Health Service Executive

Critical Care & Healthcare Associated Infection Clinical Programmes

Unit-acquired Bloodstream Infection Surveillance

Suggested Protocol for Irish Critical Care Units

Version 1.0

October 2013

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1.0 Introduction

Critically-ill patients are at high risk of acquiring infections during the period of critical care. The reasons for this are multi-factorial and include: critical illness severity, underlying comorbidities, immunocompromise, high prevalence of invasive medical device use and other breaches of the normal skin barrier, such as surgical or traumatic wounds.

The European Centre for Disease Prevention and Control (ECDC) protocol for surveillance of infections in ICUs was last updated in December 2010 and uses the Hospitals in Europe Link for Infection Control through Surveillance (HELICS) definitions for the following healthcare – associated infection (HCAI) types[1]:

- Bloodstream infection (BSI)
- Pneumonia (PN)
- Catheter-related infection (CRI)
- Urinary tract infection (UTI)

In 2010, a three-month pilot surveillance study was conducted on vascular catheter-related infections (CRI) in 11 critical care units of nine Irish hospitals and utilised the HELICS definitions. During the study 17 CRI were diagnosed, 10 (59%) of which were classified as CRI3-type or microbiologically-confirmed catheter-related bloodstream infections (CRI3).[2]

In 2012, a national point prevalence survey (PPS) of hospital-acquired infections (HAI) and antimicrobial use was conducted in 50 acute Irish hospitals. The data from 215 patients aged 16 years and older admitted to 45 critical care units in 33 Irish hospitals was analysed separately to produce a specific critical care report. Bloodstream infections (BSI), as defined by HELICS criteria, were the second most prevalent hospital-acquired infection in this patient population, with a prevalence of 5.1%, which was over five-times that of the overall cohort of 9,030 patients. Of the 11 BSI reported from patients admitted to critical care units, five (45%) were secondary to an infected indwelling vascular catheter.[3]

Formal national surveillance programmes for critical care-acquired infections are now commonplace in Europe, with 14 countries reporting data defined by HELICS criteria from 1,050 intensive care units (ICUs) in 885 hospitals to the ECDC in 2010. For that surveillance year, 5,058 episodes of unit-acquired BSI (UABSI) were reported, with 36.5% related to vascular catheter infections.[4]

In 2012, 36 Irish critical care units were surveyed regarding existing HCAI prevention practices. Of 34 units that replied to the question regarding the existence of a local UABSI surveillance programme, 12 (35%) indicated that UABSI surveillance was already in place.

This protocol provides guidance for Irish critical care units planning to undertake ongoing surveillance of UABSI. Following the implementation of the planned national critical care audit programme in Ireland, it is anticipated that quarterly UABSI rates, UABSI sources, causative pathogens and antimicrobial resistance markers may be reported by participating units to the audit programme for inclusion in a national report to improve knowledge on these important infections.

2.0 Key Requirements

Assembly of a multi-disciplinary team

Infection incidence surveillance is an ongoing process, requiring the involvement of the critical care unit's multi-disciplinary team (MDT). The MDT membership is a local decision. The input of the following key healthcare professionals, where such posts are in place, will contribute to the ongoing success of a surveillance programme:

- Director of the critical care unit or his/her nominated deputy
- Senior clinical nurse manager of the critical care unit or his/her nominated deputy
- Critical care audit nurse
- Consultant microbiologist
- Infection prevention and control nurse
- Microbiology laboratory surveillance scientist

Regular scheduled meetings to discuss suspected UABSI cases

A surveillance lead and key members of the MDT should be identified and agree to meet on a regular basis. The frequency of MDT meetings is a local decision, based on the anticipated number of suspected UABSI cases to be discussed. Larger units or those providing Level 3 critical care may require more frequent meetings. It is recommended that meetings be held at a minimum of quarterly. Minimising the interval between the date of infection diagnosis and the MDT meeting is important to facilitate staff recall of the patient's clinical history and to enable timely identification and feedback of any potentially-modifiable factors which may have contributed to the patient's infection.

Method to collect critical care unit denominator data

Identification of the population who are 'at-risk' of a unit-acquired infection (i.e., the denominator) is a prerequisite for calculation of the infection rate. Patients who are admitted to the critical care unit for three days or longer are considered to be the 'at-risk' population for a unit-acquired infection. Therefore, a daily denominator record counting the total number of 'at-risk' patients needs to be completed by the unit staff. The method for collecting the denominator data is a local decision, as it may be possible to do this using the critical care unit clinical information system (CIS). However, paper-based or IT database records are also suitable.

Method to identify critical care patients with positive blood culture results

Identification of the patients who may have a critical care unit-acquired BSI (i.e., the numerator) is a prerequisite for calculation of the infection rate. *Patients who are admitted to the critical care unit for three days or longer who have positive blood culture results taken day three onwards following admission, as per the HELICS BSI definition are identified as suspected UABSI cases for MDT review.* A weekly record counting the total number of positive blood cultures from patients admitted to the critical care unit is required. The method for collecting this record is a local decision.

3.0 Methods

Collection of the critical care denominator

The number of patients admitted to the critical care unit for three or more days is counted around the same time each day and the daily total recorded on a daily denominator form/spreadsheet.

A member of the MDT should be nominated to take responsibility for ensuring the daily denominator record is completed in the critical care unit and for the calculation and recording of the monthly total for the patient days.

The date of admission to the unit should be regarded as 'day 1'. For example, a patient is admitted to the unit on October 1st 2013 (day 1). That patient will only be counted on the daily denominator record from October 3rd (day 3) onwards.

At the end of each month, the total number of patient days is counted and recorded. A new daily denominator record is started at the beginning of each calendar month.

See **Appendix A** for an example of a paper-based daily critical care denominator form. This data could also be recorded in a spreadsheet or collected via the unit's information system.

Identification of critical care patients with positive blood culture results

The optimal method for the robust collection of this information is a local decision based on local infrastructure. Potential options might include:

- Explore whether it is possible to generate a weekly electronic extract or printout from the laboratory information system listing the critical care patients who had blood cultures ordered during the previous week and providing the results of those blood cultures
- Explore whether such data may be obtained directly from the local critical care information system

It is recommended that the positive blood culture results are reviewed on a weekly basis, one week in arrears. This will ensure that culture results have been finalised and will allow time to assess the potential clinical significance of blood cultures positive for common skin contaminants and results of any subsequent blood cultures.

A member of the MDT should take the responsibility for reviewing and interpreting the weekly list of positive blood culture results. Suspect UABSI cases are recorded for discussion at the MDT meeting.

Where a blood culture result is interim or incomplete, this should be noted and that blood culture result carried forward for review of the final laboratory result the following week.

See **Appendix B** for an example of a weekly positive blood culture form.

4.0 Bloodstream Infection (BSI) – Hospitals in Europe Link for Infection Control through Surveillance (HELICS) Surveillance Definitions

The definition below has been taken from the ECDC Healthcare-Associated Infection Intensive Care Unit (HAIICU) Protocol v1.01 – December 2010.[1]

Bloodstream Infection (BSI)

- Patient has at least 1 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
  2 positive blood cultures for a common skin contaminant (from 2 separate blood samples, usually within 48 hours).

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

BSI are attributed as unit-acquired where the date of the positive blood culture is three days onwards following the patient's date of admission to the critical care unit.

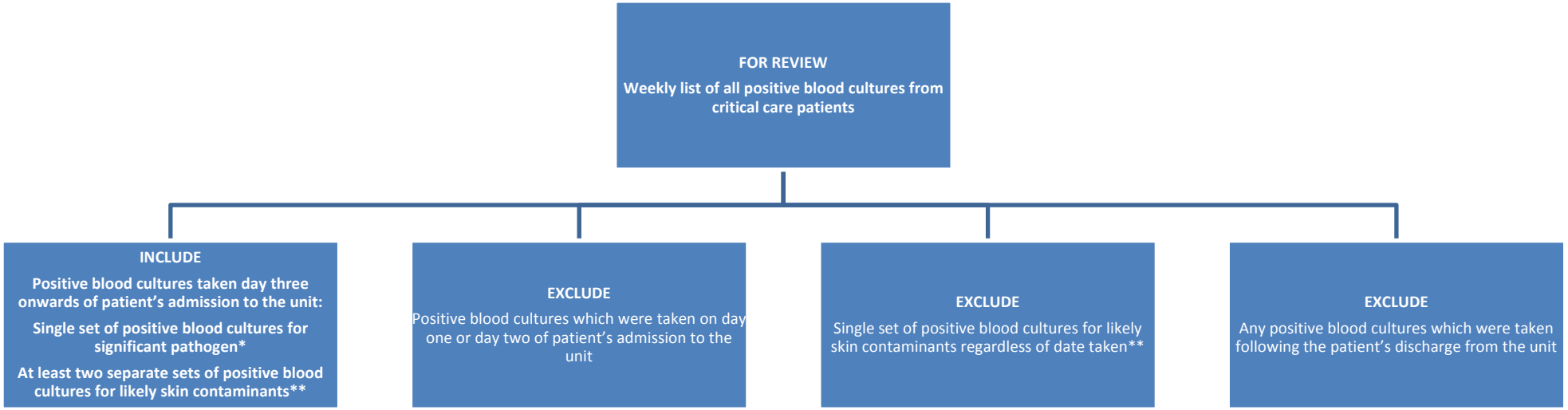
To decide whether a positive blood culture result may represent a suspected UABSI, the following information is required when the positive blood culture list is reviewed:

- Date that the blood culture was taken
- Date that the patient was admitted to the critical care unit
- Final microbiology laboratory identification of the microorganism isolated from the positive blood culture

Figure 1 displays a guide to interpretation of the list of critical care positive blood cultures.

Information on each suspected UABSI case is recorded on a weekly positive blood culture form (**Appendix B**) and each case is discussed at the MDT meeting.

Figure 1: Interpretation of Critical Care Unit Positive Blood Culture Results



*Commonly encountered significant pathogens include: *E. coli, Klebsiella pneumoniae*, *S. aureus, E. faecium, C. albicans* etc. (See **Appendix E**)

Likely skin contaminants include: Coagulase-negative staphylococci, which may include *S. epidermidis, S. hominis* etc. (See **Appendix E)

5.0 Multi-Disciplinary Team Meeting

The list of suspected cases to be discussed is gathered. The healthcare record and additional relevant information on each patient with a suspected UABSI is reviewed at the MDT meeting. The clinical significance of each suspected UABSI and the origin of each confirmed UABSI are defined as per the HELICS definition below and attributed at the MDT meeting.

Origin of BSI

Both primary (bloodstream infection of unknown origin or catheter-related) and secondary BSI (secondary to another infection site) should be reported. The origin of the BSI should be reported in a different variable:

- Catheter-related: the same micro-organism was cultured from the catheter or symptoms improve within 48 hours after removal of the catheter. Important: if microbiologically confirmed, report BSI with origin C-CVC or C-PVC as CRI3-CVC or CRI3-PVC respectively, see CRI3 definition; if CRI's are not included in the surveillance or if catheter tip culture was not done, then report as BSI with origin C-CVC or C-PVC.
    - C-CVC: central vascular catheter
    - C-PVC: peripheral vascular catheter,

- Secondary to another infection: the same micro-organism was isolated from 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): central nervous system, bone infection as osteomyelitis etc
- Unknown (UO): BSI of unknown origin (origin was verified but no source could be found for the BSI)
- Missing, data unavailable (UNK): only use this code if data on the BSI origin or missing

The decision of the MDT should be recorded in the patient's healthcare record. See **Appendix C** for an example of a proforma MDT decision sticker for insertion into the patient's healthcare record.

A record of the MDT meeting should be maintained and the following information recorded:

- List of patients with confirmed UABSI that month – Chart number, date of blood culture, blood culture specimen number
- Pathogen detected from blood cultures (**Appendix E**) and specific antimicrobial resistance markers, where applicable (**Appendix E**)
- UABSI origin, as per HELICS definition above
- Total of the patient days in the unit for that month
- Monthly UABSI rate per 1,000 patient days. Rate = (number of UABSI in that period divided by the total patient days in that period) x 1,000
- % of UABSI that were device related (e.g. secondary to an infected vascular catheter)
- Interval in days since the last documented vascular catheter-related UABSI

Appendix D contains an example of a monthly multi-disciplinary team meeting report.

Guidance on recording UABSI origin when it is due to an infected vascular catheter

The origin of the UABSI is classified based on the following information:

1. The type of vascular catheter: central vascular catheter/CVC or peripheral vascular catheter/PVC
2. The strength of evidence that links the origin of the positive blood culture to the vascular catheter: clinical (C) versus microbiological (CRI3)

Where there is no other microbiological evidence to link the positive blood culture to the vascular catheter and the MDT decision is that based on clinical evidence, the vascular catheter is the source of the patient's UABSI, this is recorded as a clinical diagnosis (C)

Examples:

- A vascular catheter exit site swab was not taken
- A vascular catheter exit site swab culture result was reported as 'pathogens not isolated/no growth' or the pathogens isolated from the exit site swab were different to those isolated from the blood cultures
- The vascular catheter tip was not sent to the microbiology laboratory
- The vascular catheter tip culture result was reported as 'pathogens not isolated/no growth' **or** the pathogens isolated from the catheter tip were the same as those in the blood culture but were reported to be in a non-significant quantity (<15 colony forming units) **or** the pathogens isolated from the catheter tip were different to those isolate from the blood cultures
- The microbiology laboratory does not process vascular catheter tips
- Therefore, a UABSI with origin due to an infected peripheral vascular catheter, based on clinical diagnosis of phlebitis at the PVC site is recorded as: BSI-C-PVC

Where there is microbiological evidence to link the positive blood culture to the vascular catheter, this is recorded as a microbiologically-confirmed catheter-related infection (CRI3)

Examples:

- The same significant pathogen is isolated from one set of blood cultures (need two positive sets for potential contaminants e.g., coagulase-negative staphylococci) and also from a swab of the vascular catheter exit site

- The same significant pathogen is isolated from one set of blood cultures (need two positive sets for potential contaminants e.g., coagulase-negative staphylococci) and also in significant growth (>15 colony forming units) from the tip of the vascular catheter following its removal

- Therefore, a UABSI with origin due to an infected peripheral vascular catheter and there is a swab of the PVC exit site from which the same pathogen is isolated as the positive blood culture is recorded as: BSI-CRI3-PVC

6.0 References

1. European Centre for Disease Prevention & Control (ECDC). European Surveillance of Healthcare-Associated Infections in Intensive Care Units. HAIICU Protocol v1.01. December 2010. www.ecdc.europa.eu

2. Conrick-Martin I, Foley M, Roche FM, Fraher M, Burns KM, Morrison P, Healy M, Power M, Fitzpatrick F, Phelan D, Walshe CM. Catheter-related infection in Irish intensive care units diagnosed with HELICS criteria: A multi-centre surveillance study. *J Hosp Infect* 2013; 83(3):238-43.

3. Foley M, Burns K. Point Prevalence Survey of Hospital-Acquired Infections & Antimicrobial Use in European Acute Care Hospitals, May 2012: Critical Care Report: February 2013.

   http://www.hpsc.ie/hpsc/A-Z/MicrobiologyAntimicrobialResistance/InfectionControlandHAI/Surveillance/HospitalPointPrevalenceSurveys/2012/PPS2012NationalReportforIreland/

4. ECDC Annual Epidemiological Report 2012. www.ecdc.europa.eu

5. Health Service Executive Critical Care & Healthcare-Associated Infection Clinical Programmes. Survey of Hygiene & HCAI Prevention Practices in Irish Critical Care Services. Version 2. February 2013. http://www.hpsc.ie/hpsc/A-Z/MicrobiologyAntimicrobialResistance/InfectionControlandHAI/Surveillance/HHCAISurvey2012/

7.0 Appendices

Appendix A: Sample Daily Critical Care Denominator Form

THANK YOU FOR COMPLETING THIS FORM EVERY DAY

		SURVEILLANCE OF UNIT-ACQUIRED BLOODSTREAM INFECTION		
DAILY DENOMINATOR DATA FORM: JULY 2013				
NAME OF UNIT:				
DAY	DATE	MONTH	TIME FORM COMPLETED	NUMBER OF PATIENTS IN UNIT DAY 3 ONWARDS
MONDAY	1st	JULY		
TUESDAY	2nd	JULY		
WEDNESDAY	3rd	JULY		
THURSDAY	4th	JULY		
FRIDAY	5th	JULY		
SATURDAY	6th	JULY		
SUNDAY	7th	JULY		
MONDAY	8th	JULY		
TUESDAY	9th	JULY		
WEDNESDAY	10th	JULY		
THURSDAY	11th	JULY		
FRIDAY	12th	JULY		
SATURDAY	13th	JULY		
SUNDAY	14th	JULY		
MONDAY	15th	JULY		
TUESDAY	16th	JULY		
WEDNESDAY	17th	JULY		
THURSDAY	18th	JULY		
FRIDAY	19th	JULY		
SATURDAY	20th	JULY		
SUNDAY	21st	JULY		
MONDAY	22nd	JULY		
TUESDAY	23rd	JULY		
WEDNESDAY	24th	JULY		
THURSDAY	25th	JULY		
FRIDAY	26th	JULY		
SATURDAY	27th	JULY		
SUNDAY	28th	JULY		
MONDAY	29th	JULY		
TUESDAY	30th	JULY		
WEDNESDAY	31st	JULY		
MONTHLY TOTAL				

Appendix B: Sample Weekly Positive Blood Culture Form

Surveillance of Unit-Acquired Bloodstream Infection – Weekly Positive Blood Culture Form

WEEK BEGINNING: DD/MM/YY		
TOTAL NUMBER OF POSITIVE BLOOD CULTURE EPISODES*		
TOTAL NUMBER OF NON-UNIT-ACQUIRED BLOODSTREAM INFECTION EPISODES		
TOTAL NUMBER OF CONTAMINATED BLOOD CULTURE EPISODES		
TOTAL NUMBER OF SUSPECTED UNIT-ACQUIRED BLOODSTREAM INFECTION EPISODES		
	Name, chart number, specimen date, specimen type, specimen number & pathogen name & antimicrobial resistance marker, where applicable	**Clinically significant (Yes or No) & If significant, document UABSI origin as per MDT decision**
SUSPECTED UABSI EPISODE 1		
SUSPECTED UABSI EPISODE 2		
SUSPECTED UABSI EPISODE 3		
SUSPECTED UABSI EPISODE 4		

*Where a patient has had more than one positive set of blood cultures with the same pathogen isolated, this is counted as a single episode

Appendix C: Sample Proforma MDT Decision Sticker for Patient Healthcare Record

Critical care bloodstream infection (BSI) surveillance MDT meeting

Patient name:……………………………………………

Meeting date:……………………………………………

Positive blood culture date:……………………………

Pathogen isolated:………………………………………
Clinically significant: Yes or No (circle as appropriate)

BSI origin:…………………………………………………

Signed:……………………………………………………

Critical care bloodstream infection (BSI) surveillance MDT meeting

Patient name:……………………………………………

Meeting date:……………………………………………

Positive blood culture date:……………………………

Pathogen isolated:………………………………………
Clinically significant: Yes or No (circle as appropriate)

BSI origin:…………………………………………………

Signed:……………………………………………………

Critical care bloodstream infection (BSI) surveillance MDT meeting

Patient name:……………………………………………

Meeting date:……………………………………………

Positive blood culture date:……………………………

Pathogen isolated:………………………………………
Clinically significant: Yes or No (circle as appropriate)

BSI origin:…………………………………………………

Signed:……………………………………………………

Critical care bloodstream infection (BSI) surveillance MDT meeting

Patient name:……………………………………………

Meeting date:……………………………………………

Positive blood culture date:……………………………

Pathogen isolated:………………………………………
Clinically significant: Yes or No (circle as appropriate)

BSI origin:…………………………………………………

Signed:……………………………………………………

Critical care bloodstream infection (BSI) surveillance MDT meeting

Patient name:……………………………………………

Meeting date:……………………………………………

Positive blood culture date:……………………………

Pathogen isolated:………………………………………
Clinically significant: Yes or No (circle as appropriate)

BSI origin:…………………………………………………

Signed:……………………………………………………

Critical care bloodstream infection (BSI) surveillance MDT meeting

Patient name:……………………………………………

Meeting date:……………………………………………

Positive blood culture date:……………………………

Pathogen isolated:………………………………………
Clinically significant: Yes or No (circle as appropriate)

BSI origin:…………………………………………………

Signed:……………………………………………………

Critical care bloodstream infection (BSI) surveillance MDT meeting

Patient name:……………………………………………

Meeting date:……………………………………………

Positive blood culture date:……………………………

Pathogen isolated:………………………………………
Clinically significant: Yes or No (circle as appropriate)

BSI origin:…………………………………………………

Signed:……………………………………………………

Critical care bloodstream infection (BSI) surveillance MDT meeting

Patient name:……………………………………………

Meeting date:……………………………………………

Positive blood culture date:……………………………

Pathogen isolated:………………………………………
Clinically significant: Yes or No (circle as appropriate)

BSI origin:…………………………………………………

Signed:……………………………………………………

Appendix D: Sample Monthly MDT Meeting Report

Unit-acquired blood stream infection surveillance report
Intensive Care Unit: July 2013

Two positive blood cultures were recorded during July 2013:

- One non unit-acquired blood stream infection
- One unit-acquired blood stream infection
- No contaminated blood cultures deemed not clinically significant

Denominator Data

Patient Days
193

Unit-acquired bloodstream infection

Initials	Chart number	Specimens	Pathogen	BSI Origin	Outcome
AA	0000000	Blood cultures Left IJV CVC (00001) & blood cultures right femoral CVC (00002) both taken 25/7/13 & BAL (00010) 24/7/13	*Enterobacter cloacae*	Pulmonary	Discharged to ward

Infection Type	Rate	Calculation
UA-BSI rate	5.1 UABSI/1000 patient days	1/193 x 1000
Contaminant rate	0 contaminated blood cultures/1000 patient days	

Discussed at multi-disciplinary meeting: 3/8/13, with 98 days elapsed since the last vascular catheter-related BSI was acquired in this ICU

Appendix E: Pathogen Code List & Antimicrobial Resistance Markers

CODE	FULL TITLE
NOEXA	MICROBIOLOGICAL EXAMINATION NOT DONE **OR** NO SPECIMEN SENT
NA	RESULTS NOT YET AVAILABLE **OR** RESULTS MISSING
NONID	MICRO-ORGANISM NOT IDENTIFIED (E.G. MIXED GROWTH)
STERI	STERILE EXAMINATION **OR** PATHOGENS NOT ISOLATED **OR** NO GROWTH REPORTED
A	
ACHSPP	ACHROMOBACTER SPECIES
ACIBAU	ACINETOBACTER BAUMANNII
ACICAL	ACINETOBACTER CALCOACETICUS
ACIHAE	ACINETOBACTER HAEMOLYTICUS
ACILWO	ACINETOBACTER LWOFFI
ACINSP	ACINETOBACTER SP., NOT SPECIFIED
ACIOTH	ACINETOBACTER SP., OTHER
ACTSPP	ACTINOMYCES SPECIES
AEMSPP	AEROMONAS SPECIES
AGRSPP	AGROBACTERIUM SPECIES
ALCSPP	ALCALIGENES SPECIES
ANANSP	ANAEROBES, NOT SPECIFIED
ANAOTH	OTHER ANAEROBES
ASPFUM	ASPERGILLUS FUMIGATUS
ASPNIG	ASPERGILLUS NIGER

CODE	FULL TITLE
ASPNSP	ASPERGILLUS SP., NOT SPECIFIED
ASPOTH	ASPERGILLUS SP., OTHER
B	
BACSPP	BACILLUS SPECIES
BATFRA	BACTEROIDES FRAGILIS
BATNSP	BACTEROIDES SPECIES, NOT SPECIFIED
BATOTH	BACTEROIDES SP., OTHER
BCTNSP	OTHER BACTERIA, NOT SPECIFIED
BCTOTH	OTHER BACTERIA
BURCEP	BURKHOLDERIA CEPACIA
C	
CAMSPP	CAMPYLOBACTER SPECIES
CANALB	CANDIDA ALBICANS
CANGLA	CANDIDA GLABRATA
CANKRU	CANDIDA KRUSEI
CANNSP	CANDIDA SP., NOT SPECIFIED
CANOTH	CANDIDA SP., OTHER
CANPAR	CANDIDA PARAPSILOSIS
CANTRO	CANDIDA TROPICALIS
CHLSPP	CHLAMYDIA SPECIES
CITDIV *	CITROBACTER KOSERI (EX. DIVERSUS) *
CITFRE *	CITROBACTER FREUNDII *
CITNSP *	CITROBACTER SP., NOT SPECIFIED *

CODE	FULL TITLE
CITOTH *	CITROBACTER SP., OTHER *
CLODIF	CLOSTRIDIUM DIFFICILE
CLOOTH	CLOSTRIDIUM OTHER
CORSPP	CORYNEBACTERIUM SPECIES
E	
ENBAER *	ENTEROBACTER AEROGENES *
ENBAGG*	ENTEROBACTER AGGLOMERANS *
ENBCLO *	ENTEROBACTER CLOACAE *
ENBGER*	ENTEROBACTER GERGOVIAE *
ENBNSP *	ENTEROBACTER SP., NOT SPECIFIED *
ENBOTH*	ENTEROBACTER SP., OTHER *
ENBSAK *	ENTEROBACTER SAKAZAKII *
ENCFAE	ENTEROCOCCUS FAECALIS
ENCFAI	ENTEROCOCCUS FAECIUM
ENCNSP	ENTEROCOCCUS SP., NOT SPECIFIED
ENCOTH	ENTEROCOCCUS SP., OTHER
ESCCOL *	ESCHERICHIA COLI *
ETBNSP	ENTEROBACTERIACEAE, NOT SPECIFIED
ETBOTH	OTHER ENTEROBACTERIACEAE
F	
FILOTH	FILAMENTS OTHER
FLASPP	FLAVOBACTERIUM SPECIES
FUNNSP	FUNGI, NOT SPECIFIED

CODE	FULL TITLE
FUNOTH	FUNGI OTHER
	G
GARSPP	GARDNERELLA SPECIES
GNBNSP	GRAM-NEGATIVE BACILLI NON-SPECIFIED (NON-ENTEROBACTERIACEAE)
GNCNSP	GRAM NEGATIVE COCCI, NOT SPECIFIED
GNCOTH	GRAM NEGATIVE COCCI, OTHER
GPBNSP	GRAM POSITIVE BACILLI, NOT SPECIFIED
GPBOTH	GRAM POSITIVE BACILLI, OTHER
GPCNSP	GRAM POSITIVE COCCI, NOT SPECIFIED
GPCOTH	GRAM POSITIVE COCCI, OTHER
	H
HAEINF	HAEMOPHILUS INFLUENZAE
HAENSP	HAEMOPHILUS SP., NOT SPECIFIED
HAEOTH	HAEMOPHILUS SP., OTHER
HAEPAI	HAEMOPHILUS PARAINFLUENZAE
HAFSPP *	HAFNIA SPECIES *
HELPYL	HELICOBACTER PYLORI
	K
KLENSP *	KLEBSIELLA SP., NOT SPECIFIED *
KLEOTH *	KLEBSIELLA SP., OTHER *
KLEOXY *	KLEBSIELLA OXYTOCA *
KLEPNE *	KLEBSIELLA PNEUMONIAE *
	L

CODE	FULL TITLE
LACSPP	LACTOBACILLUS SPECIES
LEGSPP	LEGIONELLA SPECIES
LISMON	LISTERIA MONOCYTOGENES
	M
MOGSP*	MORGANELLA SPECIES *
MORCAT	MORAXELLA CATARRHALIS
MORNSP	MORAXELLA SP., NOT SPECIFIED
MOROTH	MORAXELLA SP., OTHER
MYCATY	MYCOBACTERIUM, ATYPICAL
MYCTUB	MYCOBACTERIUM TUBERCULOSIS COMPLEX
MYPSPP	MYCOPLASMA SPECIES
	N
NEIMEN	NEISSERIA MENINGITIDIS
NEINSP	NEISSERIA SP., NOT SPECIFIED
NEIOTH	NEISSERIA SP., OTHER
NOCSPP	NOCARDIA SPECIES
	P
PAROTH	OTHER PARASITES
PASSPP	PASTEURELLA SPECIES
PRESPP	PREVOTELLA SPECIES
PROSPP	PROPIONIBACTERIUM SPECIES
PRTMIR *	PROTEUS MIRABILIS *

CODE	FULL TITLE
PRTNSP *	PROTEUS SP., NOT SPECIFIED *
PRTOTH *	PROTEUS SP., OTHER *
PRTVUL *	PROTEUS VULGARIS *
PRVSPP *	PROVIDENCIA SPECIES *
PSEAER	PSEUDOMONAS AERUGINOSA
PSENSP	PSEUDOMONADACEAE FAMILY, NOT SPECIFIED
PSEOTH	PSEUDOMONADACEAE FAMILY, OTHER
	S
SALENT *	SALMONELLA ENTERITIDIS *
SALNSP *	SALMONELLA SP., NOT SPECIFIED *
SALOTH *	SALMONELLA SP., OTHER *
SALTYM *	SALMONELLA TYPHIMURIUM *
SALTYP *	SALMONELLA TYPHI OR PARATYPHI *
SERLIQ *	SERRATIA LIQUEFACIENS *
SERMAR*	SERRATIA MARCESCENS *
SERNSP *	SERRATIA SP., NOT SPECIFIED *
SEROTH *	SERRATIA SP., OTHER *
SHISPP *	SHIGELLA SPECIES *
STAAUR	STAPHYLOCOCCUS AUREUS
STACNS	COAGULASE-NEGATIVE STAPHYLOCOCCI, NOT SPECIFIED
STAEPI	STAPHYLOCOCCUS EPIDERMIDIS
STAHAE	STAPHYLOCOCCUS HAEMOLYTICUS
STANSP	STAPHYLOCOCCUS SP., NOT SPECIFIED

CODE	FULL TITLE
STAOTH	OTHER COAGULASE-NEGATIVE STAPHYLOCOCCI (CNS)
STEMAL	STENOTROPHOMONAS MALTOPHILIA
STRAGA	STREPTOCOCCUS AGALACTIAE (GROUP B STREPTOCOCCUS)
STRHCG	OTHER BETA HAEMOLYTIC STREPTOCOCCI (GROUPS C OR G STREPTOCOCCUS)
STRNSP	STREPTOCOCCUS SP., NOT SPECIFIED
STROTH	STREPTOCOCCUS SP., OTHER
STRPNE	STREPTOCOCCUS PNEUMONIAE
STRPYO	STREPTOCOCCUS PYOGENES (GROUP A STREPTOCOCCUS)
V	
VIRADV	ADENOVIRUS
VIRCMV	CYTOMEGALOVIRUS (CMV)
VIRENT	ENTEROVIRUS (POLIO, COXSACKIE, ECHO)
VIRHAV	HEPATITIS A VIRUS
VIRHBV	HEPATITIS B VIRUS
VIRHCV	HEPATITIS C VIRUS
VIRHIV	HUMAN IMMUNODEFICIENCY VIRUS (HIV)
VIRHSV	HERPES SIMPLEX VIRUS
VIRINF	INFLUENZA VIRUS
VIRNOR	NOROVIRUS
VIRNSP	VIRUS, NOT SPECIFIED
VIROTH	VIRUS OTHER
VIRPIV	PARAINFLUENZA VIRUS
VIRRHI	RHINOVIRUS

CODE	FULL TITLE
VIRROT	ROTAVIRUS
VIRRSV	RESPIRATORY SYNCYTIAL VIRUS (RSV)
VIRSAR	SARS-CORONAVIRUS
VIRVZV	VARICELLA-ZOSTER VIRUS
Y	
YEAOTH	YEASTS, OTHER
YERSPP	YERSINIA SPECIES

Instructions

1. Find the name of the pathogen isolated from the patient's blood cultures in the alphabetical pathogen code list and record it on the weekly positive blood culture form

2. If the named pathogen lies on a row that is shaded, key antimicrobial data for that pathogen should also be recorded on the weekly positive blood culture form:

   - *Staphylococcus aureus* – Record whether it is flucloxacillin sensitive (MSSA) or flucloxacillin resistant (MRSA)

   - Any of the enterococcus species (e.g., *Enterococcus faecium, Enterococcus faecalis* etc) –Record whether it is vancomycin resistant enterococcus (VRE) or vancomycin sensitive enterococcus (VSE)

   - If the named pathogen lies on a row that is shaded and has a star beside it, this means it belongs to the *Enterobacteriaceae* group of Gram-negative bacilli

     - Record whether it has been reported as sensitive or resistant to 3rd generation cephalosporins (e.g., cefotaxime, ceftriaxone, ceftazidime) or as extended-spectrum beta lactamase (ESBL) negative or positive or AmpC beta lactamase negative or positive

     - Record whether it has been reported as sensitive or resistant to carbapenems (e.g., meropenem, ertapenem) – Carbapenem resistant *Enterobacteriaceae* (CRE) negative or positive

   - *Pseudomonas aeruginosa* or *Acinetobacter baumannii* – Record whether it is carbapenem (e.g., meropenem) sensitive or carbapenem resistant