NHS National Services Scotland

Protocol for National Enhanced Surveillance of Bacteraemia.

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Health Protection Scotland

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Contents

Aims and Objectives

The overarching aim of the Gram negative bacteraemia (*Escherichia coli* bacteraemia (ECB), *Klebsiella* species (spp.) bacteraemia (KSB), *Pseudomonas aeruginosa* bacteraemia (PAB)) and *Staphylococcus aureus* bacteraemia (SAB) national bacteraemia programmes is to monitor the burden of bacteraemia and to inform interventions/changes in practices. This has been achieved by implementing a mandatory and voluntary surveillance programmes identifying patient characteristics, history of healthcare and risk factors (potential primary infection source, potential cause of bacteraemia) and making these data available in a relevant context in order to:

- Support the NHS boards in strategic planning, implementation of targeted intervention and quality improvement in clinical areas, and to monitor the impact of these activities.
- Provide a national expert role in epidemiology to underpin and support improvement of infection management, antimicrobial treatment and effective prevention and control of bacteraemia to the NHS Boards, other NSS divisions, Scottish Government and other relevant clinical networks/ forums, including the National urinary tract infection (UTI) programme, Scottish Microbiology and Virology Network (SMVN) and Scottish Antimicrobial prescribing Group (SAPG), by identifying risk factors and populations at risks.
- Align with research and support the development of national guidance and quality improvement tools for facilitating reduction in bacteraemia incidence.
- Provide epidemiological support to NHS boards in outbreak and incident investigations.

Case Definitions

The following blood specimens are excluded from the surveillance:

- Post mortem blood/pathology reports
- Clotted blood
- Plasma
- Serum
- Ascitic fluid

Escherichia coli bacteraemia

A case of bacteraemia is a patient from whom *Escherichia coli* (*E. coli*) has been isolated from the patient's blood, and who has not previously had the same organism isolated from blood within the same 14-day period (i.e. 14 days from date last positive sample obtained).

This surveillance includes all laboratory reported cases except *E. coli* O157 or other serotype samples

Klebsiella species bacteraemia

A case of bacteraemia is a patient from whom *Klebsiella* spp. has been isolated from the patient's blood, and who has not previously had the same organism isolated from blood within the same 14 day period (i.e. 14 days from date last positive sample obtained).

If a patient has had more than one *Klebsiella* e.g. *Klebsiella pneumoniae* and *Klebsiella oxytoca* within the same rolling 14-day period this is coded to be the same episode, rather than two episodes.

Pseudomonas aeruginosa bacteraemia

A case of bacteraemia is a patient from whom *Pseudomonas aeruginosa* (*P. aeruginosa*) has been isolated from the patient's blood, and who has not previously had the same organism isolated from blood within the same 14-day period (i.e. 14 days from date last positive sample obtained).

Staphylococcus aureus bacteraemia

A case of SAB is a patient whom *Staphylococcus aureus* (*S. aureus*) has been isolated from the patient's blood, and who has not previously had the same organism isolated from blood within the same 14-day period (i.e. 14 days from the date last positive sample obtained).

Borderline oxacillin resistance *S. aureus* (BORSA) are coded as MSSA.

S. aureus Reference Laboratory samples take priority in the episode.

Enhanced surveillance datasets

Core data fields

- CHI Number
- Forename
- Surname
- Gender
- Postcode
- NHS health board of residence
- NHS health board of laboratory
- Episode date
- Specimen number
- Date of birth
- Date of admission to hospital during episode
- Ward where positive blood culture aspirated
- Health board where positive blood culture aspirated
- Hospital where positive blood culture aspirated
- Clinical Speciality where blood culture taken
- Health board bacteraemia attributed to
- Hospital bacteraemia attributed to
- Clinical Speciality bacteraemia attributed to
- Origin of infection
- Notes

ECB data fields

- Hospital Admission History (30 Days Prior)
- Specific source of *E. coli* bacteraemia
- Other source of *E. coli* bacteraemia
- Bacteraemia by system involved or external factor
- Other bacteraemia by system involved or external factor
- Urinary catheter inserted/removed in last 30 days prior to bacteraemia
- Urinary catheter manipulated 30 days prior to bacteraemia
- Duration of urinary catheter
- Reason for urinary catheter insertion
- Treatment for UTI 30 days prior to bacteraemia
- Prostate biopsy 30 days prior to bacteraemia
- Hepatobiliary procedure 30 days prior to bacteraemia
- Type of hepatobiliary procedure
- Prophylactic antibiotics given for hepatobiliary procedure

KSB data fields

- Hospital Admission History (30 Days Prior)
- Specific source of *Klebsiella* spp. bacteraemia
- Other source of *Klebsiella* spp. bacteraemia

PAB data fields

- Hospital Admission History (30 Days Prior)
- Specific source of *P. aeruginosa* bacteraemia
- Other source of *P. aeruginosa* bacteraemia

SAB data fields

- *S. aureus* susceptibility (methicillin-resistant staphylococcus aureus (MRSA) or methicillin-sensitive staphylococcus aureus (MSSA)
- SAB entry point
- SAB entry point other: please specify
- Deep-seated/metastatic infection
- Deep-seated/metastatic infection other: please specify
- Device risk factors
- Skin and soft tissue risk factors
- Other risk factors

Methods

Process for information capture

NHS Boards should coordinate the completion of the HPS enhanced ECB/SAB surveillance.

Each NHS Board is responsible for capturing the data required by the enhanced surveillance in the enhanced surveillance tool within ECOSS (www.ecoss.scot.nhs.uk). Information should be collected on a prospective basis. Data can be obtained from local Laboratory Information Management Systems (LIMS) or Patient Administration Systems (PAS) as applicable.

Case Validation

To ensure data quality, validation rules have been built into the web tool

RED

Essential data corrections/Essential fields missing.

The case cannot be saved as complete until these have been resolved.

AMBER

Desirable data checks/Unlikely cross-field combinations to be checked.

These messages are advisory and the case can still be saved as complete.

Deadlines for completion of Enhanced data on ECOSS

Quarter	Completion date
January – March (Quarter 1)	1st Friday in May
April – June (Quarter 2)	1st Friday in August
July – September (Quarter 3)	1st Friday in November
October – December (Quarter 4)	1st Friday in February

Core Surveillance Data Definitions

Data item:	CHI Number
Response required:	Essential
Definition:	
Choices:	
Rationale:	
Comments:	

Data item:	Forename
Response required:	Essential
Definition:	
Choices:	
Rationale:	Part of unique record
Comments:	

Data item:	Surname
Response required:	Essential
Definition:	
Choices:	
Rationale:	Part of unique record
Comments:	

Data item:	Gender
Response required:	Essential
Definition:	
Choices:	Male, Female
Rationale:	Part of unique record
Comments:	

Data item:	Date of birth
Response required:	Essential
Definition:	
Choices:	
Rationale:	Part of unique record
Comments:	

Data item:	Postcode
Response required:	Desirable
Definition:	
Choices:	Multiple
Rationale:	Part of unique record
Comments:	

Data item:	NHS health board of residence
Response required:	Essential
Definition:	
Choices:	AA (NHS Ayrshire and Arran), BR (NHS Borders), DG (NHS Dumfries & Galloway), FF (NHS Fife), FV (NHS Forth Valley), GR (NHS Grampian), GGC (NHS Greater Glasgow & Clyde), HG (NHS Highland), LN (NHS Lanarkshire), LO (NHS Lothian), OR (NHS Orkney), SH (NHS Shetland), TY (NHS Tayside), WI (NHS Western Isles), Non NHSScotland
Rationale:	Part of unique record
Comments:	Non NHSScotland should be used for residents from the rest of the UK or those who are visiting from other countries.

Data item:	NHS health board of laboratory
Response required:	Essential
Definition:	
Choices:	AA, BR, DG, FF, FV, GR, GGC, HG, LN, LO, NWTC, OR, SH,
TY, WI	
Rationale:	To allow data to be searched by Health Board
Comments:	

Data item:	Episode (specimen) date
Response required:	Essential
Definition:	
Choices:	
Rationale:	Required to identify origin of bacteraemia
Comments:	

Data item:	Specimen number
Response required:	Essential
Definition:	
Choices:	
Rationale:	
Comments:	

Data item:	Date of admission to hospital during bacteraemia episode
Response required:	Essential for SAB/ECB, Voluntary for KSB/PAB
Definition:	If the patient was first admitted to A&E, the A&E admission date should be used.
Choices:	
Rationale:	
Comments:	If patient has not been admitted to hospital, enter 09/09/9999 in this field and complete the location of sample aspiration within the notes field. Contact the SSHAIP team to override validation.

Data item:	Ward where positive blood culture aspirated
Response required:	Optional
Definition:	
Choices:	Individual Infection Prevention and Control Teams will need to identify wards in their own NHS Board
Rationale:	
Comments:	For local use only.

Data item:	Health board where positive blood culture aspirated
Response required:	Essential for SAB/ECB, Voluntary for KSB/PAB
Definition:	
Choices:	AA, BR, DG, FF, FV, GR, GGC, HG, LN, LO, NWTC, OR, SH,
TY, WI	
Rationale:	
Comments:	

Data item:	Hospital where positive blood culture aspirated
Response required:	Essential for SAB/ECB, Voluntary for KSB/PAB
Definition:	
Choices:	Hospital code*
Rationale:	
Comments:	If the sample was taken in a hospice, the 'hospital at home' option should be used, name of care home/location can be entered into the comments.

* The hospital code list included in the web tool will be refreshed on an annual basis. If a change is required please contact Information Services Scotland

Data item:	Clinical speciality where blood culture taken
Response required:	Essential for SAB/ECB, Voluntary for KSB/PAB
Definition:	
Choices:	Multiple (See Appendix 1)
Rationale:	
Comments:	

Data item:	Health board bacteraemia attributed to
Response required:	Optional
Definition:	For patient transfers positive blood culture MUST be obtained within 48 hours of transfer to the new health board If infection source/entry point is surgical site infection (SSI) (refer SSI protocol definitions), attribute to health board of surgery If infection source/entry point is dialysis, attribute to health board of dialysis
Choices:	AA, BR, DG, FF, FV, GR, GGC, HG, LN, LO, NWTC, OR, SH, TY, WI, Non NHSScotland
Rationale:	Option available for HAI bacteraemia only
Comments:	Non NHSScotland should be used where the infection is attributed to a hospital within the rest of the UK or in other countries.

Data item:	Hospital bacteraemia attributed to
Response required:	Optional
Definition:	For patient transfers positive blood culture MUST be obtained within 48 hours of transfer to the new hospital If infection source/entry point is surgical site infection (SSI) (refer SSI protocol definitions), attribute to hospital of surgery If infection source/entry point is dialysis, attribute to hospital of dialysis
Choices:	Hospital code
Rationale:	Option available for HAI bacteraemia only
Comments:	The hospital code list included in the web tool will be refreshed on an annual basis. If a change is required please contact Information Services Scotland

Data item:	Clinical speciality bacteraemia attributed to
Response required:	Optional
Definition:	For patient transfers positive blood culture MUST be obtained within 48 hours of transfer to the different speciality
Choices:	Multiple (See Appendix 1)
Rationale:	
Comments:	

Data item:	Origin of infection
Response required:	Essential for SAB/ECB, Voluntary for KSB/PAB
Definition:	**Hospital acquired infection (HAI):** Positive blood culture obtained from a patient who has been hospitalised for ≥48 hours. If the patient was transferred from another hospital, the duration of in-patient stay is calculated from the date of the first hospital admission. If the patient was a neonate/baby who has never left hospital since being born. OR The patient was discharged from hospital in the 48hr prior to the positive blood culture being taken. OR A patient who receives regular haemodialysis as an out-patient. OR Contaminant if the blood aspirated in hospital. OR If infection source/entry point is surgical site infection (SSI). **Healthcare associated infection (HCAI):** Positive blood culture obtained from a patient within 48 hours of admission to hospital and fulfils one or more of the following criteria: Was hospitalised overnight in the 30 days prior to the positive blood culture being taken. OR Resides in a nursing, long term care facility or residential home. OR IV, or intra-articular medication in the 30 days prior to the positive blood culture being taken, but **excluding IV illicit drug use**. OR Had the use of a registered medical device in the 30 days prior to the positive blood culture being taken e.g. intermittent self-catheterisation or percutaneous endoscopic gastrostomy (PEG) tube with or without the direct involvement of a healthcare worker (excludes haemodialysis lines see HAI). OR Underwent any medical procedure which broke mucous or skin barrier i.e. biopsies or dental extraction in the 30 days prior to the positive blood culture being taken. OR Underwent care for a medical condition by a healthcare worker in the community which involved contact with non-intact skin, mucous membranes or the use of an invasive device in the 30 days prior to the positive blood culture being taken e.g. podiatry or dressing of chronic ulcers, catheter change or insertion.

	Community infection: Positive blood culture obtained from a patient within 48 hours of admission to hospital who does not fulfil any of the criteria for healthcare associated bloodstream infection. **Not known:** Only to be used if the bacteraemia is not an HAI, and unable to determine if Community or HCAI.
Choices:	Hospital acquired infection (HAI) Healthcare associated infection (HCAI) Community Not known
Rationale:	
Comments:	

Data item:	Notes
Response required:	Optional
Definition:	
Choices:	Variable and patient specific
Rationale:	
Comments:	Can be used to provide additional information or qualifying information. **In addition, for SAB** it can be used to specify what multiple sites of metastatic infection have been picked in "Deep-seated metastatic infection"

E. coli Bacteraemia Surveillance Data Definitions

Data item:	Hospital admission history (30 days prior)
Response required:	Essential
Definition:	Any hospital admission in prior 30 days to the current admission being recorded including A&E admissions.
Choices:	Yes/No/Unknown
Rationale:	
Comments:	

Data item:	Specific source of *E. coli* bacteraemia
Response required:	Essential
Definition:	Specific source of the *E. coli* bacteraemia.
Choices:	Multiple (See Appendix 2)
Rationale:	
Comments:	

Data item:	Other source of *E. coli* bacteraemia
Response required:	Optional
Definition:	
Choices:	Free text
Rationale:	If the specific source is not present on the drop down menu
Comments:	

Data item:	Bacteraemia by system involved or external factor
Response required:	Essential
Definition:	System involved or external factor to help identify the entry point of the bacteraemia.
Choices:	Multiple (See Appendix 3)
Rationale:	
Comments:	

Data item:	Other bacteraemia by system involved or external factor
Response required:	Optional
Definition:	
Choices:	Free text
Rationale:	If the system involved or external factor is not present on the drop down menu
Comments:	

Data item:	Urinary catheter inserted/removed in last 30 days prior to bacteraemia
Response required:	Optional **Definition:**
Choices:	Yes / No / Unknown
Rationale:	
Comments:	Voluntary risk factor question.

Data item:	Urinary catheter manipulated 30 days prior to bacteraemia
Response required:	Optional
Definition:	
Choices:	Yes / No / Unknown
Rationale:	
Comments:	Voluntary risk factor question.

Data item:	Duration of urinary catheter
Response required:	Optional
Definition:	
Choices:	Intermittent self catheterisation / Short (<30 days) / Long (≥30days) / Unknown
Rationale:	Only available for completion if 'yes' is selected for 'Urinary catheter inserted in last 30 days prior' or 'Urinary catheter removed in last 30 days prior' or 'Urinary catheter manipulated 30 days prior'.
Comments:	Voluntary risk factor question.

Data item:	Reason for urinary catheter insertion
Response required:	Optional
Definition:	
Choices:	Fluid balance / Urinary retention / Urinary obstruction / Neurogenic bladder Surgery / Incontinence / Not documented / Other (please specify)
Rationale:	Only available for completion if 'yes' is selected for 'Urinary catheter inserted/removed in last 30 days prior' or 'Urinary catheter manipulated 30 days prior'.
Comments:	Voluntary risk factor question. If 'other: specify' is selected complete the free text field.

Data item:	Other reason for urinary catheter insertion
Response required:	Optional
Definition:	
Choices:	
Rationale:	Only available for completion if 'yes' is selected for 'Urinary catheter inserted/removed in last 30 days prior' or 'Urinary catheter manipulated 30 days prior', and then "Other (please specify)" selected for "Reason for urinary catheter insertion".
Comments:	Voluntary risk factor question. If 'other: specify' is selected complete the free text field.

Data item:	Treatment for UTI 30 days prior to bacteraemia
Response required:	Optional
Definition:	Patient has received medical care in 30 days prior to onset of bacteraemia with intention of treating a urinary tract infection.
Choices:	Yes / No / Unknown
Rationale:	
Comments:	Voluntary risk factor question. If 'yes (other: specify)' is selected complete the free text field.

Data item:	Prostate biopsy 30 days prior to bacteraemia
Response required:	Optional
Definition:	Patient has received procedure in 30 days prior to bacteraemia
Choices:	Yes / No / Unknown
Rationale:	
Comments:	Voluntary risk factor question.

Data item:	Hepatobiliary procedure 30 days prior to bacteraemia
Response required:	Optional
Definition:	Any procedure performed on hepatobiliary organs, such as Magnetic Resonance Cholangiopancreatography (MRCP) or Endoscopic Retrograde Cholangio-Pancreatography (ERCP).
Choices:	Yes (ERCP) / Yes (MRCP) / Yes (Stent insertion) / Yes (other please specify) / No / Unknown
Rationale:	
Comments:	Voluntary risk factor question.

Data item:	Other hepatobiliary procedure 30 days prior to bacteraemia
Response required:	Optional
Definition:	
Choices:	
Rationale:	Only available for completion if 'yes (other please specify)' is selected for "Hepatobiliary procedure 30 days prior to bacteraemia" field.
Comments:	Voluntary risk factor question.

Data item:	Type of hepatobiliary procedure
Response required:	Optional
Definition:	
Choices:	Elective / Emergency / Unknown
Rationale:	If 'yes' answered to 'Hepatobiliary procedure 30 days prior'
Comments:	Voluntary risk factor question.

Data item:	Prophylactic antibiotics given for hepatobiliary procedure
Response required:	Optional
Definition:	Prophylactic antibiotics given before/during/after procedure
Choices:	Yes / No / Not recorded
Rationale:	If 'yes' answered to 'Hepatobiliary procedure 30 days prior'.
Comments:	Voluntary risk factor question.

Klebsiella spp. Bacteraemia Surveillance Data Definitions

Data item:	Hospital admission history (30 days prior)
Response required:	Voluntary
Definition:	Any hospital admission in prior 30 days to the current admission being recorded including A&E admissions.
Choices:	Yes / No / Unknown
Rationale:	
Comments:	

Data item:	Specific source of *Klebsiella* spp. bacteraemia
Response required:	Voluntary
Definition:	Specific source of the *Klebsiella* spp. bacteraemia.
Choices:	Multiple (See Appendix 2)
Rationale:	
Comments:	

Data item:	Other source of *Klebsiella* spp. bacteraemia
Response required:	Optional
Definition:	
Choices:	Free text
Rationale:	If the specific source is not present on the drop down menu
Comments:	

P. aeruginosa Bacteraemia Surveillance Data Definitions

Data item:	Hospital admission history (30 days prior)
Response required:	Voluntary
Definition:	Any hospital admission in prior 30 days to the current admission being recorded including A&E admissions.
Choices:	Yes / No / Unknown
Rationale:	
Comments:	

Data item:	Specific source of *P. aeruginosa* bacteraemia
Response required:	Voluntary
Definition:	Specific source of the *Pseudomonas aeruginosa* bacteraemia.
Choices:	Multiple (See Appendix 2)
Rationale:	
Comments:	

Data item:	Other source of *P. aeruginosa* bacteraemia
Response required:	Optional
Definition:	
Choices:	Free text
Rationale:	If the specific source is not present on the drop down menu
Comments:	

S. aureus Bacteraemia Surveillance Data Definitions

Data item:	*S. aureus* susceptibility
Response required:	Essential
Definition:	When there is a difference in sensitivities between the laboratory results then the result from the Reference Laboratory should be used.
Choices:	MSSA / MRSA
Rationale:	
Comments:	

Data item:	SAB entry point
Response required:	Essential
Definition:	
Choices:	Multiple (See Appendix 5)
Rationale:	Identifies the proven or probable entry point of *S. aureus* into the blood stream and can be used to target interventions.
Comments:	Where the SAB is a continuation of a previous episode, the primary entry point should be used.

Data item:	SAB entry point – other: please specify
Response required:	Essential if SAB entry point = “other: please specify”
Definition:	
Choices:	Free text
Rationale:	If the entry point is not present on the drop down menu
Comments:	

Data item:	Deep-seated/metastatic infection
Response required:	Essential
Definition:	
Choices:	Multiple (See Appendix 6)
Rationale:	Useful for the clinical management of a patient and can be linked to patient outcome data.

Data item:	Deep-seated/metastatic infection – other: please specify
Response required:	Essential if deep-seated/metastatic infection = “other: please specify”
Definition:	
Choices:	Free text
Rationale:	If the entry point is not present on the drop down menu
Comments:	

Data item:	List all the device risk factors
Response required:	Essential
Definition:	List all devices risk factors in the 30 days prior to the date the positive blood culture was aspirated but do not include devices inserted to treat the current SAB episode.
Choices:	Multiple (See Appendix 7)
Rationale:	May identify practices where interventions can be targeted to reduce SAB
Comments:	If a device risk factor is selected as the Entry Point, then it must also be selected from risk factor list.

Data item:	Skin & soft tissue risk factors
Response required:	Essential
Definition:	List all skin and soft tissue risk factors at the time the blood culture was aspirated
Choices:	Multiple (See Appendix 7)
Rationale:	May identify practices where interventions can be targeted to reduce SAB
Comments:	If a skin & soft tissue risk factor is selected as the Entry Point, then it must also be selected from risk factor list.

Data item:	Other risk factors
Response required:	Essential
Definition:	List all other recognised risk factors at the time the blood culture was aspirated
Choices:	Multiple (See Appendix 7)
Rationale:	May identify practices where interventions can be targeted to reduce SAB
Comments:	

Appendix 1: Systematic classification ofclinical specialties for enhanced surveillance

Specialty	Sub-specialties within specialty classification
Accident & emergency	
Cardiology	
Cardio-thoracic surgery	
Care of the elderly	
Ear, Nose and Throat	
General surgery	Including: upper and lower bowel surgery, acute surgery and Surgical High Dependency Unit
Haematology	
Hospital at home/community	Including: patients managed in their own home, but receiving extra care provided by care of the elderly consultants or services beyond the scope of GPs, OR obtained in a community setting by healthcare worker i.e. GP surgery or patients home or OPAT service
Infectious disease	
Intensive care	
Maxilo-facial surgery	
Medicine	Including: General medicine, Acute medicine, Respiratory medicine, Dermatology, Palliative care, Medical high dependency unit
Mental health	
Neurosurgery	Including: spinal surgery
Obstetrics & gynaecology	
Oncology	
Ophthalmology	
Orthopaedic surgery	
Paediatrics and neonatology	Including: SCBU, neonatal ICU
Plastic surgery	Including: burns units
Rehabilitation Medicine	
Renal medicine	
Transplant surgery	
Urology	
Vascular surgery	

Appendix 2: Specific source of ECB/KSB/PAB

Specific source	Definition
Contaminant	To call *E. coli* / *Klebsiella* spp. / *P. aeruginosa* a contaminant it must conform to the definition below: Blood culture obtained from a patient with no clinical signs of infection and is not prescribed an antibiotic which is active against *E. coli* / *Klebsiella* spp. / *P. aeruginosa*. Or The patient has signs and symptoms of infection with or without objective markers for infection AND is treated by the clinical team for another pathogen. Or The surveillance team along with the clinical team agree *E. coli* / *Klebsiella* spp. / *P. aeruginosa* is a contaminant.
Cystitis	Inflammation of the bladder
Device - CAPD	Continuous ambulatory peritoneal dialysis - A permanent soft flexible plastic tube (catheter) inserted in the abdomen under local or general anaesthetic. Dialysis fluid are run via the catheter into the peritoneal cavity, and remain in the cavity for several hours before being drained out into an empty bag by gravity.
Device - Dialysis line	All types of dialysis except CAPD
Device - Suprapubic Catheter	Sterile tube used to drain urine from your bladder when you cannot urinate
Device - Urinary Catheter	Includes all urethral catheters used to drain the bladder and collect urine
Device - Other: please specify	Any device that has not been specified already
Endocarditis	Inflammation of the inner layer of the heart usually involving the heart valves
Hepatobiliary	Infections involving liver plus the gallbladder, bile ducts, or bile.
Hydronephrosis	Condition where one or both kidneys become stretched and swollen as the result of a build-up of urine inside them.
Lower urinary tract infection	Infection of the bladder and urethra
Mediastinitis	Inflammation of the tissues in the mid-chest, or mediastinum
Nephrostomy	Artificial opening created between the kidney and the skin which allows for the urinary diversion directly from the upper part of the urinary system (renal pelvis)
Osteomyelitis	Inflammation of bone or bone marrow
Pneumonia	Swelling (inflammation) of the tissue in one or both of your lungs
Pyelonephritis	Inflammation of the kidney tissue, calyces, and renal pelvis
Renal abscess	Collection of pus around one or both kidneys
Septic arthritis	Infection of a joint that causes arthritis
Skin - Abscess	Collection of pus under skin
Skin - Burns	Burn / scald to skin

Specific source	Definition
Skin - Necrotising fasciitis	Infection of the deeper layers of skin and subcutaneous tissues
Skin - Ulcer	Open wound on skin
Surgical site infection (superficial)	See definitions for SSI surveillance
Surgical site infection (deep)	See definitions for SSI surveillance
Surgical site infection (organ/space)	See definitions for SSI surveillance
Not known	Source not known.
Other: please specify	Any infection source that has not been specified already

Appendix 3: Classification of the ECB source by system involved or external factor

System involved or external factor	Specific infections (not exhaustive)
Cardiovascular infection	Infections of native valves and other structures related to the heart and vasculature i.e. thrombophlebitis.
Central nervous system infection	Infections related to the meninges, subdural or extradural, and involving the spinal column.
Congenital infection	Infection acquired while in-utero i.e. as a result of chorioamnionitis or traversing the birth canal.
Contaminant	To call *E. coli* a contaminant it must conform to the definition below: Blood culture obtained from a patient with no clinical signs of infection and is not prescribed an antibiotic which is active against *E. coli*. Or Has signs and symptoms of infection with or without objective markers for infection AND is treated by the clinical team for another pathogen. Or The surveillance team along with the clinical team agree *E. coli* is a contaminant.
Genital tract including prostate in males and the reproductive organs in females	Would include infections and abscess related to the reproductive organs including; ovaries, salpinx, uterus, cervical canal and vagina in females. In males the testis, epididymis and prostate.
Hepatobiliary system	Infections related to the liver, gallbladder, hepatic duct and bile duct.
Intra abdominal infection (other than HB system)	Infections related to the GI tract including presumed translocation in the context of ischaemic bowel, pancreas, gastroenteritis, diverticulitis and perforations of the oesophagus, stomach, small and large bowel.
Procedure related bacteraemia	Would include all *E. coli* bacteraemia related to an invasive procedure (i.e. post ERCP, post invasive radiological procedure, post cystoscopy) in the previous 48hr, but not related to a surgical procedure.
Related to IV illicit drug use	Would include any infection caused by IV illicit drug use such as injection site abscess, cellulitis and endocarditis.
Related to medical device other than VAD	Would include supra-pubic catheters, urethral catheters, PEG tubes, surgical drains, chest drains, nephrostomy tubes, tracheostomy tubes, epidural anaesthesia, peritoneal dialysis. NOTE: implanted devices such as vascular grafts, prosthetic joints, prosthetic valves, pacing wires and ventricular shunts infections may be classified under this group if arise sometime after the surgery. Alternatively, may be classified under surgical site infection if the infection occurred at time of surgery.

System involved or external factor	Specific infections (not exhaustive)
Renal tract infection	Structures related and including the kidney, ureter, bladder and urethra.
Respiratory infection	Lower and upper respiratory tract and associated structures.
Skeletal or joint infection	Would include septic arthritis, osteomyelitis, discitis and abscess/collections related to a bone or disc infection.
Skin & soft tissue infection	Includes pressure sores, chronic wounds necrotising fasciitis folliculitis, cellulitis, myositis and abscess within soft tissue.
Source not known	Source not known.
Surgical site infection	Infections resulting from or the result of surgery. Can be superficial, deep or organ/space related. See definitions for SSI surveillance. This would include dental extraction.
Vascular access device	Would include PVC, CVC, PICC, dialysis lines and dialysis fistulas.
Other	Any source by system that has not been specified already

Appendix 4: Voluntary risk factors for ECB

Risk factor	Qualification and examples	Time period
Urinary catheter inserted/removed	Includes intermittent self catheterisation	30 days prior to bacteraemia
Urinary catheter manipulated	Includes intermittent self catheterisation	30 days prior to bacteraemia
Duration of urinary catheter	Only available for completion if 'yes' is selected for 'Urinary catheter inserted in last 30 days prior' or 'Urinary catheter removed in last 30 days prior' or 'Urinary catheter manipulated 30 days prior'.	-
Reason for urinary catheter insertion	Only available for completion if 'yes' is selected for 'Urinary catheter inserted in last 30 days prior' or 'Urinary catheter removed in last 30 days prior' or 'Urinary catheter manipulated 30 days prior'.	-
Treatment for UTI	Patient has received medical care in 30 days prior to onset of bacteraemia with intention of treating a urinary tract infection.	30 days prior to bacteraemia
Prostate biopsy	Patient has received procedure in 30 days prior to bacteraemia	30 days prior to bacteraemia
Hepatobiliary procedure	Any procedure performed on hepatobiliary organs, such as Magnetic Resonance Cholangiopancreatography (MRCP) or Endoscopic Retrograde Cholangio-Pancreatography (ERCP).	30 days prior to bacteraemia
Type of hepatobiliary procedure	If 'yes' answered to 'Hepatobiliary procedure 30 days prior'	-
Prophylactic antibiotics given for hepatobiliary procedure	If 'yes' answered to 'Hepatobiliary procedure 30 days prior'	-

Appendix 5: Classification of SAB entrypoint

Infection prevention is interested in identifying the proven or probable entry point of the initial bacteraemia because if they can be prevented then the primary and secondary bacteraemia can be prevented.

Entry Point	Definition or comment
Contaminant	To call a SAB a contaminant it must conform to one of the definitions below after all other systems or external factors have been excluded: Blood culture taken from a patient with no clinical signs of infection and is not prescribed an antibiotic which is active against the *S. aureus.* Or Has signs and symptoms of infection with or without objective markers for infection AND is treated by the clinical team for another pathogen e.g. UTI with Gram negative bacillus. Or The surveillance team along with the clinical team agree the SAB is a contaminant.
Dental	Infection of the mouth, gums or teeth.
Device (A) to (E)	Vascular access devices.
Devices (F) to (M)	Medical devices other than VAD. Invasive ventilation includes endotracheal and tracheostomy tubes. NOTE: implanted devices cannot be entered as an SAB entry point only as a deep-seated/metastatic infection. Infections associated with implanted devices will be due to metastatic spread or SSI.
Device (N)	Other: please specify (free text box) in Device Risk Factors
ENT	Infections of the ear, nose or throat.
Injection site related to illicit drug use	Includes any infection caused by illicit IV or IM drug use at the injection site e.g. abscess, cellulitis, thrombophlebitis.
Nephrostomy	Tube, stent or catheter inserted into kidney through the skin.
Respiratory infection	Infection in the lower and upper respiratory tract and associated structures.
Skin & soft tissue (A) to (H)	Includes infections of skin, subcutaneous tissue, fascia and muscle.
Skin & soft tissue (I)	Other: please specify (free text box) in Skin Risk Factors
Surgical site infection	Infections resulting from or the result of surgery. Can be superficial, deep or organ/space related. See definitions for SSI surveillance. This would include dental extraction.
Urinary tract infection	Infection of the bladder or urethra. If “Device (J) Urinary Catheter” is selected as risk factor then UTI entry point must be amended to Device (J) Urinary Catheter, since UTI would be Catheter Associated UTI (CAUTI).

Entry Point	Definition or comment
Other: see specify	Free text box.
Not known	

Appendix 6: Deep-seated/metastatic infection associated with SAB

Clinicians are interested in the source of the bacteraemia either superficial or deep because it influences the antibiotic regimen and length of treatment.

Deep-seated/metastatic infection type	Site of deep-seated/ metastatic infection	Specific infections (not exhaustive)
Cardiovascular	Endocarditis	Inflammation of the inner layer of the heart usually involving the heart valves.
	Myocarditis	Inflammation of the heart muscle.
	Pericarditis	Inflammation of the pericardium (fibrous sac surrounding the heart).
	Thrombophlebitis	Inflammation of the wall of a vein related to thrombosis.
Bone & Joint	Bursitis	Inflammation of one or more bursae of synovial fluid in the body.
	Discitis	Inflammation of the invertebral disc space
	Osteomyelitis	Inflammation of bone or bone marrow.
	Septic arthritis	Infection of a joint that causes arthritis.
Implanted device - infection of these devices within 30 days of the implant surgery are likely to have occurred at the time of surgery and therefore recorded under the SSI entry point.	Prosthetic valve Pacemaker	Infection of subcutaneous pocket or pacemaker lead.
	Prosthetic joint	Infection at the site of prosthetic joint.
	Prosthetic valve	Infection at the site of prosthetic valve.
	Vascular graft	Infection at a site of graft, patch, stent, etc.
Deep abscess(es)/ haematoma	Central nervous system infection	Infections related to the meninges, subdural or extradural, and involving the spinal column.
	Genitourinary infection system	Infections and deep abscesses in reproductive and urinary system organs, including kidneys.
	Hepatobiliary infection system	Infections related to the liver, gallbladder, hepatic duct and bile duct.

Deep-seated/metastatic infection type	Site of deep-seated/ metastatic infection	Specific infections (not exhaustive)
Deep abscess(es)/ haematoma	Intra abdominal infection (other)	Infections related to organs within the abdomen, excluding the hepatobiliary system. This would include the stomach, pancreas and small and large intestines (excluding the kidneys).
	Lung abscess	Collection of pus in/around one or both lungs.
	Mediastinitis	Inflammation of the tissues in the mid-chest, or mediastinum.
Multiple site of metastatic infection	Multiple site of metastatic infection	More than one deep-seated/ metastatic infection – please record sites in comments section.
Not known	Not known	Site not known.
None	None	No evidence of deep-seated/ metastatic infection.
Other: see comments	Other: see comments	Any infection source that has not been specified already.

Appendix 7: Risk factors for SAB

These include likely entry points for a *S. aureus* bacterium which could give rise to a localised infection which may go on to result in a *S. aureus* bacteraemia, plus risk factors in the patient which make a localised infection more likely to result in haematogenous spread.

Risk factor	Qualification and examples	Time period
Indwelling vascular access devices (VAD)	Device (A) Arterial Line Device (B) PVC Device (C1) CVC non-tunnelled Device (C2) CVC tunnelled Device (D1) Dialysis line – non-tunnelled Device (D2) Dialysis line – tunnelled Device (D3) Dialysis line – fistula Device (E) PICC/Midline	In the 30 days prior to the date the positive blood culture was taken.
Indwelling medical device other than VAD	Device (F) Invasive ventilation Device (G) CAPD Device (H) Surgical drain Device (I) Chest drain Device (J) Urinary catheter Device (K) Suprapubic catheter Device (L) PEG Device (M) External shunt	In the 30 days prior to the date the positive blood culture was taken.
Other Devices	Device (N) Other: please specify	In the 30 days prior to the date the positive blood culture was taken.
Skin & soft tissue: Infections of skin but does not include deep seated/metastatic skin & soft tissue infection.	Skin & soft tissue (A) Abscess Skin & soft tissue (B) Cellulitis Skin & soft tissue (C) Pressure ulcer Skin & soft tissue (D) Skin break Skin & soft tissue (E) e.g. Eczema Skin & soft tissue (F) Necrotising fasciitis Skin & soft tissue (G) Ulcer Skin & soft tissue (H) Burns Skin & soft tissue (I) Other: please specify	At the time the positive blood culture was taken.
Other risk factor (A): Medical/surgical instrumentation	Interventions which require breaking the skin such as muscle or bone biopsy, or endoscopic procedure where a biopsy was taken i.e. prostate biopsy, dental extraction.	In the 30 days prior to the date the positive blood culture was taken.

Risk factor	Qualification and examples	Time period
Other risk factor (B): Previous hospital admission	Overnight stay in hospital.	In the 30 days prior to the positive blood culture being taken.
Other risk factor (C): Diabetes mellitus		At the time the positive blood culture was taken.
Other risk factor (D): IM, IV, subcutaneous intra-articular medication, or venepuncture	i.e. insulin, dalteparin, steroid injections into joints, vaccination.	In the 30 days prior to the date the positive blood culture was taken.
Other risk factor (E): Immunosuppressed	This would include medical conditions such a HIV and haematological malignancy, but also drug induced immunosuppression by azathioprine, ciclosporin, leflunomide methotrexate, cyclophosphomide, prednisolone or immunosuppressive chemotherapy **TNFα inhibitors:** (Analimumab, etanercet, infliximab, certolizumab, golimumab) Cytockine modulators: (Anakinra, Tocilizumab) **B-cell inhibitors:** (Belimumab) **T-cell inhibitors:** (Abatacept).	At the time the positive blood culture was taken.
Other risk factor (F): Related to IV illicit drug use	Includes Intra muscular (IM) illicit drug use	
Other risk factor (G): Patient admitted from care home/institutional facility/other hospital	Would include nursing homes, care homes, prisons, residential homes, military barracks, transfers from peripheral hospital.	Immediately prior to hospital admission when the *S. aureus* bacteraemia occurred.
Other risk factor (H): Non healthcare cosmetic procedure breaking skin or mucous membrane	Includes, but not exclusively: skin piercing, tattoos and botox injections.	In the 30 days prior to the positive blood culture being taken.
Other risk factor (I) Implanted devices (risk for deep focus/ metastatic spread)	Includes, devices such as vascular grafts, prosthetic joints, prosthetic valves, pacing wires, ventricular shunts and pacemakers.	In place at the time the positive blood culture was taken.