Point Prevalence Survey of Healthcare-Associated Infections & Antimicrobial Use in European Acute Care Hospitals

Irish Protocol 2023

Version 2.0

(Adapted from the Original © ECDC Protocol: v 6.1)

Contents

1.0. Background

Ireland conducted its first point prevalence survey (PPS) on antimicrobial use and healthcare associated infection (HAI) in 2006 in collaboration with the UK. In 2010, EU member states agreed to organise a European PPS of HAI and antimicrobial use in acute care hospitals every five years. ECDC undertook the responsibility of developing an agreed EU protocol for the first European PPS and 29 EU member states conducted the first PPS over a 2-year period, 2011/2012 (May 2012 in Ireland). The second PPS took place over the period 2016/2017 (May 2017 in Ireland).

Table. Prevalence of healthcare-associated infection (HAI) and antimicrobial use (AMU) for EU/EEA countries overall and for Ireland in ECDC Point Prevalence Surveys organised in 2011/2012 and 2016/2017

	EU/EEA	Ireland
PPS 2011/2012		
HAI prevalence	6.0%	5.2%
AMU prevalence	35.0%	34.0%
PPS 2016/2017		
HAI prevalence	5.5%	6.1%
AMU prevalence	35.5%	39.7%

Note: there were amendments to the protocol for the 2nd PPS thus the data are not directly comparable.

The third EU-wide PPS will take place during 2022/2023, one year after it was originally planned due to COVID-19 pandemic. Ireland will perform the PPS in **May 2023**.

2.0. Objectives

- Measure the overall prevalence of HAI, types of HAI, HAI causative pathogens and key antimicrobial resistance profiles
- Measure the overall prevalence of antimicrobial use, types of antimicrobial prescribed, as well as diagnosis antimicrobials are intended to treat
- Identify priority areas for future interventions to prevent and control HAI, for antimicrobial stewardship and for future targeted incidence surveillance of HAI
- Contribute data from Ireland to the ECDC report
- 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

- **Training Dates:** Training days for PPS data collectors will be held around Ireland during **April 2023**
- **PPS Dates**: In Ireland, the PPS will be conducted in all participating hospitals between **Tuesday May 2nd and Wednesday May 31st 2023**
- **Completion of data entry**: In Ireland, the deadline for completion of data entry using HelicsWin.Net software (from ECDC) will be **Friday June 23rd 2023**
- **Hospital reports** will be available once all data submitted by participating hospitals has been validated and analysed local hospital reports should be available in **Q3 2023**
- **Submission of data to ECDC:** Data from all participating hospitals will be submitted to ECDC by the **end of July 2023** for inclusion in the European Report
- **PPS National Report** is expected in **Q4 2023**
- **Final European PPS report** publication date is yet to be confirmed by ECDC

4.0. Key Protocol Changes 2023 versus 2017

The changes are listed below:

- At hospital and ward level:
  - Removal of hospital group variables (replaced by an optional hospital site code variable at ward level), nursing staffing levels, `matrix' variables to measure the implementation of multimodal strategies, single patient rooms with individual toilet and shower;
  - Addition of the questions on multimodal strategies from the World Health Organisation Infection Prevention and Control Assessment Framework (WHO IPCAF) questionnaire (core component 5);
  - Addition of two questions on (semi-)automated surveillance of HAIs;
  - Addition of COVID-19 indicators: burden of COVID-19 last year (number of hospitalised cases and number of hospital outbreaks), current COVID-19 case load (hospital and ICU), HCW vaccination coverage against COVID-19 and against Influenza;
- Patient data:
  - Removal of the presence of a peripheral vascular catheter;
  - Addition of the vaccination status of the patient against COVID-19;
- Antimicrobial use data:
  - Removal of the variables date start antimicrobial, date start first antimicrobial and dosage per day (number, strength and unit of doses per day);
- HAI data:
  - Addition of the HAI codes for COVID-19; COVID -19 Asymptomatic 'COV-ASY', COVID-19 Mild or Moderate 'COV-MM', and COVID-19 severe 'COV-SEV' and of the microorganism code 'VIRCOV' for SARS-CoV-2;
  - Addition of the HAI origin 'LTCF';
  - Changes in the case definition of `active HAI':
    - include HAIs associated with a stay in other healthcare facilities, not just acute care hospitals
    - HAIs in newborns now explicitly added (rather than only in a footnote);
    - added criteria for healthcare-associated COVID-19*;
  - Addition of vasopressor treatment for the treatment of the consequences of the HAI, as marker of septic shock;
  - Change of the labels of the antimicrobial susceptibility codes S and I to the new EUCAST terminology;
- National data: addition of the national definition of full vaccination against COVID-19 in healthcare workers at the time of the PPS;
- Codebook:
  - Antimicrobial ATC codes: updated with new codes added since 2016;
  - Microorganism codes:
    - *Enterobacter aerogenes* (ENBAER) was renamed to *Klebsiella aerogenes* (KLEAER). Both the new and the old codes are accepted for the PPS in 2022-2023;
    - *Klebsiella pneumoniae* (KLEPNE) was renamed to *Klebsiella pneumoniae* complex (same code) to include *K. pneumoniae senso strictu* and related species and subspecies recently identified by genomic characterisation of clinical isolates identified as *K. pneumoniae* via biochemical tests or mass spectrometry;
  - HAI case definitions:
    - COVID-19 (COV): addition of a case definition of confirmed COVID-19 by severity (COV-ASY, COV-MM, COV-SEV);
    - Active HAI: adaptation of the definition to include HAIs imported from non-acute healthcare facilities;

        - Criteria for healthcare-associated COVID-19 during current hospitalisation now include `possible' healthcare-associated COVID-19 with onset from day 3 to day 7 (instead of `indeterminate association' and instruction in notes to report them);
        - GI-CDI: renamed to *Clostridioides difficile* infection;
- Other changes:
    - Criteria for national representativeness: no change in the criteria, but `poor' changed to `medium' and `very poor' to `poor' in accordance with change in the protocol for PPSs in LTCFs (HALT-4)

5.0. Protocol

5.1. Where will data be collected? (Inclusion/exclusion criteria)

The following hospitals, wards and patients are eligible for inclusion in the survey:

Hospital Level

- All acute care hospitals

Ward Level

- All acute wards, including:
    - Chronic care and long-term care wards;
    - Acute psychiatric wards;
    - Neonatal ICUs
- 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 or bays attached to ED or who have been admitted and transferred to a day ward at 8am

EXCEPT

- Emergency Departments (see exceptions above)
- Day units/wards unless they contain patients that have been admitted overnight (i.e. exclude strictly Day patients specifically)
- Labour/delivery suites
- Operating theatres
- Outpatient departments
- Outpatient dialysis units
- Separate units specifically designated as residential care units (i.e. completely separate building on the hospital grounds acting as a nursing home)

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
- Patients admitted to acute hospital wards who await transfer to a long-term care facility should be **included**

EXCEPT

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

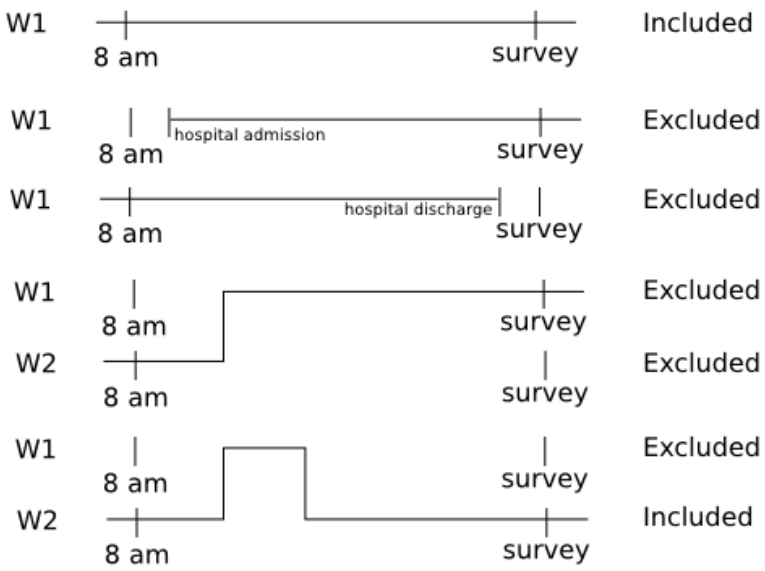


Figure 1: Examples of Inclusion and Exclusion to the PPS (W1= Ward 1, W2: Ward 2)

5.2. Who should collect the data?

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 2 below.

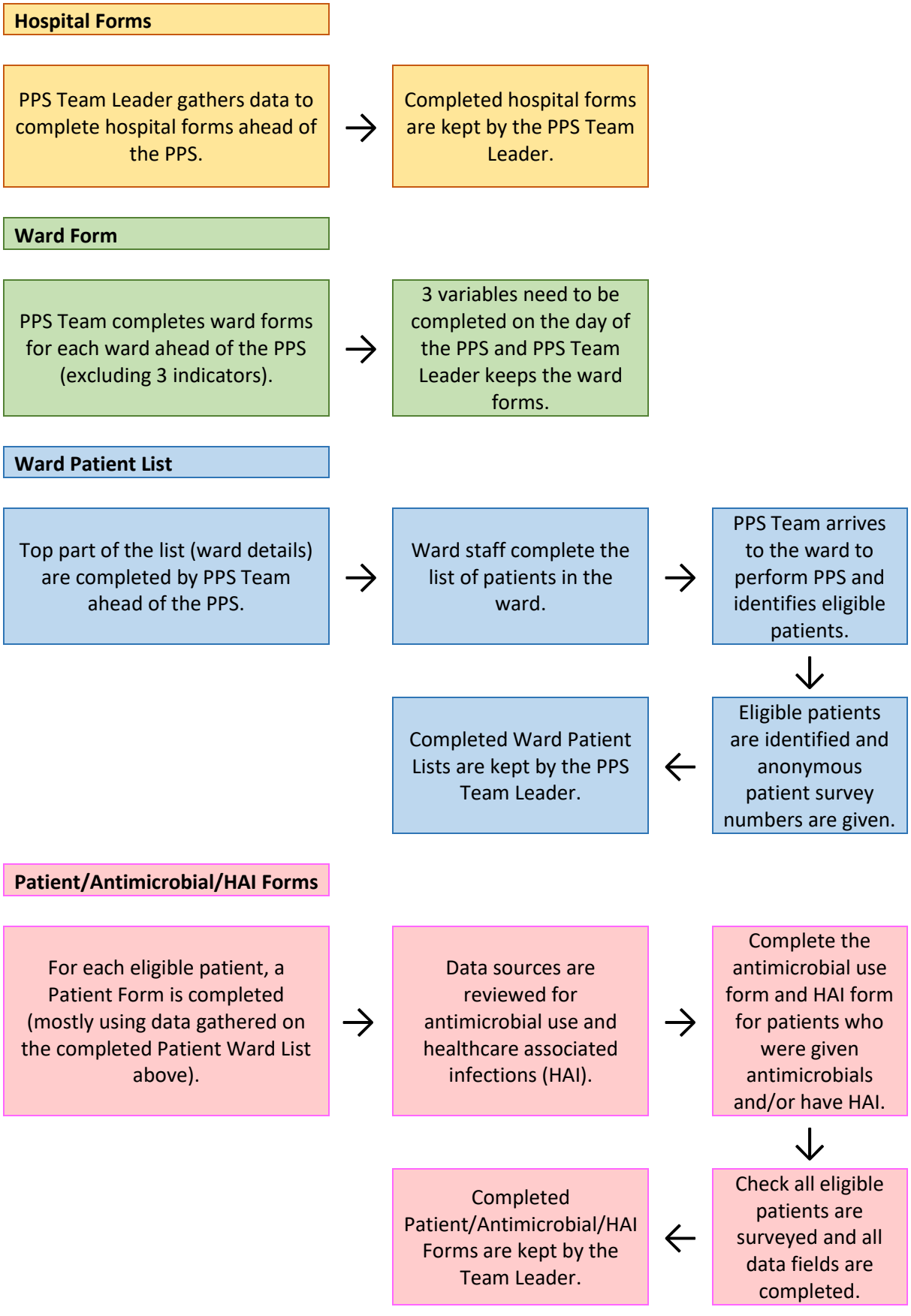


Figure 2: Data Collection Algorithm

5.3. What data will be collected?

Anonymous denominator data are collected for each patient.

Numerator data are collected for each patient having an active healthcare-associated 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 or a long-term care facility stay.**

- A patient may develop HAI on day 3 or later 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 long-term care facility

  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 or long-term care facility with *Clostridium difficile* infection

  OR
- 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

  OR
- A patient may be readmitted with COVID-19 within 48 hours of discharge following a previous stay of more than 7 days in the same or other healthcare facility.

  OR
- A new born might develop symptoms within 48 hours if they never left the hospital they were born in

5.4. When should data be collected?

- In Ireland, the survey will **commence on Tuesday May 2nd and end on Wednesday May 31st 2023**
- 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 (or Wednesdays, if the preceding Monday is a bank holiday) and Fridays. This will optimise collection of surgical antimicrobial prophylaxis information for elective surgical admissions on Mondays (or Tuesday, if a bank holiday)
- Paper data collected during the survey must be entered onto **HelicsWin.Net** by the data collection team in each participating hospital
- The complete dataset for each hospital must be entered into HelicsWin.Net by a **FINAL deadline of Friday June 23rd 2023**

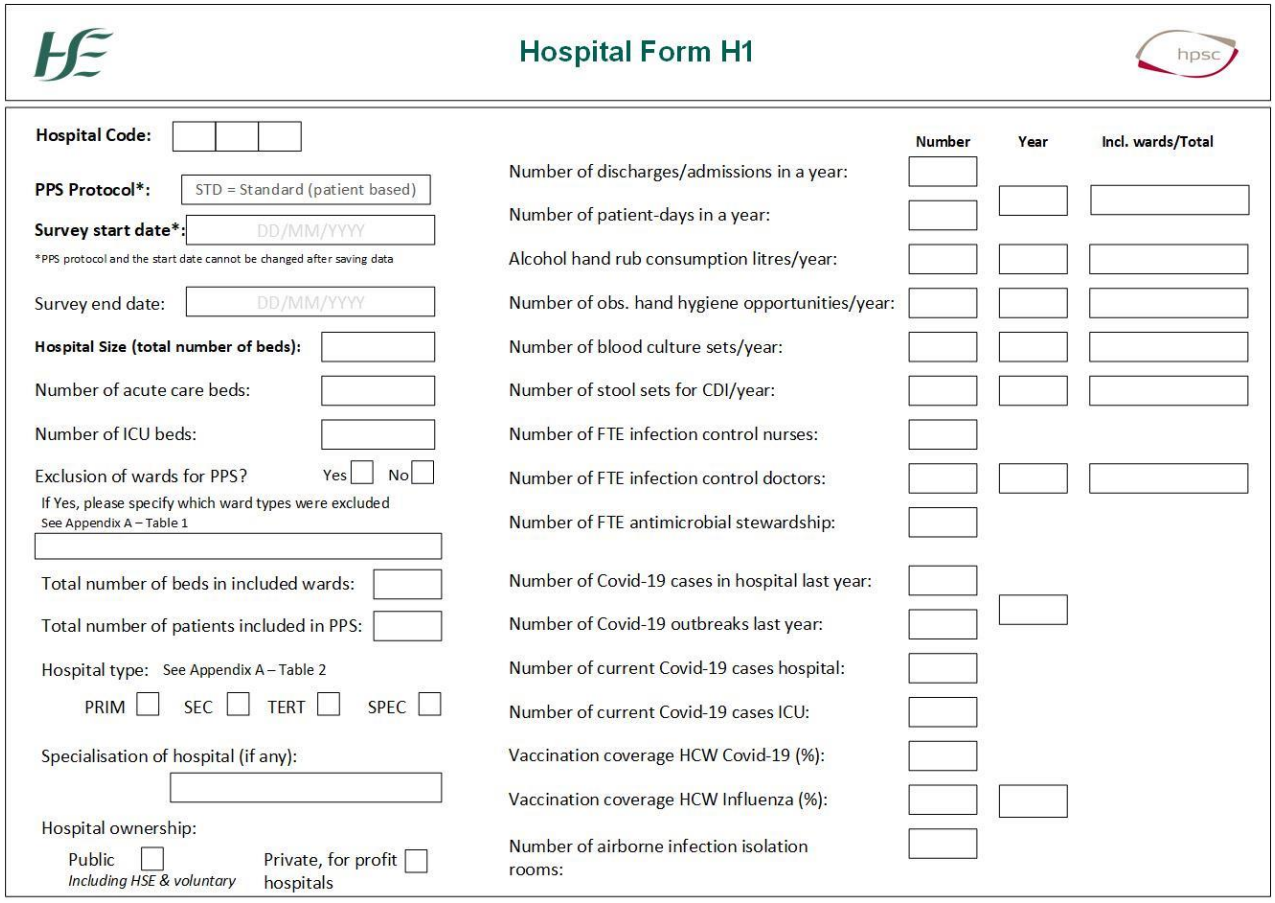
5.5. Completion of the Hospital Forms (Form H1, H2, H3)

The PPS team leader in each hospital is responsible for completing and returning hospital forms on behalf of the hospital. Only three of the four hospital forms (H1, H2 and H3) need to be completed for each hospital.

Please note: For the purpose of the Irish PPS protocol, we are not recommending that hospitals complete the WHO IPCAF questionnaire in place of form H3, as is recommended by ECDC. This is a much larger questionnaire (12 pages) compared to form H3 (1 page). If hospitals wish to complete the WHO IPCAF questionnaire, it can be filled out on WHO's IPC website portal (https://ipcportal.who.int/ecdc).

H4 is ***not*** required since it contains variables similar to ward level indicators.

5.5.1. Hospital Form H1



Hospital Form H1

Hospital Code:

PPS Protocol*: STD = Standard (patient based)

Survey start date*: DD/MM/YYYY

*PPS protocol and the start date cannot be changed after saving data

Survey end date: DD/MM/YYYY

Hospital Size (total number of beds):

Number of acute care beds:

Number of ICU beds:

Exclusion of wards for PPS? Yes ☐ No ☐

If Yes, please specify which ward types were excluded
See Appendix A – Table 1

Total number of beds in included wards:

Total number of patients included in PPS:

Hospital type: See Appendix A – Table 2

PRIM ☐ SEC ☐ TERT ☐ SPEC ☐

Specialisation of hospital (if any):

Hospital ownership:

Public ☐ *Including HSE & voluntary* Private, for profit ☐ hospitals

	Number	Year	Incl. wards/Total
Number of discharges/admissions in a year:			
Number of patient-days in a year:			
Alcohol hand rub consumption litres/year:			
Number of obs. hand hygiene opportunities/year:			
Number of blood culture sets/year:			
Number of stool sets for CDI/year:			
Number of FTE infection control nurses:			
Number of FTE infection control doctors:			
Number of FTE antimicrobial stewardship:			
Number of Covid-19 cases in hospital last year:			
Number of Covid-19 outbreaks last year:			
Number of current Covid-19 cases hospital:			
Number of current Covid-19 cases ICU:			
Vaccination coverage HCW Covid-19 (%):			
Vaccination coverage HCW Influenza (%):			
Number of airborne infection isolation rooms:			

Figure 3: Hospital Form H1

Definitions of Variables in Hospital Form 1

Hospital code: Unique hospital code assigned by the national PPS coordinating centre = three digits (this is the same code as used in the previous PPSs).

PPS Protocol: Select STD=Standard (patient-based) as we are following the Standard Protocol in Ireland.

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. Enter it in **DD/MM/YYYYY** format. **Note:** ECDC recommends a maximum collection period of 2 weeks in an individual hospital.

Hospital size: Total number of beds in the hospital, excluding beds which are exclusively used for day cases.

Number of acute care beds: Number of acute care beds in the hospital. If a hospital has a separate unit (i.e. building) designated for long-term care patients, then these beds should not be included. Long-term wards in the hospital should be included.

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 enter number of ICU beds as zero (0). Note: High dependency units are not considered as ICU beds.

Ward exclusion: Were any wards excluded for the PPS in your hospital? Answer as Yes or No.

Note: It is recommended that all eligible acute wards are included.

Specify excluded wards: If there is a ward that is excluded please specify which wards were excluded and use specialty codes (***Appendix A, Table 1***) to specify ward speciality.

Total number of beds in included wards: Sum of the number of beds in wards that were included in the PPS. Include vacant beds and exclude trolleys.

Total number of patients included in PPS: Sum of the number of patients included in the PPS (including patients on trolleys).

Hospital type: Specify hospital type for your hospital as indicated in ***Appendix A, Table 2***.

- **PRIM:** Refers to primary hospitals (or smaller general hospitals/Model 2)
- **SEC:** Refers to secondary hospitals (or larger general hospitals/Model 3
- **TERT:** Refers to tertiary hospitals (Model 4)
- **SPEC:** Refers to specialised hospitals

Hospital specialisation type: Free text. For hospitals with a single specialty, please enter the specialty type here as indicated in ***Appendix A, Table 2***.

Hospital ownership: Specify hospital ownership.

- **PUB:** Public hospitals including all HSE and Voluntary hospitals.
- **PRIVFP:** Private, for profit hospitals: Hospitals that are set up for the purpose of producing goods and services to generate financial gain for their owners.

Hospital indicators:

Year data: Record the latest full year for which the figures are provided. Please take a look at Figure 3 to determine which variables require the data from the exact same year, since one indicator could be used as a numerator while the next one is used as denominator. In such circumstances, it is important to record the numbers from the same year.

Included wards only/or total number for hospital: Provide the number for wards that are included in the PPS only.

Number of discharges/admissions: Number of hospital discharges in a given year (data from 2022 specify year in second column). Use number of admissions if discharge numbers are not available. Specify that this is **total for hospital** (**TOT**) in appropriate column.

Number of patient-days (or bed-days used): Number of hospital patient-days in 2022 (specify year as 2022 in second column). Specify that this is **total for hospital** (**TOT**) in the last column. HPSC can provide this data.

Alcohol hand rub consumption: Total number of litres of alcoholic hand rub used (or litres purchased) in 2022 (specify 2022 in second column). Specify that this is **total for hospital** (**TOT**) in last column.

Number of observed hand hygiene opportunities: Number of observed hand hygiene opportunities in 2022 (data from 2022, specify year in second column). Specify that this is **total for hospital** (**TOT**) in last column.

Note: Report the total number of observed opportunities for hand hygiene (=the denominator of hand hygiene compliance), not only the compliant observations.

Number of blood cultures per year: Total number of blood culture sets received from the hospital and incubated by the microbiology laboratory in 2022 (specify year in second column). HPSC can provide this data.

Number of stool tests for CDI per year: Total number of inpatient faeces specimens received from the hospital and tested for *C. difficile* by the microbiology laboratory in 2022 (specify year in second column). HPSC cannot provide this data.

Note: Microbiology laboratories that process faeces specimens from more than 1 hospital will need to breakdown and provide the total number of inpatient faeces specimens tested for *C. difficile* for your own hospital, not the total number processed for all hospitals combined. The microbiology laboratory should also **exclude** faeces specimens from **non-inpatients** (e.g. outpatients, day care, primary care, long-term care facilities)

Number of FTE (full time equivalent; or WTE, whole time equivalent) infection control nurses: Number of FTE infection control nurses in the hospital. Specify year of data collection (should be 2023) and that the number of FTE infection control nurses is provided for the entire hospital (TOT).

Infection control nurses are nurses 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 etc.

Number of FTE infection control doctors: Number of FTE infection prevention & control doctors currently working in hospital. Please ensure that the reported number was collected for the same year and for the entire hospital as the number of FTE infection control nurses (should be 2023).

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 etc.

Note: 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 FTE).

Number of FTE antimicrobial stewardship: Number of WTE antimicrobial stewardship practitioners in the hospital. Please ensure that the reported number was collected for the same year as the number of FTE infection control nurses (2023 if available).

FTE antimicrobial stewardship refers to the dedicated time of an antimicrobial pharmacist or clinical microbiologist/infectious diseases doctor employed by the hospital and specifically paid for antimicrobial stewardship tasks as part of their daily practice, not the time spent by treating physicians on antimicrobial stewardship activities (e.g. post-prescription review) as part of their daily practice.

Note: In case antimicrobial stewardship tasks are an integral part of the job description/daily activities of the microbiology/infectious diseases doctors (or equivalent), the estimated FTE (proportion of his/her time) spent on antimicrobial stewardship activities should be deduced from the FTE infection control doctors (or equivalent) and be reported separately.

Number of COVID-19 cases in the hospital last year: Number of COVID-19 cases in the hospital in 2022, including hospitalised community-onset cases and hospitalised hospital-onset cases. Specify the year. If possible count episodes of infection, including recurrent or reinfections, rather than just positive tests.

Number of COVID-19 hospital outbreaks last year: Number of COVID-19 outbreaks or clusters in the current hospital in 2022. Specify the year.

A COVID-19 hospital outbreak is a minimum of 2 confirmed healthcare-associated COVID-19 cases among patients and/or healthcare workers epidemiologically linked in time and space.

Number of current COVID-19 cases in the hospital: Number of COVID-19 cases in hospital at the time of the PPS, including hospitalised community-onset cases and hospitalised hospital-onset cases. Report the number on the last PPS day in current hospital if possible.

Number of COVID-19 cases currently in intensive care: Number of COVID-19 cases in intensive care units (ICUs) or high dependency units (HDUs) at the time of the PPS. Report the number on the last PPS day in current hospital if possible.

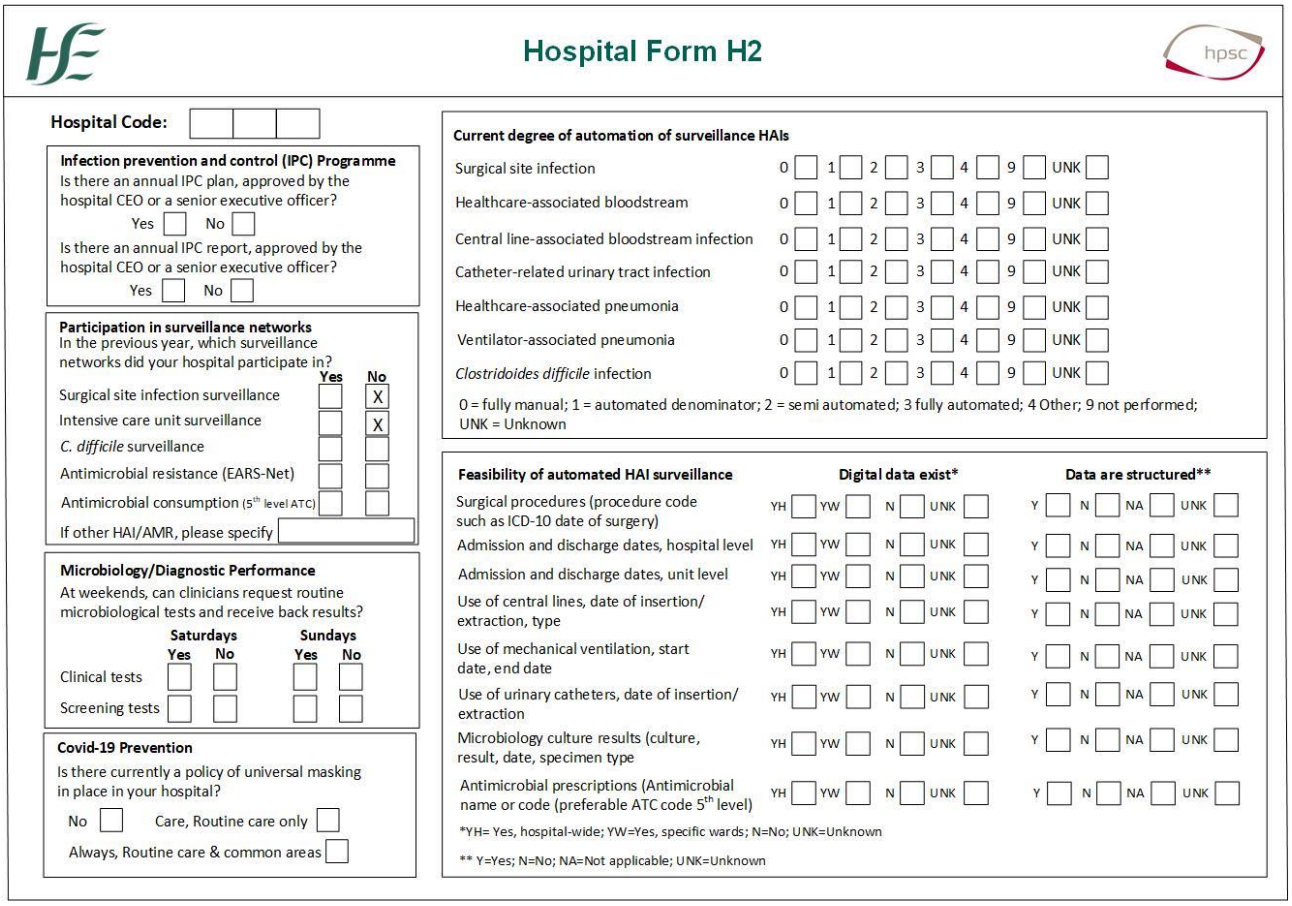
Vaccination coverage of HCW against COVID-19 (%): Current percentage of healthcare workers fully vaccinated against COVID-19.

Full vaccination means completion of base doses with or without booster doses. (Fully vaccinated: at least 1 dose for Janssen/Jcovden, at least 2 doses for Pfizer/BioNTech, Moderna/Spikevax, Novavax and AstraZeneca).

Vaccination coverage of HCW against Influenza (%): Percentage of healthcare workers vaccinated against Influenza during the last Influenza vaccination campaign. Specify the year of vaccination campaign.

Number of airborne infection isolation rooms: Number of airborne infection isolation rooms in the hospital. An airborne infection isolation room is defined as a hospital room with negative pressure ventilation and an anteroom.

5.5.2. Hospital Form H2



Hospital Form H2

Hospital Code:

Infection prevention and control (IPC) Programme
Is there an annual IPC plan, approved by the hospital CEO or a senior executive officer? Yes ☐ No ☐
Is there an annual IPC report, approved by the hospital CEO or a senior executive officer? Yes ☐ No ☐

Participation in surveillance networks
In the previous year, which surveillance networks did your hospital participate in?

	Yes	No
Surgical site infection surveillance	☐	X
Intensive care unit surveillance	☐	X
C. difficile surveillance	☐	☐
Antimicrobial resistance (EARS-Net)	☐	☐
Antimicrobial consumption (5th level ATC)	☐	☐

If other HAI/AMR, please specify ☐

Microbiology/Diagnostic Performance
At weekends, can clinicians request routine microbiological tests and receive back results?

	Saturdays Yes	Saturdays No	Sundays Yes	Sundays No
Clinical tests	☐	☐	☐	☐
Screening tests	☐	☐	☐	☐

Covid-19 Prevention
Is there currently a policy of universal masking in place in your hospital?
No ☐ Care, Routine care only ☐
Always, Routine care & common areas ☐

Current degree of automation of surveillance HAIs

	0	1	2	3	4	9	UNK
Surgical site infection	☐	☐	☐	☐	☐	☐	☐
Healthcare-associated bloodstream	☐	☐	☐	☐	☐	☐	☐
Central line-associated bloodstream infection	☐	☐	☐	☐	☐	☐	☐
Catheter-related urinary tract infection	☐	☐	☐	☐	☐	☐	☐
Healthcare-associated pneumonia	☐	☐	☐	☐	☐	☐	☐
Ventilator-associated pneumonia	☐	☐	☐	☐	☐	☐	☐
Clostridoides difficile infection	☐	☐	☐	☐	☐	☐	☐

0 = fully manual; 1 = automated denominator; 2 = semi automated; 3 fully automated; 4 Other; 9 not performed; UNK = Unknown

Feasibility of automated HAI surveillance	Digital data exist*	Data are structured**
Surgical procedures (procedure code such as ICD-10 date of surgery)	YH ☐ YW ☐ N ☐ UNK ☐	Y ☐ N ☐ NA ☐ UNK ☐
Admission and discharge dates, hospital level	YH ☐ YW ☐ N ☐ UNK ☐	Y ☐ N ☐ NA ☐ UNK ☐
Admission and discharge dates, unit level	YH ☐ YW ☐ N ☐ UNK ☐	Y ☐ N ☐ NA ☐ UNK ☐
Use of central lines, date of insertion/ extraction, type	YH ☐ YW ☐ N ☐ UNK ☐	Y ☐ N ☐ NA ☐ UNK ☐
Use of mechanical ventilation, start date, end date	YH ☐ YW ☐ N ☐ UNK ☐	Y ☐ N ☐ NA ☐ UNK ☐
Use of urinary catheters, date of insertion/ extraction	YH ☐ YW ☐ N ☐ UNK ☐	Y ☐ N ☐ NA ☐ UNK ☐
Microbiology culture results (culture, result, date, specimen type	YH ☐ YW ☐ N ☐ UNK ☐	Y ☐ N ☐ NA ☐ UNK ☐
Antimicrobial prescriptions (Antimicrobial name or code (preferable ATC code 5th level)	YH ☐ YW ☐ N ☐ UNK ☐	Y ☐ N ☐ NA ☐ UNK ☐

*YH= Yes, hospital-wide; YW=Yes, specific wards; N=No; UNK=Unknown

** Y=Yes; N=No; NA=Not applicable; UNK=Unknown

Figure 4: Hospital Form H2

Definitions of Variables in Hospital Form H2

Annual IPC plan, approved by CEO: Is there an annual infection prevention and control (IPC) plan *and* if so, was it approved by the hospital CEO or by a senior management team member? Answer as Yes or No. 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, approved by CEO: Is there an annual infection prevention and control (IPC) report *and* if so, was it approved by the hospital CEO or by senior management team member? Answer as Yes or No. If the Hospital's infection control committee is chaired by the CEO or senior management team member, can answer 'yes' to this question.

Participation in surveillance networks: Answer yes or no whether your hospital participates in a national or regional surveillance network or not for each of following surveillance modules:

- Surveillance of surgical site infections (SSI) (Answer=No);
- Surveillance of HAIs in intensive care (ICU) (Answer=No);
- Surveillance of *C. difficile* infections (CDI) (Answer=Yes or No as appropriate);
- Surveillance of antimicrobial resistance with the EARS-Net protocol (surveillance of antimicrobial resistance in invasive isolates of *S. pneumoniae*, *S. aureus*, *Enterococcus* spp., *E. coli*, *K. pneumoniae*, *P. aeruginosa* and/or *A. baumannii*) (Answer=Yes or No as appropriate);

- Surveillance of antimicrobial consumption in the hospital (surveillance at 5th ATC level in defined daily dose (DDD) per 1 000 patient-days) (Answer=Yes or No as appropriate);
- Other HAI or AMR surveillance modules not mentioned here (Answer=No). Specify the surveillance network if answered Yes

Note: Local surveillance and feedback is not sufficient to select yes for network participation.

Microbiological laboratory performance during weekends: At weekends, can clinicians request routine microbiological tests and receive back results within the standard turnaround time? Report yes/no/unknown separately for Saturdays and Sundays and for clinical tests (e.g. blood cultures, CSFs, tissue, pus, wound swab for culture, faeces, urines) and screening test (e.g. MRSA screening swabs, VRE screening swabs/faeces, ESBL screening swabs/faeces, CRE screening swabs/faeces).

Policy of universal masking for COVID-19 prevention: Is there currently a policy of universal masking in place in your hospital? Universal masking in this context refers to the mandatory wearing of face masks or respirators inside the hospital, during activities other than care for COVID-19 patients. Select one of the options below.

- **No:** no policy of universal masking, face masks are only required during COVID-19 care and in other circumstances where use of face masks is recommended
- **Yes, for routine care only:** face masks are required by healthcare workers for all routine care (all contact with non-COVID-19 patients) but not in other areas of the hospital
- **Yes, for routine care and in all common areas of the hospital (e.g. doctors' room):** requirement for all persons (staff, patients, visitors, service providers and others) to wear a mask at all times, except for when eating or drinking.

Current degree of automation of surveillance of HAIs: Select one of the options below for each type of HAI listed (see below) to what degree the surveillance of this type of HAI is automated in your hospital. Note that the term `automation' in this question refers to the process of case finding of HAIs and denominator selection, not the electronic data linkage to case-mix variables (e.g. age, ASA score, wound class in SSI surveillance) to automate the surveillance.

- **Fully manual:** Fully manual surveillance, selection of patients that should be included in the surveillance (e.g. based on device use or procedures) and detection of HAI is performed by manually reviewing charts.
- **Automated denominator collection:** Automated rule-based routine selection of procedures or patient- days to be included in the surveillance, e.g. based on admission to specific wards, surgical procedures or use of devices such as central lines; Codes are selected without manual steps and directly linked to a digital record for surveillance purposes. Subsequently charts are manually reviewed to detect HAI in the selected patients.
- **Semi-automated:** Automated selection of patients in surveillance (as in #1) **AND** an automated algorithm flags patient with a high probability of an HAI that require manual confirmation of HAI presence, based on information extracted from electronic health records and linked to a digital record for surveillance purposes.
- **Fully automated:** Automated selection of patients in surveillance (as in #1) **AND** fully automated algorithm for detection of HAI based on information extracted from electronic health records. This means that no manual selection or confirmation step is necessary.
- **Other:** Electronically available databases are used to either preselect patients to be included in the surveillance (denominator collection) and/or preselect patients that require manual confirmation of HAI presence (e.g. from microbiology database) without

automated direct linkage to an electronic surveillance record (still requiring manual steps for the selection process).
- **Not performed:** Surveillance is not performed for this type of HAI.

The current degree of automation of surveillance is asked for following types of HAI:

- Surgical site infection (SSI): surveillance of SSIs for one or more operation categories.
- Healthcare-associated bloodstream infection (HA-BSI): surveillance of BSIs with onset on day 3 of the hospital stay or 48 hours or more after admission, with or without determination of the origin (source) of the BSI
- Central line-associated bloodstream infection (CLABSI) (synonym: central vascular catheter (CVC)-associated bloodstream infection) or CVC-related bloodstream infection: CVC/central line-*associated* refers to the presence of a CVC within 48 hours before onset of a primary BSI (i.e. a BSI which is not secondary to another infection site); CVC-*related* bloodstream infection refers to microbiological or clinical criteria to determine the origin of the bloodstream infection (see definition of BSI origin and case definition of CRI3).
- Catheter-associated urinary tract infections (CAUTI): urinary tract infections with presence of a urinary catheter within 7 days before onset of the urinary tract infection
- Healthcare-associated pneumonia (HA-PN): pneumonia (see case definition) with onset on day 3 of the hospital stay or 48 hours or more after admission, with or without determination of an association to invasive device use.
- Ventilator-associated pneumonia (VAP), or intubation-associated pneumonia (IAP), see case definitions.
- *Clostridoides difficile* infections (CDI)

Feasibility of automated HAI surveillance: This variable aims to determine the feasibility of the data collection and storage for automated HAI surveillance. Automated surveillance requires extraction of data from electronic health records in a structured format. For each data sources listed at the end of this section below, please indicate:

1) **Data are stored digitally:** the data exist in a digital subsystem.
    - **YH=**Yes, hospital-wide
    - **YW=**Yes, in specific wards only
    - **N=**No
    - **UNK=**Unknown
2) **If yes, data are structured and well defined:** Indicate whether the data are stored in a structured format which allows easier analyses (e.g. not as free text notes but as coded or standardized such as dropdown options). Examples of structured and well-defined data include date field in standard format (DD-MM-YYYY), ICD-10 diagnosis codes, ATC-5 codes to specify prescribed medication etc… Select NA if data is not stored digitally.
    - **Y=**Yes
    - **N=**No
    - **NA=**Not applicable
    - **UNK=**Unknown

    List of data sources:
    - Surgical procedures: procedure code such as ICD-10, date of surgery
    - Admission and discharge dates, hospital level
    - Admission and discharge dates, unit level

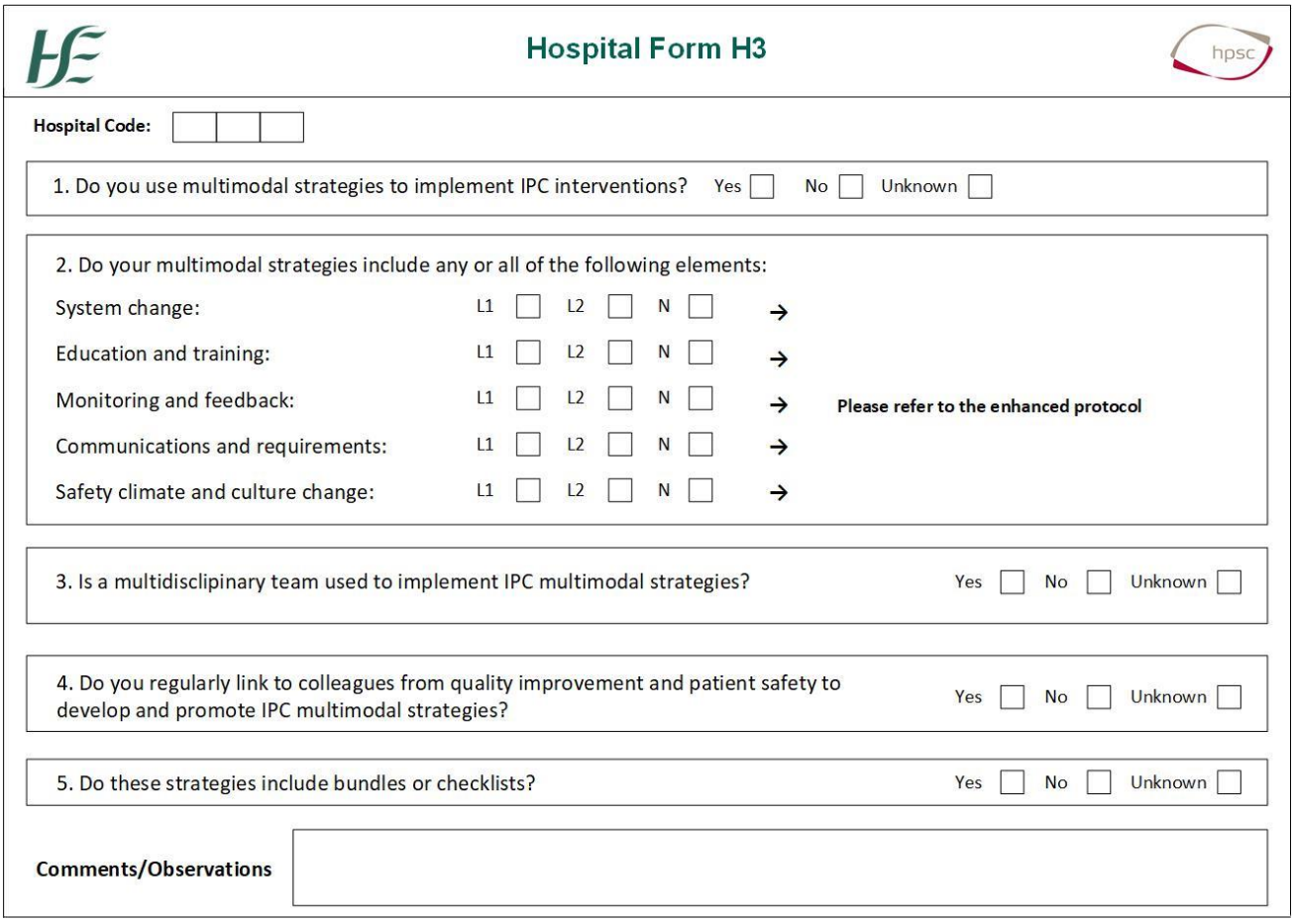
- Use of central lines: date of insertion and removal, type (select yes even if only insertion date is known)
- Use of mechanical ventilation or intubation: start date, end date
- Use of urinary catheters: date of insertion/removal (select yes even if only insertion date is known)
- Microbiology culture results (culture result, date of sampling, specimen type)
- Antimicrobial prescriptions: antimicrobial name or code (preferable ATC code 5th level)

5.5.3. Hospital Form H3

For the purpose of this PPS, Irish hospitals are asked to complete Hospital Form H3.

Select "No" where you see "Optional: Full IPCAF questionnaire provided".

WHO's Infection Prevention and Control Assessment Framework (IPCAF) questionnaire is a detailed questionnaire with 12 pages of questions to be completed. If hospitals wish, they can fill out this questionnaire online (https://ipcportal.who.int/ecdc) but we would also prefer that you complete Form H3 as well.



Hospital Form H3

hpsc

Hospital Code: ☐☐☐

1. Do you use multimodal strategies to implement IPC interventions? Yes ☐ No ☐ Unknown ☐

2. Do your multimodal strategies include any or all of the following elements:

System change:	L1 ☐	L2 ☐	N ☐	→		
Education and training:	L1 ☐	L2 ☐	N ☐	→		
Monitoring and feedback:	L1 ☐	L2 ☐	N ☐	→	Please refer to the enhanced protocol	
Communications and requirements:	L1 ☐	L2 ☐	N ☐	→		
Safety climate and culture change:	L1 ☐	L2 ☐	N ☐	→		

3. Is a multidisclipinary team used to implement IPC multimodal strategies? Yes ☐ No ☐ Unknown ☐

4. Do you regularly link to colleagues from quality improvement and patient safety to develop and promote IPC multimodal strategies? Yes ☐ No ☐ Unknown ☐

5. Do these strategies include bundles or checklists? Yes ☐ No ☐ Unknown ☐

Comments/Observations

Figure 5: Hospital Form H3

Definitions of Variables in Hospital Form 3

Multimodal strategies for implementation of IPC interventions: Do you use multimodal strategies (system change, education and training, monitoring and feedback, communications and reminders, safe climate and culture change) to implement IPC interventions? Select yes, no or unknown.

Do your multimodal strategies include any or all of the following elements?

System change refers to availability of necessary infrastructure in place to allow healthcare workers to practice good IPC practices (ensuring good infrastructure, equipment, adequate supplies and other resources). Select one of the options below for system change element.

- **N=**Element not included in multimodal strategies
- **L1=**Interventions to ensure the necessary infrastructure and continuous availability of supplies are in place
- **L2=**Interventions to ensure the necessary infrastructure and continuous availability of supplies are in place and addressing ergonomics and accessibility (e.g. best placement of central venous catheter set and tray).

Education and training refer to providing regular online or in person training and education to the staff on the importance of IPC to improve their knowledge. Select one of the options for education and training element.

- **N=**Element not included in multimodal strategies
- **L1=**Written information and/or oral instruction and/or e-learning only
- **L2=**Additional interactive training sessions (includes simulation and/or bedside training).

Monitoring and feedback refer to monitoring IPC practices and infrastructure, along with related perceptions and knowledge among healthcare workers, while providing performance and results feedback to staff. Select one of the options for monitoring and feedback element.

- **N=**Element not included in multimodal strategies
- **L1=**Monitoring compliance with process or outcome indicators (e.g. audits of hand hygiene or catheter practices)
- **L2=**Monitoring compliance and providing timely feedback of monitoring results to healthcare workers and key players

Communications and reminders refer to prompting and reminding healthcare workers about the importance of IPC through advocacy, campaigns, conferences and other interventions

- **N=**Element not included in multimodal strategies
- **L1=**Reminders, posters, or other advocacy/awareness-raising tools to promote the intervention
- **L2=**Additional methods/initiatives to improve team communication across units and disciplines (e.g. by establishing regular case conferences and feedback rounds)

Safety climate and culture change refer to facilitating an organizational climate that values the intervention, with a focus on involvement of senior managers, champions or role models.

- **N=**Element not included in multimodal strategies;
- **L1=** Managers/leaders show visible support and act as champions and role models, promoting an adaptive approach and strengthening a culture that supports IPC, patient safety and quality;
- **L2=**Additionally, teams and individuals are empowered so that they perceive ownership of the intervention (e.g. by participatory feedback rounds)

Is a multidisciplinary team used to implement IPC multimodal strategies? Select yes, no or unknown.

Do you regularly link to colleagues from quality improvement and patient safety to develop and promote IPC multimodal strategies? Select yes, no or unknown.

Do these strategies include bundles or checklists? Select yes, no or unknown.

5.5.4. Hospital Form H4

The variables on the Hospital Form H4 are collected at the ward level.

Do **not** complete this form.

5.6. Completion of the Ward Form (Form W)

The local PPS team leader plans the timetable of wards to be covered each day of the PPS in the hospital. One Ward Form per ward should be completed.
ED is not considered as a ward so a Ward Form (Form W) shouldn't be completed for ED but it should be completed for every other ward. However, patients that have been admitted to the hospital at 8am and are awaiting transfer to a ward should be included. Such patients may be housed in a specific bay of the ED or on an adjacent room.

The local PPS team can begin collecting and recording most of data on the Ward Form (Form W) ahead of the PPS date, in conjunction with the ward clinical nurse or midwifery manager.

Three questions will need to be completed once the PPS team arrives on the ward:

- Number of beds occupied on the day of PPS;
- Number of healthcare workers on the ward on the day of PPS;
- Number of HCWs on ward carrying AHR dispensers

The completed ward forms for each ward must be retained by the local PPS team leader and entered onto HWN.

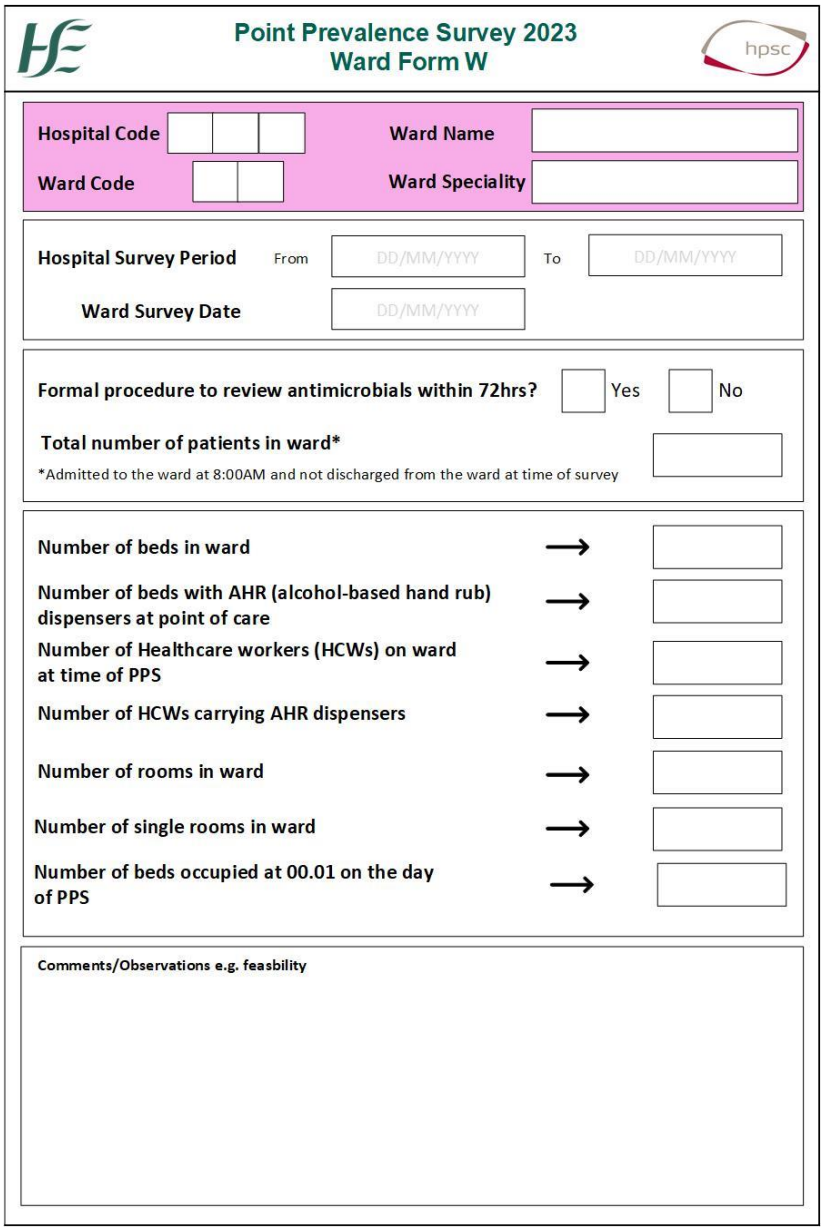


Figure 6: Ward Form (**Form W**)

Definitions of Variables in the Ward Form

Hospital code: Unique 3-digit code for your hospital assigned by the national PPS coordinating centre.

Ward code/unit ID: Unique 2-digit code for each ward assigned in advance by the local PPS team. (02, 11 etc.)

Ward name: The usual name of the ward in the hospital **for internal use only**

Ward specialty: The main specialty of the ward should be selected from the options below (see **Appendix A, Table 1** for full description and table).

PED=Paediatrics, **NEO=**Neonatal, **ICU**=Intensive Care, **MED=**Medicine, **SUR=**Surgery, **GO=**Gynaecology/Obstetrics/Maternity, **GER=**Geriatrics, **PSY=**Psychiatry, **RHB=**Rehabilitation, **LTC=**Long-term care, **OTH=**Other, **MIX=**Mixed.

Note:

- **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 (e.g. cardiac, respiratory, gastrointestinal…) or surgical conditions (e.g. vascular, colorectal, upper gastrointestinal) are admitted.
- Only select specialty wards if >80% of patients admitted to the ward belong to a single specialty (e.g. **GER** = geriatrics, **PSY** = psychiatry, **RHB** = rehabilitation, **LTC:** long-term care ward).
- If <80% of patients belong to a single specialty, meaning if the ward is a combination of specialities it should be recorded **MIX**.
- Paediatric ICUs and wards should be always coded as **PED** and neonatal ICUs and wards should always be coded as **NEO**. **ICU** coding should be used for adult ICUs only.

Hospital survey period: Start and end date for the PPS in the entire hospital; end date is the date the data were collected on the last ward. Enter it in **DD/MM/YYYYY** format. **Note:** ECDC recommends a maximum collection period of 2 weeks in an individual hospital.

Ward survey date: Date on which the data were collected in the ward. Data from a single ward should be collected on one day. Enter it as **DD/MM/YYYY** format.

Post-prescription review of antimicrobials in ward: Is there a formal procedure in the hospital to review the appropriateness of an antimicrobial within 72 hours (three calendar days) from the initial order in the hospital (post-prescription review)? Please answer as yes or no.

A formal post-prescription review procedure should be documented and adopted by the hospital management and should be 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 procedure should at least address the prescription of broad-spectrum or reserve antimicrobials.

Total number of patients in ward: Total number of patients admitted to the ward before or at 8 a.m. that were not discharged from the ward at the time of the survey.

Number of beds in ward: Total number of beds in ward, which are available for occupancy by patients on the PPS day. Include 'corridor beds' and neonatal beds/cots. If beds/rooms are closed and not available for occupancy, these should not be counted.

Number of beds in ward with 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). 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. Specify 'included wards only *or* total for hospital' in last column
Dispensers available at the point of care that are empty on the PPS day should be included.

Number of HCWs on ward at time of PPS: Total number of healthcare workers (HCWs) on ward at the time of PPS. The purpose of this variable is to provide the denominator of those carrying AHR dispensers. Therefore, HCWs should not be included if there is no information on the carriage of alcohol hand rub dispensers.

Number of HCWs on ward carrying AHR dispensers: Number of HCWs on ward carrying AHR dispensers in their pockets at the time of PPS.

Number of patient rooms in ward: Total number of patient rooms available for occupancy in the ward on the PPS day.

This includes single rooms and multiple-occupancy rooms/bays (e.g. a bay shared by two or more patients is counted as one room). If rooms are closed and not available for occupancy, they should not be counted.

Number of single rooms in ward: Total number of single-bed rooms available for occupancy in the ward on the PPS day. 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. Rooms with more than one bed that are designated for use as single occupancy and isolation rooms (e.g. for infection control purposes) should be included. If rooms are closed and not available for occupancy, they should not be counted.

Number of beds occupied at 00:01 on the day of PPS: Total number of ward beds occupied at midnight on the day of the PPS. This excludes day cases.

Comments/observations. Free text field to report, for example, feasibility issues, data quality problems, or specific epidemiological information for the current ward.

5.7. Completion of the Ward Patient List (Form WPL)

In order to facilitate the PPS data collection on the day the PPS is being conducted in each ward, it is recommended that a Ward Patient List form (**Form WPL**; Figure 8) is completed by the night staff on the ward prior to the arrival of the local PPS team.

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.

The Ward Patient List is given to each ward manager (for nursing or midwifery staff) to complete on the scheduled date.

The ward manager and/or the local PPS team should fill in the ward details at top of the form.

The ward staff should complete the patient list and enter the variables for each patient.

The Ward Patient List form should be filled in by the night shift nursing or midwifery staff (as requested by the ward manager) before 8 am on the date of the survey on that ward. Data on **EVERY** patient present on the ward before/at 8 am on the date of the survey should be collected and recorded on the scheduled day.

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 local PPS team will go through the Ward Patient List form (**Form WPL**) when they arrive on the ward, mark and count up eligible patients and enter patient study numbers and complete the Ward Patient List.

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 completed ward patient list for each ward must be retained by the local PPS team leader for future reference.

Additionally, the remaining questions on the Ward Form (**Form W**; see section 5.6 on page 22) can be completed once the PPS team arrives on the ward. These variables are:

- Number of beds occupied on the day of PPS;
- Number of healthcare workers on the ward on the day of PPS; and
- Number of HCWs on ward carrying AHR dispensers

Form WPL

Ward Patient List

For internal hospital use only;
Completed Ward List should be retained by the local PPS team leader

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

Ward Name

Hospital code (3-digits) Ward code (2-digits) Ward specialty

Date of PPS (DD/MM/YYYY)

COMPLETED BY WARD STAFF

Bed Number e.g. 1-20	Patient Identifier	Gender M/F	Age in Years if ≥2 years	Age in Months If <2 years	Birth weight in grams Neonates only	Admission date DD/MM/YYYY Currrent admission	Surgery + or - Since admission	Surgery + or - Last 24hrs	CVC + or -	Urethral catheter + or -	Intubation + or -	Patient on antimicrobials + or -	Completed by PPS data team: Eligible patient + or -	Completed by PPS data team: Patient Study Number 2-digits 01-20

Total eligible patients included in PPS

Note: If there are more than 20 beds on the ward, please continue on a another Patient List sheet

Please complete Patient Form P on each eligible patient

Figure 7: Form WPL Ward Patient List

Definitions of Variables in the Ward Patient List (Form WPL)

Ward name: The usual name of the ward in the hospital (same as entered on Form A1)

Hospital code: Unique hospital code assigned by the national PPS coordinating centre (Maximum three digits) (same as entered on Ward Form and Hospital Forms)

Ward code: Abbreviated ward code assigned to every ward in the hospital (Maximum two digits – 02, 11 etc.) (same as entered on Ward Form)

Ward specialty: The main specialty of the ward (same as entered on Ward Form). See **Appendix A Table 1**.

Date of PPS: The date on which the PPS will be conducted on this ward (DD/MM/YYYY).

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 **is not collected** on the Patient Form nor in the data file to submitted to HPSC. The data that will be shared with HPSC will be completely anonymized.

On maternity wards, both the mother and the neonate should be counted as separate patients provided both are present on the ward at 8 am. If the mother was admitted to the ward at or before 8 am and the baby was born after 8 am, only the mother is included.

Gender: Enter patient gender as M or F

Age in years (if ≥2 years): For patients aged 2 years and older, record the age in years, e.g. 2, 13, 46.

Age in months (<2 years): For patients aged less than 2 years, record the age in months, e.g. 1, 12, 22.

Round down ages to the nearest month (e.g. if 45 days, record as 1 month).

For neonates (aged less than one month (or four weeks), record the age in months as 0.

Birth weight: For neonates only (i.e. aged less than 4 weeks on the PPS date), enter the birth weight in grams. Do not enter the weight at the time of PPS.

Admission date: Date of patient's admission to the current hospital (DD/MM/YYYY).

If the patient was transferred from another hospital, the date of transfer to the **current hospital** should be recorded as the date of admission. For babies born in the current hospital – date of birth is the same date as date of admission.

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 8 am 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 not considered central vascular catheters, because fluids are not infused, pushed, nor withdrawn through such devices.

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*.

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 8 am on the day of the survey **and** after 8am on the day before the survey should be recorded as being on antimicrobials.

The following should be **excluded**:

- Topical antimicrobials
- Antivirals, antiprotozoals and antihelminthics
- Treatment of tuberculosis (TB)

The following fields **will be completed by the PPS team** on the day the PPS is carried out on the ward and should be left blank by the ward nursing and midwifery staff:

Eligible patient: The patient meets the criteria to be included in the PPS.

Patient study number: The anonymous consecutive number of eligible patients present on the ward and included in the study.

Total: The total number of eligible patients on the ward who have been assigned a patient study number.

5.8. Completion of the Patient Form (Form P)

One patient form 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.

Patient data have to be collected for each patient admitted to the ward at 8 am on the survey date, infected or not, only excluding day cases (see inclusion criteria).

On maternity wards, both the mother and the neonate should be counted as separate patients provided both are present on the ward at 8 am. If the mother was admitted to the ward at or before 8 am and the baby was born after 8 am, only the mother is included.

Neonates:

- Count all infections after the neonate's birth
- Register consultant/patient specialty for healthy neonates as either GOBAB or PEDBAB

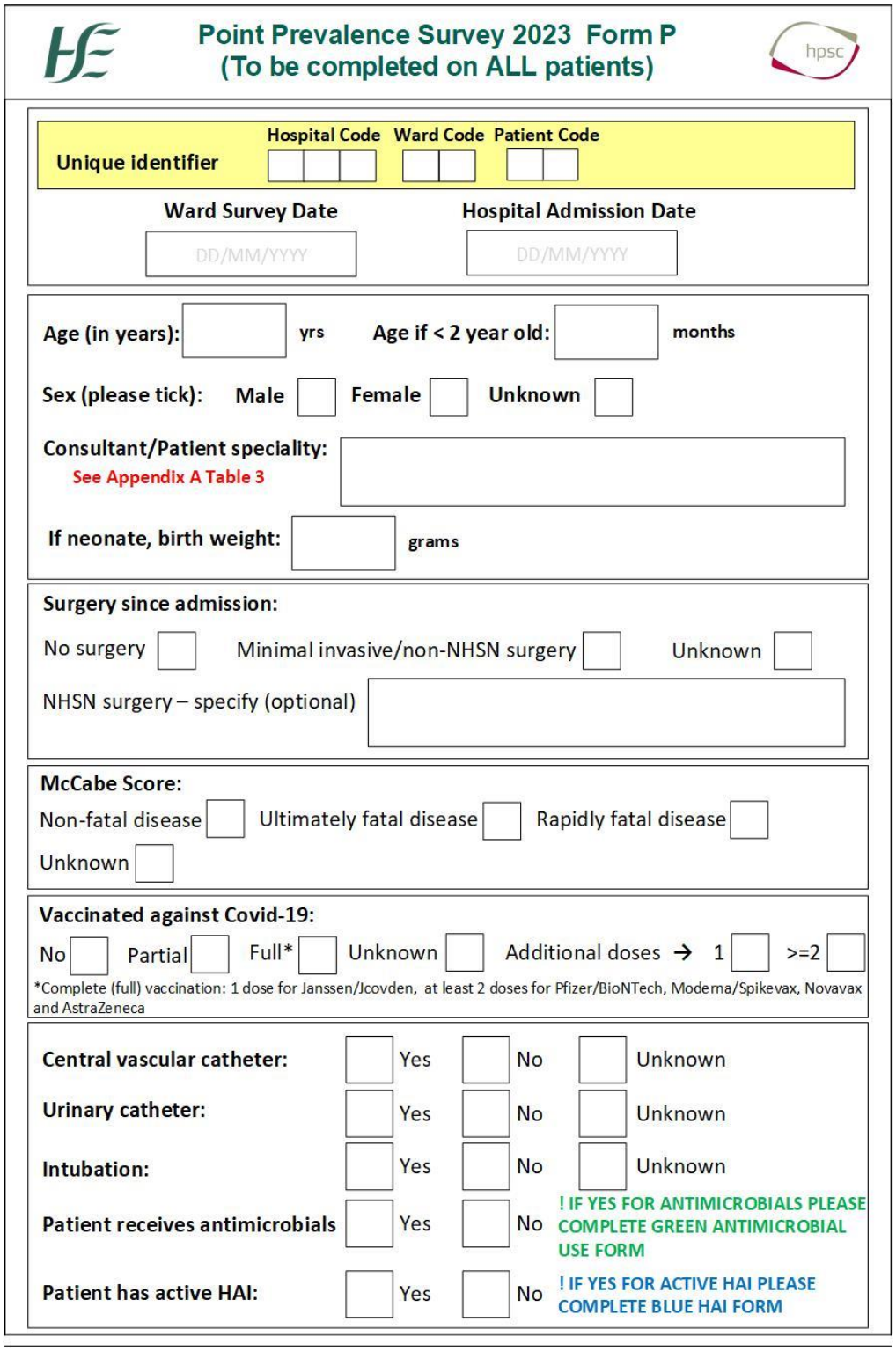
Obstetrics: in the case of natural birth with no interventions/procedures/devices, a maternal infection is only considered as an HAI if the date of onset is *on day 3 or later.*

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 Patient List to the Patient Form. For each patient, the data collection team should review:

- Current healthcare record/medical notes
- Current nursing 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.



Point Prevalence Survey 2023 Form P
(To be completed on ALL patients)

hpsc

Unique identifier Hospital Code ☐☐☐ Ward Code ☐☐ Patient Code ☐☐

Ward Survey Date DD/MM/YYYY

Hospital Admission Date DD/MM/YYYY

Age (in years): ☐ yrs **Age if < 2 year old:** ☐ months

Sex (please tick): Male ☐ Female ☐ Unknown ☐

Consultant/Patient speciality: ☐
See Appendix A Table 3

If neonate, birth weight: ☐ grams

Surgery since admission:

No surgery ☐ Minimal invasive/non-NHSN surgery ☐ Unknown ☐

NHSN surgery – specify (optional) ☐

McCabe Score:

Non-fatal disease ☐ Ultimately fatal disease ☐ Rapidly fatal disease ☐

Unknown ☐

Vaccinated against Covid-19:

No ☐ Partial ☐ Full* ☐ Unknown ☐ Additional doses → 1 ☐ >=2 ☐

*Complete (full) vaccination: 1 dose for Janssen/Jcovden, at least 2 doses for Pfizer/BioNTech, Moderna/Spikevax, Novavax and AstraZeneca

Central vascular catheter:	Yes ☐	No ☐	Unknown ☐
Urinary catheter:	Yes ☐	No ☐	Unknown ☐
Intubation:	Yes ☐	No ☐	Unknown ☐
Patient receives antimicrobials	Yes ☐	No ☐	! IF YES FOR ANTIMICROBIALS PLEASE COMPLETE GREEN ANTIMICROBIAL USE FORM
Patient has active HAI:	Yes ☐	No ☐	! IF YES FOR ACTIVE HAI PLEASE COMPLETE BLUE HAI FORM

Figure 8: Patient Form (Form P)

Definitions of Variables in the Patient Form

Unique identifier/Patient counter: A unique and anonymised 7-digit number composed of three-parts used to link the patient to the HAI/AU data (as recorded on the completed Ward Patient List). The patient counter has no meaning outside of the hospital and it ensures that the patient data collected during the PPS remains anonymous.

1) **Hospital code**: Unique 3-digit hospital code assigned by the national PPS coordinating centre, same code as issued in previous PPSs.
2) **Ward code**: 2-digit ward code assigned in advance by the local PPS team leader to every ward in the hospital. Enter as recorded on the completed Ward Patient List
3) **Patient code**: The consecutive 2-digit 'patient study number' in the final column of the Ward List, assigned by the PPS team to each eligible patient on the ward on the PPS date (01, 02, 03, etc.)

Example. **3500102** indicates that this is patient 02 on ward 01 in hospital 350

Ward Survey date: Date on which data were collected in this ward. Data from a single ward should be collected on one day (**DD/MM/YYYY**).

Patient ID (optional in HWN, not on form and not exported): This is the patient's medical record number, or MRN and should **not** be collected on any form or on HelicsWin.Net in order to comply with GDPR.

Date of hospital admission: Date of patient's admission to the current hospital as recorded on the completed **Form WPL** (**DD/MM/YYYY**).

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.

Age in years: Patient age in years if the patient is two years old or greater (as recorded on the completed Ward Patient List form, or **Form WPL**)

- If ≥2 years = Record age in years = 2, 79, 98, etc.

Age in months: Patient age in months if the patient is less than two years old (as recorded on the completed **Form WPL**)

- If <2 years, round down age to the nearest month, i.e. if 46 days then the age should be 1 month
- For neonates less than 4 weeks/one month, record age in months = 0

Sex: Gender of the patient (as recorded on the completed **Form WPL**)

- **M** (male), **F** (female), or **UNK** (unknown)

Consultant/patient specialty: This is the specialty of the consultant looking after the patient, or the main specialty for which the patient was admitted to the hospital. If the consultant specialty differs from the patient specialty, give priority to the patient specialty. The consultant specialty and the ward specialty may be different.

Record the coded specialty of consultant under whose care the patient is admitted. This should be selected from the 'admitting consultant's specialty code list' (Maximum 9 characters) **(*Appendix A Table 3*)**

- 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**, not **MEDRHEU**
- If a rheumatology patient is admitted under the same clinician as above, count the admitting consultant's specialty as **MEDRHEU** for accuracy
- For healthy neonates on a maternity ward, register admitting consultant specialty as **GOBAB**
- For healthy neonates on a 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
- For paediatric patients on a PED ward, use the admitting consultant subspecialty (**SURGEN**, **MEDONCO**) (see ward specialty) OR **PEDGEN**
- If a patient aged <65 years is admitted 'on-call' under the care of a geriatrician, count as **MEDGEN**, not **GER**
- Long-term care (**LTC**) is a ward specialty and should only be used exceptionally as a consultant/patient specialty

Birth weight: Birth weight in grams, to be provided for neonate (infants less than one month old at time of PPS). The birth weight is the weight of the infant at the time of birth, not the weight on the PPS date changed as the infant gains or loses weight.

Surgery since admission: Patient has undergone surgery during current hospitalisation.

- No surgery
- Yes - Minimally invasive/non-NHSN surgery (see examples below)
- Yes - NHSN surgery: If a surgical procedure has been performed, write the corresponding NHSN code (or operative procedure name) of the surgical procedure (***Appendix A Table 4***)
- Unknown

Surgery is defined as a procedure performed primarily for therapeutic reasons where an incision is made (not just a needle puncture), with breach of mucosa and/or skin – not necessarily in the operating theatre. Insertion of a device or line is not considered to be a surgical procedure.

Check the completed Ward Patient List form (**Form WPL**). For patients who have been marked as **+** = Yes for surgery, the patient's case notes should be reviewed to confirm that the patient has actually undergone surgery during the current admission. This information can be found in surgery/operation notes. Cross check the procedure performed as documented in the patient notes with the 'surgery list' (**Appendix A Table 4**).

Please note that the following procedures are **NOT** regarded as surgical or 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 intra-aortic balloon pump
- Insertion of an intercostal tube drain or chest drain
- Insertion of a percutaneous nephrostomy

Please note that the following procedures are regarded as **minimally invasive/non-NHSN procedures**:

- Application of Ilizarov frame: external fracture fixation device application

- Arthroscopy: exploration of joint using arthroscopy
- Ear surgery
- Episiotomy (transvaginal delivery with episiotomy)
- External ventricular drain placement
- Eye surgery
- Incision & drainage of abscess at a superficial site
- Incision with surgical wound left open to heal by secondary intention: Surgical incision without primary closure
- Laparoscopic surgery: any surgery involving use of laparoscope, including laparoscopic hysterectomy
- Tonsillectomy
- Transurethral resection of prostate (TURP)
- Transvaginal gynaecological or obstetric procedures

McCabe score. Classification of the severity of underlying medical conditions. Disregard the influence of acute infections, e.g. if the patient has an active HAI, estimate the score the patient had before the infection.

Input from the staff caring for the patient will be required to ensure correct application of the underlying disease prognosis. Although the prognosis of diseases varies in time and between hospitals due to changes in treatment options and their availability, using McCabe scores can still be helpful. Some examples of diseases and their different McCabe score categories are given below. These examples, in particular those of the second (ultimately fatal) category, are not meant to be exhaustive but rather to serve as a guidance tool for the current protocol.

Answer categories with examples:

1. **NONFATAL** or Non-fatal disease (expected survival at least five years): The patient is otherwise healthy **OR** the patient has one of the following non-fatal conditions:
    - Diabetes mellitus (not requiring limb amputation)
    - Carcinoma/haematological malignancy with >80% five-year survival (Non-metastatic carcinoma)
    - Inflammatory disorders
    - Chronic gastrointestinal conditions
    - Chronic genitourinary conditions
    - Obstetrics
    - Infections (including HIV, HCV, HBV – unless in above categories)
    - Previously healthy trauma patient
    - Patient classified as having non-severe chronic obstructive pulmonary disease (COPD) or non-severe ischaemic heart disease (IHD)
    - All other diseases

2. **ULTFATAL** or Ultimately fatal disease (expected survival between one and five years)
    - Chronic leukaemias, myelomas, lymphomas, metastatic carcinoma, end-stage kidney disease (without transplant)
    - Motor neurone disease
    - Multiple sclerosis non-responsive to treatment
    - Alzheimer's disease/dementia
    - Diabetes requiring amputation or post amputation
    - Patient classified as having severe chronic obstructive pulmonary disease (COPD) or severe ischaemic heart disease (IHD)

3. **RAPFATAL** or Rapidly fatal disease (expected death within one year)
    - 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?
    - End-stage haematological malignancies (unsuitable for transplant, or relapsed), heart failure (EF <25%) and end-stage liver disease (unsuitable for transplant with recalcitrant ascites, encephalopathy or varices)
    - Multiple organ failure on intensive care unit – APACHE II score >30, SAPS II score >70
    - Pulmonary disease with cor pulmonale
4. **UNK** or Unknown: 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

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.

Vaccinated against COVID-19: The patient was vaccinated against COVID-19.

- Not vaccinated
- Partial:
- Complete[1]
- Unknown
- Number of boosters[2] received:
    - 0
    - 1
    - 2+
    - Unk

[1] Complete (full) vaccination: 1 dose for Janssen/Jcovden, at least 2 doses for Pfizer/BioNTech, Moderna/Spikevax, Novavax and AstraZeneca.

[2] Number of boosters of any vaccine more than two weeks before the survey date (same or other brand, original or variant-specific)

Central vascular catheter (CVC): Patient has CVC in place on survey date. Based on the completed Ward Patient List:

- Yes (i.e. + on form)
- No
- Unknown

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.

Pacemaker wires and other non-lumened devices inserted into central blood vessels or the heart are not considered central lines, because fluids are not infused, pushed, nor withdrawn through such devices.

Urinary catheter. Patient has indwelling urinary catheter in place at the date of the survey.

Based on the completed Ward List:

- Yes* (i.e. + on form)
- No
- Unknown

*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. Patient is under intubation with or without mechanical ventilation (endotracheal tube or tracheostomy) on survey date.

Based on the completed Ward List:

- Yes* (i.e. + on form)
- No
- Unknown

*This question should only be answered 'Yes' if the patient is intubated with or without mechanical ventilation (endotracheal tube or tracheostomy) **at the time of survey**.

Note: Non-invasive ventilation e.g. CPAP and AIRVO are not regarded as intubation.

Conditions of Interest

Patient receives antimicrobials: Patient receives at least one systemic antimicrobial agent at the date of the survey.

Include:

- Systemic antimicrobial agents [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)
- Surgical prophylaxis before 8am on the day of the survey **and** after 8am on the day before the survey, i.e. given in the 24 hours prior to 8 a.m. on the day of the survey
- Treatment for infection caused by non-tuberculous mycobacteria (NTM)/mycobacteria other than tuberculosis (MOTT)/atypical mycobacteria

Exclude:

- Any topical antibacterial/antifungal/antiviral agents
- All antivirals, anti-protozoal or anti-helminthic agents
- Any agent prescribed for treatment of *Mycobacterium tuberculosis* (TB)

Based on review of Ward Patient List plus review of medication prescription and administration record and healthcare record:

- Yes **→ Complete the Antimicrobial Use Form**
- No

If the answer to the question is not clear, the data collector should approach a member of ward staff for clarification.

The question on 'Surgery in last 24 hours' on the Ward Patient List should also be reviewed; if this is **+**, 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.

Patient has active HAI: Patient has an active healthcare-associated infection on survey date.

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.

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 signs and symptoms 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.

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 HAIs. Other data sources should also be consulted: nursing or midwifery staff and clinicians caring for the patient and infection prevention and control staff.

Infections originating in healthcare facilities that are not acute hospitals (e.g. long-term care facilities or nursing homes) **should also** be included as healthcare-associated infections (HAI).

Based on review of Ward Patient List plus review of medication prescription and administration record and healthcare record:

- Yes → **Complete the Healthcare Associated Infection (HAI) Form**
- No

An algorithm to assist with identification of a HAI is provided in **Figure 10** below.

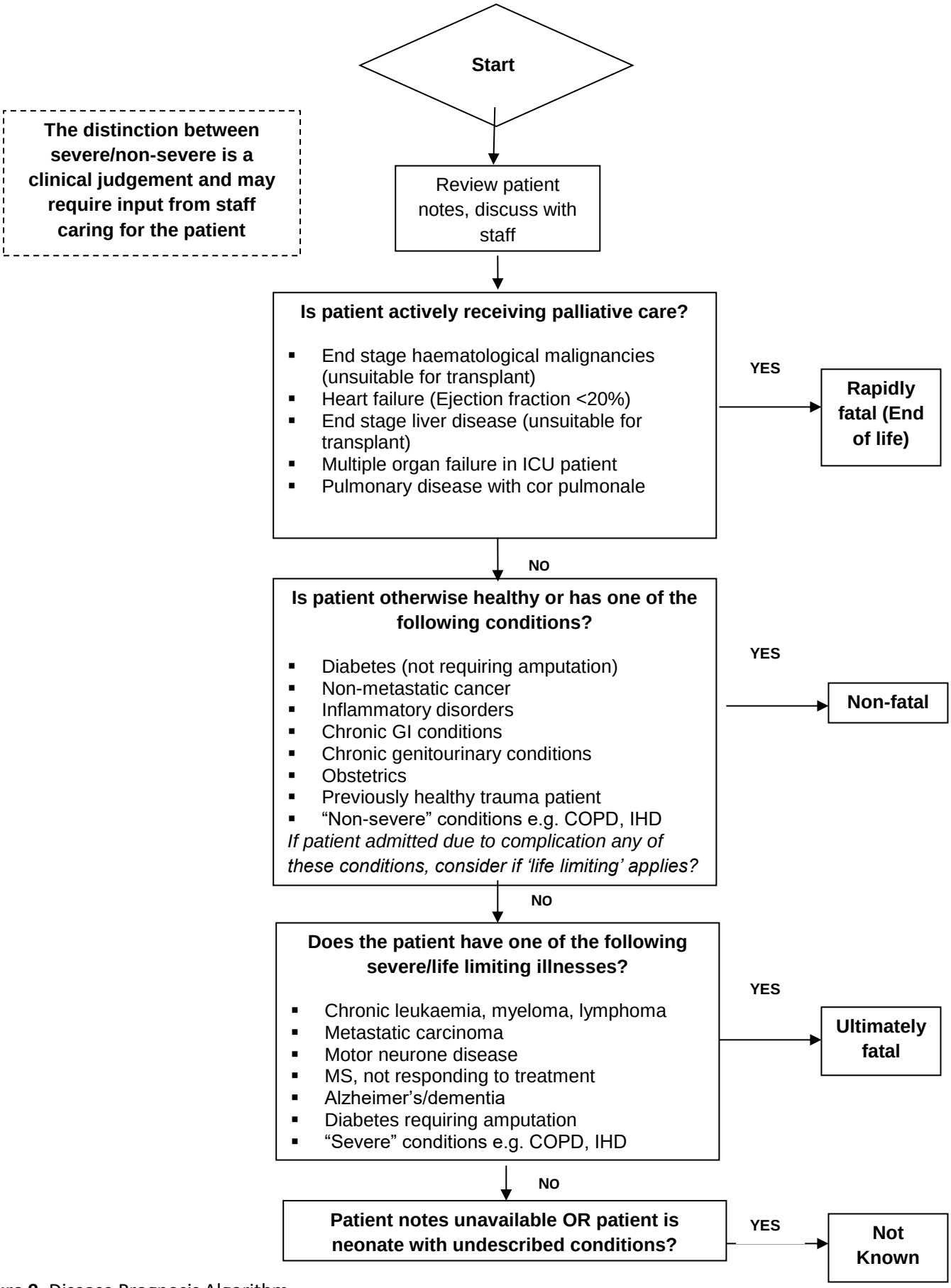


Figure 9. Disease Prognosis Algorithm

Onset of HAI		Case Definition
All HAI Types • The onset of symptoms was on Day 3 or later (day of admission = Day 1) of the current admission		
or		
All HAI Types • The patient presents with an infection but has been readmitted less than 48 hours after a previous discharge or transfer from a healthcare facility including LTCF		
or		
Surgical Site Infection • The patient has been admitted with an infection (or develops symptoms on Day 1 or 2) with an infection that meets the case definition of an active surgical site infection (SSI).	**and**	**Surgical Site Infection** SSI occurred within 30 days of the operation (or in the case of surgery involving an implant, was a deep or organ/space SSI that developed within 90 days of the operation) and the patient either has symptoms that meet the case definition and/or is on antimicrobial treatment for that infection.
or		
***Clostridiodes difficile* Infection** • The patient has been admitted (or develops symptoms on Day 1 or 2) with C. difficile infection less than 28 days after a previous discharge or transfer from a healthcare facility including LTCF		
or		
Device Associated Infection • Relevant invasive device* in situ placed on day 1 or day 2, resulting in a HAI onset before day 3 (day 1 or 2) *Intubation, vascular catheter (PVC/CVC) or urinary catheter		
or		
Infection in Neonates • Count any active infection arising after birth while infant remains in hospital		
or		
COVID-19 Infection • The patient was diagnosed with COVID-19 and the onset of symptoms (or first positive test if asymptomatic) was on Day 3 or later of the current admission or the patient has COVID-19 on admission (or onset before day 3) and was (re-)admitted less than 48 hours after a stay of more than 7 days in the same or another healthcare facility including LTCF		

Figure 10: HAI Identification Algorithm

5.9. Completion of the Antimicrobial Use Form

Systemic antimicrobials are defined as antibacterial or antifungal agents prescribed at the time of the survey for *treatment of infection, medical prophylaxis against infection or surgical antimicrobial prophylaxis.* Only collect information if the patient receives at least one antimicrobial at the time of the survey (except for surgical prophylaxis, for which the preceding day is also included – see next paragraph).

Surgical antimicrobial prophylaxis is defined as prophylaxis given between 8 am on the date before the survey and 8am on the date of survey. Surgical antimicrobial prophylaxis commenced after 8 am on the date of the survey is not included. For all other antimicrobial use administration of antimicrobials should be registered at the time of the survey only.

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.

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.

Data on up to four separate systemic antimicrobial prescriptions can be recorded. An extension sheet can be printed for the small number of patients who may receive >3 antimicrobials.

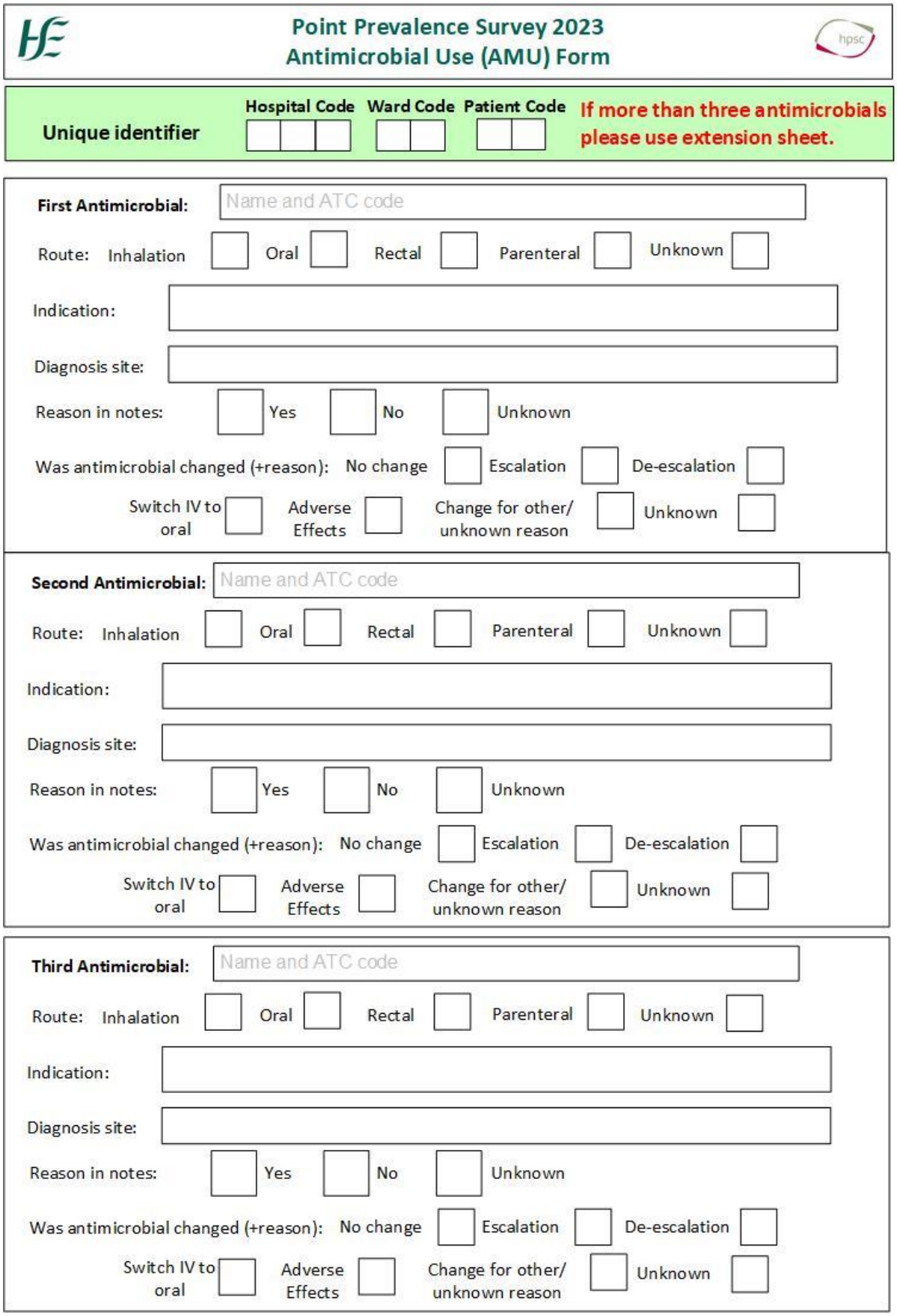


Figure 11: Antimicrobial Use Form

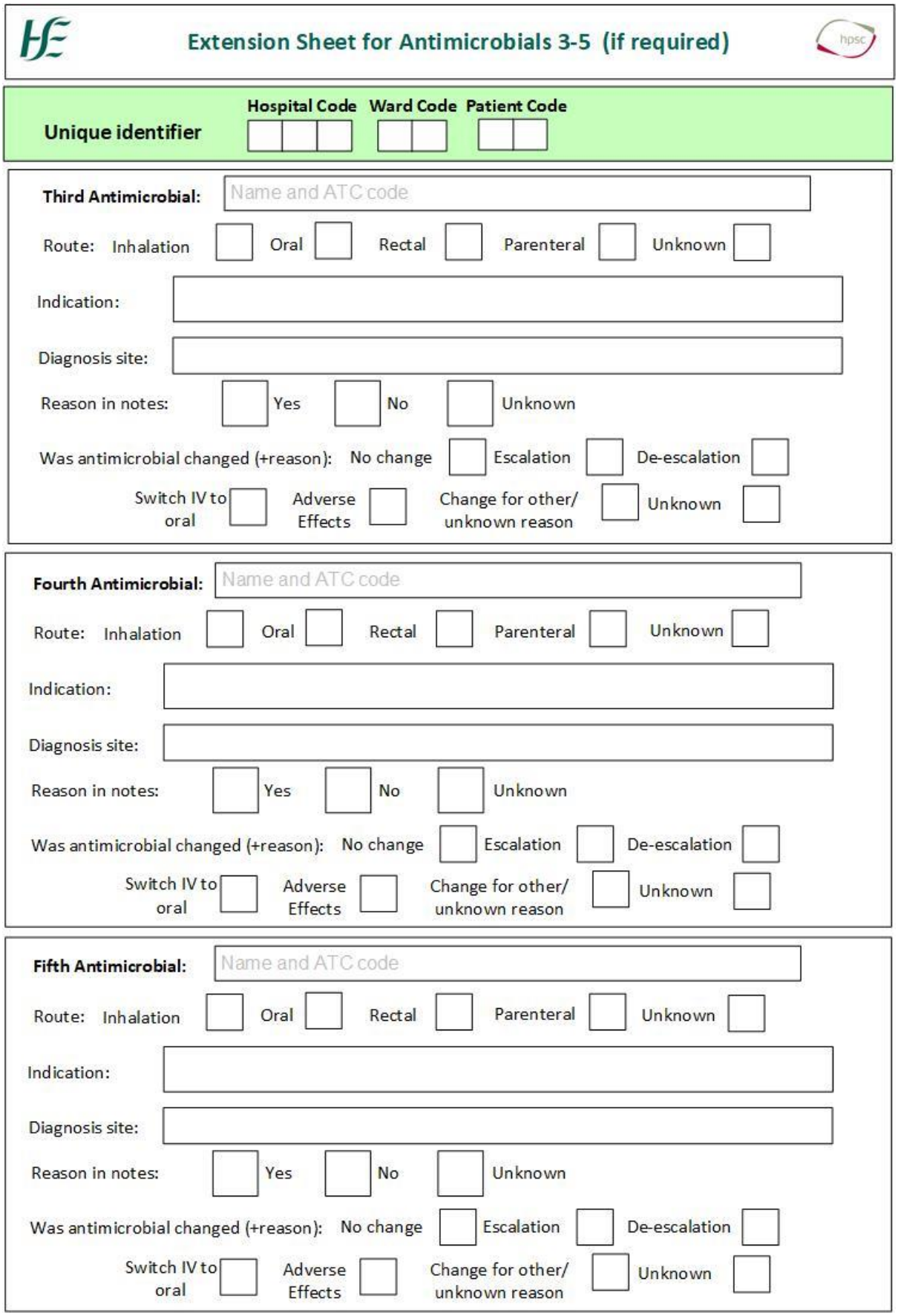


Figure 12: Antimicrobial Use Form – extension sheet if required

Definitions of Antimicrobial Use Data

Antimicrobial generic name and ATC 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 in ***Appendix A Table 5A or 5B***.

BOTH the generic name AND the corresponding ATC5 code for each antimicrobial prescribed should be recorded.

It is not necessary to collect the brand name but this can be useful during the data entry process as it is possible to "Search by brand" in HelicsWin.Net (HWN; data entry software being used) to find the correct generic name/ATC code.

Include:

- Patient prescribed at least one systemic antimicrobial agent 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 8 am on the day of the survey **and/or** after 8 am 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 agents
- All antivirals, antiprotozoals and antihelminthics
- Any agent prescribed for treatment of *Mycobacterium tuberculosis* (TB)

Route: Route of administration of the antimicrobial agent. Select one of the options below. Please note all topical agents are excluded.

- Parenteral (**P**) = intravenous (IV) or intramuscular (IM) or intraocular injection or intraventricular administration
- Oral (**O**) = enteral or oral or via nasogastric/jejunal/PEG/RIG tube
- Rectal (**R**)
- Inhalation (**I**)

Indication for antimicrobial use: 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 (***Appendix A Table 6***):

- Treatment intention for infection: If the antimicrobial use is intended for treatment of an infection, fill in site of infection (diagnosis; see next section below). Otherwise select code NA (not applicable).
  - **CI** = Community-acquired infection
  - **LI** = Infection acquired in long-term care facility (nursing home)
  - **HI** = Acute Hospital-acquired infection

If the antimicrobial use is intended for treatment of an infection, fill in site of infection (diagnosis/site indicator below). Otherwise select code NA (not applicable) for diagnosis/site.

- Surgical prophylaxis: Check the completed Ward Patient List form (**Form WPL**) column **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:
  - **SP1** = Surgical prophylaxis, single dose prescribed once only – **single dose**
  - **SP2** = Surgical prophylaxis, >1 dose but prescribed for 24 hours or less – **one day**
  - **SP3 =** Surgical prophylaxis, prescribed for more than 24 hours **– >1 day**

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.

- **MP** = Medical prophylaxis; e.g. co-trimoxazole for PCP prophylaxis, intrapartum benzylpenicillin or erythromycin for PPROM, azithromycin used for prevention of COPD exacerbation
- **O** = Other indication; e.g. erythromycin used as a pro-kinetic agent
- **UI =** Unknown indication/reason: 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
- **UNK** = Unknown or missing information**:** Indication information was not verified during the survey.

Diagnosis (site): Diagnosis group by anatomical site. The prescriber's diagnosis/site for antimicrobial is required when an intention to treat an infection is indicated (meaning **CI, LI, HI** for indication variable) and should be selected from the list provided in ***Appendix A Table 7***.

Prescriber's indication:
- intention to treat an infection' (CI, LI, HI) → select code from ***Appendix A Table 7****
- prophylaxis or other indication (SP, MP, O, UI or UNK) → enter **NA**
- no clear evidence of infection or inflammation → enter **UND**

Choose the site that fits best with the clinical information available on the PPS date. For example, the prescriber suspects the patient has a bloodstream 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.

*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 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
- No

- Unknown

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.

Antimicrobial changed? (+ reason). Was the antimicrobial (or the route of administration) changed for this infection episode, and if so, what was the reason? If the antimicrobial was changed more than once for the current infection episode, report the reason of the last change. Changes should be considered for the entire treatment regimen for one infection episode.

- **N**=no change, antimicrobial was not changed
- **E**=escalation: antimicrobial was escalated (or another antimicrobial was added) on microbiological and/or clinical grounds, i.e. the isolated microorganism was not susceptible to the previous antimicrobial and/or lack of clinical effect of previous antimicrobial; includes switch from oral to parenteral for the same antimicrobial
- **D**=De-escalation: antimicrobial was de-escalated on microbiological and/or clinical grounds, i.e. the isolated microorganism was susceptible to more narrow-spectrum or first-line antimicrobials than the previous antimicrobial and/or the clinical situation of the patient allows changing to a more narrow-spectrum or to a first-line antimicrobial. If other antimicrobials given for the same indication were stopped at the time of the survey, report de-escalation for the remaining antimicrobial(s)
- **S**=switch IV to oral*; route of administration of same antimicrobial was changed from parenteral to oral. A switch can also occur between antimicrobials belonging to the same antimicrobial class, e.g. IV ampicillin/sulbactam to oral amoxicillin/clavulanate or IV ceftriaxone to oral cefuroxime axetil

  ***Please Note:** Switching from oral to IV should be recorded as **Escalation (E)**
- **A**=adverse effects; antimicrobial was changed because of observed side effect or adverse event attributed to the initial antimicrobial prescribed
- **OU**=change for other or unknown reason: the antimicrobial for that indication was changed for another reason, or the antimicrobial was changed but the reason could not be determined by the surveyor
  Select this option for patient who has been changed to a different antimicrobial
  - to facilitate OPAT, where clinical and microbiological factors have not influenced the decision (e.g. switch from cefotaxime to ceftriaxone or meropenem to ertapenem)
  - 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: no information on whether the antimicrobial was changed or not

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 chart(s) and from discussion with staff caring for the patient will be required to determine this information.

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.

5.10. Completion of the Healthcare Associated Infection Form

The use of antimicrobials will often lead to the detection of a HAI. Some patients may have a HAI that is not treated by an antimicrobial (e.g. viral infections, urinary tract infections, etc.), which makes it necessary to consult other sources (see HAI case finding algorithm). In other cases, the physicians may treat an infection which does not match the case definition. Therefore, the diagnosis list for antimicrobial use differs from the HAI case definition list (see codebook) and the indication list mentions treatment intention of an infection.

Note: It is not the objective of this survey to relate the use of an antibiotic to the information on HAIs (such as microorganisms). Both types of data are collected separately.

An **active healthcare-associated infection** (associated to a healthcare stay) present on the day of the survey is defined as follows:

- An infection is active when signs and symptoms of the infection are present on the survey date **or** signs and symptoms were present in the past and the patient is (still) receiving treatment for that infection on the survey date. The presence of signs and symptoms should be verified back to the start of the treatment in order to determine whether the treated infection matches one of the case definitions of healthcare-associated infection;

AND

- The onset of symptoms was on Day 3 or later (day of admission = Day 1) of the current admission
  OR
- The patient presents with an infection but has been readmitted less than 48 hours after a previous discharge **or** transfer from another healthcare facility;
  OR
- The patient has been admitted (or develops symptoms within two days) with an infection that meets the case definition of an active **surgical site infection (SSI)**, i.e. the SSI occurred within 30 days of the operation (or in the case of surgery involving an implant, was a deep or organ/space SSI that developed within 90 days of the operation) and the patient either has symptoms that meet the case definition and/or is on antimicrobial treatment for that infection;
  OR
- The patient has been admitted (or develops symptoms within two days) with ***C. difficile*** infection less than 28 days after a previous discharge or transfer from a healthcare facility;
  OR
- An **invasive device** was placed on Day 1 or Day 2, resulting in a HAI before Day 3;
  OR
- Onset of symptoms on Day 1 or Day 2 in a **newborn**;
  OR
- The patient was diagnosed with **COVID-19** and the onset of symptoms (or first positive test if asymptomatic) was on Day 3 or later (day of admission = Day 1) of the current admission **or** the patient has COVID-19 on admission (or onset before Day 3) and was (re-)admitted less than 48 hours after a stay of more than 7 days in the same or another healthcare facility (see notes). Further categorisation of these cases as possible, probable and definite healthcare-

associated COVID-19 is done in the analysis (by HPSC/ECDC) based on the date of admission and the date of onset.

Notes:

- Results of tests/examinations that are not yet available on the survey date should neither be completed after the survey date nor considered when establishing whether the case definition criteria are fulfilled. This will probably cause some actual cases of HAI to be discarded, but can be seen as compensation for the (potentially long) retrospective period preceding the start of the treatment when no more signs or symptoms are present on the survey date.

Device-associated HAI is a HAI in a patient with a (relevant) device that was present within the 48-hour period before onset of infection (even intermittently). The term 'device-associated' is only used for pneumonia, bloodstream infection and urinary tract infection. The relevant devices are intubation, vascular catheter (CVC/PVC) and urinary catheter, respectively. If the interval is longer than 48 hours, there must be compelling evidence that the infection was associated with device use. For catheter-associated UTI, the indwelling urinary catheter must have been in place within seven days before positive laboratory results or signs and symptoms meeting criteria for UTI were evident.

A **bloodstream infection** (BSI and secondary BSI) is always registered as a separate HAI with specification of the source in a separate field (catheter – **C-CVC**, **C-PVC**; other secondary infection site – **S-PUL**, **S-UTI**, **S-DIG**, **S-SSI**, **S-SST**, **S-OTH**);

The only exceptions are **CRI3** (catheter-related bloodstream infection with microbiological documentation of the relationship between the vascular catheter and the BSI) and neonatal bloodstream infections: **CRI3** and neonatal BSIs should not be reported twice in the point prevalence survey (see case definitions). Microbiologically-confirmed catheter-related BSI should be reported as a **CRI3**. Neonatal bloodstream infections should be reported as **NEO-LCBI** or **NEO-CNSB**, together with BSI origin.

Data on healthcare-associated infections can be recorded. An extension sheet can be used for the small number of patients who have >1 HAIs.

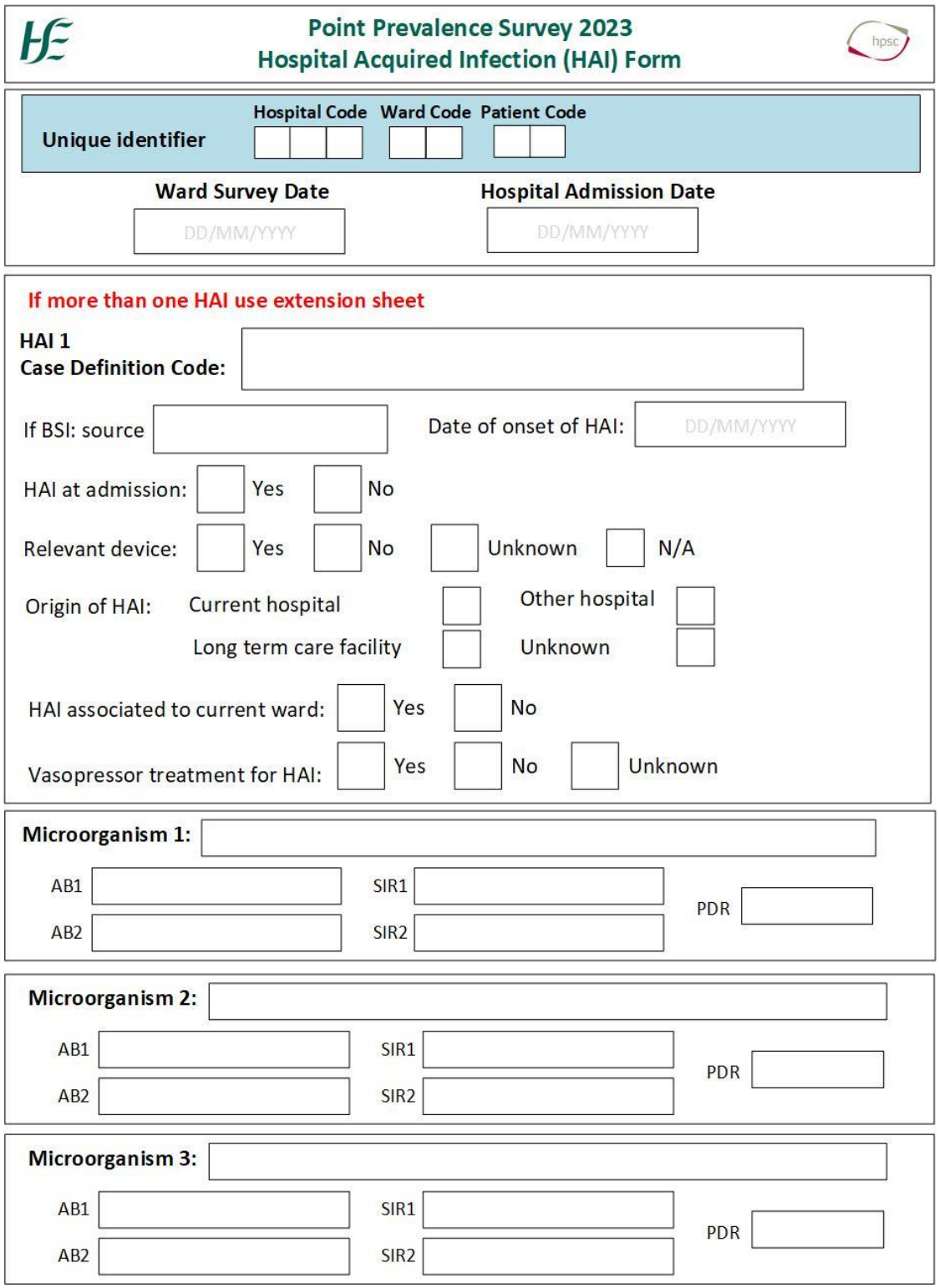


Figure 13: Healthcare Associated Infection (HAI) Form

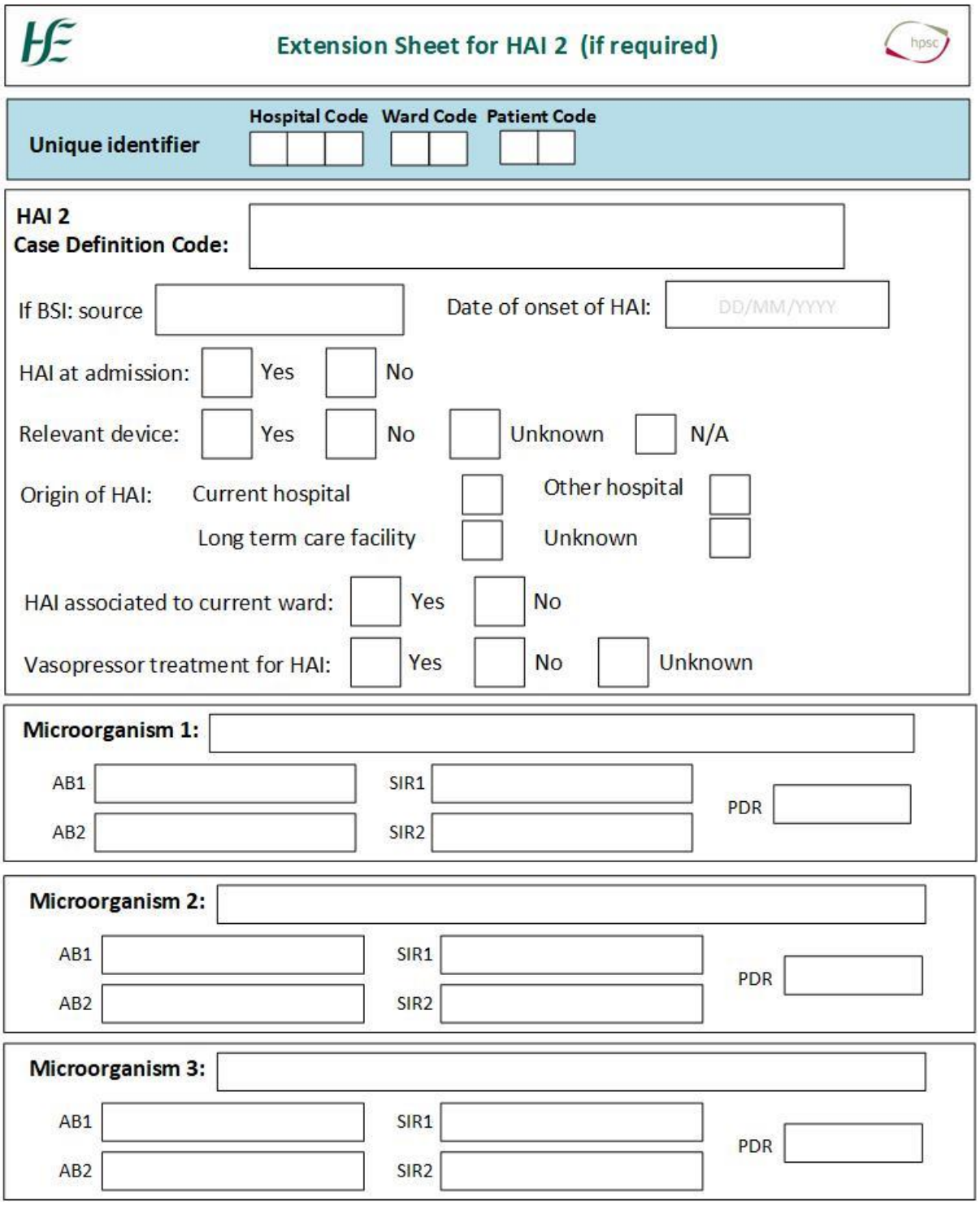


Figure 14: Healthcare Associated Infection (HAI) Form – extension sheet if required

Definitions of Healthcare-Associated Infection Data

Ward Survey date: Date on which data were collected in this ward. Data from a single ward should be collected on one day (**DD/MM/YYYY**)

Patient ID (optional in HWN, not on forms/exported): This is the patient's medical record number, or MRN and should **not** be collected on any form or on HelicsWin.Net in order to comply with GDPR.

Date of hospital admission: Date of patient's admission to the current hospital as recorded on the completed **Form WPL** (**DD/MM/YYYY**).

Case definition code: HAI case definition codes: specify subcategory, e.g. **PN4**, **CVS-VASC** (see code lists, overview and HAI case definitions in ***Appendix A Table 8*** and ***Appendix B***.

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.

Select the appropriate HAI code for the HAI type from ***Appendix A Table 8*****: Overview of HAI case definition codes** and ***Appendix B*****: HAI case definitions**

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** considered retrospectively, to establish whether the HAI case definition criteria are fulfilled. This will result in a few true HAIs present on the survey date not being counted.

- A single-case definition code should only be provided once per patient (i.e. do not report different infection episodes for the same HAI code)
- For pneumonia and urinary tract infections, only fill in one subcategory (for pneumonia priority should be given as follows: **PN1**>**PN2**>**PN3**>**PN4**>**PN5**; and for urinary tract infections: **UTI-A**>**UTI-B**)
- For laboratory-confirmed bloodstream infections, provide only one of **BSI**, **CRI3** (priority: **CRI3**>**BSI**), **NEO-LCBI** or **NEO-CNSB** (priority: **NEO-LCBI**>**NEO-CNSB** [>**BSI**])
- All signs and symptoms since the onset of the infection until the time of the survey should be considered to categorise the HAI
- 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

A hospital-acquired bloodstream infection is always registered as a separate HAI with specification of the source in a separate field (see BSI source below). 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)

If BSI, source: If the patient's HAI meets the case definition for lab-confirmed bloodstream infection, specify the origin (see ***Appendix A Table 9***):

- primary catheter-related* (central: **C-CVC**, peripheral **C-PVC**)

  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**);

  *When the same microorganism was cultured from both the blood and the vascular catheter tip or exit site, this should be reported as microbiologically- confirmed catheter-related BSI (**CRI3**): **CRI3-PVC** or **CRI3-CVC** (See CRI definitions); Do **not** report as **BSI C-CVC** or **BSI C-PVC**.

- secondary to another infection^

  pulmonary (**S-PUL**), urinary tract (**S-UTI**), digestive tract (**S-DIG**), surgical site infection (**S-SSI**), skin and soft tissue infection (**S-SST**), other infection (**S-OTH**)

  when the same microorganism 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;

  ^Report a secondary BSI as a separate HAI, in addition to reporting the primary infection if it matches the relevant HAI case definition.

- primary BSI of (confirmed) unknown origin (**UO**)

  not related to vascular catheter infection and not meeting definition of secondary BSI above. 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;

- BSI source unknown. no information available or missing data (**UNK**)

Note: In case more than one source was found for the same BSI episode, only a single source should be reported, using the following priority ranking:

C-CVC>C-PVC>S-PUL>S-UTI>S-SSI>S-DIG>S-SST>S-OTH>UO>UNK

Date of onset. Date of onset (first signs and symptoms) of the infection. Enter in **DD/MM/YYYY** format.

This should only be recorded if the HAI was not present on admission to hospital. Record the date of first signs or symptoms of the infection developed after admission to hospital; if unknown, record the date treatment was started for this infection or the date the first diagnostic sample was taken. If no treatment or sample, please estimate.

Infection present at admission. Signs and symptoms of the infection (i.e. an active HAI) were present at admission to the hospital; if not, provide date of onset of infection. Select one of the options as appropriate:

- Yes
- 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 a healthcare facility in the preceding 48 hours (except COVID-19)
- Surgical site infection diagnosed in a patient admitted to this hospital with SSI of any category (**SSI-S**, **SSI-D** or **SSI-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
- *Clostridiodes difficile* infection diagnosed in a patient discharged from an acute hospital in preceding 28 days prior to admission to this hospital
- COVID-19 diagnosed in a patient admitted to this hospital having been discharged from another healthcare facility after a stay of more than 7 days in that healthcare facility, including long term care facilities

Relevant device in situ (before onset): a relevant invasive device was in situ (even intermittently) for any amount of time within a 48-hour time period (7 days for UTIs) before onset of the infection, i.e. intubation for pneumonia, central/peripheral vascular catheter for bloodstream infections, urinary catheter for UTI**.** Record it as:

- Yes
- No
- Unknown
- NA, Not applicable

The term **device-associated** is used only for the following HAI only: **PN, BSI, NEO-LCBI, NEO-CNSB and UTI.**

- 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
- **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
- **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
- 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

^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: Other HAI-related to devices (e.g. ventriculitis due to external ventricular drain) are recorded as HAI, but are not recorded as device-associated.

Origin of the infection. Infection is associated with (1) current hospital; (2) another hospital; (3) a long-term care facility; (4) other origin or unknown.

Infections present at admission may be associated with a previous stay in your hospital **or** a transfer from another healthcare facility.

The category **other origin** / **unknown** can be used, for example, for infections with an onset after day 2 of the current hospitalisation (= HAI by definition) which the surveyor does not consider to be associated with the current hospital stay, 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 healthcare facility.

Tick as appropriate from one of the options below. Infection (HAI) is associated with:

- 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 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
    - Patient was admitted with COVID-19 and was discharged from current hospital after a stay of more than 7 days
- another hospital:
    - 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 (**SSI-S**, **SSI-D** or **SSI-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
    - Patient was admitted with COVID-19 and was discharged from another hospital after a stay of more than 7 days
- a long-term care facility:
    - Patient was admitted with HAI (or HAI presented on day 1 or 2) and was in a long-term care facility in preceding 48 hours
    - Patient was admitted with CDI (or CDI presented on day 1 or 2) and was in a long-term care facility in the preceding 28 days
    - Patient was admitted with COVID-19 and was in a long-term care facility after a stay of more than 7 days
- other origin or unknown

Note: It may not always be possible to determine a single origin of the 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.

HAI associated to current ward. A HAI is associated with the current ward:

- if the infection started on day 3 or later after admission to the current ward (where the date of admission to the ward is day 1) ***or***
- if the infection started on day 1 or 2 after placement of an invasive device in the current ward ***or***
- if the patient was readmitted with a HAI present on admission associated to a previous stay in the same ward, within 30 days after operation for surgical site infections (or 90 days for deep and organ/space SSI after implant surgery), less than 28 days after discharge for *C. difficile* infections, a previous stay of at least 7 days in the same ward for COVID-19, discharged less than 48 hours (two calendar days) after discharge for other HAIs

Select one of the options as appropriate:

- Yes
- No

Vasopressor treatment: Vasopressor treatment (e.g. norepinephrine/noradrenaline, epinephrine/adrenaline, vasopressin, phenylephrine, dopamine) was initiated for the treatment of the consequences of the HAI (marker of septic shock):

- Yes
- No
- Unknown

Microorganisms: 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 investigation.

Collect microbiological results available on the survey date **only** (do not wait for results not available on the survey date).

Specify up to three isolated microorganisms using six-letter microorganism codes (e.g. **STAAUR**=*Staphylococcus aureus*): a patient meeting the case definition for intraabdominal infection (**GI-IAB**) may have a polymicrobial infection.

See codebook (***Appendix A Table 10***, and also ***Appendix B - HAI Definitions)*** for more information regarding the relevant microbiology results for each HAI type.

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

Note:

- Do not enter microbiology results retrospectively and do not wait for final microbiology reports that were incomplete at the time of PPS
- 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.

Antimicrobial resistance phenotype: Specify susceptibility to selected antimicrobial resistance (AMR) markers for the 5 key pathogens listed below.

Specify the results for the relevant antimicrobial group in the AM section. While reporting, use the antimicrobial groups (Do not report by individual antimicrobial agents).

1. *Staphylococcus aureus*: **OXA**, **GLY**
   - MRSA: Resistant to oxacillin (**OXA**) or other markers of meticillin-resistant *S. aureus* (MRSA), such as cefoxitin, cloxacillin, flucloxacillin, meticillin
   - VRSA: Resistant to glycopeptides (**GLY**): vancomycin or teicoplanin
2. *Enterococcus* spp.: **GLY**
   - VRE: Resistant to glycopeptides (**GLY**): vancomycin or teicoplanin

3. Enterobacterales (Selection: *Escherichia coli*, *Klebsiella* spp., *Enterobacter* spp., *Proteus* spp., *Citrobacter* spp., *Serratia* spp., *Morganella* spp., etc): **3GC**, **CAR**
    - Third-generation cephalosporins (**3GC; Note:** appears as **C3G** in HelicsWin.Net): cefotaxime, ceftriaxone, ceftazidime
    - Carbapenems (**CAR**): imipenem, meropenem
4. *Pseudomonas* aeruginosa: **CAR**
    - Carbapenems (**CAR**): imipenem, meropenem
5. *Acinetobacter* spp.: **CAR**
    - Carbapenems (**CAR**): imipenem, meropenem

Resistance data are NOT required for any other microorganisms. If the microorganism identified does not belong to one of key microorganisms listed above, leave AM and SIR fields the susceptibility results blank.

While reporting specifying antimicrobial group is preferred for tested antimicrobials within the group. Reporting group susceptibility requires that at least one antimicrobial belonging to the group is tested. 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 result and use the antimicrobial group code. For instance, if an *E. cloacae* isolate is found to be resistant to ertapenem and susceptible to meropenem, record it as resistant (**R**) to carbapenems (**CAR**).

While reporting choose one of the options below.

- **S** = Susceptible, standard dosing regimen
- **I** = Susceptible, increased exposure
- **R** = Resistant
- **UNK** = Unknown

Pandrug-resistant (PDR). Microorganism is pandrug-resistant. Select the appropriate option for the microorganism's overall resistance status:

- **N** = Not PDR: susceptible to at least one antimicrobial agent tested
- **P** = Possibly PDR: R to all antimicrobial agents tested in the laboratory
- **C** = Confirmed PDR: R to all agents in all antimicrobial categories, confirmed by a reference or other clinical microbiology laboratory testing a supplemental panel of antimicrobial agents beyond those routinely tested
- **UNK** = Unknown

Appendix A: Tables

Table 1: Ward Specialty Code List

Ward specialty (code)	Ward specialty categories
Surgical specialties **(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
Medical specialties **(MED)**	Choose for the majority of acute medical wards or HDU to which patients with a variety of medical conditions are generally admitted
Neonatology **(NEO)**	Neonatology including Neonatal ICU (NICU)
Paediatrics **(PED)**	Paediatrics including Paediatric ICU (PICU)
Intensive care unit **(ICU)**	Intensive care unit for adult patients Remember NICU is coded as NEONATOLOGY 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
Geriatrics **(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
Long-term care (**LTC**)	Ward designated for long-term care patients
Other **(OTH)**	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 (**MIX**)	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: Hospital Types

Hospital Group	Hospital Name	Hospital type	Type of Hospital
Dublin Midlands	Coombe Women and Infant's University Hospital	Specialist	-
	Midland Regional Hospital Portlaoise	Primary / Secondary	Model 3
	Midland Regional Hospital Tullamore	Primary / Secondary	Model 3
	Naas General Hospital	Primary / Secondary	Model 3
	St James's Hospital	Tertiary	Model 4
	St Luke's Hospital, Dublin	Specialist	-
	Tallaght University Hospital	Tertiary	Model 4
Ireland East Hospital Group	Cappagh National Orthopaedic Hospital	Specialist	-
	Mater Misericordiae University Hospital	Tertiary	Model 4
	Midland Regional Hospital Mullingar	Primary / Secondary	Model 3
	National Maternity Hospital, Holles Street	Specialist	-
	National Rehabilitation Hospital	Specialist	-
	Our Lady's Hospital, Navan	Primary / Secondary	Model 3
	Royal Victoria Eye & Ear Hospital, Dublin	Specialist	-
	St Columcille's Hospital, Loughlinstown	Primary / Secondary	Model 2
	St Luke's General Hospital, Kilkenny	Primary / Secondary	Model 3
	St Michael's Hospital, Dun Laoghaire	Primary / Secondary	Model 2
	St Vincent's University Hospital	Tertiary	Model 4
	Wexford General Hospital	Primary / Secondary	Model 3
RCSI Hospital Group	Beaumont Hospital	Tertiary	Model 4
	Cavan General Hospital	Primary / Secondary	Model 3
	Connolly Hospital, Blanchardstown	Primary / Secondary	Model 3
	Louth County Hospital, Dundalk	Primary / Secondary	Model 2
	Our Lady of Lourdes Hospital, Drogheda	Primary / Secondary	Model 3
	Rotunda Hospital	Specialist	-
Saolta Hospital Group	Letterkenny University Hospital	Primary / Secondary	Model 3
	Mayo University Hospital	Primary / Secondary	Model 3
	Portiuncula University Hospital	Primary / Secondary	Model 3
	Roscommon University Hospital	Primary / Secondary	Model 2
	Sligo University Hospital	Primary / Secondary	Model 3
	University Hospital Galway	Tertiary	Model 4
South/South West Hospital Group	Bantry General Hospital	Primary / Secondary	Model 2
	Cork University Hospital	Tertiary	Model 4
	Cork University Maternity Hospital	Specialist	-
	University Hospital Kerry	Primary / Secondary	Model 3
	Lourdes Orthopaedic Hospital, Kilcreene, Kilkenny	Specialist	-
	Mallow General Hospital	Primary / Secondary	Model 2
	Mercy University Hospital, Cork	Primary / Secondary	Model 3
	South Infirmary - Victoria University Hospital, Cork	Primary / Secondary	Model 2
	South Tipperary General Hospital, Clonmel	Primary / Secondary	Model 3
	University Hospital Waterford	Tertiary	Model 4

Table 2: Hospital Types (continued)

Hospital Group	Hospital Name	Hospital type	Type of Hospital
UL Hospital Group	Croom Hospital	Specialist	-
	Ennis Hospital	Primary / Secondary	Model 2
	Nenagh Hospital	Primary / Secondary	Model 2
	St John's Hospital	Primary / Secondary	Model 2
	University Hospital Limerick	Tertiary	Model 4
	University Maternity Hospital Limerick	Specialist	-
Private Hospitals	Aut Even, Kilkenny	Private	-
	Beacon Hospital, Dublin	Private	-
	Blackrock Clinic	Private	-
	Bon Secours, Cork	Private	-
	Bon Secours, Galway	Private	-
	Bon Secours, Glasnevin	Private	-
	Bon Secours, Limerick	Private	-
	Bon Secours, Tralee	Private	-
	Galway Clinic	Private	-
	Hermitage Medical Clinic, Dublin	Private	-
	Kingsbridge Private Hospital, Sligo	Private	-
	Mater Private, Cork	Private	-
	Mater Private, Dublin	Private	-
	Sports Surgery Clinic, Santry	Private	-
	St Vincent's Private Hospital, Dublin	Private	-
	St Francis Private Hospital (Charter Medical), Mullingar	Private	-
	St John of God Hospital, Dublin	Private	-
	UPMC Kildare (Clane General Hospital)	Private	-
	UPMC Waterford	Private	-
Children's Health Ireland	Children's Health Ireland at Tallaght	Specialist	-
	Children's Health Ireland at Temple St	Specialist	-
	Children's Health Ireland at Crumlin	Specialist	-

Table 3: Ward Speciality Codes and Patient/Consultant Speciality Codes

Specialty codes are used for following variables: Ward specialty, patient/consultant specialty, specialised hospital (form H). Ward specialty codes are shown in the first column (in parentheses).

Ward specialty (code)	Patient/consultant specialty code	Patient/consultant specialty name
Surgical specialties **(SUR)**	SURGEN	General surgery
	SURDIG	Digestive tract surgery
	SURORTR	Orthopaedics and surgical traumatology
	SURORTO	Orthopaedics
	SURTR	Traumatology
	SURCV	Cardio surgery and vascular surgery
	SURCARD	Cardio surgery
	SURVASC	Vascular surgery
	SURTHO	Thoracic surgery
	SURNEU	Neurosurgery
	SURPED	Paediatric general surgery
	SURTRANS	Transplantation surgery
	SURONCO	Surgery for cancer
	SURENT	ENT
	SUROPH	Ophthalmology
	SURMAXFAC	Maxillo-facial surgery
	SURSTODEN	Stomatology/Dentistry
	SURBURN	Burns care
	SURURO	Urology
	SURPLAS	Plastic and reconstructive surgery
	SUROTH	Other surgery
Medical specialties **(MED)**	MEDGEN	General medicine
	MEDGAST	Gastroenterology
	MEDHEP	Hepatology
	MEDENDO	Endocrinology
	MEDONCO	Oncology
	MEDHEMA	Haematology
	MEDBMT	Bone marrow transplantation (BMT)
	MEDHEMBMT	Haematology/BMT
	MEDCARD	Cardiology
	MEDCOV	COVID-19 (non-ICU)
	MEDDERM	Dermatology
	MEDNEPH	Nephrology
	MEDNEU	Neurology
	MEDPNEU	Pneumology
	MEDRHEU	Rheumatology
	MEDID	Infectious diseases
	MEDTR	Medical traumatology
	MEDOTH	Other medical (if specialty not listed)
	PEDNEO	Neonatology (excl. healthy neonates)

Ward specialty (code)	Patient/consultant specialty code	Patient/consultant specialty name
Neonatology **(NEO)**	PEDBAB	Healthy neonates (paediatrics)
	ICUNEO	Neonatal ICU
Paediatrics **(PED)**	ICUPED	Paediatric ICU
	PEDGEN	Paediatrics general, not specialised
Intensive care medicine **(ICU)**	ICUMED	Medical ICU
	ICUSUR	Surgical ICU
	ICUMIX	Mixed (polyvalent) ICU, general intensive or critical
Intensive care medicine (**ICU**)	ICUCOV	COVID-19 ICU
	ICUSPEC	Specialised ICU
	ICUOTH	Other ICU
Gynaecology/Obstetrics **(GO)**	GOOBS	Obstetrics /maternity
	GOGYN	Gynaecology
	GOBAB	Healthy neonates (maternity)
Geriatrics **(GER)**	GER	Geriatrics, care for the elderly
Psychiatry **(PSY)**	PSY	Psychiatry
Rehabilitation **(RHB)**	RHB	Rehabilitation
Long-term care **(LTC)**	LTC*	Long-term care
OTHER **(OTH)**	OTH	Others not listed
Mixed **(MIX)**	MIX*	Combination of specialties

* **LTC** and **MIX** are in principle ward specialties and should only exceptionally be used as a patient/consultant specialty (e.g. for **LTC**, use **MEDGEN**, **GER**, **RHB** instead; for **MIX**, use the specialty of the main disease of the patient only).

Table 4: List of Surgical Procedures

Reference: NHSN operative procedure category mappings to ICD-9-CM codes, October 2010. Available from: www.cdc.gov/nhsn/PDFs/pscManual/9pscSSIcurrent.pdf.

Report NHSN-codes even if the incision is not entirely closed at procedure's end (i.e. if wires or tubes extrude through the incision).

NHSN Surgery Codes

Category	NHSN code	Operative procedure	Description
Cardiac	NHSN-HTP	Heart transplant	Transplantation of heart **Includes insertion/ replacement of leads **Excludes insertion of temporary transvenous pacemaker system
Cardiac	NHSN-CARD	Cardiac surgery	Procedures on the valves or septum of heart Does not include coronary artery bypass graft, surgery on vessels, heart transplantation, or pacemaker implantation
Cardiac	NHSN-CBGB	Coronary artery bypass graft with both chest and donor site incisions	Chest procedure to perform direct revascularisation of the heart; includes obtaining suitable vein from donor site for grafting.
Cardiac	NHSN-CBGC	Coronary artery bypass graft with chest incision only	Chest procedure to perform direct vascularisation of the heart using, for example the internal mammary (thoracic) artery
Cardiac	NHSN-PACE	Pacemaker surgery	Insertion, manipulation or replacement of pacemaker
ENT & Maxillofacial	NHSN-NECK	Neck surgery	Major excision or incision of the larynx and radical neck dissection; does not include thyroid and parathyroid opera; Maxillofacial surgery **Excludes thyroid and parathyroid operations - see NHSN-THYR below
General	NHSN-APPY	Appendix surgery	Operation of appendix (not incidental to another procedure) **Includes laparoscopic appendectomy
General	NHSN-BILI	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)

Category	NHSN code	Operative procedure	Description
General	NHSN-CHOL	Gallbladder surgery	Cholecystectomy and cholecystotomy
General	NHSN-HER	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	NHSN-LTP	Liver transplant	Transplantation of liver
General	NHSN-REC	Rectal surgery	Operations on rectum
General	NHSN-SB	Small bowel surgery	Incision or resection of the small intestine **Excludes small-to-large bowel anastomosis (See colon surgery)
General		General-Abdominal Surgery	Abdominal operations not involving the gastrointestinal tract or biliary system
General	NHSN-BRST	Breast surgery	Excision of lesion or tissue of breast including radical, modified, or quadrant resection, lumpectomy, incisional biopsy, or mammoplasty
General	NHSN-COLO	Colon surgery	Incision, resection, or anastomosis of the large intestine **Includes large-to-small and small-to-large bowel anastomosis **Excludes rectal operations
General	NHSN-GAST	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	NHSN-SPLE	Spleen surgery	Resection or manipulation of spleen
General	NHSN-THYR	Thyroid and/or parathyroid surgery	Resection or manipulation of thyroid and/or parathyroid
Neurosurgery	NHSN-CRAN	Craniotomy	Incision through the skull to excise, repair, or explore the brain **Excludes taps or punctures
Neurosurgery	NHSN-VSHN	Ventricular shunt	Ventricular shunt operations, including revision and removal of shunt
NHSN-XLAP	NHSN-XLAP	Exploratory laparotomy	Procedures involving an incision through abdominal wall to gain access into the abdominal cavity; diagnostic procedure on abdominal region

Category	NHSN code	Operative procedure	Description
Obstetrics and Gynaecology	NHSN-CSEC	Caesarean section	Obstetrical delivery by Caesarean section
Obstetrics and Gynaecology	NHSN-HYST	Abdominal hysterectomy	Removal of uterus through an abdominal incision **Excludes vaginal hysterectomy (see separate procedure listed below)
Obstetrics and Gynaecology	NHSN-OVRY	Ovarian surgery	Operations on ovary and related structures
Obstetrics and Gynaecology	NHSN-VHYS	Vaginal hysterectomy	Vaginal hysterectomy; includes that by laparoscope
Orthopaedics	NHSN-FUSN	Spinal fusion	Immobilisation of spinal column **Excludes refusion of spine
Orthopaedics	NHSN-FX	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
Orthopaedics	NHSN-KPRO	Knee prosthesis	Arthroplasty of knee **Includes total, partial and revisions
Orthopaedics	NHSN-LAM	Laminectomy	Exploration or decompression of spinal cord through excision or incision into vertebral structures
Orthopaedics	NHSN-RFUSN	Refusion of spine	Refusion of spine
Orthopaedics		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
Orthopaedics	NHSN-HPRO	Hip prosthesis	Arthroplasty of hip **Includes total, partial and revisions
Thoracic	NHSN-THOR	Thoracic surgery	Noncardiac, nonvascular thoracic surgery ** Includes pneumonectomy and diaphragmatic or hiatal hernia repair
Urology	NHSN-KTP	Kidney transplant	Transplantation of kidney
Urology	NHSN-NEPH	Kidney surgery	Resection or manipulation of the kidney with or without removal of related structures **Excludes kidney transplant

Category	NHSN code	Operative procedure	Description
Urology	NHSN-PRST	Prostate surgery	Suprapubic, retropubic, radical, or perineal excision of the prostate **Excludes include transurethral resection of the prostate, which should be recorded as minimally invasive
Vascular	NHSN-AAA	Abdominal aortic aneurysm repair	Resection of abdominal aorta with anastomosis or replacement
Vascular	NHSN-AMP	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	NHSN-AVSD	Shunt for dialysis	Arteriovenostomy for renal dialysis (surgery to create an AV fistula or graft for haemodialysis)
Vascular	NHSN-CEA	Carotid endarterectomy	Endarterectomy on vessels of head and neck (includes carotid artery and jugular vein)
Vascular	NHSN-PVBY	Peripheral vascular bypass surgery	Bypass operations on peripheral arteries

Table 5A: The 20 Most Commonly Prescribed Antimicrobials, In Order of Frequency

Antimicrobial agent: generic name	ATC5 code
Amoxicillin and enzyme inhibitor – co-amoxiclav	J01CR02
Piperacillin and enzyme inhibitor – piperacillin-tazobactam	J01CR05
Metronidazole (oral, rectal)	P01AB01
Metronidazole (parenteral/IV)	J01XD01
Flucloxacillin	J01CF05
Clarithromycin	J01FA09
Ciprofloxacin	J01MA02
Cefuroxime	J01DC02
Vancomycin parenteral (IV)	J01XA01
Vancomycin enteral (oral) [Treatment of *C. difficile* infection only]	A07AA09
Gentamicin	J01GB03
Meropenem	J01DH02
Sulfamethoxazole and trimethoprim (co-trimoxazole)	J01EE01
Benzylpenicillin	J01CE01
Ceftriaxone	J01DD04
Nitrofurantoin	J01XE01
Amoxicillin	J01CA04
Azithromycin	J01FA10
Doxycycline	J01AA02
Levofloxacin	J01MA12

Table 5B: All Antimicrobials with ATC5 Codes, Alphabetical Order

Antimicrobial agent: generic name	ATC5 code
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
Arbekacin	J01GB12
Aspoxicillin	J01CA19
Azanidazole	P01AB04
Azidocillin	J01CE04
Azithromycin	J01FA10
Azithromycin, fluconazole and secnidazole	J01RA07
Azlocillin	J01CA09
Aztreonam	J01DF01
Bacampicillin	J01CA06
Bacitracin	J01XX10
Bekanamycin	J01GB13
Benzathine benzylpenicillin	J01CE08
Benzathine phenoxymethylpenicillin	J01CE10
Benzylpenicillin	J01CE01
Biapenem	J01DH05
Brodimoprim	J01EA02
Carbenicillin	J01CA03
Carindacillin	J01CA05
Carumonam	J01DF02
Caspofungin	J02AX04
Cefacetrile	J01DB10
Cefaclor	J01DC04
Cefadroxil	J01DB05
Cefalexin	J01DB01
Cefaloridine	J01DB02
Cefalotin	J01DB03

Antimicrobial agent: generic name	ATC5 code
Cefamandole	J01DC03
Cefapirin	J01DB08
Cefatrizine	J01DB07
Cefazedone	J01DB06
Cefazolin	J01DB04
Cefbuperazone	J01DC13
Cefcapene	J01DD17
Cefdinir	J01DD15
Cefditoren	J01DD16
Cefepime	J01DE01
Cefepime and amikacin	J01RA06
Cefetamet	J01DD10
Cefiderocol	J01DI04
Cefixime	J01DD08
Cefixime and ornidazole	J01RA15
Cefmenoxime	J01DD05
Cefmetazole	J01DC09
Cefminox	J01DC12
Cefodizime	J01DD09
Cefonicide	J01DC06
Cefoperazone	J01DD12
Cefoperazone, combinations	J01DD62
Ceforanide	J01DC11
Cefotaxime	J01DD01
Cefotaxime and beta-lactamase inhibitor	J01DD51
Cefotetan	J01DC05
Cefotiam	J01DC07
Cefoxitin	J01DC01
Cefozopran	J01DE03
Cefpiramide	J01DD11
Cefpirome	J01DE02
Cefpodoxime	J01DD13
Cefpodoxime and beta-lactamase inhibitor	J01DD64
Cefprozil	J01DC10
Cefradine	J01DB09
Cefroxadine	J01DB11

Antimicrobial agent: generic name	ATC5 code
Cefsulodin	J01DD03
Ceftaroline fosamil	J01DI02
Ceftazidime	J01DD02
Ceftazidime and beta-lactamase inhibitor	J01DD52
Cefteram	J01DD18
Ceftezole	J01DB12
Ceftibuten	J01DD14
Ceftizoxime	J01DD07
Ceftobiprole medocaril	J01DI01
Ceftolozane and beta-lactamase inhibitor	J01DI54
Ceftriaxone	J01DD04
Ceftriaxone, combinations	J01DD54
Cefuroxime	J01DC02
Cefuroxime and metronidazole	J01RA03
Chloramphenicol	J01BA01
Chlortetracycline	J01AA03
Cinoxacin	J01MB06
Ciprofloxacin	J01MA02
Ciprofloxacin and metronidazole	J01RA10
Ciprofloxacin and ornidazole	J01RA12
Ciprofloxacin and tinidazole	J01RA11
Clarithromycin	J01FA09
Clindamycin	J01FF01
Clofoctol	J01XX03
Clometocillin	J01CE07
Clomocycline	J01AA11
Cloxacillin	J01CF02
Colistin (injection, infusion)	J01XB01
Colistin (oral)	A07AA10
Combinations of beta-lactamase sensitive penicillins	J01CE30
Combinations of intermediate-acting sulphonamides	J01EC20
Combinations of long-acting sulphonamides	J01ED20
Combinations of penicillins	J01CR50
Combinations of penicillins with extended spectrum	J01CA20
Combinations of short-acting sulphonamides	J01EB20
Combinations of tetracyclines	J01AA20

Antimicrobial agent: generic name	ATC5 code
Cycloserine	J04AB01
Dalbavancin	J01XA04
Daptomycin	J01XX09
Delafloxacin	J01MA23
Demeclocycline	J01AA01
Dibekacin	J01GB09
Dicloxacillin	J01CF01
Dirithromycin	J01FA13
Doripenem	J01DH04
Doxycycline	J01AA02
Enoxacin	J01MA04
Epicillin	J01CA07
Eravacycline	J01AA13
Ertapenem	J01DH03
Erythromycin	J01FA01
Ethambutol	J04AK02
Ethionamide	J04AD03
Faropenem	J01DI03
Fidaxomicin	A07AA12
Fleroxacin	J01MA08
Flomoxef	J01DC14
Flucloxacillin	J01CF05
Fluconazole	J02AC01
Flucytosine	J02AX01
Flumequine	J01MB07
Flurithromycin	J01FA14
Fosfomycin	J01XX01
Furazidin	J01XE03
Fusidic acid	J01XC01
Garenoxacin	J01MA19
Gatifloxacin	J01MA16
Gemifloxacin	J01MA15
Gentamicin	J01GB03
Grepafloxacin	J01MA11
Griseofulvin	D01BA01
Hachimycin	J02AA02

Antimicrobial agent: generic name	ATC5 code
Hetacillin	J01CA18
Iclaprim	J01EA03
Imipenem and enzyme inhibitor	J01DH51
Imipenem, cilastatin and relebactam	J01DH56
Isavuconazole	J02AC05
Isepamicin	J01GB11
Isoniazid	J04AC01
Itraconazole	J02AC02
Josamycin	J01FA07
Kanamycin	A07AA08
Kanamycin	J01GB04
Ketoconazole	J02AB02
Lascufloxacin	J01MA25
Latamoxef	J01DD06
Lefamulin	J01XX12
Levofloxacin	J01MA12
Levofloxacin, combinations with other antibacterials	J01RA05
Levonadifloxacin	J01MA24
Lincomycin	J01FF02
Linezolid	J01XX08
Lomefloxacin	J01MA07
Loracarbef	J01DC08
Lymecycline	J01AA04
Mandelic acid	J01XX06
Mecillinam	J01CA11
Meropenem	J01DH02
Meropenem and vaborbactam	J01DH52
Metacycline	J01AA05
Metampicillin	J01CA14
Methenamine	J01XX05
Meticillin	J01CF03
Metronidazole (oral, rectal)	P01AB01
Metronidazole (parenteral)	J01XD01
Metronidazole, combinations	P01AB51
Mezlocillin	J01CA10
Micafungin	J02AX05

Antimicrobial agent: generic name	ATC5 code
Miconazole	J02AB01
Midecamycin	J01FA03
Minocycline	J01AA08
Miocamycin	J01FA11
Moxifloxacin	J01MA14
Nafcillin	J01CF06
Nalidixic acid	J01MB02
Natamycin	A07AA03
Nemonoxacin	J01MB08
Neomycin (injection, infusion)	J01GB05
Neomycin (oral)	A07AA01
Neomycin, combinations (oral)	A07AA51
Netilmicin	J01GB07
Nifurtoinol	J01XE02
Nimorazole	P01AB06
Nitrofurantoin	J01XE01
Nitrofurantoin, combinations	J01XE51
Nitroxoline	J01XX07
Norfloxacin	J01MA06
Norfloxacin and metronidazole	J01RA14
Norfloxacin and tinidazole	J01RA13
Nystatin	A07AA02
Ofloxacin	J01MA01
Ofloxacin and ornidazole	J01RA09
Oleandomycin	J01FA05
Omadacycline	J01AA15
Oritavancin	J01XA05
Ornidazole (oral)	P01AB03
Ornidazole (parenteral)	J01XD03
Oteseconazole	J02AC06
Oxacillin	J01CF04
Oxolinic acid	J01MB05
Oxytetracycline	J01AA06
Oxytetracycline, combinations	J01AA56
Panipenem and betamipron	J01DH55
Paromomycin	A07AA06

Antimicrobial agent: generic name	ATC5 code
Pazufloxacin	J01MA18
Pefloxacin	J01MA03
Penamecillin	J01CE06
Penicillins, combinations with other antibacterials	J01RA01
Penimepicycline	J01AA10
Pheneticillin	J01CE05
Phenoxymethylpenicillin	J01CE02
Pipemidic acid	J01MB04
Piperacillin	J01CA12
Piperacillin and enzyme inhibitor	J01CR05
Piromidic acid	J01MB03
Pivampicillin	J01CA02
Pivmecillinam	J01CA08
Plazomicin	J01GB14
Polymyxin Benteral, indicated as intestinal antiinfective)	A07AA05
Polymyxin B, other indications)	J01XB02
Posaconazole	J02AC04
Pristinamycin	J01FG01
Procaine benzylpenicillin	J01CE09
Propenidazole	P01AB05
Propicillin	J01CE03
Prulifloxacin	J01MA17
Pyrazinamide	J04AK01
Quinupristin/dalfopristin	J01FG02
Ribostamycin	J01GB10
Rifabutin	J04AB04
Rifampicin	J04AB02
Rifaximin	A07AA11
Rokitamycin	J01FA12
Rolitetracycline	J01AA09
Rosoxacin	J01MB01
Roxithromycin	J01FA06
Rufloxacin	J01MA10
Sarecycline	J01AA14
Secnidazole	P01AB07
Sisomicin	J01GB08

Antimicrobial agent: generic name	ATC5 code
Sitafloxacin	J01MA21
Solithromycin	J01FA16
Sparfloxacin	J01MA09
Spectinomycin	J01XX04
Spiramycin	J01FA02
Spiramycin and metronidazole	J01RA04
Streptoduocin	J01GA02
Streptomycin (oral)	A07AA04
Streptomycin (parenteral)	J01GA01
Streptomycin, combinations	A07AA54
Sulbactam	J01CG01
Sulbenicillin	J01CA16
Sulfadiazine	J01EC02
Sulfadiazine and tetroxoprim	J01EE06
Sulfadiazine and trimethoprim	J01EE02
Sulfadimethoxine	J01ED01
Sulfadimidine	J01EB03
Sulfadimidine and trimethoprim	J01EE05
Sulfafurazole	J01EB05
Sulfaisodimidine	J01EB01
Sulfalene	J01ED02
Sulfamazone	J01ED09
Sulfamerazine	J01ED07
Sulfamerazine and trimethoprim	J01EE07
Sulfamethizole	J01EB02
Sulfamethoxazole	J01EC01
Sulfamethoxazole and trimethoprim	J01EE01
Sulfamethoxypyridazine	J01ED05
Sulfametomidine	J01ED03
Sulfametoxydiazine	J01ED04
Sulfametrole and trimethoprim	J01EE03
Sulfamoxole	J01EC03
Sulfamoxole and trimethoprim	J01EE04
Sulfanilamide	J01EB06
Sulfaperin	J01ED06
Sulfaphenazole	J01ED08

Antimicrobial agent: generic name	ATC5 code
Sulfapyridine	J01EB04
Sulfathiazole	J01EB07
Sulfathiourea	J01EB08
Sulfonamides, combinations with other antibacterials (excl. trimethoprim)	J01RA02
Sultamicillin	J01CR04
Talampicillin	J01CA15
Tazobactam	J01CG02
Tebipenem pivoxil	J01DH06
Tedizolid	J01XX11
Teicoplanin	J01XA02
Telavancin	J01XA03
Telithromycin	J01FA15
Temafloxacin	J01MA05
Temocillin	J01CA17
Terbinafine	D01BA02
Tetracycline	J01AA07
Tetracycline and oleandomycin	J01RA08
Thiamphenicol	J01BA02
Thiamphenicol, combinations	J01BA52
Ticarcillin	J01CA13
Ticarcillin and enzyme inhibitor	J01CR03
Tigecycline	J01AA12
Tinidazole (oral, rectal)	P01AB02
Tinidazole (parenteral)	J01XD02
Tobramycin	J01GB01
Tosufloxacin	J01MA22
Trimethoprim	J01EA01
Troleandomycin	J01FA08
Trovafloxacin	J01MA13
Vancomycin (oral)	A07AA09
Vancomycin (parenteral)	J01XA01
Voriconazole	J02AC03
Xibornol	J01XX02

Table 6: Indications for Antimicrobial Use

Indication code	Indication
Treatment	
CI	Treatment of community-acquired infection (CI)
LI	Treatment of long-term care-acquired infection (LI)
HI	Treatment of hospital-acquired infection (HI)
Prophylaxis	
MP	Medical prophylaxis
SP1	Surgical prophylaxis: single dose
SP2	Surgical prophylaxis: one day
SP3	Surgical prophylaxis: >1 day
Other	
O	Other reason (e.g. prokinetic erythromycin)
UI	Unknown indication (verified during PPS)

Table 7: Diagnosis (Site) List for Antimicrobial Use

Diagnosis / site code	Prescriber's diagnosis of the site of infection for which the patient receives antimicrobial therapy
CNS	Infections of the central nervous system (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
CVS	Cardiovascular infections (e.g. endocarditis, vascular graft infection)
GI	Gastrointestinal infections (e.g. salmonellosis, *C. difficile* infection)
IA	Intra-abdominal sepsis, including hepatobiliary
SST-SSI	Surgical site infection involving skin or soft tissue, but not bone
SST-O	Skin soft tissue infection, includes cellulitis, wound infection and deep soft tissue infection, not involving bone AND not related to surgery
BJ-SSI	Septic arthritis, osteomyelitis related to surgery at site of infection, includes prosthetic joint infection
BJ-O	Septic arthritis, osteomyelitis, not related to surgery
CYS	Symptomatic lower urinary tract infection (e.g. cystitis)
PYE	Symptomatic upper urinary tract infection (e.g. pyelonephritis)
ASB	Asymptomatic bacteriuria: positive urine microbiology results in the absence of signs of urinary tract infection
OBGY	Obstetric or gynaecological infections, includes STIs in women
GUM	Prostatitis, epididymo-orchitis, includes STIs in men
BAC	Laboratory-confirmed clinically-significant bacteraemia (positive blood cultures)
CSEP	Clinical sepsis (suspected bloodstream infection without lab confirmation of positive blood culture **or** results are not available, **or** no blood cultures collected, **or** negative blood culture Note: CSEP excludes patients with febrile neutropenia and infection in immuno-compromised hosts (See FN below)
FN	Febrile neutropenia or other form of manifestation of infection in immunocompromised host (e.g. patient with HIV infection, patient receiving chemotherapy or other immunosuppressive therapy.) with no clear anatomical site
SIRS	Systemic inflammatory response with no clear anatomical site
UND	Completely undefined; site with no systemic inflammation
NA	Not applicable; for antimicrobial use other than treatment

Table 8: Overview of Healthcare-Associated Infection (HAI) Case Definition Codes

HAI case definition codes are recorded on Patient Form in the *HAI data* section.

Always check **Appendix B** for a detailed description of each HAI case definition when deciding if patient meets HAI case definition

HAI codes		HAI description
PN		**Pneumonia**
	PN1	Positive quantitative culture from minimally contaminated lower respiratory tract
	PN2	Positive quantitative culture from possibly contaminated lower respiratory tract
	PN3	Microbiological diagnosis by alternative microbiology methods
	PN4	Positive sputum culture or non-quantitative culture from lower respiratory tract
	PN5	Clinical signs of pneumonia without positive microbiology
COV		**COVID-19 (SARS-CoV-2 infection)**
	COV-ASY	asymptomatic COVID-19
	COV-MM	COV-MM: mild/moderate COVID-19
	COV-SEV	COV-SEV: severe COVID-19
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

HAI codes		HAI description
	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**

HAI codes		HAI description
	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 9: BSI Origin (BSI Source) Code List

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, 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, 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, microbiologically-confirmed with the same organism isolated from both blood cultures and central vascular catheter (tip/exit site swab)
*	CRI3-PVC, peripheral vascular catheter, microbiologically-confirmed with the same organism isolated from both blood cultures and peripheral vascular catheter (tip/exit site swab)
Primary BSI: BSI of unknown origin	
UO	BSI confirmed to be of unknown origin
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	
UO	BSI source is unknown as no information available or information missing

* Note: Do not report CRI3 as BSI with BSI origin C-CVC or C-PVC, but use CRI3-CVC or CRI3-PVC; see CRI definitions.

Table 10: Microorganism Code List (PPS Selection), By Category

The current list (150 codes) is a selection of microorganisms based on their frequency of occurrence in healthcare-associated infections in different infection types and/or on their public health importance.

Please note that organisms in bold below require a resistance phenotype (See **Table 10** below for further details)

Family	Microorganism	Code
Gram-positive cocci	***Staphylococcus aureus***	**STAAUR**
	Staphylococcus epidermidis	STAEPI
	Staphylococcus haemolyticus	STAHAE
	Coagulase-negative staphylococci, not specified	STACNS
	Other coagulase-negative staphylococci (CNS)	STAOTH
	Staphylococcus spp., not specified	STANSP
	Streptococcus pneumoniae	STRPNE
	Streptococcus agalactiae or Group B streptococcus	STRAGA
	Streptococcus pyogenes or Group A streptococcus	STRPYO
	Other haemolytic streptococci (C, G)	STRHCG
	Streptococcus spp., other	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	GPCOTH
Gram-negative cocci	*Moraxella catharralis*	MORCAT
	Moraxella spp., other	MOROTH
	Moraxella spp., not specified	MORNSP
	Neisseria meningitidis	NEIMEN
	Neisseria spp., other	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

Family	Microorganism	Code
	Gram-positive bacilli, not specified	GPBNSP
	Other gram-positive bacilli	GPBOTH
Enterobacterales	***Citrobacter freundii***	**CITFRE**
	***Citrobacter koseri* (e.g. *diversus*)**	**CITDIV**
	***Citrobacter* spp., other**	**CITOTH**
	***Citrobacter* spp., not specified**	**CITNSP**
	Enterobacter cloacae	**ENBCLO**
	Enterobacter aerogenes* – renamed to *Klebsiella aerogenes*	**ENBAER**
	Enterobacter agglomerans	**ENBAGG**
	Enterobacter sakazakii	**ENBSAK**
	Enterobacter gergoviae	**ENBGER**
	***Enterobacter* spp., other**	**ENBOTH**
	***Enterobacter* spp., not specified**	**ENBNSP**
	Escherichia coli	**ESCCOL**
	Klebsiella aerogenes*	**KLEAER**
	***Klebsiella pneumoniae* complex**	**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**

Family	Microorganism	Code
	***Yersinia* spp.**	**YERSPP**
	Other enterobacterales	**ETBOTH**
	Enterobacterales, not specified	**ETBNSP**
Gram-negative bacilli, other	***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 influenza	HAEINF
	Haemophilus parainfluenzae	HAEPAI
	Haemophilus spp., other	HAEOTH
	Haemophilus spp., not specified	HAENSP
	Legionella spp.	LEGSPP
	Achromobacter spp.	ACHSPP
	Aeromonas spp.	AEMSPP
	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, non enterobacterales	GNBOTH
Anaerobic bacilli	*Bacteroïdes fragilis*	BATFRA
	Bacteroïdes other	BATOTH
	Clostridioides difficile (previously *Clostridium difficile*)	CLODIF
	Clostridioides other (previously *Clostridium* other)	CLOOTH
	Propionibacterium spp.	PROSPP
	Prevotella spp.	PRESPP

Family	Microorganism	Code
	Anaerobes, not specified	ANANSP
	Other anaerobes	ANAOTH
Other bacteria	Mycobacterium, atypical	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 auris	CANAUR
	Candida glabrata	CANGLA
	Candida krusei	CANKRU
	Candida parapsilosis	CANPAR
	Candida tropicalis	CANTRO
	Candida spp., other	CANOTH
	Candida spp., not specified	CANNSP
	Aspergillus fumigatus	ASPFUM
	Aspergillus niger	ASPNIG
	Aspergillus spp., other	ASPOTH
	Aspergillus spp., not specified	ASPNSP
	Other yeasts	YEAOTH
	Fungi other	FUNOTH
	Filaments other	FILOTH
	Other parasites	PAROTH
Viruses	Adenovirus	VIRADV
	Cytomegalovirus (CMV)	VIRCMV
	SARS-CoV-2	VIRCOV
	Enterovirus (polio, coxsackie, echo)	VIRENT
	Hepatitis A virus	VIRHAV
	Hepatitis B virus	VIRHBV
	Hepatitis C virus	VIRHCV
	Herpes simplex virus	VIRHSV
	Human immunodeficiency virus (HIV)	VIRHIV

Family	Microorganism	Code
	Influenza A virus	VIRINA
	Influenza B virus	VIRINB
	Influenza C virus	VIRINC
	Norovirus	VIRNOR
	Parainfluenzavirus	VIRPIV
	Respiratory syncytial virus (RSV)	VIRRSV
	Rhinovirus	VIRRHI
	Rotavirus	VIRROT
	SARS virus	VIRSAR
	Varicella-zoster virus	VIRVZV
	Virus, not specified	VIRNSP
	Other virus	VIROTH
Microorganism not identified		_NONID
Examination not done		_NOEXA
Sterile examination		_STERI
Result not (yet) available or missing		_NA

Notes

Negative microorganism codes:

- _NONID: evidence exists that a microbiological examination has been done, but the microorganism cannot be correctly classified
- _NOEXA: no diagnostic sample taken, no microbiological examination done;
- _STERI: a microbiological examination has been done, but the result was negative (e.g. negative culture);
- _NA: the results of the microbiological examination are not yet available or cannot be retrieved

**Klebsiella aerogenes*: both KLEAER and the old code ENBAER (*Enterobacter aerogenes*) are accepted.

If available, microbiological results should be reported for the active HAI on the survey date, covering the entire infection episode. Results which are not available on the survey date should not be waited for.

Table 11: Antimicrobial Resistance Markers and Codes

For each antimicrobial marker below, indicate whether the microorganism is:

- S: susceptible, standard dose*
- I: susceptible, increased exposure*
- R: resistant
- UNK: susceptibility unknown

* New definitions according to EUCAST guidelines

Microorganism	Antibiotic code	Resistance marker
Staphylococcus aureus	OXA	**MRSA**, Meticillin-resistant *S. aureus;* Resistance to oxacillin or other markers of MRSA, such as cefoxitin, cloxacillin, flucloxacillin, meticillin
	GLY	**VRSA**, Glycopeptide-resistant *S. aureus*; Resistance to glycopeptides: vancomycin or teicoplanin
Enterococcus spp.	GLY	**VRE**, Vancomycin-resistant enterococci; Resistance to glycopeptides: vancomycin (VAN) or teicoplanin
Enterobacterales[1]	3GC	Third-generation cephalosporins (3GC): cefotaxime, ceftriaxone, ceftazidime
	CAR	**CRE**, Carbapenem-resistant enterobacterales: Carbapenems (CAR): imipenem, meropenem
Pseudomonas aeruginosa	CAR	Carbapenems (CAR): imipenem, meropenem
Acinetobacter spp.	CAR	**CRA**, Carbapenem-resistant acinetobacter; Carbapenems (CAR): imipenem, meropenem

[1]*Escherichia coli*, *Klebsiella* spp., *Enterobacter* spp., *Proteus* spp., *Citrobacter* spp., *Serratia* spp., *Morganella* spp.

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 Healthcare-Associated Infections (HAI)

1.1. PN: Pneumonia

Rx

Two or more serial chest X-rays or CT-scans with a 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), ronchi, wheezing;
- worsening gas exchange (e.g. oxygen desaturation or increased oxygen requirements or increased ventilation demand);

and
according to the used diagnostic method:

Microbiology

a) Bacteriologic diagnostic test performed by:

- Positive quantitative culture from minimally contaminated LRT (lower respiratory tract) specimen **(PN 1)**:
  - broncho-alveolar 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 microorganisms (legionella, aspergillus, mycobacteria, mycoplasma, *Pneumocystis carinii*):
  - 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 (e.g. influenza viruses, legionella, chlamydia);
  - detection of antigens in urine (legionella)

c) Others:

- positive sputum culture or non-quantitative LRT specimen culture **(PN 4)**;

- no positive microbiology **(PN 5)**

Notes:
One definitive chest X-ray or CT-scan for the current pneumonia episode may be sufficient in patients with underlying cardiac or pulmonary disease if comparison with previous X-rays is possible.
PN 1 and PN 2 criteria were validated without previous antimicrobial therapy. However, this does not exclude the diagnosis of PN 1 or PN 2 in the case of previous antimicrobial use.

Comment: The subdivision of the pneumonia definition in five categories allows for the comparison of similar entities of pneumonia within and between countries. It is essential that all hospitals report PN4 and PN5 (clinical pneumonia without microbiological evidence) if appropriate in order to achieve overall comparability, even if a microbiological exam was performed and yielded negative results. It is also advised, both for clinical and surveillance purposes, that networks promote as microbiological confirmation (PN1–3) as a routine practice, at least in the ICU.

Intubation-associated pneumonia (IAP): a pneumonia is defined as intubation-associated (IAP) if an invasive respiratory device was present (even intermittently) in the 48 hours preceding the onset of infection.

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. COV: COVID-19 (SARS-CoV-2 Infection)

- Patient has documentation in the medical record of any laboratory confirmation test for COVID-19 (viral RNA target or antigenic detection from an oropharyngeal or nasal swab or any other appropriate clinical specimen)

and

COV-ASY: asymptomatic COVID-19

- Patient has no signs or symptoms compatible with COVID-19

COV-MM: mild/moderate COVID-19

- Patient has any sign or symptom compatible with COVID-19*, without need for oxygen therapy and oxygen saturation level ≥ 92%

COV-SEV: severe COVID-19

- Patient has signs or symptoms compatible with COVID-19* with need for oxygen therapy for shortness of breath due to COVID-19 and/or oxygen saturation level <92%

Notes:

- *Signs and symptoms compatible with COVID-19: Fever, cough, fatigue, shortness of breath, anorexia, myalgias, loss of smell (anosmia), loss of taste (ageusia). Other non-specific symptoms, such as sore throat, nasal congestion, headache, diarrhoea, nausea and vomiting, have also been reported. Additional neurological manifestations reported include dizziness, agitation, weakness, seizures, or findings suggestive of stroke including trouble with speech or vision, sensory loss, or problems with balance in standing or walking. Older people and immunosuppressed patients in particular may present with atypical symptoms such as fatigue, reduced alertness, reduced mobility, diarrhoea, loss of appetite, confusion, and absence of fever. Symptoms such as dyspnoea, fever, gastrointestinal (GI) symptoms or fatigue due to physiologic adaptations in pregnant women, adverse pregnancy events, or other diseases such as malaria, may overlap with symptoms of COVID-19. Children might not have reported fever or cough as frequently as adults. Source: WHO. Living guidance for clinical management of COVID-19. 23 November 2021. Available from https://www.who.int/publications/i/item/WHO-2019-nCoV-clinical-2021-2.
- Only laboratory-confirmed COVID-19 cases should be reported (with or without symptoms). For further guidance on laboratory issues, e.g. rapid antigen tests, see references available from https://www.ecdc.europa.eu/en/covid-19/surveillance/case-definition.
- Healthcare-associated COVID-19 (HA-COVID-19) cases are categorised according to the day of symptom onset (or first positive test for asymptomatic cases), as follows:
    - Possible HA-COVID-19: onset on day 3-7
    - Probable HA-COVID-19: onset on day 8-14
    - Definite HA-COVID-19: onset on day 15 and later
- Specific reporting instructions for the ECDC PPS:
    - COVID-19 with onset during the current hospitalisation: report COVID-19 cases with symptom onset (or first positive test for asymptomatic cases) during the current hospitalisation from Day 3 onwards. Categorisation of these cases in possible, probable and definite healthcare-associated COVID-19 is done in the analysis based on the date of admission and the date of onset.
    - Imported healthcare-associated COVID-19: for COVID-19 present on admission or with onset on Day 1 or 2, only report probably/definitely healthcare-associated COVID-19, defined as `the patient has COVID-19 on admission (or onset before Day 3) and was (re-)admitted less than 48 hours after a stay of more than 7 days in the same or another healthcare facility'
    - *In case of co-infection with a different pathogen (during the same clinical episode), report another pathogen under the COVID-19 case;*

- *Report COVID-19 superinfection (e.g. PN) after clinical improvement of the primary COVID-19 episode as a separate infection.*

1.3. LRI: Lower Respiratory Tract Infection, Other Than Pneumonia

LRI-BRON: bronchitis, tracheobronchitis, bronchiolitis, tracheitis, without evidence of pneumonia

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

- 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:
  - positive culture obtained by deep tracheal aspirate or bronchoscopy;
  - positive antigen test on respiratory secretions

Reporting instruction: Do not report chronic bronchitis in a patient with chronic lung disease as an infection unless there is evidence of an acute secondary infection, manifested by 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:

- patient has organisms seen on smear or cultured from lung tissue or fluid, including pleural fluid;
- patient has a lung abscess or empyema seen during a surgical operation or histopathologic examination;
- patient has an abscess cavity seen on radiographic examination of lung

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

1.4. UTI: Urinary Tract Infection

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).

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 culture, 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:
  - positive dipstick for leukocyte esterase and/or nitrate;
  - 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;
  - organisms seen on Gram stain of unspun urine;
  - at least **TWO** urine cultures with repeated isolation of the same uropathogen (Gram-negative bacteria or *S. saprophyticus*) with ≥10^2 colonies/ml urine in non-voided specimens;
  - ≤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;
  - clinician diagnosis of a urinary tract infection;
  - clinician institutes appropriate therapy for a urinary infection

*UTI-C: asymptomatic bacteriuria: EXCLUDED FOR PPS, not to be reported**

- Patient has no fever (>38°C), urgency, frequency, dysuria, or suprapubic tenderness

and

either of the following criteria:

- Patient has had an indwelling urinary catheter within seven days before urine is cultured,

and

- patient has a urine culture, that is, ≥10^5 microorganisms per ml of urine with no more than two species of microorganisms;
- patient has not had an indwelling urinary catheter within seven days before the first positive culture;

and

- patient has had at least two positive urine cultures ≥ 10^5 microorganisms per mm^3 of urine with repeated isolation of the same microorganism and no more than two species of microorganisms.

** Note: Bloodstream infections secondary to asymptomatic bacteriuria are reported as BSI with source (origin) S-UTI*

1.5. SST: Skin and Soft Tissue Infection

SST-SKIN: skin infection

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

- patient has purulent drainage, pustules, vesicles, or boils;
- patient has at least **TWO** of the following signs or symptoms with no other recognised cause: pain or tenderness, localised swelling, redness, or heat;
  and
  at least **ONE** of the following:
  - organisms cultured from aspirate or drainage from affected site; if organisms are normal skin flora (i.e. diphtheroids [*Corynebacterium* spp.], *Bacillus* spp. [not *B. anthracis*], *Propionibacterium* spp., coagulase-negative staphylococci [including *S. epidermidis*], viridans group streptococci, *Aerococcus* spp., *Micrococcus* spp.), they must be a pure culture;
  - organisms cultured from blood;
  - positive antigen test performed on infected tissue or blood (e.g. herpes simplex, varicella zoster, *H. influenzae, N. meningitidis*);
  - multinucleated giant cells seen on microscopic examination of affected tissue;
  - diagnostic single antibody titre (elevated IgM) or four-fold increase in paired sera ((elevation of IgG between acute and convalescent serum samples)) for pathogen

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-ST: soft tissue (necrotizing fasciitis, infectious gangrene, necrotizing cellulitis, infectious myositis, lymphadenitis, or lymphangitis)

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

- patient has organisms cultured from tissue or drainage from affected site;
- patient has purulent drainage at affected site;
- patient has an abscess or other evidence of infection seen during a surgical operation or histopathologic examination;
- 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:
  - organisms cultured from blood;
  - positive antigen test performed on blood or urine (e.g. Haemophilus influenzae, Streptococcus pneumoniae, Neisseria meningitidis, Group B *Streptococcus*, *Candid*a spp.);
  - diagnostic single antibody titre (elevated IgM) or four-fold increase in paired sera (elevation of IgG between acute and convalescent serum samples) for pathogen

Reporting instructions:

- Report infected decubitus ulcers/pressure sores that involve soft tissue as SST-DECU
- Report infection of deep pelvic tissues as REP- OREP

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

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

- patient has at least **TWO** of the following signs or symptoms with no other recognised cause: redness, tenderness, or swelling of decubitus wound edges
  and
  at least **ONE** of the following:
  - organisms cultured from properly collected fluid or tissue (see comments below);
  - organisms cultured from blood

Comments:

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

SST-BURN: burn

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

- patient has a change in burn wound appearance or character, such as rapid eschar separation, **or** dark brown, black, or violaceous discoloration of the eschar, **or** oedema at wound margin
  and
  histologic examination of burn biopsy shows invasion of microorganisms into adjacent viable tissue;
- 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:
  - microorganisms cultured from blood in the absence of other identifiable infection;
  - 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
- patient with a burn 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 <20 cc/hr), hyperglycaemia at previously tolerated level of dietary carbohydrate, or mental confusion;
  and
  at least **ONE** of the following:
  - histologic examination of burn biopsy shows invasion of organisms into adjacent viable tissue
  - microorganisms cultured from blood;
  - 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

Comments:

- Purulence alone at the burn wound site is not adequate for the diagnosis of burn infection; such purulence may reflect incomplete wound care.
- Fever alone in a burn patient is not adequate for the diagnosis of a burn infection because fever may be the result of tissue trauma or the patient may have an infection at another site.

- Surgeons in regional burn centres who take care of burn patients exclusively may require Criterion 1 for diagnosis of burn infection.
- Hospitals with regional burn centres may further divide burn infections into the following: burn wound site, burn graft site, burn donor site, burn donor site-cadaver; NHSN, however, will code all of these as BURN.

SST-BRST: breast abscess or mastitis

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

- patient has a positive culture of affected breast tissue or fluid obtained by incision and drainage or needle aspiration;
- patient has a breast abscess or other evidence of infection seen during a surgical operation or histopathologic examination;
- patient has fever (>38°C) and local inflammation of the breast **and** clinician diagnosis of breast abscess

1.6. 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:

- purulent drainage, with or without laboratory confirmation, from the superficial incision.
- microorganisms isolated from an aseptically obtained culture of fluid or tissue from the superficial incision
- at least **ONE** of the following signs or symptoms of infection: pain or tenderness, localised swelling, redness, or heat, **and** superficial incision is deliberately opened by surgeon, **unless** incision is culture-negative
- diagnosis of superficial incisional SSI made by a surgeon or 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:

- purulent drainage from the deep incision but not from the organ/space component of the surgical site;
- a deep incision spontaneously dehisces or is deliberately opened by a surgeon when the patient has at least **ONE** of the following signs or symptoms: fever (>38°C), localised pain or tenderness, unless incision is culture-negative;
- an abscess or other evidence of infection involving the deep incision is found on direct examination, during reoperation, or by histopathologic or radiologic examination;
- diagnosis of deep incisional SSI made by a surgeon or 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:

- purulent drainage from a drain that is placed through a stab wound into the organ/space;
- organisms isolated from an aseptically obtained microbiological culture of fluid or tissue in the organ/space;
- an abscess or other evidence of infection involving the organ/space that is found on direct examination, during reoperation, or by histopathologic or radiologic examination;
- diagnosis of organ/space SSI made by a surgeon or consultant clinician

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

1.7. BSI: Bloodstream Infection

BSI: Laboratory-confirmed bloodstream infection

- **ONE** positive blood culture for a recognised pathogen

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 samples, usually within 48 hours).

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

Sources of bloodstream infection:

- primary
    - catheter-related: 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 (CRI: Catheter-Related Infection) for further information; and **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 to another infection. the same microorganism was isolated from blood and another infection site, or strong clinical evidence exists that bloodstream infection was secondary to another infection site, invasive diagnostic procedure or foreign body:
    - pulmonary (S-PUL);
    - urinary tract infection (S-UTI);
    - digestive tract infection (S-DIG);
    - surgical site infection (S-SSI);
    - skin and soft tissue (S-SST);
    - other (S-OTH)
- unknown (UNK): no information available about the source of the bloodstream infection or information missing

Reporting instruction: Secondary BSI is reported as a separate HAI, in addition to the primary infection, if the primary infection matches the relevant HAI case definition.

Note*:* A CVC-*as*sociated bloodstream infection in accordance with CDC/NHSN definitions (as opposed to CVC-related BSI) is a primary BSI with central venous catheter use (even intermittent) in the 48 hours preceding the onset of the infection: therefore, the presence of 'the relevant device' (central/peripheral vascular catheter) in the 48 hours before onset of infection is collected even in the absence of microbiological confirmation.

1.8. 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-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
- evidence of pus/inflammation at the CVC insertion site or tunnel

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 ≥ 103 CFU/ml of a microorganism isolated from the PVC tip
  and
- evidence of pus/inflammation at the PVC 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
- clinical signs of systemic infection improve within 48 hours after CVC removal

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
- clinical signs of systemic infection improve within 48 hours after PVC removal

CRI3-CVC: microbiologically confirmed CVC-related bloodstream infection

- BSI occurring 48 hours before or after catheter removal
  and
- positive culture with the same microorganism of quantitative CVC culture $\geq 10^3$ CFU/ml or semi-quantitative CVC culture >15 CFU;

or

- BSI occurring with or without catheter removal, and at least one of:
  - quantitative blood culture ratio CVC blood sample/peripheral blood sample >5 ;

- differential delay of positivity of blood cultures (4, 5): CVC blood sample culture positive two hours or more before peripheral blood culture (blood samples drawn at the same time);
- positive culture with the same microorganism from pus from insertion site

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

1. 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)
2. 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:
3. 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**

1. Positive culture from pus swab of the CVC exit site with the same micro-organism isolated from the swab **or**

1. 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.

CRI3-PVC: microbiologically confirmed PVC-related bloodstream infection

- BSI occurring 48 hours before or after catheter removal and positive culture with the same microorganism of quantitative PVC culture $\geq 10^3$ CFU/ml or semi-quantitative PVC culture >15 CFU;

or

- BSI occurring with or without catheter removal and positive culture with the same microorganism from pus from insertion site.

CRI3-PVC: Microbiologically confirmed PVC-related bloodstream infection

4. 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).
5. 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 either:
6. 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**

2. Positive culture from pus swab of the PVC exit site with the same microorganism isolated from the swab

Notes:

- *CVC=central vascular catheter; PVC=peripheral vascular catheter.*
- *Central vascular catheter colonisation should not be reported.*
- *A CRI3 (-CVC or -PVC) is also a bloodstream infection with source C-CVC or C-PVC respectively; however when a CRI3 is reported, the BSI should not be reported in the point prevalence survey; microbiologically confirmed catheter-related BSI should be reported as CRI3.*

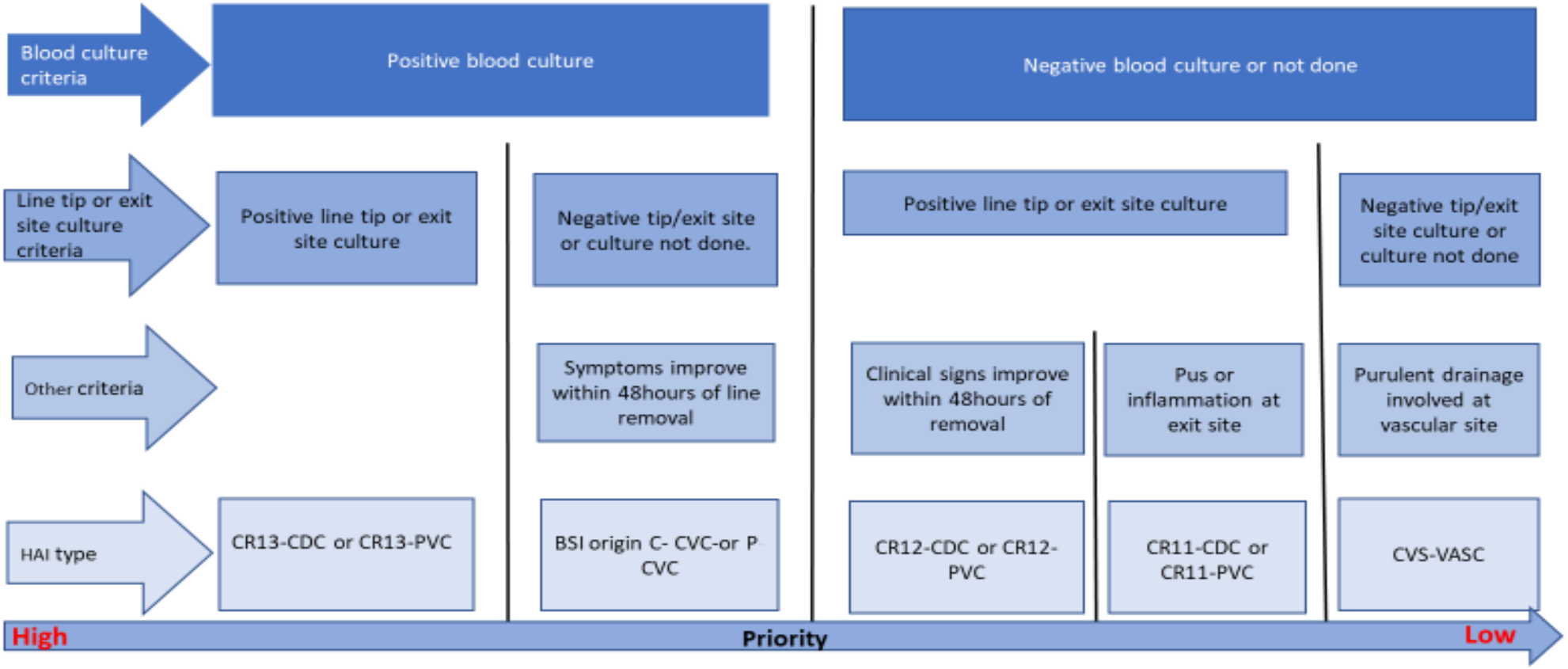
A positive CVC/PVC tip culture with significant growth in the absence of positive blood cultures or local evidence of infection at the exit site or systemic signs of infection which improve within 48 hours of the CVC/PVC removal represents CVC/PVC colonisation or contamination of the CVC/PVC tip by skin 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].

Algorithm for diagnosis of catheter-related infection



1.9. CVS: Cardiovascular System Infection

CVS-VASC: arterial or venous infection

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

- patient has microorganisms cultured from arteries or veins removed during a surgical operation **and** blood culture not done or no organisms cultured from blood;
- patient has evidence of arterial or venous infection seen during a surgical operation or histopathologic examination;
- patient has at least **ONE** of the following signs or symptoms with no other recognised cause: fever (>38°C), pain, erythema, or heat at involved vascular site,
  and
  >15 colonies cultured from intravascular catheter tip using semiquantitative culture method,
  and
  blood culture not done or no organisms cultured from blood
- patient has purulent drainage at involved vascular site,
  and
  blood culture not done or no organisms cultured from blood

Reporting instructions: Report infections of an arteriovenous graft, shunt, fistula or intravascular catheter site without organisms cultured from blood as CVS-VASC; report CVS-VASC matching the third criterion as CRI1 or CRI2, as appropriate.

CVS-ENDO: endocarditis

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

- patient has organisms cultured from valve or vegetation;
- patient has **TWO** or more of the following signs or symptoms with no other recognised cause: fever (>38°C), new or changing murmur, embolic phenomena, skin manifestations (i.e. petechiae, splinter haemorrhages, painful subcutaneous nodules), congestive heart failure, or cardiac conduction abnormality,
  and at least **ONE** of the following:
  - organisms cultured from two or more blood cultures;
  - organisms seen on Gram stain of valve when culture is negative or not done;
  - valvular vegetation seen during a surgical operation or autopsy;
  - positive antigen test on blood or urine (e.g. Haemophilus influenzae, Streptococcus pneumoniae, Neisseria meningitidis or Group B *Streptococcus*);
  - evidence of new vegetation seen on echocardiogram;
    and
    if diagnosis is made in a living patient (antemortem), clinician institutes appropriate antimicrobial therapy.

CVS-CARD: myocarditis or pericarditis

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

- patient has microorganisms cultured from pericardial tissue or fluid obtained by needle aspiration or during a surgical operation;
- patient has at least **TWO** of the following signs or symptoms with no other recognised cause: fever (>38°C), chest pain, paradoxical pulse, or increased heart size;
  and
  at least **ONE** of the following:

- abnormal electrocardiogram (ECG) consistent with myocarditis or pericarditis;
- positive antigen test on blood (e.g. *H. influenzae*, *S. pneumoniae*);
- evidence of myocarditis or pericarditis on histologic examination of heart tissue;
- four-fold rise in type-specific antibody, with or without isolation of virus from pharynx or faeces;
- pericardial effusion identified by echocardiogram, CT scan, MRI, or angiography

Note: 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:

- patient has microorganisms cultured from mediastinal tissue or fluid obtained during a surgical operation or needle aspiration;
- patient has evidence of mediastinitis seen during a surgical operation or on histopathologic examination;
- patient has at least **ONE** of the following signs or symptoms with no other recognised cause: fever (>38°C), chest pain, or sternal instability;
  and
  at least **ONE** of the following:
  - purulent discharge from mediastinal area;
  - microorganisms cultured from blood or discharge from mediastinal area;
  - mediastinal widening on X-ray

Reporting instruction: Report mediastinitis following cardiac surgery that is accompanied by sternal osteomyelitis as SSI-O.

1.10. GI: Gastrointestinal System Infection

GI-CDI: Clostridioides difficile *infection*

A *Clostridioides difficile* infection (previously also referred to as *Clostridium difficile* associated diarrhoea, or CDAD) must meet at least **ONE** of the following criteria:

- diarrhoeal stools or toxic megacolon, **and** a positive laboratory assay for *C. difficile* toxin A and/or B in stools or a toxin-producing *C. difficile* organism detected in stool via culture or other means, e.g. a positive PCR result;
- pseudomembranous colitis revealed by lower gastro-intestinal endoscopy;
- colonic histopathology characteristic of *C. difficile* infection (with or without diarrhoea) on a specimen obtained during endoscopy, colectomy or autopsy

Note: If clinical signs of *Clostridioides difficile* infection appear in 28 days after hospital discharge period, GI-CDI must be defined as healthcare-associated infection.

(*) May be community- or healthcare-associated, depending on case's history. If healthcare-associated, may have been acquired in the same facility or imported.

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:

- Patient has an acute onset of diarrhoea (liquid stools for more than 12 hours) with or without vomiting or fever (>38°C) and no likely non-infectious cause (possible non-infectious causes include: bowel preparation for diagnostic tests, therapeutic regimen other than antimicrobial agents, acute exacerbation of a chronic condition, or psychological stress).
- Patient has at least TWO of the following signs or symptoms with no other recognised cause: nausea, vomiting, abdominal pain, fever (>38°C), or headache;
  and
  at least **ONE** of the following:
  - 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;
  - an enteric pathogen is detected by routine or electron microscopy (e.g. norovirus, small round structured virus, *Cryptosporidium* spp.);
  - an enteric pathogen is detected by antigen or antibody assay on blood or faeces (e.g. rotavirus, adenovirus);

- evidence of an enteric pathogen is detected by cytopathic changes in tissue culture (toxin assay);
- diagnostic single antibody titre (elevated level of IgM) or four-fold increase in paired sera (elevation of IgG between acute and convalescent serum samples) for pathogen.

GI-GIT: gastrointestinal tract (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:

- patient has an abscess or other evidence of infection seen during a surgical operation or histopathologic examination;
- 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:
  - organisms cultured from drainage or tissue obtained during a surgical operation or endoscopy or from a surgically placed drain;
  - organisms seen on Gram stain 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;
  - organisms cultured from blood;
  - evidence of pathologic findings on radiographic examination;
  - evidence of pathologic findings on endoscopic examination (e.g. Candida esophagitis or proctitis)

GI-HEP: hepatitis

Hepatitis must meet the following criterion:

- Patient has at least **TWO** of the following signs or symptoms with no other recognised cause: fever (>38°C), anorexia, nausea, vomiting, abdominal pain, jaundice, or history of transfusion within the previous three months;
  and
  at least **ONE** of the following:
  - positive antigen or antibody test for hepatitis A, hepatitis B, hepatitis C, or delta hepatitis;
  - abnormal liver function tests (e.g. elevated ALT/AST, bilirubin);
  - cytomegalovirus (CMV) detected in urine or oropharyngeal secretions

<u>Reporting instructions:</u>

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

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

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

- patient has organisms cultured from purulent material from intra-abdominal space obtained during a surgical operation or needle aspiration;
- patient has abscess or other evidence of intra-abdominal infection seen during a surgical operation or histopathologic examination;
- patient has at least **TWO** of the following signs or symptoms with no other recognised cause: fever (>38°C), nausea, vomiting, abdominal pain, or jaundice;
  and
  at least **ONE** of the following:
  - organisms cultured from drainage from surgically placed drain (e.g. closed suction drainage system, open drain, T-tube drain);
  - organisms seen on Gram stain of drainage or tissue obtained during surgical operation or needle aspiration;
  - organisms cultured from blood and radiographic evidence of infection, e.g. abnormal findings on ultrasound, CT scan, MRI, or radiolabel scans (gallium, technetium, etc.) or on abdominal X-ray

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

1.11. BJ: Bone and Joint Infection

BJ-BONE: osteomyelitis

Osteomyelitis must meet at least ONE of the following criteria:

- patient has microorganisms cultured from bone;
- patient has evidence of osteomyelitis on direct examination of the bone during a surgical operation or histopathologic examination;
- patient has at least **TWO** of the following signs or symptoms with no other recognised cause: fever (>38°C), localised swelling, tenderness, heat, or drainage at suspected site of bone infection;
  and
  at least **ONE** of the following:
  - microorganisms cultured from blood;
  - positive blood antigen test (e.g. *H. influenzae*, *S. pneumoniae*);
  - radiographic evidence of infection, e.g. abnormal findings on X-ray, CT scan, MRI, radiolabel scan (gallium, technetium, etc.)

Reporting instruction: Report mediastinitis following cardiac surgery that is accompanied by osteomyelitis as 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:

- patient has organisms cultured from joint fluid or synovial biopsy;
- patient has evidence of joint or bursa infection seen during a surgical operation or histopathologic examination;
- 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:
  - organisms and white blood cells (or pus cells) seen on Gram stain of joint fluid;
  - positive antigen test on blood, urine, or joint fluid;
  - cellular profile and chemistries of joint fluid compatible with infection and not explained by an underlying rheumatologic disorder;
  - radiographic evidence of infection, e.g. abnormal findings on X-ray, CT scan, MRI, radiolabelled scan (gallium, technetium, etc.).

BJ-DISC: disc space infection

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

- patient has microorganisms cultured from vertebral disc space tissue obtained during a surgical operation or needle aspiration;
- patient has evidence of vertebral disc space infection seen during a surgical operation or histopathologic examination;
- patient has fever (>38°C) with no other recognised 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, etc.);

- patient has fever (>38°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*).

1.12. 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:

- patient has organisms cultured from brain tissue or dura;
- patient has an abscess or evidence of intracranial infection seen during a surgical operation or histopathologic examination;
- patient has at least two of the following signs or symptoms with no other recognised cause: headache, dizziness, fever (>38°C), localising neurologic signs, changing level of consciousness, or confusion,
  and
  at least **ONE** of the following:
  - microorganisms seen on microscopic examination of brain or abscess tissue obtained by needle aspiration or by biopsy during a surgical operation or autopsy;
  - positive antigen test on blood or urine;
  - radiographic evidence of infection, e.g. abnormal findings on ultrasound, CT scan, MRI, radionuclide brain scan, or arteriogram;
  - diagnostic single antibody titre (elevated IgM) or four-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

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:

- patient has microorganisms cultured from cerebrospinal fluid (CSF);
- patient has at least **ONE** of the following signs or symptoms with no other recognised cause: fever (>38°C), headache, stiff neck, meningeal signs, cranial nerve signs, or irritability,
  and
  at least **ONE** of the following:
  - increased white cells, elevated protein, and/or decreased glucose in CSF;
  - microorganisms seen on Gram stain of CSF;
  - microorganisms cultured from blood;
  - positive antigen test of CSF, blood, or urine;
  - diagnostic single antibody titre (elevated IgM) or four-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

Reporting instructions:

- Report CSF shunt infection as SSI-O if it occurs within 90 days of placement; if infection occurs more than 90 days after shunt placement, or manipulation or access of the shunt, report as CNS-MEN if the infection meets the general case definition of HAI
- Report meningoencephalitis 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 or adjacent bone structures, must meet at least **ONE** of the following criteria:

- patient has microorganisms cultured from abscess in the spinal epidural or subdural space;
- patient has an abscess in the spinal epidural or subdural space seen during a surgical operation or at autopsy or evidence of an abscess seen during a histopathologic examination;
- patient has at least **ONE** of the following signs or symptoms with no other recognised cause: fever (>38°C), back pain, focal tenderness, radiculitis, paraparesis, or paraplegia,
  and
  at least **ONE** of the following:
  - microorganisms cultured from blood;
  - radiographic evidence of a spinal abscess, e.g. abnormal findings on myelography, ultrasound, CT scan, MRI, or other scans (gallium, technetium, etc.);

  and
  if diagnosis is made in a living patient (i.e. antemortem), clinician institutes appropriate antimicrobial therapy

Reporting instruction: Report spinal abscess with meningitis as CNS-MEN.

1.13. EENT: Eye, Ear, Nose, Throat, Or Mouth Infection

EENT-CONJ: conjunctivitis

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

- patient has microorganism cultured from purulent exudate obtained from the conjunctiva or contiguous tissues, such as eyelid, cornea, meibomian glands, or lacrimal glands;
- patient has pain or redness of conjunctiva or around eye;
  and
  at least **ONE** of the following:
  - White blood cells (WBC), or pus cells, and microorganisms seen on Gram stain of exudates;
  - purulent exudates from conjunctivitis or adjacent tissues;
  - positive antigen test (e.g. enzyme-linked immunosorbant assay (ELISA) or immunofluorescence (IF) for *Chlamydia trachomatis*, herpes simplex virus, adenovirus) on exudate or conjunctival scraping;
  - multinucleated giant cells seen on microscopic examination of conjunctival exudate or scrapings
  - positive viral culture;
  - diagnostic single antibody titre (elevated level of IgM) or four-fold increase in paired sera (elevation of IgG between acute and convalescent serum sample) for pathogen

Reporting instructions:

- Report other infections of the eye as ENT-EYE
- Do not report chemical conjunctivitis caused by silver nitrate (AgNO3) as a healthcare–associated 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)

EENT-EYE: eye, other than conjunctivitis

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

- patient has microorganisms cultured from anterior or posterior chamber or vitreous fluid
- 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:
  - physician diagnosis of an eye infection
  - positive antigen test on blood (e.g. *H. influenzae*, *S. pneumoniae*)
  - organisms cultured from blood

EENT-EAR: ear mastoid

Ear and mastoid infections must meet at least **ONE** of the following criteria:

- **Otitis externa** (external ear infection) must meet at least ONE of the following criteria:
  - patient has pathogens cultured from purulent drainage from ear canal;
  - patient has at least **ONE** of the following signs or symptoms with no other recognised cause:
    fever (>38°C), pain, redness, or drainage from ear canal and organisms seen on Gram stain of purulent drainage

or

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

- patient has organisms cultured from fluid from middle ear obtained by tympanocentesis or at surgical operation;
- patient has at least **TWO** of the following signs or symptoms with no other recognised cause:
  fever (>38°C), pain in the eardrum, inflammation, retraction or decreased mobility of eardrum, or fluid behind eardrum

or

- **Otitis interna** (inner ear infection) must meet at least **ONE** of the following criteria:
  - patient has organisms cultured from fluid from inner ear obtained at surgical operation;
  - patient has a clinician diagnosis of inner ear infection

or

- **Mastoiditis** must meet at least **ONE** of the following criteria:
  - patient has organisms cultured from purulent drainage from mastoid;
  - patient has at least **TWO** of the following signs or symptoms with no other recognised cause:
    fever (>38°C), pain, tenderness, erythema, headache, or facial paralysis; **and**
    at least **ONE** of the following:
    - microorganisms seen on Gram stain of purulent material from mastoid;
    - 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:

- patient has organisms cultured from purulent material from tissues of oral cavity;
- patient has an abscess or other evidence of oral cavity infection seen on direct examination, during a surgical operation, or during a histopathologic examination;
- 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:
  - microorganisms seen on Gram stain;
  - positive KOH (potassium hydroxide) stain for fungal hyphae;
  - multinucleated giant cells seen on microscopic examination of mucosal scrapings;
  - positive antigen test on oral secretions;
  - diagnostic single antibody titre (elevated level of IgM) or four-fold increase in paired sera (elevation of IgG between acute and convalescent serum samples) for pathogen;
  - clinician diagnosis of infection and treatment with topical or oral antifungal therapy

Reporting instruction: Report healthcare-associated primary herpes simplex infections of the oral cavity as EENT-ORAL; recurrent herpes infections are not healthcare-associated.

EENT-SINU: sinusitis

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

- patient has organisms cultured from purulent material obtained from sinus cavity;
- patient has at least **ONE** of the following signs or symptoms with no other recognised cause:
  fever (>38°C), pain or tenderness over the involved sinus, headache, purulent exudate, or nasal obstruction;

and
at least **ONE** of the following:
- positive transillumination;
- 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:

- Patient has at least **TWO** of the following signs or symptoms with no other recognised cause: fever (>38°C), erythema of pharynx, sore throat, cough, hoarseness, or purulent exudate in throat;
  and
  at least **ONE** of the following:
  - microorganisms cultured from the specific site;
  - microorganisms cultured from blood;
  - positive antigen test on blood or respiratory secretions;
  - diagnostic single antibody titre (elevated level of IgM) or four-fold increase in paired sera (elevation of IgG between acute and convalescent serum samples) for pathogen;
  - clinician diagnosis of an upper respiratory infection.
- Patient has an abscess seen on direct examination, during a surgical operation, or during a histopathologic examination

1.14. REPR: Reproductive Tract Infection

REPR-EMET: endometritis

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

- patient has microorganisms cultured from fluid or tissue from endometrium obtained during surgical operation, by needle aspiration, or by brush biopsy;
- patient has at least **TWO** of the following signs or symptoms with no other recognised cause: fever (>38°C), abdominal pain, uterine tenderness, or purulent drainage from uterus

Reporting instruction: Report postpartum endometritis as a healthcare-associated infection unless the amniotic fluid is infected at the time of admission or the patient was admitted 48 hours after rupture of the membrane.

REPR-EPIS: episiotomy

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

- postvaginal delivery patient has purulent drainage from the episiotomy;
- postvaginal delivery patient has an episiotomy abscess

REPR-VCUF: vaginal cuff

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

- posthysterectomy patient has purulent drainage from the vaginal cuff;
- posthysterectomy patient has an abscess at the vaginal cuff;
- posthysterectomy patient has pathogens cultured from fluid or tissue obtained from the vaginal cuff

Reporting instruction: Report vaginal cuff infections as SSI-O if other SSI criteria are met (within 30 days following hysterectomy).

REPR-OREP: other infections of the male or female reproductive tract (epididymis, testes, prostate, vagina, ovaries, uterus, or other deep pelvic tissues, EXCLUDING endometritis or vaginal cuff infections – see above)

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

- patient has organisms cultured from tissue or fluid from affected site
- patient has an abscess or other evidence of infection of affected site seen during a surgical operation or histopathologic examination
- patient has two of the following signs or symptoms with no other recognised cause: fever (>38°C), nausea, vomiting, pain, tenderness, or dysuria;
  and
  at least **ONE** of the following:
  - organisms cultured from blood;
  - clinician diagnosis

1.15. SYS: Systemic Infection

SYS-DI: disseminated infection

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

Reporting instructions:

- Use this code for viral infections involving multiple organ systems (e.g. measles, mumps, rubella, varicella, erythema infectiosum/parvovirus B19). These infections often can be identified by clinical criteria alone
- Do not use this code for healthcare-associated infections with multiple metastatic sites, such as with bacterial endocarditis
- Do not report fever of unknown origin (FUO) as DI
- Report viral exanthems or rash illness as DI

SYS-CSEP: treated unidentified severe infection (formerly: 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 pressure <90 mmHg);
  - or oliguria (urine output <20 ml/hr);

  and
  - blood culture not done or no organisms or antigen detected in blood;

  and
  - no apparent infection at another site;

  and
  - clinician institutes treatment for sepsis

Reporting instructions:

- Do not use this code unless absolutely needed (last-resort definition)
- For CSEP in neonates, use NEO-CSEP case definition (see below)

1.16. 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

All of the THREE following criteria:

- supervising clinician started appropriate antimicrobial therapy for sepsis for at least five days;
- no detection of pathogens in blood culture or blood culture not taken;
- no obvious infection at another site;

and

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

- fever (>38°C) or temperature instability (frequent post-set of the incubator) or hypothermia (<36.5°C);
- tachycardia (heart rate >200 beats per min) or new /increased bradycardia (<80/min);
- capillary refilling time (CRT) >2 seconds;
- new or increased apnoea(s) (>20 seconds);
- unexplained metabolic acidosis;
- new-onset hyperglycaemia (>140mg/dl);
- another sign of sepsis (skin colour (only if the 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 (CNS) 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 CNS, which would usually be considered as a blood culture contaminant, while other criteria of CNS bloodstream infection are not met and criteria of clinical sepsis have been met.

Note: 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 CNS) in a neonate

- At least **TWO** of: temperature >38°C or <36.5°C or temperature instability, tachycardia or bradycardia, apnoea, extended capillary refilling time (CRT), metabolic acidosis, hyperglycaemia, other sign of BSI: 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

- a recognised pathogen other than coagulase-negative staphylococci (CNS), cultured from blood or cerebrospinal fluid (CSF). CSF is included because meningitis in this age group is usually haematogenous, so positive CSF can be regarded as evidence of BSI even if blood cultures are negative or were not taken.

Reporting instructions:

- Report the origin of the neonatal BSI, if identified, in the field BSI origin
- If both the case definitions for NEO-LCBI and NEO-CNSB are matched, report NEO-LCBI

NEO-CNSB: laboratory-confirmed BSI with coagulase-negative staphylococci (CNS) in a neonate

At least **TWO** of the following:

- fever (>38°C) or temperature instability or hypothermia (<36.5°C);
- tachycardia (heart rate >200 beats per min) or new /increased bradycardia (<80/min);
- capillary refilling time (CRT) >2 seconds;
- new or increased apnoea(s) (>20 seconds);
- unexplained metabolic acidosis;
- new-onset hyperglycaemia (>140mg/dl);
- another sign of sepsis (skin colour (only if the CRT is not used), laboratory signs (CRP, interleukin), increased oxygen requirement (intubation), unstable general condition of the patient, apathy)

and

- Coagulase-negative staphylococci (CNS), includes Staphylococcus epidermidis, is cultured from blood or vascular catheter tip;

and

- patient 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

Reporting instructions:

- Report the origin of the neonatal BSI, if identified, in the field BSI origin
- If both the case definitions for NEO-LCBI and NEO-CNSB are matched, report NEO-LCBI

NEO-PNEU: pneumonia in a neonate

- respiratory compromise;

and

- evidence of a new pulmonary infiltrate, consolidation or pleural effusion on chest X-ray;

and

- and at least **FOUR** of:
  - temperature >38°C or <36.5°C or temperature instability,
  - tachycardia or bradycardia,
  - tachypnoea or apnoea,
  - dyspnoea,
  - increased respiratory secretions,
  - new onset of purulent sputum,
  - isolation of a pathogen from respiratory secretions,
  - C-reactive protein >2.0 mg/dL,
  - Immature/total neutrophil ratio (I/T ratio) >0.2

NEO-NEC: necrotising enterocolitis

- 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 distention, pre-feeding residuals, persistent microscopic or gross blood in stools

Note: Arterial line is central or peripheral, depending on where it ends.

Appendix C: PPS Steering Group Membership

MEMBER	TITLE	REPRESENTING
Dr Susanna Frost (Chairperson)	Consultant Clinical Microbiologist National Coordinator 2023 PPS	HSE-HPSC
Dr Karen Burns	Consultant Clinical Microbiologist PPS National Co-ordinator for 2012 & 2017	Clinical Microbiology
Dr Tara Mitchell (from January 2023)	Senior Epidemiologist	HSE-HPSC
Ms Mairead O'Hanlon (from January 2023)	Epidemiologist	HSE-HPSC
Mr Stephen Murchan (to February 2023)	Senior Epidemiologist	HSE-HPSC
Mr Emre Umut Gurpinar(to February 2023)	Epidemiologist	HSE-HPSC
Ms Rafaela Franca	Clinical Nurse Manager II	HSE-HPSC
Ms Brid Ann O' Shea	Project Manager	HSE-HPSC
Ms Fiona Cloak	Surveillance Assistant	HSE-HPSC
Ms Maureen Nwadike	Administrative Officer	HSE-HPSC
Ms Deirdre Halford	NMPDU Officer	NMPDU Dublin South, Kildare and Wicklow
Dr Eimear Brannigan	National Clinical Lead	AMRIC
Ms Shirley Keane	National Programme Manager	AMRIC
Ms Lauren Webster	Epidemiologist	AMRIC
Prof Fidelma Fitzpatrick	Consultant Clinical Microbiologist & Professor of Clinical Microbiology	RCSI
Ms Michelle Bergin	ADON IPC	Midlands Regional Hospital Tullamore/IPCN public hospitals
Dr Robyn Traynor	Clinical Microbiology Specialist Registrar	Clinical Microbiology specialist trainees
Dr Caoimhe Brennan	Clinical Microbiology Specialist Registrar	Clinical Microbiology specialist trainees
Ms Caoimhe Finn	ADON IPC	Beaumont Hospital/ IPCN public hospitals
Ms Therese Dalchan	Head of Service	AMRIC Acute Operations
Mr David McCabe	HCAI / AMR Project Manager	Acute Operations HSE
Ms Michelle Evans	Data analyst	Acute Hospitals Division
Ms Lenora Leonard	Head of Infection Control	Beacon Private Hospital/ IPCN private hospitals
Ms Leah Colclough	Senior Pharmacist (Antimicrobial)	Irish Antimicrobial Pharmacist Group of Hospital Pharmacists
Mr Richard Sykes	Chief 1 Pharmacist PUH	HPAI