MEDGEN
	Gastroenterology	MEDGAST
	Hepatology	MEDHEP
	Endocrinology	MEDENDO
	Oncology & radiation oncology	MEDONCO
	Haematology (looks after haematology patients only)	MEDHEMA
	Haematology/Bone Marrow Transplant (mixed ward looking after both haematology and BMT/HSCT patients)	MEDHEMBMT
	Cardiology	MEDCARD
	Dermatology	MEDDERM
	Nephrology	MEDNEPH
	Neurology	MEDNEU
	Pneumatology or respiratory medicine	MEDPNEU
	Rheumatology	MEDRHEU
	Infectious diseases	MEDID
	Other medical …if medical specialty not listed above	MEDOTH
PED = Paediatrics	*PED ward patients can also be coded using any of the admitting consultant subspecialty codes (e.g. MEDENDO, SURGEN, SURCARD)*	
	Paediatrics general, not specialised	PEDGEN
	Paediatric ICU	ICUPED
NEO = Neonatology	Neonatology (excl. healthy neonates)	PEDNEO
	Healthy neonates accommodated in paediatric ward	PEDBAB
	Neonatal ICU	ICUNEO
GO = Gynaecology/Obstetrics	Obstetrics /maternity	GOOBS
	Gynaecology	GOGYN
	Healthy neonates accommodated in maternity ward	GOBAB
ICU = Adult intensive care medicine	Medical ICU	ICUMED
	Surgical ICU	ICUSUR
	Mixed (polyvalent) ICU, general intensive or critical care	ICUMIX
	Specialised ICU	ICUSPEC
	Other ICU	ICUOTH
GER = Geriatrics	Geriatrics, care for the elderly	GER
PSY = Psychiatry	Psychiatry	PSY
RHB = Rehabilitation	Rehabilitation	RHB
OTHER (OTH)	Others not listed	OTH

Table 3: List of Surgical Procedures

Record the surgical procedure as provided in the column shaded in grey

Surgical Category	Surgical Procedure	Description
Cardiac	**Cardiac-Cardiac surgery**	Procedures on the valves or septum of the heart **excludes coronary artery bypass graft, surgery on vessels, heart transplantation or pacemaker transplantation.
	Cardiac-Coronary artery bypass graft with both chest and donor site incisions	Chest procedure to perform direct revascularization of the heart; includes obtaining suitable vein from donor site for grafting.
	Cardiac-Coronary artery bypass graft with chest incision only	Chest procedure to perform direct revascularization of the heart using, for example the internal mammary (thoracic) artery.
	Cardiac-Heart transplant	Transplantation of heart
	Cardiac-Pacemaker surgery	Insertion, manipulation or replacement of permanent pacemaker or implantable cardiac device (ICD) **includes insertion/replacement of leads **Excludes insertion of temporary transvenous pacemaker system.
ENT & Maxillofacial	**ENT/Neck Surgery**	Major excision or incision of the larynx and radical neck dissection Maxillofacial surgery **Excludes thyroid and parathyroid operations - see thyroid or parathyroid surgery
	Tonsillectomy select Minimally Inv-Tonsillectomy	Surgical removal of tonsils
	Ear surgery select 'Procedure not classified as NHSN (Inc. eyes- ears- throat- bladder)'	Operations on the ear
Ophthalmology	**Eye surgery select 'Procedure not classified as NHSN (Inc. eyes- ears- throat- bladder)'**	Operations on the eye
General	**General-Abdominal Surgery**	Abdominal operations not involving the gastrointestinal tract or biliary system – Can include exploratory laparotomy here if unable to categorise otherwise
	General-Appendix Surgery	All operations of the appendix (not incidental to another procedure) **includes laparoscopic appendectomy
	General-Bile duct- liver or pancreatic surgery	Excision of bile ducts or operative procedures on the biliary tract, liver or pancreas **Excludes operations only on gallbladder (See Gallbladder Surgery)
	General-Breast Surgery	Excision of lesion or tissue of breast including radical, modified, or quadrant resection, lumpectomy, incisional biopsy or mammoplasty.
	General-Colon surgery	Incision, resection or anastomosis of the large intestine **Includes large-to-small and small-to-large bowel anastomosis **Excludes rectal operations

	General-Gallbladder Surgery	Cholecystectomy and cholecystotomy
	General-Gastric Surgery	Incision or excision of stomach; includes subtotal or total gastrectomy **Excludes vagotomy and fundoplication which should be recorded as minimally invasive (unless open)
	General-Herniorrhaphy	Repair of inguinal, femoral, umbilical, or anterior abdominal wall hernia; **Excludes repair of diaphragmatic or hiatal hernia or hernias at other body sites (See Thoracic Surgery)
	General-Liver Transplant	Transplantation of liver
	General-Rectal surgery	Operations on the rectum
	General-Small bowel surgery	Incision or resection of the small intestine **Excludes small-to-large bowel anastomosis (See colon surgery)
	General-Spleen surgery	Resection or manipulation of spleen
	General-Thyroid and/or parathyroid surgery	Resection or manipulation of thyroid and/or parathyroid
	Laparoscopic surgery select 'Minimally Inv-Laparoscopic or arthroscopic approach'	Any surgery involving use of laparoscope Laparoscopic hysterectomy may be coded under 'vaginal or laparoscopic hysterectomy'
	Incision & drainage of abscess select 'Minimally Inv-Incision and drainage of abscess'	Incision and drainage of an abscess at a superficial site
	Incision with surgical wound left open to heal by secondary intention select 'Minimally Inv-Other procedures where healing is by secondary intention'	Surgical incision without primary closure
Neurosurgery	**Neurosurgery-Ventricular shunt**	Ventricular shunt operations, including revision and removal of shunt
	Neurosurgery-Craniotomy	Incision through the skull to excise, repair or explore the brain; does not include taps or punctures
	External ventricular drain select 'Minimally Inv-Extraventricular shunt'	Placement of external ventricular drain
Obstetrics and Gynaecology	**Obstetrics and Gynae-Abdominal hysterectomy**	Removal of uterus through an abdominal incision **Excludes Vaginal Hysterectomy
	Obstetrics and Gynae-Caesarean Section	Obstetrical delivery by Caesarean section
	Obstetrics and Gynae-Ovarian Surgery	Operations on ovary and related structures
	Obstetrics and Gynae-Vascular-Obstetrics and Gynae-Vaginal hysterectomy	Removal of the uterus through vaginal or perineal incision
	Laparoscopic hysterectomy select 'Minimally Inv-Laparoscopic or arthroscopic approach'	Any surgery involving use of laparoscope Laparoscopic hysterectomy may be coded under 'vaginal or laparoscopic hysterectomy'
	Transvaginal gynaecological or obstetric procedures select	Hysteroscopy + procedure Evacuation of retained products of conception

Obstetrics and Gynaecology	**'Minimally Inv-Obstetric/gynaecological procedures performed via transvaginal**	
	Episiotomy select 'Obstetrics and Gynae-Caesarean Section'	Transvaginal delivery with episiotomy
Orthopaedics **Note: Limb amputation is recorded under 'Vascular-Limb amputation'**	**Ortho-Hip prosthesis**	Arthroplasty of hip includes total, partial and revisions
	Ortho-Knee prosthesis	Arthroplasty of knee includes total, partial and revisions
	Ortho-Laminectomy	Exploration or decompression of spinal cord through excision or incision into vertebral structures
	Ortho-Open reduction of fracture	Open reduction of fracture or dislocation of long bones that requires internal or external fixation **Excludes placement of joint prosthesis (see Hip and Knee Prosthesis) **Excludes closed application of external fixator which should be recorded as minimally invasive
	Ortho-Upper limb surgery excl. open reduction # long bones	Operations on the upper limb (hand, arm, shoulder) including joint prosthesis **excluding hip/knee prosthesis **excluding Open reduction of fracture or dislocation of long bones
	Ortho-Refusion of spine	Refusion of spine
	Ortho-Spinal fusion	Immobilisation of spinal column **Excludes refusion of spine
	Arthroscopy select 'Minimally Inv-Laparoscopic or arthroscopic approach'	Exploration of joint using arthroscopy
	Application of Ilizarov frame select 'Minimally Inv-Application of external fixator/Ilizarov'	External fracture fixation device application
Thoracic	**Thoracic surgery**	Noncardiac, nonvascular thoracic surgery **includes pneumonectomy and diaphragmatic or hiatal hernia repair.
Urology	**Urology-Kidney Surgery**	Resection or manipulation of the kidney with or without removal of related structures **excludes kidney transplant
	Urology-Kidney Transplant	Transplantation of kidney
	Urology-Prostate Surgery	Suprapubic, retropubic, radical or perineal excision of the prostate
	Transurethral resection of prostate select 'Minimally Inv-Transurethral resection of prostate'	Transurethral resection of the prostate (TURP)
	Urology-Bladder surgery	Operations on the bladder
Vascular	**Vascular-Abdominal aortic aneurysm repair**	Resection of abdominal aorta with anastomosis or replacement

Vascular	**Vascular-Carotid endarterectomy**	Endarterectomy on vessels of head and neck (includes carotid artery and jugular vein)
	Vascular-Limb amputation	Total or partial amputation or disarticulation of the upper or lower limbs, including digits **Excludes amputation with healing by secondary intention which should be recorded as minimally invasive
	Vascular-Peripheral vascular bypass surgery	Bypass operations on peripheral arteries
	Vascular-Shunt for dialysis	Arteriovenostomy for renal dialysis (Surgery to create an AV fistula or graft for haemodialysis)

Tables 4a & 4b: Generic Antimicrobial & ATC5 Code List

The most commonly-prescribed antimicrobials are listed in order of frequency in the shaded section at start of Table 4a, followed by all other antimicrobials [antibacterials & antifungals] in alphabetical order Table 4b.

Table 4a: The most commonly prescribed antimicrobials, in order of frequency

Antimicrobial generic name	ATC5
Amoxicillin and enzyme inhibitor – co-amoxiclav	J01CR02
Piperacillin and enzyme inhibitor – piperacillin-tazobactam	J01CR05
Metronidazole (oral, rectal)	P01AB01
Metronidazole (parenteral/IV)	J01XD01
Flucloxacillin	J01CF05
Ciprofloxacin	J01MA02
Cefuroxime	J01DC02
Clarithromycin	J01FA09
Vancomycin parenteral (IV)	J01XA01
Vancomycin enteral (oral) [Treatment of *C. difficile* infection only]	A07AA09
Gentamicin	J01GB03
Benzylpenicillin	J01CE01
Meropenem	J01DH02
Amikacin	J01GB06
Amoxicillin	J01CA04
Azithromycin	J01FA10
Sulfamethoxazole and trimethoprim (co-trimoxazole)	J01EE01
Teicoplanin	J01XA02

Table 4b: All antimicrobials, alphabetical order

Antimicrobial generic name-ATC5	ATC5
Amikacin	J01GB06
Amoxicillin	J01CA04
Amoxicillin and enzyme inhibitor co_amoxiclav	J01CR02
Amphotericin B (oral)	A07AA07
Amphotericin B (parenteral)	J02AA01
Ampicillin	J01CA01
Ampicillin and enzyme inhibitor	J01CR01
Ampicillin combinations	J01CA51
Anidulafungin	J02AX06
Aspoxicillin	J01CA19
Azithromycin	J01FA10
Aztreonam	J01DF01
Bacitracin	J01XX10
Benzathine benzylpenicillin	J01CE08
Benzylpenicillin	J01CE01
Caspofungin	J02AX04
Cefaclor	J01DC04
Cefadroxil	J01DB05

Cefalexin	J01DB01
Cefazolin	J01DB04
Cefixime	J01DD08
Cefotaxime	J01DD01
Cefpodoxime	J01DD13
Cefradine	J01DB09
Ceftazidime	J01DD02
Ceftriaxone	J01DD04
Ceftriaxone combinations	J01DD54
Cefuroxime	J01DC02
Cefuroxime combinations with other antibacterials	J01RA03
Chloramphenicol	J01BA01
Ciprofloxacin	J01MA02
Clarithromycin	J01FA09
Clindamycin	J01FF01
Colistin (injection_infusion)	J01XB01
Colistin (oral)	A07AA10
Combinations of beta_lactamase sensitive penicillins	J01CE30
Combinations of intermediate acting sulfonamides	J01EC20
Combinations of long acting sulfonamides	J01ED20
Combinations of penicillins	J01CR50
Combinations of penicillins with extended spectrum	J01CA20
Combinations of short acting sulfonamides	J01EB20
Combinations of tetracyclines	J01AA20
Daptomycin	J01XX09
Demeclocycline	J01AA01
Doripenem	J01DH04
Doxycycline	J01AA02
Ertapenem	J01DH03
Erythromycin	J01FA01
Ethambutol	J04AK02
Fidaxomicin	A07AA12
Flucloxacillin	J01CF05
Fluconazole	J02AC01
Flucytosine	J02AX01
Fosfomycin	J01XX01
Fusidic acid	J01XC01
Gentamicin	J01GB03
Griseofulvin	D01BA01
Imipenem and enzyme inhibitor	J01DH51
Isavuconazole	J02AC05
Isoniazid	J04AC01
Itraconazole	J02AC02
Ketoconazole	J02AB02
Levofloxacin	J01MA12
Linezolid	J01XX08
Lymecycline	J01AA04
Mecillinam	J01CA11
Meropenem	J01DH02

Methenamine	J01XX05
Meticillin	J01CF03
Metronidazole (oral_rectal)	P01AB01
Metronidazole (parenteral)	J01XD01
Micafungin	J02AX05
Miconazole	J02AB01
Minocycline	J01AA08
Moxifloxacin	J01MA14
Nalidixic acid	J01MB02
Neomycin (injection infusion)	J01GB05
Neomycin (oral)	A07AA01
Neomycin combinations (oral)	A07AA51
Nitrofurantoin	J01XE01
Nitroxoline	J01XX07
Norfloxacin	J01MA06
Nystatin	A07AA02
Ofloxacin	J01MA01
Oxytetracycline	J01AA06
Oxytetracycline, combinations	J01AA56
Paromomycin	A07AA06
Penicillins combinations with other antibacterials	J01RA01
Phenoxymethylpenicillin	J01CE02
Piperacillin	J01CA12
Piperacillin and enzyme inhibitor piperacillin_tazobactam	J01CR05
Pivmecillinam	J01CA08
Polymyxin B enteral	A07AA05
Polymyxin B parenteral	J01XB02
Posaconazole	J02AC04
Procaine benzylpenicillin	J01CE09
Pyrazinamide	J04AK01
Rifampicin	J04AB02
Rifaximin	A07AA11
Spiramycin	J01FA02
Spiramycin combinations with other antibacterials	J01RA04
Streptomycin (oral)	A07AA04
Streptomycin (parenteral)	J01GA01
Streptomycin combinations	A07AA54
Sulfadiazine	J01EC02
Sulfadiazine and trimethoprim	J01EE02
Sulfamethizole	J01EB02
Sulfamethoxazole	J01EC01
Sulfamethoxazole and trimethoprim (co_trimoxazole)	J01EE01
Sulfonamides combinations with other antibacterials (ex. trimethoprim)	J01RA02
Tazobactam	J01CG02
Tedizolid	J01XX11
Teicoplanin	J01XA02
Teicoplanin	J01XA02
Telithromycin	J01FA15
Temocillin	J01CA17

Terbinafine	D01BA02
Tetracycline	J01AA07
Ticarcillin	J01CA13
Ticarcillin and enzyme inhibitor	J01CR03
Tigecycline	J01AA12
Tinidazole (oral, rectal)	P01AB02
Tinidazole (parenteral)	J01XD02
Tobramycin	J01GB01
Trimethoprim	J01EA01
Vancomycin (parenteral)	J01XA01
Vancomycin enteral (oral) [Treatment of *C. difficile* infection only]	A07AA09
Voriconazole	J02AC03

Table 5: Prescriber's Diagnosis Site Code List for Antimicrobial Use

Code	Prescriber's diagnosis of the site of infection for which the patient receives antimicrobial therapy
CNS	Central nervous system infection (e.g., meningitis, brain abscess)
EYE	Endophthalmitis
ENT	Infections of ear, nose, throat, larynx and mouth
BRON	Acute bronchitis or exacerbations of chronic bronchitis
PNEU	Pneumonia
CF	Cystic fibrosis infective exacerbation
CVS	Cardiovascular infection (e.g., endocarditis, vascular graft infection)
GI	Gastrointestinal infections (e.g., salmonellosis, *C. difficile* infection)
IA	Intraabdominal infection, including hepatobiliary
SSTSSI	Surgical site infection involving skin or soft tissue, but not bone
SSTO	Skin soft tissue infection, includes cellulitis, wound infection and deep soft tissue infection, not involving bone AND not related to surgery
BJSSI	Septic arthritis, osteomyelitis related to surgery at site of infection, includes prosthetic joint infection
BJO	Septic arthritis, osteomyelitis not related to surgery
CYS	Cystitis or symptomatic lower urinary tract infection
PYE	Pyelonephritis or symptomatic upper urinary tract infection
ASB	Asymptomatic bacteriuria – positive urine microbiology results in the absence of signs of urinary tract infection
OBGY	Obstetric or gynaecological infections, includes sexually transmitted infection (STI) in women
GUM	Prostatitis, epididymo-orchitis, includes sexually transmitted infection (STI) in men
BAC	Laboratory-confirmed clinically-significant positive blood cultures (bacteraemia or bloodstream infection)
CSEP	Clinical sepsis (suspected bloodstream infection without microbiology laboratory confirmation of positive blood cultures OR results are not yet available OR blood cultures have not been collected OR laboratory has confirmed that blood cultures are negative after five days incubation) Note CSEP excludes patients with febrile neutropenia and infection in immunocompromised hosts (See FN below)
FN	Febrile neutropenia or other form of manifestation of infection without an obvious site in an immunocompromised host (e.g. patient with HIV infection, patient receiving chemotherapy or other immunosuppressive therapy)
SIRS	Systemic inflammatory response with no clear anatomical site
UND	Completely undefined site for infection with no systemic inflammation
NA	Not applicable, indication for antimicrobial use is not for 'treatment intention of infection = CI, LI or HI'

Table 6: Overview of Hospital-Acquired Infection (HAI) Case Definition Codes

HAI case definition codes are recorded on Patient Form C - Section 4 'HAI data' – Always check Appendix B for a detailed description of each HAI case definition when deciding if patient meets HAI case definition

PN		**Pneumonia**
	PN1	Positive quantitative culture from minimally contaminated lower respiratory tract specimen
	PN2	Positive quantitative culture from possibly contaminated lower respiratory tract specimen
	PN3	Microbiological diagnosis by alternative microbiology methods
	PN4	Positive sputum culture or non-quantitative culture from lower respiratory tract specimen
	PN5	Clinical signs of pneumonia without positive microbiology
LRI		**Lower respiratory tract infection, other than pneumonia**
	BRON	Bronchitis, tracheobronchitis, bronchiolitis, tracheitis, without evidence of pneumonia
	LUNG	Other infections of the lower respiratory tract
UTI		**Urinary tract infection**
	UTI-A	Microbiologically confirmed symptomatic UTI
	UTI-B	Not microbiologically confirmed symptomatic UTI
BSI		**Bloodstream infection (laboratory-confirmed)**
	Source of BSI:	
	C-CVC	Central vascular catheter (note: report as CRI3 if microbiological criteria are met)
	C-PVC	Peripheral vascular catheter
	S-PUL	Secondary to pulmonary infection
	S-UTI	Secondary to urinary tract infection
	S-DIG	Secondary to digestive tract infection
	S-SSI	Secondary to surgical site infection
	S-SST	Secondary to skin and soft tissue infection
	S-OTH	Secondary to another infection
	UO	BSI of (confirmed) unknown origin
	UNK	No information/truly unknown
CRI-CVC		**Central vascular catheter-related infection**
	CRI1-CVC	Local CVC-related infection (no positive blood culture)
	CRI2-CVC	General CVC-related infection (no positive blood culture)
	CRI3-CVC	Microbiologically confirmed CVC-related BSI
CRI-PVC		**Peripheral vascular catheter-related infection**
	CRI1-PVC	Local PVC-related infection (no positive blood culture)
	CRI2-PVC	General CRI (no positive blood culture)
	CRI3-PVC	Microbiologically confirmed PVC-related BSI
SSI		**Surgical site infection**
	SSI-S	Superficial incisional
	SSI-D	Deep incisional
	SSI-O	Organ/space
SST		**Skin and soft tissue infections**
	SKIN	Skin
	ST	Soft tissue (necrotising fasciitis, infectious gangrene, necrotizing cellulitis, infectious myositis, lymphadenitis, or lymphangitis)
	DECU	Decubitus ulcer or pressure sore, including both superficial and deep infections

	BURN	Burn
	BRST	Breast abscess or mastitis
BJ		**Bone and joint infection**
	BONE	Osteomyelitis
	JNT	Joint or bursa
	DISC	Disc space infection
GI		**Gastrointestinal system infections**
	CDI	*Clostridium difficile* infection
	GE	Gastroenteritis (excluding CDI)
	GIT	Gastrointestinal tract (oesophagus, stomach, small and large bowel, and rectum), excluding GE, CDI
	HEP	Hepatitis
	IAB	Intra-abdominal, not specified elsewhere
CVS		**Cardiovascular system infection**
	VASC	Arterial or venous infection
	ENDO	Endocarditis
	CARD	Myocarditis or pericarditis
	MED	Mediastinitis
CNS		**Central nervous system infection**
	IC	Intracranial infection
	MEN	Meningitis or ventriculitis
	SA	Spinal abscess without meningitis
EENT		**Eye, ear, nose or mouth infection**
	CONJ	Conjunctivitis
	EYE	Eye, other than conjunctivitis
	EAR	Ear mastoid
	ORAL	Oral cavity (mouth, tongue, or gums)
	SINU	Sinusitis
	UR	Upper respiratory tract, pharyngitis, laryngitis, epiglottitis
REPR		**Reproductive tract infections**
	EMET	Endometritis
	EPIS	Episiotomy
	VCUF	Vaginal cuff
	OREP	Other infections of the male or female reproductive tract
SYS		**Systemic infections**
	DI	Disseminated infection
	CSEP	Treated unidentified severe infection in adults and children
NEO		**CASE DEFINITIONS FOR NEONATES**
	CSEP	Clinical sepsis in neonates
	LCBI	Laboratory-confirmed bloodstream infection in neonates, non-coagulase-negative staphylococci
	CNSB	Laboratory-confirmed bloodstream infection with coagulase-negative staphylococci in neonates
	PNEU	Pneumonia in neonates
	NEC	Necrotising enterocolitis

Table 7: Bloodstream Infection (BSI) Source Codes

Primary BSI: Catheter related = BSI due to infection of either a peripheral vascular catheter (PVC) or central vascular catheter (CVC)	
C-CVC	Central vascular catheter infection: Clinical relationship (e.g. symptoms improve within 48 hours after catheter removal): No positive microbiology linking the positive blood culture with the central vascular catheter (tip/exit site swab)
C-PVC	Peripheral vascular catheter infection: Clinical relationship (e.g. symptoms improve within 48 hours after catheter removal). No positive microbiology linking the positive blood culture with the peripheral vascular catheter (tip/exit site swab)
CRI3-CVC	Central vascular catheter infection: Microbiologically confirmed. The same organism isolated from both blood cultures and central vascular catheter (tip/exit site swab)
CRI3-PVC	Peripheral vascular catheter infection: Microbiologically confirmed. The same organism isolated from both blood cultures and peripheral vascular catheter (tip/exit site swab)
Primary BSI: Unknown origin	
UO	Primary BSI of unknown origin – not related to infection of vascular catheter and not secondary to infection elsewhere as described below
Secondary BSI: BSI arising secondary to infection elsewhere	
S-PUL	Pulmonary infection
S-UTI	Urinary tract Infection
S-SSI	Surgical Site Infection
S-DIG	Digestive tract infection
S-SST	Skin soft tissue
S-OTH	Other infection (e.g. meningitis, osteomyelitis etc)
BSI Source Unknown: No information available or information is missing	
UNK	BSI source is unknown as no information available or information missing

Table 8: Microorganism Code List by Category

Rows highlighted in grey below correspond to MO-codes for which a resistance phenotype should also be recorded (See Table 9 for resistance codes)

Family	Microorganism	MO-code
Gram-positive cocci	*Staphylococcus aureus*	STAAUR
	Staphylococcus epidermidis	STAEPI
	Staphylococcus haemolyticus	STAHAE
	Coagulase negative staphylococci, not specified to species level	STACNS
	Other coagulase-negative staphylococci specified to species level (CoNS)	STAOTH
	Staphylococcus spp*., not specified as Staphylococcus aureus or CoNS*	STANSP
	Streptococcus pneumoniae or pneumococcus	STRPNE
	Streptococcus agalactiae or Group B streptococcus	STRAGA
	Streptococcus pyogenes or Group A streptococcus	STRPYO
	Other beta haemolytic streptococci – Group C or Group G streptococcus	STRHCG
	Streptococcus spp. specified *(Other than Streptococcus pneumoniae or Group A,B,C,G)*	STROTH
	Streptococcus spp*., not specified*	STRNSP
	Enterococcus faecalis	ENCFAE
	Enterococcus faecium	ENCFAI
	Enterococcus spp*., other*	ENCOTH
	Enterococcus spp*., not specified*	ENCNSP
	Gram-positive cocci, not specified	GPCNSP
	Other Gram-positive cocci specified	GPCOTH
Gram-negative cocci	*Moraxella catarralis*	MORCAT
	Moraxella spp*., other*	MOROTH
	Moraxella spp*., not specified*	MORNSP
	Neisseria meningitidis	NEIMEN
	Neisseria spp*., other specified*	NEIOTH
	Neisseria spp*., not specified*	NEINSP
	Gram-negative cocci, not specified	GNCNSP
	Other Gram-negative cocci	GNCOTH
Gram-positive bacilli	*Corynebacterium spp.*	CORSPP
	Bacillus spp.	BACSPP
	Lactobacillus spp.	LACSPP
	Listeria monocytogenes	LISMON
	Gram-positive bacilli, not specified	GPBNSP
	Other Gram-positive bacilli	GPBOTH
***Enterobacteriaceae* Gram-negative bacilli**	*Citrobacter freundii*	CITFRE
	Citrobacter koseri (e.g. *diversus*)	CITDIV
	Citrobacter spp., other	CITOTH
	Citrobacter spp., not specified	CITNSP
	Enterobacter cloacae	ENBCLO

Family	Microorganism	MO-code
	Enterobacter aerogenes	ENBAER
	Enterobacter agglomerans	ENBAGG
	Enterobacter sakazakii	ENBSAK
	Enterobacter gergoviae	ENBGER
	Enterobacter spp., other	ENBOTH
	Enterobacter spp., not specified	ENBNSP
	Escherichia coli	ESCCOL
	Klebsiella pneumoniae	KLEPNE
	Klebsiella oxytoca	KLEOXY
	Klebsiella spp., other	KLEOTH
	Klebsiella spp., not specified	KLENSP
	Proteus mirabilis	PRTMIR
	Proteus vulgaris	PRTVUL
	Proteus spp., other	PRTOTH
	Proteus spp., not specified	PRTNSP
	Serratia marcescens	SERMAR
	Serratia liquefaciens	SERLIQ
	Serratia spp., other	SEROTH
	Serratia spp., not specified	SERNSP
	Hafnia spp.	HAFSPP
	Morganella spp.	MOGSPP
	Providencia spp.	PRVSPP
	Salmonella enteritidis	SALENT
	Salmonella typhi or *paratyphi*	SALTYP
	Salmonella typhimurium	SALTYM
	Salmonella spp., not specified	SALNSP
	Salmonella spp., other	SALOTH
	Shigella spp.	SHISPP
	Yersinia spp.	YERSPP
	Other *Enterobacteriaceae, specified*	ETBOTH
	Enterobacteriaceae, not specified	ETBNSP
Other Gram-negative bacilli	*Acinetobacter baumannii*	ACIBAU
	Acinetobacter calcoaceticus	ACICAL
	Acinetobacter haemolyticus	ACIHAE
	Acinetobacter lwoffii	ACILWO
	Acinetobacter spp., other	ACIOTH
	Acinetobacter spp., not specified	ACINSP
	Pseudomonas aeruginosa	PSEAER
	Stenotrophomonas maltophilia	STEMAL
	Burkholderia cepacia	BURCEP
	Pseudomonadaceae family, other	PSEOTH
	Pseudomonadaceae family, not specified	PSENSP
	Haemophilus influenzae	HAEINF
	Haemophilus parainfluenzae	HAEPAI
	Haemophilus spp., other	HAEOTH
	Haemophilus spp., not specified	HAENSP
	Legionella spp.	LEGSPP
	Achromobacter spp.	ACHSPP
	Aeromonas spp.	AEMSPP

Family	Microorganism	MO-code
	Agrobacterium spp.	AGRSPP
	Alcaligenes spp.	ALCSPP
	Campylobacter spp.	CAMSPP
	Flavobacterium spp.	FLASPP
	Gardnerella spp.	GARSPP
	Helicobacter pylori	HELPYL
	Pasteurella spp.	PASSPP
	Gram-negative bacilli, not specified	GNBNSP
	Other Gram-negative bacilli, specified and non-*Enterobacteriaceae*	GNBOTH
Anaerobic bacilli	*Bacteroides fragilis*	BATFRA
	Bacteroides other	BATOTH
	Clostridium difficile	CLODIF
	Clostridium spp. other	CLOOTH
	Propionibacterium spp.	PROSPP
	Prevotella spp.	PRESPP
	Anaerobes, not specified	ANANSP
	Other anaerobes specified	ANAOTH
Other bacteria	Mycobacterium, atypical/non-tuberculous	MYCATY
	Mycobacterium tuberculosis complex **TB is not reported in the PPS – Do not report *M. tuberculosis* complex or antimicrobial treatment for suspected or confirmed active or latent *M. tuberculosis* complex infection**	MYCTUB
	Chlamydia spp.	CHLSPP
	Mycoplasma spp.	MYPSPP
	Actinomyces spp.	ACTSPP
	Nocardia spp.	NOCSPP
	Other bacteria	BCTOTH
Fungi	*Candida albicans*	CANALB
	Candida glabrata	CANGLA
	Candida krusei	CANKRU
	Candida parapsilosis	CANPAR
	Candida tropicalis	CANTRO
	Candida spp., other specified	CANOTH
	Candida spp., not specified	CANNSP
	Aspergillus fumigatus	ASPFUM
	Aspergillus niger	ASPNIG
	Aspergillus spp., other specified	ASPOTH
	Aspergillus spp., not specified	ASPNSP
	Other yeasts	YEAOTH
	Fungi other	FUNOTH
	Filaments other	FILOTH
	Other parasites	PAROTH
Virus	Adenovirus	VIRADV
	Cytomegalovirus (CMV)	VIRCMV
	Enterovirus (polio, coxsackie, echo)	VIRENT
	Hepatitis A virus	VIRHAV
	Hepatitis B virus	VIRHBV
	Hepatitis C virus	VIRHCV
	Herpes simplex virus	VIRHSV

Family	Microorganism	MO-code
	Human immunodeficiency virus (HIV)	VIRHIV
	Influenza A virus	VIRINA
	Influenza B virus	VIRINB
	Influenza C virus	VIRINC
	Norovirus	VIRNOR
	Parainfluenza virus	VIRPIV
	Respiratory syncytial virus (RSV)	VIRRSV
	Rhinovirus	VIRRHI
	Rotavirus	VIRROT
	SARS virus	VIRSAR
	Varicella-zoster virus	VIRVZV
	Virus, not specified	VIRNSP
	Other virus	VIROTH
Micro-organism not identified		NONID
Examination not done		NOEXA
Sterile examination		STERI
Result not (yet) available or missing		NA

Table 9: Antimicrobial Resistance Markers & Codes

Resistance phenotype –For each microorganism shaded in grey in table 8, specify the relevant antimicrobial resistance marker in the column titled 'Resistance Code'. The antimicrobial resistance markers are:

- S = Sensitive
- I = Intermediate
- R = Resistant
- UNK = Unknown antimicrobial susceptibility test results for that micro-organism

Organism identification (MO-code)	S	I	R	UNK
Staphylococcus aureus **(STAAUR)**	Flucloxacillin sensitive (S) MSSA		Flucloxacillin resistant (R) MRSA	Unknown antimicrobial results for flucloxacillin
	Glycopeptide (vancomycin, teicoplanin) sensitive (S)	Glycopeptide (vancomycin, teicoplanin) intermediate (I) GISA	Glycopeptide (vancomycin, teicoplanin) resistant (R) GRSA/VRSA	Unknown antimicrobial results for glycopeptide
Enterococcus **(ENCFAE, ENCFAI, ENCOTH, ENCNSP)**	Glycopeptide (vancomycin, teicoplanin) sensitive (S) VSE		Glycopeptide (vancomycin, teicoplanin) resistant (R) VRE	Unknown antimicrobial results for glycopeptide
Enterobacteriaceae **All organisms listed in the table under Gram-negative bacilli *Enterobacteriaceae***	Third generation cephalosporin (cefotaxime, ceftriaxone, ceftazidime) (C3G) sensitive (S)	Third generation cephalosporin (C3G) (cefotaxime, ceftriaxone, ceftazidime) intermediate(I)	Third generation cephalosporin (C3G) (cefotaxime, ceftriaxone, ceftazidime) resistant (R)	Unknown antimicrobial results for C3G
	Carbapenem (meropenem, ertapenem) sensitive (S)	Carbapenem (meropenem, ertapenem) intermediate (I)	Carbapenem (meropenem, ertapenem) resistant (R) CRE/CPE	Unknown antimicrobial results for carbapenem
Acinetobacter baumannii **(ACIBAU)**	Carbapenem (meropenem, ertapenem) sensitive (S)	Carbapenem (meropenem, ertapenem) intermediate (I)	Carbapenem (meropenem, ertapenem) resistant (R)	Unknown results for carbapenem
Pseudomonas aeruginosa **(PSEAUR)**	Carbapenem (meropenem, ertapenem) sensitive (S)	Carbapenem (meropenem, ertapenem) intermediate (I)	Carbapenem (meropenem, ertapenem) resistant (R)	Unknown antimicrobial results for carbapenem

If a microorganism is tested against more than one antimicrobial in the same class, with different results, assign the priority code to the more resistant antimicrobial R>I>S
e.g., *E. cloacae* resistant to ertapenem = R, meropenem = S
=> Record *E. cloacae* as carbapenem = R

Appendix B: Case Definitions of Hospital-Acquired Infections (HAI)

1.1 PN: PNEUMONIA

Rx

Two or more serial chest X-rays or CT-scans of lungs with suggestive image of pneumonia for patients with underlying cardiac or pulmonary disease*. In patients without underlying cardiac or pulmonary disease, one definitive chest X-ray or CT-scan is sufficient.

and at least ONE of the following

Symptoms

- Fever > 38 °C with no other cause
- Leukopenia (<4000 WBC/mm^3) or leucocytosis (≥ 12 000 WBC/mm^3)

and at least ONE of the following
(or at least TWO if clinical pneumonia only = PN 4 and PN 5)

- New onset of purulent sputum, or change in character of sputum (colour, odour, quantity, consistency)
- Cough or dyspnoea or tachypnoea
- Suggestive auscultation (rales or bronchial breath sounds), rhonchi, wheezing
- Worsening gas exchange (e.g., O_2 desaturation or increased oxygen requirements or increased ventilation demand)

and according to the used diagnostic method

Microbiology

a – Bacteriologic diagnostic performed by:

Positive quantitative culture from minimally contaminated lower respiratory tract (LRT) specimen **(PN 1)**

- Bronchoalveolar lavage (BAL) with a threshold of ≥ 10^4 colony-forming units (CFU)/ml or ≥ 5 % of BAL obtained cells contain intracellular bacteria on direct microscopic exam (classified on the diagnostic category BAL).
- Protected brush (PB Wimberley) with a threshold of ≥10^3 CFU/ml
- Distal protected aspirate (DPA) with a threshold of ≥ 10^3 CFU/ml

Positive quantitative culture from possibly contaminated LRT specimen **(PN 2)**

- Quantitative culture of LRT specimen (e.g. endotracheal aspirate) with a threshold of 10^6 CFU/ml

b – Alternative microbiology methods **(PN 3)**

- Positive blood culture not related to another source of infection
- Positive growth in culture of pleural fluid
- Pleural or pulmonary abscess with positive needle aspiration
- Histologic pulmonary exam shows evidence of pneumonia
- Positive exams for pneumonia with virus or particular microorganism detected: *Legionella spp.*, *Aspergillus spp.*, mycobacteria, *Mycoplasma spp.*, *Pneumocystis spp.*)
    - Positive detection of viral antigen or antibody from respiratory secretions (e.g., EIA, FAMA, shell vial assay, PCR)
    - Positive direct exam or positive culture from bronchial secretions or tissue
    - Seroconversion
    - Detection of antigens in urine (*Legionella pneumophila, Streptococcus pneumoniae)*

c – Others

- Positive **sputum** culture **or non-quantitative LRT specimen** culture **(PN 4)**
- **No positive microbiology** **(PN 5)**

PN reporting instruction:
*For patients with underlying cardiac or pulmonary disease, one definitive CXR or CT scan for the current episode will suffice, provided it may be compared with a previous CXR or CT scan performed within the last 12 months
For pneumonia, only fill one subcategory (where more than one PN definition is met by the patient, prioritise recorded pneumonia definition as: PN1>PN2>PN3>PN4>PN5).

1.2 LRI: LOWER RESPIRATORY TRACT INFECTION, OTHER THAN PNEUMONIA

LRI-BRON: Bronchitis, tracheobronchitis, bronchiolitis, tracheitis, without evidence of pneumonia
Tracheobronchial infections must meet the following criteria:

1. 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 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

LRI-BRON 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 change in organism.

LRI-LUNG: Other infections of the lower respiratory tract
Other infections of the lower respiratory tract must meet at least **ONE** of the following criteria:

1. Patient has organisms seen on smear or cultured from lung tissue or fluid, including pleural fluid
2. Patient has a lung abscess or empyema seen during a surgical operation or histopathologic examination
3. Patient has an abscess cavity seen on radiographic examination of lung

LRI-Lung reporting instruction:
Report lung abscess or empyema without pneumonia as LRI-LUNG.

1.3 UTI: URINARY TRACT INFECTION

UTI-A: microbiologically confirmed symptomatic UTI

Patient has at least **ONE** of the following signs of symptoms with no other recognised cause: fever (>38°C), urgency, frequency, dysuria, or suprapubic tenderness **and** patient has a positive urine microbiology culture report. That is, ≥ 10^5 microorganisms per ml of urine with no more than two species of microorganisms detected in the same urine sample.

UTI-B: not microbiologically confirmed symptomatic UTI

Patient has at least **TWO** of the following with no other recognised cause: fever (>38°C), urgency, frequency, dysuria, or suprapubic tenderness **and** at least **ONE** of the following:

a. Positive dipstick for leukocyte esterase and/or nitrite
b. Pyuria – White blood cells (WBC) or pus cells seen on urine specimen microscopy 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 *Staphylococcus saprophyticus*) with ≥ 10^2 colonies/ml urine in non-voided specimens
e. ≤10^5 colonies/ml of a single uropathogen (Gram-negative bacteria or *S. saprophyticus*) in a patient being treated with effective antimicrobial agent for a urinary infection
f. Clinician clinical diagnosis of a urinary tract infection
g. Clinician institutes appropriate therapy for a urinary infection

UTI reporting instruction:
For urinary tract infection, only fill in one subcategory (where more than one UTI definition is met by the patient, prioritise urinary tract infection as UTI-A>UTI-B).

1.4 SST: SKIN AND SOFT TISSUE INFECTION

SST-SKIN: Skin infection

Skin infections must meet at least **ONE** of the following criteria:

1. Patient has purulent drainage, pustules, vesicles, or boils
2. Patient has at least **TWO** of the following signs or symptoms with no other recognised cause: localised 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 isolated on culture are normally considered to be components of normal skin flora (i.e., diphtheroids [*Corynebacterium* spp], *Bacillus spp.* [not *Bacillus anthracis*], *Propionibacterium* spp, coagulase-negative staphylococci [including *S. epidermidis*], viridans group streptococci, *Aerococcus* spp, *Micrococcus* spp), they must be isolated in a pure culture
    b. Organisms cultured from blood
    c. Positive antigen test performed on infected tissue or blood (e.g., herpes simplex virus, varicella zoster virus, *Haemophilus influenzae*, *Neisseria meningitidis*)
    d. Multinucleated giant cells seen on microscopic examination of affected tissue
    e. Diagnostic single antibody titre (elevated level of IgM) or 4-fold increase in paired sera (elevation of IgG between acute and convalescent serum samples) for pathogen

SST-SKIN reporting instructions:

- Report decubitus ulcer/pressure sore infection involving skin as SST-DECU
- Report infected burns as SST-BURN
- Report breast abscesses or mastitis as SST-BRST

SST-DECU: Decubitus ulcer or pressure sore, including both superficial and deep infections

Decubitus ulcer/pressure sore infections must meet the following criteria:

1. Patient has at least **TWO** of the following signs or symptoms with no other recognised cause: redness, tenderness, or swelling of decubitus ulcer/pressure sore 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

*Purulent drainage from the decubitus ulcer/pressure sore alone is not sufficient evidence of an infection. Microorganisms cultured from surface swabs of a decubitus ulcer are 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.

SST-BRST: Breast abscess or mastitis

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

1. Patient has a positive microbiology culture result of affected breast tissue or fluid obtained by incision and drainage or needle aspiration
2. Patient has a breast abscess or other evidence of infection seen during a surgical operation or histopathologic examination
3. Patient has fever (>38 C) and local inflammation of the breast **and** clinician diagnosis of breast abscess

SST-BURN: Burn wound infection

Burn wound infections must meet at least **ONE** of the following criteria:

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 a burn biopsy shows invasion of organisms into adjacent viable tissue
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
3. Patient with a burn wound has at least **TWO** of the following signs or symptoms with no other recognised cause: fever (>38 C) or hypothermia (< 36 C), hypotension, oliguria (urine output <20ml/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 visualization of viral particles by electron microscopy in biopsies or lesion scrapings

Purulence alone at the burn wound site is not adequate for the diagnosis of burn wound infection. Fever alone in a burn patient is not adequate for the diagnosis of a burn wound infection, because fever may be the result of tissue trauma or the patient may have an infection at another site.

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

SST-ST: Soft tissue infections must meet at least **ONE** of the following criteria:

1. Patient has organisms cultured from tissue or drainage from affected site
2. Patient has purulent drainage at affected site
3. Patient has an abscess or other evidence of infection seen during a surgical operation or histopathologic examination
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 (e.g., *Haemophilus influenzae*, *Streptococcus pneumoniae*, *Neisseria meningitidis*, Group B *Streptococcus*, *Candida* spp.)
    c. Diagnostic single antibody titre (elevated level of IgM) or 4-fold increase in paired sera (elevation of IgG between acute and convalescent serum samples) for pathogen

Reporting instructions

- Report decubitus ulcer/pressure sore infection which involves soft tissues as SST-DECU.
- Report infection of deep pelvic tissues as REPR-OREP.

1.5 SSI: SURGICAL SITE INFECTION

Superficial incisional (SSI-S)
Infection occurs within 30 days after the operation **and** infection involves only skin and subcutaneous tissue of the incision **and** at least **ONE** of the following is present:

1. Purulent drainage with or without laboratory confirmation, from the superficial incision
2. Organisms isolated from an aseptically obtained culture of fluid or tissue from the superficial incision
3. 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
4. Clinical diagnosis of superficial incisional SSI made by consultant clinician

Deep incisional (SSI-D)
Infection occurs within 30 days after the operation if no implant is left in place or within 90 days if implant is in place **and** the infection appears to be related to the operation **and** infection involves deep soft tissue (e.g., fascia, muscle) of the incision **and** at least **ONE** of the following:

1. Purulent drainage from the deep incision but not from the organ/space component of the surgical site
2. 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 (>38º C), localised pain or tenderness, unless incision is culture-negative
3. An abscess or other evidence of infection involving the deep incision is found on direct examination, during reoperation or by histopathologic or radiologic examination
4. Diagnosis of deep incisional SSI made by consultant clinician

Organ/Space (SSI-O)
Infection occurs within 30 days after the operation if no implant is left in place or within 90 days if implant is in place **and** the infection appears to be related to the operation **and** infection involves any part of the anatomy (e.g., organs and spaces) other than the incision which was opened or manipulated during an operation **and** at least **ONE** of the following:

1. Purulent drainage from a drain that is placed through a stab wound into the organ/space
2. Organisms isolated from an aseptically-obtained microbiological culture of fluid or tissue in the organ/space
3. An abscess or other evidence of infection involving the organ/space that is found on direct examination, during reoperation, or by histopathologic or radiologic examination
4. Diagnosis of organ/space SSI made by consultant clinician

SSI reporting instruction:
Report vaginal cuff infections as SSI-O if diagnosed within 30 days of hysterectomy. See section on REPR: Reproductive tract infection

1.6 BSI: BLOODSTREAM INFECTION

BSI: Laboratory-confirmed bloodstream infection

- **ONE** positive blood culture for a recognised pathogen (e.g., *Staphylococcus aureus, Escherichia coli, Candida albicans* etc.) [If any doubt regarding what constitutes a recognised pathogen, please discuss with microbiologist]

or

- Patient has at least **ONE** of the following signs or symptoms: fever (>38°C), chills or hypotension
  and
  TWO positive blood cultures for a common skin contaminant** (the same organism must have been isolated from two separate blood culture samples, usually taken within a 48 hour period)

**Skin contaminants = coagulase-negative staphylococci*, Micrococcus sp., Propionibacterium acnes, Bacillus spp., Corynebacterium spp.*

Primary BSI:
Catheter-related BSI: Primary BSI due to infection of either a peripheral vascular catheter (PVC) or central vascular catheter (CVC)
When the same microorganism was cultured from both the blood and the vascular catheter, this is microbiologically confirmed catheter-related BSI (CRI3): CRI3-PVC or CRI3-CVC. See CRI definitions below for further information (See **Appendix D** for algorithm for diagnosis of catheter related-infection).
When the patient has positive blood cultures (one or more sets with a significant pathogen or at least two sets with organism regarded as a skin contaminant) without microbiological confirmation of the same organism from the vascular catheter tip or exit site swab and the patient's symptoms improve within 48 hours after removal of the catheter, this is clinically-diagnosed catheter-related BSI without microbiological confirmation linking the blood culture to the vascular catheter (C-PVC or C-CVC).
Unknown origin (UO): Primary BSI of unknown origin. Not related to vascular catheter infection and not meeting definition of secondary BSI below. Decision to classify as BSI-UO has been verified during the PPS, as no identifiable source was found for that BSI on review of all available information)

Secondary BSI:
BSI arising secondary to an infection elsewhere in the body.
When the same micro-organism was cultured from both the blood and another infection site or strong clinical evidence exists that the patient's BSI developed secondary to another infection site, invasive diagnostic procedure or foreign body.
Pulmonary infection resulting in BSI **(S-PUL)**
Urinary tract infection resulting in BSI **(S-UTI)**
Digestive tract infection resulting in BSI **(S-DIG)**
Surgical site infection resulting in BSI **(S-SSI)**
Skin and soft tissue infection resulting in BSI **(S-SST)**
Other infection not covered by those categories above resulting in BSI **(S-OTH)**
Note: Secondary BSI is reported as a separate HAI, in addition to the primary infection, if the primary infection matches the relevant HAI case definition.

BSI Source Unknown (UNK): No information available about the BSI source or information missing.

1.7 CRI: CATHETER-RELATED INFECTION

There are three categories of catheter-related infection: CRI1, CRI2 & CRI3.
CRI1 and CRI2 are defined as CRI without a positive blood culture result. As the patient will not have a positive blood culture result, to reach the definition of CRI1 or CRI2, there must be clinical evidence of infection linked to that vascular catheter plus significant growth of a microorganism on the tip of the vascular catheter).
CRI3 is CRI with a positive blood culture result (at least **ONE** positive blood culture for a recognised pathogen and at least **TWO** positive blood cultures for common skin contaminants).
CRI are further classified based on whether the infection is related to a peripheral vascular catheter (PVC) or a central vascular catheter (CVC).

See **Appendix D** for algorithm for diagnosis of catheter related-infection.

CRI1-PVC: Local PVC-related infection (no positive blood culture)

- Semi-quantitative PVC tip culture with >15 colony-forming units (CFU) or quantitative PVC tip culture with $\geq 10^3$ CFU/ml of a microorganism isolated from the PVC tip **and**
- There is evidence of pus/inflammation at the PVC insertion site

CRI2-PVC: General PVC-related infection (no positive blood culture)

- Semi-quantitative PVC tip culture with >15 colony-forming units (CFU) or quantitative PVC tip culture with $\geq 10^3$ CFU/ml of a microorganism isolated from the PVC tip **and**
- The patient's clinical signs of systemic infection improve within 48 hours after PVC removal

CRI3-PVC: Microbiologically confirmed PVC-related bloodstream infection

- When the same microorganism was cultured from both the blood **and** the vascular catheter (PVC tip or PVC exit site swab), this is microbiologically confirmed catheter-related BSI (CRI3).
- The same microorganism isolated from a positive blood culture taken 48 hours before or after removal of the PVC (at least **ONE** positive blood culture for a recognised pathogen and at least **TWO** positive blood cultures for common skin contaminants) **and** also from a positive culture of <u>either</u>:
- Semi-quantitative PVC tip culture with >15 colony-forming units (CFU) or quantitative PVC tip culture with $\geq 10^3$ CFU/ml of the same microorganism isolated from the PVC tip **or**
- Positive culture from pus swab of the PVC exit site with the same microorganism isolated from the swab

CRI1-CVC: Local CVC-related infection (no positive blood culture)

- Semi-quantitative CVC tip culture with >15 colony-forming units (CFU) or quantitative CVC tip culture with $\geq 10^3$ CFU/ml of a microorganism isolated from the CVC tip **and**
- There is evidence of pus/inflammation at the CVC insertion site or tunnel

CRI2-CVC: General CVC-related infection (no positive blood culture)

- Semi-quantitative CVC tip culture with >15 colony-forming units (CFU) or quantitative CVC tip culture with $\geq 10^3$ CFU/ml of a microorganism isolated from the CVC tip **and**
- The patient's clinical signs of systemic infection improve within 48 hours after CVC removal

CRI3-CVC: microbiologically confirmed CVC-related bloodstream infection (positive blood culture)

- When the same microorganism was cultured from both the blood **and** the vascular catheter (CVC tip or CVC exit site swab), this is microbiologically confirmed catheter-related BSI (CRI3)

- The same microorganism isolated from a positive blood culture taken 48 hours before or after removal of the CVC (at least ONE positive blood culture for a recognised pathogen and at least TWO positive blood cultures for common skin contaminants) **and** also from a positive culture of either:
- Semi-quantitative CVC tip culture with >15 colony-forming units (CFU) or quantitative CVC tip culture with $\geq 10^3$ CFU/ml of the same microorganism isolated from the CVC tip **or**
- Positive culture from pus swab of the CVC exit site with the same micro-organism isolated from the swab **or**
- Criterion of differential time to positivity (DTP) of blood cultures achieved: When a patient with a CVC *in situ* develops symptoms or signs of infection, it is recommended that simultaneous blood cultures should be taken both from the CVC and from a peripheral vein. If the set of blood culture bottles taken from the CVC flag with positive bacterial growth two hours or more before/earlier than the set of blood culture bottles taken from the peripheral vein, this suggests that the CVC is the source of the patient's BSI. Positive DTP criterion can only be applied to CVC and peripheral blood culture sets taken at the same time.

A positive CVC/PVC tip culture with significant growth in the absence of positive blood cultures or local evidence of infection at the exit site or systemic signs of infection which improve within 48 hours of the CVC/PVC removal represents CVC/PVC colonisation or contamination of the CVC/PVC tip by skin organisms at the time of CVC/PVC removal. This should not be reported as CRI.

Note, when a patient has a BSI (at least **ONE** positive blood culture for a recognised pathogen and at least **TWO** positive blood cultures for common skin contaminants) without microbiological confirmation of the same organism from the vascular catheter and the patient's symptoms improve within 48 hours after removal of the catheter, this is clinically-diagnosed catheter-related primary BSI without microbiological confirmation (C-PVC or C-CVC).

For microbiology laboratory-confirmed bloodstream infections, only provide one of:
- Bloodstream infection (BSI), catheter related bloodstream infection (CRI3) [priority CRI3>BSI]
- Neonatal laboratory confirmed bloodstream infection caused by organisms other than coagulase-negative staphylococci (NEO-LCBI) or neonatal laboratory confirmed bloodstream infection caused by coagulase-negative staphylococci (NEO-CNSB) [priority NEO-LCBI>NEO-CNSB].

1.8 CVS: CARDIOVASCULAR SYSTEM INFECTION

CVS-VASC: Arterial or venous infection

Arterial or venous infection must meet at least **ONE** of the following criteria:

1. Patient has microorganisms cultured from arteries or veins removed during a surgical operation **and** blood culture not done or blood culture remains sterile
2. Patient has evidence of arterial or venous infection seen during a surgical operation or on histopathologic examination
3. Patient has at least **ONE** of the following signs or symptoms with no other recognised cause: Fever (>38^{0}C), pain, erythema or heat at involved vascular site **and** significant growth from an intravascular catheter tip using semi-quantitative culture with >15 colony-forming units (CFU) or quantitative CVC tip culture with $\geq 10^3$ CFU/ml **and** blood culture not done or blood culture remains sterile
4. Patient has purulent drainage at involved vascular site **and** blood culture not done or blood culture remains sterile

CVS-VASC reporting instruction:

Report infection of an arteriovenous graft/shunt/fistula or intravascular catheter site without organisms cultured from blood as CVS-VASC.

CVS-ENDO: Endocarditis

Endocarditis of a native or prosthetic heart valve must meet at least **ONE** of the following criteria:

1. Patient has microorganisms cultured from valve or vegetation
2. Patient has **TWO** or more of the following signs or symptoms with no other recognised cause: Fever (>38^{0}C), new or changing cardiac murmur, embolic phenomena, skin manifestations (e.g., petechiae, splinter haemorrhages, painful subcutaneous nodules), congestive heart failure or cardiac conduction abnormality **and** at least **ONE** of the following:
    a. Microorganisms cultured from two or more sets of blood cultures
    b. Organisms seen on Gram's stain of cardiac valve when valve culture is sterile or valve culture not done
    c. Valvular vegetation seen during a surgical operation or at post-mortem
    d. Positive antigen test on blood or urine (e.g., *Haemophilus influenzae*, *Streptococcus pneumoniae*, *Neisseria meningitidis*, or Group B *Streptococcus*)
    e. Evidence of new vegetation seen on echocardiogram

    and if diagnosis is made in a living patient (*ante mortem*), clinician institutes appropriate antimicrobial therapy

CVS-CARD: Myocarditis or pericarditis

Myocarditis or pericarditis must meet at least **ONE** of the following criteria:

1. Patient has microorganisms cultured from pericardial tissue or fluid obtained by needle aspiration or during a surgical operation
2. Patient has at least **TWO** of the following signs or symptoms with no other recognised cause: Fever (>38^{0}C), chest pain, paradoxical pulse or increased heart size **and** at least **ONE** of the following:
    a. abnormal electrocardiogram (ECG) consistent with myocarditis or pericarditis
    b. Positive antigen test on blood (e.g., *Haemophilus influenzae*, *Streptococcus pneumoniae*)
    c. Evidence of myocarditis or pericarditis on histologic examination of heart tissue
    d. Four-fold rise in type-specific serum antibody, with or without direct isolation of a virus from pharynx or faeces
    e. Pericardial effusion identified by echocardiogram, CT scan, MRI or angiography

Comment: Most cases of pericarditis arising after cardiac surgery or myocardial infarction are not infectious. Discuss suspected HAI pericarditis case with clinician responsible for care of patient.

CVS-MED: Mediastinitis

Mediastinitis must meet at least **ONE** of the following criteria:

1. Patient has microorganisms cultured from mediastinal tissue or fluid obtained during a surgical operation or needle aspiration
2. Patient has evidence of mediastinitis seen during a surgical operation or on histopathologic examination
3. Patient has at least **ONE** of the following signs or symptoms with no other recognised cause: Fever (>38^{0}C), chest pain or sternal instability **and** at least **ONE** of the following:
    a. Purulent discharge from mediastinal area
    b. Microorganisms cultured from blood or discharge from mediastinal area
    c. Mediastinal widening on chest x-ray

CVS-MED reporting instruction:

Report mediastinitis arising following cardiac surgery that is accompanied by sternal osteomyelitis as a surgical site infection-organ/space (SSI-O).

1.9 GI: GASTROINTESTINAL SYSTEM INFECTION

GI-CDI: *Clostridium difficile* infection

Clostridium difficile infection must meet at least **ONE** of the following criteria:

1. Diarrhoeal stools or toxic megacolon **and** a positive laboratory assay for *C. difficile* toxin A and/or toxin B in stools **or** toxin-producing *C. difficile* detected in stool via culture, PCR or other means
2. Pseudomembranous colitis revealed by lower gastro-intestinal endoscopy
3. Colonic histopathology characteristic of *C. difficile* infection (with or without diarrhoea) on a specimen obtained during endoscopy, colectomy or post mortem

NOTE: If clinical signs of *Clostridium difficile* infection appear within 28 days after hospital discharge period, GI-CDI must be defined as hospital-acquired infection (HAI)

GI-CDI reporting instruction:

If you report CDI as a HAI, don't forget to also report *C. difficile* as the causative microorganism using MO-code CLODIF. The only circumstance where CLODIF would not be reported would be if the patient's CDI was diagnosed only on the basis of findings of pseudomembranous colitis at endoscopy or colectomy without a positive microbiological result for *C. difficile* toxin.

GI-GE: Gastroenteritis (excluding CDI)

Gastroenteritis must meet at least **ONE** of the following criteria:

1. Patient has an acute onset of diarrhoea (liquid stools for more than 12 hours) with or without vomiting or fever (>38^{0}C) and no likely non-infectious cause (possible non-infectious causes include: bowel preparation for diagnostic tests, therapeutic regimen other than antimicrobial agents (e.g., laxatives, post-GI surgery), acute exacerbation of a chronic condition or psychological stress).
2. Patient has at least **TWO** of the following signs or symptoms with no other recognised cause: nausea, vomiting, abdominal pain, fever (>38^{0}C) or headache **and** at least **ONE** of the following:
    a. An enteric pathogen (e.g., *Salmonella spp*, *Shigella spp*, *Campylobacter spp*. *E. coli* O157) is cultured from stool or rectal swab or detected on PCR
    b. An enteric pathogen is detected by routine or electron microscopy (e.g., norovirus, small round structured virus, *Cryptosporidium spp.*)
    c. An enteric pathogen is detected by antigen or antibody assay on blood or faeces (e.g., rotavirus, adenovirus)
    d. Evidence of an enteric pathogen is detected by cytopathic changes in tissue culture (toxin assay)
    e. Diagnostic single antibody titre elevated level of IgM) or 4-fold increase in paired sera (elevation of IgG between acute and convalescent serum samples) for pathogen.

GI-GIT: Gastrointestinal tract including oesophagus, stomach, small and large bowel and rectum) excluding gastroenteritis and appendicitis

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

1. Patient has an abscess or other evidence of infection seen during a surgical operation or histopathologic examination
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 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 potassium hydroxide (KOH) fungal 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 (e.g., Candida oesophagitis or proctitis)

GI-HEP: Hepatitis

Hepatitis must meet the following criteria:

1. Patient has at least **TWO** of the following signs or symptoms with no other recognised cause: fever (>38^{0}C), anorexia, nausea, vomiting, abdominal pain, jaundice or history of blood product transfusion within the previous three months **and** at least **ONE** of the following:
   a. Positive antigen or antibody test for hepatitis A virus, hepatitis B virus, hepatitis C virus or delta hepatitis
   b. Abnormal liver function tests (e.g., elevated ALT/ AST, bili rubin)
   c. Cytomegalovirus (CMV) detected in urine or oropharyngeal secretions

GI-HEP reporting instructions:

- Do not report hepatitis or jaundice of non-infectious origin (alpha-1 antitrypsin deficiency)
- Do not report hepatitis or jaundice resulting from exposure to hepatotoxins (alcoholic or acetaminophen-induced hepatitis)
- Do not report hepatitis or jaundice resulting from biliary obstruction (cholecystitis)

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

Intraabdominal infections must meet at least **ONE** of the following criteria:

1. Patient has organisms cultured from purulent material from intraabdominal space obtained during a surgical operation or needle aspiration
2. Patient has abscess or other evidence of intraabdominal infection seen during a surgical operation or histopathologic examination
3. Patient has at least **TWO** of the following signs or symptoms with no other recognised cause: fever (>38^{0}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 or 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, MRI, or radiolabelled scans [gallium, technetium] or on abdominal x-ray)

GI-IAB reporting instruction:

Do not report pancreatitis (an inflammatory syndrome characterized by abdominal pain, nausea, and vomiting associated with high serum levels of pancreatic enzymes) unless it is determined to be infectious in origin.

1.10 BJ: BONE AND JOINT INFECTION

BJ-BONE: Osteomyelitis

Osteomyelitis must meet at least **ONE** of the following criteria:

1. Patient has microorganisms cultured from bone
2. Patient has evidence of osteomyelitis on direct examination of the bone during a surgical operation or on histopathologic examination
3. Patient has at least **TWO** of the following signs or symptoms with no other recognised cause: fever (>38^{0}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 (e.g. *Streptococcus pneumoniae*)
    c. Radiographic evidence of infection (e.g., abnormal findings on x-ray, CT scan, MRI, radiolabelled scans [gallium, technetium])

BJ-BONE reporting instruction:

Report mediastinitis arising following cardiac surgery that is accompanied by sternal osteomyelitis as a surgical site infection-organ/space (SSI-O).

BJ-JNT: Joint or bursa

Joint or bursa infections must meet at least **ONE** of the following criteria:

1. Patient has microorganisms cultured from joint fluid or synovial biopsy
2. Patient has evidence of joint or bursa infection seen during a surgical operation or on histopathologic examination
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 (WBC) or pus 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, radiolabelled scans [gallium, technetium])

BJ-DISC: Disc space infection

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

1. Patient has microorganisms cultured from vertebral disc space tissue obtained during a surgical operation or needle aspiration
2. Patient has evidence of vertebral disc space infection seen during a surgical operation or on histopathologic examination
3. Patient has fever (>38^{0}C) with no other recognized cause or pain at the involved vertebral disc space **and** radiographic evidence of infection (e.g., abnormal findings on x-ray, CT scan, MRI, radiolabelled scan [gallium, technetium])
4. Patient has fever (>38^{0}C) with no other recognised cause and pain at the involved vertebral disc space **and** positive antigen test on blood or urine (e.g., *Haemophilus influenzae, Streptococcus pneumoniae, Neisseria meningitidis,* or Group B *Streptococcus*)

1.11 CNS: CENTRAL NERVOUS SYSTEM INFECTION

CNS-IC: Intracranial infection (brain abscess, subdural or epidural infection, encephalitis)
Intracranial infection must meet at least **ONE** of the following criteria:

1. Patient has microorganisms cultured from brain tissue or dura
2. Patient has an abscess or evidence of intracranial infection seen during a surgical operation or on histopathologic examination
3. Patient has at least **TWO** of the following signs or symptoms with no other recognised cause: headache, dizziness, fever (>38^{0}C), localising neurologic signs, changing level of consciousness or confusion **and** at least **ONE** of the following:
    a. Microorganisms seen on microscopic examination of brain or abscess tissue obtained by needle aspiration or by biopsy during a surgical operation or post mortem
    b. Positive antigen test on blood or urine
    c. Radiographic evidence of infection (e.g., abnormal findings on ultrasound, CT scan, MRI, radiolabelled brain scan or angiogram)
    d. Diagnostic single antibody titre (elevated IgM) or 4-fold increase in paired sera (elevation of IgG between acute and convalescent serum samples) for pathogen

    and if diagnosis is made in a living patient (ante mortem), clinician institutes appropriate antimicrobial therapy

CNS-IC reporting instruction:
If meningitis and a brain abscess are present together, report the infection as CNS-IC.

CNS-MEN: Meningitis or ventriculitis
Meningitis or ventriculitis must meet at least **ONE** of the following criteria:

1. Patient has microorganisms cultured from cerebrospinal fluid (CSF)
2. Patient has at least **ONE** of the following signs or symptoms with no other recognised cause: fever (>38^{0}C), headache, neck stiffness, meningeal signs, cranial nerve signs or irritability
   and at least **ONE** of the following:
    a. Increased CSF white cell count, elevated CSF protein and/or decreased CSF glucose
    b. Organisms seen on CSF Gram stain
    c. Organisms cultured from blood
    d. Positive antigen test of CSF, blood or urine
    e. Diagnostic single antibody titre (elevated IgM) or 4-fold increase in paired sera (elevation of IgG between acute and convalescent serum samples) for pathogen

    and if diagnosis is made in a living patient (ante mortem), clinician institutes appropriate antimicrobial therapy

CNS-MEN reporting instructions:

- Report CSF shunt infection as SSI-O if it occurs within 90 days of date of shunt placement surgery. If CSF shunt infection occurs more than 90 days after shunt placement or if CSF shunt infection occurs at any time after manipulation/access of the shunt, report as CNS-MEN
- Report meningo-encephalitis as CNS-MEN
- Report spinal abscess with meningitis as CNS-MEN

CNS-SA: Spinal abscess without meningitis

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

1. Patient has microorganisms cultured from abscess in the spinal epidural or subdural space
2. Patient has an abscess in the spinal epidural or subdural space seen during a surgical operation or at post mortem or evidence of an abscess seen during a histopathologic examination
3. Patient has at least **ONE** of the following signs or symptoms with no other recognised cause: Fever (>38^{0}C), back pain, focal tenderness, radiculitis, paraparesis or paraplegia **and** at least **ONE** of the following:
    a. Microorganisms cultured from blood
    b. Radiographic evidence of a spinal abscess (e.g., abnormal findings on myelography, ultrasound, CT scan, MRI or other scan)

and if diagnosis is made in a living patient (ante mortem), clinician institutes appropriate antimicrobial therapy.

Reporting instruction:

Report spinal abscess with meningitis as meningitis CNS-MEN

1.12 EENT: EYE, EAR, NOSE, THROAT OR MOUTH INFECTION

EENT-CONJ: Conjunctivitis

Conjunctivitis must meet at least **ONE** of the following criteria:

1. Patient has microorganisms cultured from purulent exudate obtained from the conjunctiva or adjacent tissues, such as eyelid, cornea, meibomian glands or lacrimal glands
2. Patient has pain or redness of conjunctiva or around eye and at least **ONE** of the following:
    a. White blood cells (WBC) or pus cells and organisms seen on Gram stain of exudate
    b. Purulent exudates from conjunctiva or adjacent tissues
    c. Positive antigen test (e.g., enzyme linked immunosorbant assay (ELISA) or immunofluorescence (IF) for *Chlamydia trachomatis*, herpes simplex virus, adenovirus) on exudate or conjunctival scrapings
    d. Multinucleated giant cells seen on microscopic examination of conjunctival exudate or scrapings
    e. Positive viral culture
    f. Diagnostic single antibody titre (elevated level of IgM) or 4-fold increase in paired sera (elevation of IgG between acute and convalescent serum samples) for pathogen

EENT-CONJ reporting instructions:

- Report other infections of the eye as EENT-EYE
- Do not report chemical conjunctivitis caused by silver nitrate (AgNO3) as a hospital-acquired infection
- Do not report conjunctivitis that occurs as a part of a more widely disseminated viral illness (such as measles, chickenpox, or upper respiratory tract infection URI)

EENT-EYE: Eye, other than conjunctivitis

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

1. Patient has microorganisms cultured from anterior or posterior chamber or vitreous fluid.
2. Patient has at least **TWO** of the following signs or symptoms with no other recognised cause: eye pain, visual disturbance or hypopyon **and** at least **ONE** of the following:
    a. Clinician diagnosis of an eye infection
    b. Positive antigen test on blood (e.g., *Haemophilus influenzae, Streptococcus pneumoniae*)
    c. Organisms cultured from blood

EENT-EAR: Ear mastoid

Otitis externa (external ear infection) must meet at least **ONE** of the following criteria:

1. Patient has microorganisms cultured from purulent drainage from ear canal
2. Patient has at least **ONE** of the following signs or symptoms with no other recognised cause: Fever (>38^{0}C), pain, redness or drainage from ear canal **and** organisms seen on Gram stain of purulent drainage

Otitis media (middle ear infection) must meet at least **ONE** of the following criteria:

1. Patient has microorganisms cultured from fluid from middle ear obtained by tympanocentesis or at surgical operation
2. Patient has at least **TWO** of the following signs or symptoms with no other recognised cause: fever (>38^{0}C), pain in the eardrum, inflammation, retraction or decreased mobility of eardrum or fluid behind eardrum

Otitis interna (inner ear infection) must meet at least **ONE** of the following criteria:

1. Patient has microorganisms cultured from fluid obtained from inner ear at surgical operation

2. Patient has a clinician diagnosis of inner ear infection

Mastoiditis must meet at least **ONE** of the following criteria:

1. Patient has microorganisms cultured from purulent drainage from mastoid
2. Patient has at least **TWO** of the following signs or symptoms with no other recognised cause: Fever (>38^{0}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

EENT-ORAL: Oral cavity (mouth, tongue, or gums)

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

1. Patient has microorganisms cultured from purulent material from tissues of oral cavity
2. Patient has an abscess or other evidence of oral cavity infection seen on direct examination, during a surgical operation or during a histopathologic examination
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. Microorganisms seen on Gram stain
   b. Positive KOH (potassium hydroxide) stain for fungal hyphae
   c. Multinucleated giant cells seen on microscopic examination of mucosal scrapings
   d. Positive antigen test on oral secretions
   e. Diagnostic single antibody titre (elevated level of IgM) or 4-fold increase in paired sera (elevation of IgG between acute and convalescent serum samples) for pathogen
   f. Clinician diagnosis of infection and treatment with topical or oral antifungal therapy

EENT-ORAL reporting instruction:

Report hospital-acquired primary herpes simplex infections of the oral cavity as EENT- ORAL; Recurrent herpes infections are not HAI.

EENT-SINU: Sinusitis

Sinusitis must meet at least **ONE** of the following criteria:

1. Patient has microorganisms cultured from purulent material obtained from sinus cavity
2. Patient has at least **ONE** of the following signs or symptoms with no other recognised cause: Fever (>38^{0}C), pain or tenderness over the involved sinus, headache, purulent exudate or nasal obstruction **and** at least **ONE** of the following:
   a. Positive trans-illumination
   b. Positive radiographic examination (including CT scan)

EENT-UR: Upper respiratory tract, pharyngitis, laryngitis, epiglottitis

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

1. Patient has at least **TWO** of the following signs or symptoms with no other recognised cause: fever (>38^{0}C), erythema of pharynx, sore throat, cough, hoarseness or purulent exudate in throat **and** at least **ONE** of the following:
   a. Microorganisms cultured from the specific site
   b. Microorganisms cultured from blood
   c. Positive antigen test on blood or respiratory secretions
   d. Diagnostic single antibody titre (elevated level of IgM) or 4-fold increase in paired sera (elevation of IgG between acute and convalescent serum samples) for pathogen
   e. Clinician diagnosis of an upper respiratory infection
2. Patient has an abscess seen on direct examination, during a surgical operation, or during a histopathologic examination

1.13 REPR: REPRODUCTIVE TRACT INFECTION

REPR-EMET: Endometritis
Endometritis must meet at least **ONE** of the following criteria:

1. Patient has microorganisms cultured from fluid or tissue from endometrium obtained during surgical operation, by needle aspiration or by brush biopsy
2. Patient has at least **TWO** of the following signs or symptoms with no other recognised cause: Fever (>38^{0}C), abdominal pain, uterine tenderness or purulent drainage from uterus

REPR-EMET reporting instruction:
Report postpartum endometritis as a hospital-acquired infection unless the amniotic fluid is infected at the time of admission or the patient was not admitted to hospital until 48 hours after rupture of the membrane

REPR-EPIS: Episiotomy
Episiotomy infection must meet at least **ONE** of the following criteria:

1. Post-vaginal delivery patient has purulent drainage from the episiotomy wound
2. Post-vaginal delivery patient has an episiotomy abscess

REPR-VCUF: Vaginal cuff infections by definition occur post-hysterectomy. Therefore, if a vaginal cuff infection is diagnosed within 30 days of hysterectomy, it should be reported as SSI-O. If vaginal cuff infection is diagnosed >30 days after hysterectomy, record as REPR-VCUF
Vaginal cuff infections must meet at least **ONE** of the following criteria:

1. Post-hysterectomy patient has purulent drainage from the vaginal cuff
2. Post-hysterectomy patient has an abscess at the vaginal cuff
3. Post-hysterectomy patient has pathogens cultured from fluid or tissue obtained from the vaginal cuff

REPR-VCUF reporting instruction:
Report vaginal cuff infections as SSI-O if diagnosed within 30 days of hysterectomy

REPR-OREP: Other infections of the male reproductive tract (epididymis, testes, prostate) or female reproductive tract (vagina, ovaries, uterus, or other deep pelvic tissues, excluding endometritis or vaginal cuff infections)
Other infections of the male or female reproductive tract must meet at least **ONE** of the following criteria:

1. Patient has microorganisms cultured from tissue or fluid from affected site
2. Patient has an abscess or other evidence of infection of affected site seen during a surgical operation or on histopathologic examination
3. Patient has **TWO** of the following signs or symptoms with no other recognised cause: Fever (>38^{0}C), nausea, vomiting, pain, tenderness or dysuria **and** at least **ONE** of the following:
    a. Microorganisms cultured from blood
    b. Clinician diagnosis

1.14 SYS: SYSTEMIC INFECTION

SYS-DI: Disseminated infection

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.

SYS-DI reporting instructions:

- Use this code (SYS-DI) for viral infections involving multiple organ systems (e.g., varicella, measles, rubella, mumps, erythema infectiosum/parvovirus B19). These infections often can be identified by clinical criteria alone
- Do not use this code for HAI with multiple metastatic sites, such as bacterial endocarditis with embolic infection to other sites. Only the primary site of such disseminated HAI should be reported
- Do not report fever/pyrexia of unknown origin (FUO/PUO) as SYS-DI
- Report viral exanthems or rash illness as SYS-DI

SYS-CSEP: Clinical sepsis in adults and children

Patient has at least **ONE** of the following clinical signs or symptoms with no other recognised cause: Fever (>38° C), hypotension (systolic blood pressure <90 mmHg) or oliguria (urine output <20 ml/hr)

- **and** blood culture not done or no micro-organisms or antigen detected in blood
- **and** no apparent infection at another site
- **and** clinician institutes treatment for sepsis

SYS-CSEP reporting instructions:

- Do not use this code unless there is absolutely no other potential focus for HAI (last resort definition)
- For CSEP in neonates, use NEO-CSEP case definition (see below)

1.15 NEO: SPECIFIC NEONATAL CASE DEFINITIONS

Where a suspected HAI in a neonate does not meet a specific neonatal case definition below, (e.g., skin infection) check the other HAI definitions and record as appropriate.

NEO-CSEP: Clinical sepsis in a neonate

ALL of the **THREE** following criteria:

1. Supervising clinician started appropriate antimicrobial therapy for sepsis for a duration of therapy of at least 5 days
2. No detection of microorganisms in blood culture or blood culture not done
3. No obvious infection at another site

and TWO of the following criteria (without other apparent cause):

a. Fever (>38°C) or temperature instability or hypothermia (<36.5°C)
b. Tachycardia (heart rate > 200 beats per minute) or new/increased bradycardia (heart rate <80 beats per minute)
c. Capillary refilling time (CRT) >2 seconds
d. New or increased apnoea(s) > 20 seconds
e. Unexplained metabolic acidosis
f. New-onset hyperglycaemia (>140mg/dl)
g. Another sign of sepsis: skin colour (only if the capillary refill time (CRT) is not used), laboratory signs (CRP, interleukin), increased oxygen requirement (intubation), unstable general condition of the patient, apathy

Note: Detection of coagulase-negative staphylococci (CoNS) in one set of blood cultures taken from a neonate should not exclude the diagnosis of clinical sepsis. Clinical sepsis in a neonate (NEO-CSEP) can also be diagnosed with a single positive blood culture with CoNS, which would usually be considered as a blood culture contaminant, unless other criteria of laboratory-confirmed bloodstream infection are met, provided the criteria of clinical sepsis (NEO-CSEP) above have been met.

NEO-LCBI: Laboratory-confirmed BSI (with organisms other than CoNS) in a neonate

A recognised pathogen (other than coagulase-negative staphylococci (CoNS) cultured from blood or cerebrospinal fluid (CSF). CSF is included in this definition because meningitis in neonates is usually haematogenous. A positive CSF can be regarded as evidence of BSI in a neonate, even if blood cultures remain sterile or blood cultures were not taken **and** at least **TWO** of:

a. Fever (>38°C) or temperature instability or hypothermia (<36.5°C)
b. Tachycardia (heart rate > 200 beats per minute) or new/increased bradycardia (heart rate <80 beats per minute)
c. Capillary refilling time (CRT) >2 seconds
d. New or increased apnoea(s) > 20 seconds)
e. Unexplained metabolic acidosis
f. New-onset hyperglycaemia (>140mg/dl)
g. Another sign of sepsis: skin colour (only if the capillary refill time (CRT) is not used), laboratory signs (CRP, interleukin), increased oxygen requirement (intubation), unstable general condition of the patient, apathy

Note:

- Report the source of the neonatal BSI, if identified, in the field 'BSI source'
- If the neonate meets both of the case definitions for NEO-LCBI and NEO-CNSB, prioritise reporting of BSI as NEO-LCBI

NEO-CNSB: Laboratory-confirmed BSI with coagulase-negative staphylococci (CoNS) in a neonate

Coagulase-negative staphylococci (CoNS), includes *Staphylococcus epidermidis,* cultured from blood or vascular catheter tip **and** at least **TWO** of:

a. Fever (>38°C) or temperature instability or hypothermia (<36.5°C)
b. Tachycardia (heart rate > 200 beats per minute) or new/increased bradycardia (heart rate <80 beats per minute)
c. Capillary refilling time (CRT) >2 seconds
d. New or increased apnoea(s) > 20 seconds)
e. Unexplained metabolic acidosis
f. New-onset hyperglycaemia (>140mg/dl)
g. Another sign of sepsis: skin colour (only if the capillary refill time (CRT) is not used), laboratory signs (CRP, interleukin), increased oxygen requirement (intubation), unstable general condition of the patient, apathy)

and neonate has **ONE** of: C-reactive protein >2.0 mg/dL, immature/total neutrophil ratio (I/T ratio) >0.2, leukocytes <5/nL, platelets <100/nL.

Note:

- Report the source of the neonatal BSI, if identified, in the field 'BSI source'
- If the neonate meets both of the case definitions for NEO-LCBI and NEO-CNSB, prioritise reporting of BSI as NEO-LCBI

NEO-PNEU: Pneumonia in a neonate

Neonate has respiratory compromise **and** evidence of a new pulmonary infiltrate, consolidation or pleural effusion on chest X ray **and** at least **FOUR** of:

a. Temperature (>38^0C or <36.5^0C) or temperature instability
b. Tachycardia or bradycardia
c. Tachypnoea or apnoea
d. Dyspnoea
e. Increased respiratory secretions
f. New onset of purulent sputum
g. Isolation of a microorganism from respiratory secretions
h. C-reactive protein >2.0 mg/dL
i. Immature/total neutrophil ratio (I/T ratio) >0.2.

NEO-NEC: Necrotising enterocolitis in a neonate

Histopathological evidence of necrotising enterocolitis

OR

At least **ONE** characteristic radiographic abnormality (pneumoperitoneum, pneumatosis intestinalis, unchanging 'rigid' loops of small bowel) **and** at least **TWO** of the following without other explanation: vomiting, abdominal distension, pre-feeding residuals, persistent microscopic or gross blood in stools

Appendix C: PPS Steering Group Membership – Ireland

MEMBER	TITLE	REPRESENTING
Dr Karen Burns (Chairperson)	Consultant Clinical Microbiologist	HSE-HPSC
Ms Helen Murphy	Infection Prevention & Control Nurse Manager	HSE-HPSC
Ms Sarah Hennessy	Surveillance Scientist	HSE-HPSC
Mr Stephen Murchan	Surveillance Scientist	HSE-HPSC
Mr Myles Houlden	IT Manager	HSE-HPSC
Ms Melissa Leonard	Administrative Officer	HSE-HPSC
Ms Margaret Nadin	Project Manager,	HSE-NMPDU, Dublin North-East
Ms Mary McKenna	Lead Infection Prevention & Control ADON	HSE-HCAI & AMR Clinical Programme, Quality Improvement Division
Ms Roisin Breen	Programme Manager	HSE-HCAI & AMR Clinical Programme, Quality Improvement Division
Dr Robert Cunney	Consultant Clinical Microbiologist & HCAI & AMR Clinical Programme Lead	HSE-HCAI & AMR Clinical Programme, Quality Improvement Division
Dr Fidelma Fitzpatrick	Consultant Clinical Microbiologist & Senior Lecturer	Beaumont Hospital & RCSI
Professor Hilary Humphreys	Consultant Clinical Microbiologist & Professor of Clinical Microbiology	Beaumont Hospital & RCSI
Ms Sheila Donlon	ADON Infection Prevention & Control	Beaumont Hospital
Ms Mary Regan	Antimicrobial Senior Pharmacist	Sligo University Hospital & Chairperson of Irish Antimicrobial Pharmacists Group
Ms Clare MacGabhann	National Lead & Director of Nursing & Midwifery (Prescribing)	HSE-ONMSD
Ms Annette Cuddy	Assistant Director of Nursing & Midwifery (Prescribing)	HSE-ONMSD
Dr Rachel Grainger	Specialist Registrar, Clinical Microbiology	Beaumont Hospital
Sarah O'Sullivan	Quality & Patient Safety Lead	Bon Secours Hospital, Limerick & Private Hospitals Association
Elaine Doherty	Clinical Nurse Specialist, Infection Prevention & Control	Hermitage Clinical & Private Hospitals Association

Appendix D – Algorithm for diagnosis of catheter-related infection