Enhanced *S. aureus* Bacteraemia Surveillance Protocol

April 2016, Version 1.0

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SAB SURVEILLANCE DATA DEFINITIONS

Data item (Q1): Health Board
Response required: Essential
Definition:
Choices: AA, BR, DG, FF, FV, GR, GGC, HG, LN, LO, NWTC, OR, SH, TY, WI, Non NHS Scotland
Rationale: To allow data to be searched by Health Board
Comments: Enforce integrity with drop down list in ECOSS Enhanced Surveillance Web Tool

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Data item (Q2): CHI number. If not available then date of birth required (record as DDMMYY with no dot or slash)
Response required: Essential
Definition:
Choices:
Rationale: Part of unique record
Comments: Obtained from LIMS or Patient Administration System (PAS)

Data item (Q3): Forename
Response required: Essential
Definition:
Choices:
Rationale: Part of unique record
Comments: Obtained from Laboratory Information Management System (LIMS)

Data item (Q4): Surname
Response required: Essential
Definition:
Choices:
Rationale: Part of unique record
Comments: Useful to filter records using surname
Obtained from Laboratory Information Management System (LIMS)

Data item (Q5): Gender
Response required: Essential
Definition:
Choices: Male, Female
Rationale:
Comments: Obtained from LIMS
Enforce integrity with drop down list in ECOSS Enhanced Surveillance Web Tool

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Data item (Q6): Post code
Response required: Desirable
Definition:
Choices: Multiple
Rationale: Part of unique record
Comments: Obtained from Laboratory Information Management System (LIMS) or Patient Administration System (PAS)

Data item (Q7): Date of admission to hospital during SAB episode
Response required: Essential
Definition:

Choices:
Rationale: Required to identify origin of SAB
Comments: Obtained from Patient Administration System

Data item (Q8): Ward where positive blood culture aspirated
Response required: Optional (for local use only)
Definition:
Choices: Health Board specific
Rationale:
Comments: Individual Infection Prevention & Control Teams will need to identify wards in their Health Board

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Data item (Q9): Hospital where positive blood culture aspirated
Response required: Essential
Definition:
Choices: Health Board specific
Rationale:
Comments: Enforce integrity with drop down list in ECOSS Enhanced Surveillance Web Tool

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Data item (Q10): Date blood culture aspirated
Response required: Essential
Definition:
Choices:
Rationale: Required to identify origin of SAB
Comments: Obtain from LIMS. If not available use date of receipt into specimen reception

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Data item (Q11): Specimen number from first isolate
Response required: Essential
Definition: Specimen number isolate sent to reference laboratory
Choices:
Rationale: Required for cross checking with EARSS
Comments: Obtained from LIMS

Data item (Q12): *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 or MRSA
Rationale:
Comments: Obtained from LIMS

Data item (Q13): Clinical specialty where positive blood culture aspirated
Response required: Essential to collect the risk of care received within the speciality.
Definition: Required to access risk of treatment in speciality location.
Choices: Multiple (see appendix 1)
Rationale: Useful to filter records by specialty
Comments: Enforce integrity with drop down list in ECOSS Enhanced Surveillance Web Tool

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Data item (Q14): Origin of infection
Response required: Essential
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

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:

1. Was hospitalised overnight in the 30 days prior to the positive blood culture being taken.
   OR
2. Resides in a nursing, long term care facility or residential home.
   OR
3. IV, or intra-articular medication in the 30 days prior to the positive blood culture being taken, but **excluding IV illicit drug use.**
   OR
4. Regular user of a registered medical device e.g. intermittent self-catheterisation, home CPD or PEG tube with or without the direct involvement of a healthcare worker (excludes haemodialysis lines see HAI).
   OR
5. 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
6. 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 SAB 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: Enforce integrity with drop down list in ECOSS Enhanced Surveillance Web Tool

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Data item (Q14a): Hospital bacteraemia attributed to if different from Q9
Response required: Optional
Definition: Positive blood culture MUST be obtained within 48 hours of transfer to the new hospital
Choices: Hospital code
Rationale: Option available for HAI bacteraemias only
Comments: Enforce integrity with drop down list in ECOSS Enhanced Surveillance Web Tool

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Data item (Q14b): Clinical specialty bacteraemia attributed to if different from Q13
Response required: Optional
Definition: Positive blood culture MUST be obtained within 48 hours of transfer to the different speciality

Choices: Multiple (see appendix 1)
Rationale: Local surveillance team have evidence to suggest the SAB is the result of practice in another specialty
Comments: Enforce integrity with drop down list in ECOSS Enhanced Surveillance Web Tool

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Data item (Q15): SAB entry point
Response required: Essential
Definition:
Choices: Multiple (see appendix 2)
Rationale: Identifies the proven or probable entry point of *S. aureus* into the blood stream and can be used to target interventions.
Comments: Enforce integrity with drop down list in ECOSS Enhanced Surveillance Web Tool

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Data item (Q16): Deep-seated/metastatic infection
Response required: Essential
Definition:
Choices: Multiple (see appendix 3)
Rationale: Useful for the clinical management of a patient and can be linked to patient outcome data.
Comments: Enforce integrity with drop down list in ECOSS Enhanced Surveillance Web Tool

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Data item (Q17): 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 4)
Rationale: May identify practices where interventions can be targeted to reduce SAB
Comments:

Data item (Q18): 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 4)
Rationale: May identify practices where interventions can be targeted to reduce SAB
Comments:

Data item (Q19):	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 4)
Rationale:	May identify practices where interventions can be targeted to reduce SAB
Comments:	

Data item (Q20):	Comments
Response required:	Optional
Definition:	
Choices:	Variable and patient specific
Rationale:	
Comments:	Can be used to provide additional information or qualifying information. In addition can be used to specify when multiple sites of metastatic infection has been picked in Q16 “Deep-seated metastatic infection”

METHODS

Process for information capture

Each Infection Prevention & Control Team (IP&CT) in each Health Board is responsible for capturing the data required by the Enhanced SAB Surveillance in the Enhanced Surveillance Tool within ECOSS (www.ecoss.scot.nhs.uk). HPS have provided a data collection form for Enhanced SAB surveillance which can be used by IP&CTs to collect data. However the data will need to be transcribed in to the Enhanced Surveillance tool for electronic submission to HPS.

Table 1 Deadlines for completion of Enhanced SAB data on ECOSS

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

Please refer to the ECOSS ESAB Enhanced Surveillance Health Board User Guide for details of data collection and input via the web tool from April 2016 onwards.

Case Validation:
To ensure data quality, validation rules have been built in to the ESAB 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.

Please see Appendix 5 for details of the temporary process for parallel testing between April and June 2016.

REFERENCES

1. Friedman ND, Kaye KS, Stout JE, McGarry SA, Trivette SL, Briggs JP *et al.* Health Care-Associated Bloodstream Infections in Adults: A Reason To Change the Accepted Definition of Community-Acquired Infections. Ann Intern Med. 2002; 137: 791-797

APPENDIX 1 - Systematic classification of clinical specialties for enhanced *S. aureus* bacteraemia surveillance

The measure of speciality risk is for the care received by the patient in the ward where the positive blood culture is aspirated

Specialty	Sub-specialties within specialty classification
Accident & Emergency	
Cardiology	
Cardio-thoracic surgery	
Care of the elderly	As defined by local health board
Ear, nose & 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* taken in a community setting by healthcare worker i.e. GP surgery or patients home or OPAT service
Infectious Disease	
Intensive Care	
Maxillofacial surgery	
Medicine	Including: General medicine, Acute medicine, Respiratory medicine, Dermatology, Palliative care, Medical High Dependency Unit, Stroke, Gastroenterology, Neuromedicine
Mental health	
Neonatology	Including: SCBU, neonatal ICU
Neurosurgery	Including spinal surgery
Oncology	
Obstetrics & Gynaecology	
Orthopaedic surgery	
Ophthalmology	
Paediatrics	
Plastic surgery	Including burns units
Rehabilitation medicine	
Renal medicine	
Transplant surgery	
Urology	
Vascular surgery	

APPENDIX 2 - Classification of SAB entry point

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** bacteraemias can be prevented.

Entry Point	Definition or comment
Contaminant	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)
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).
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.

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

APPENDIX 3 – Deep-seated/metastatic infection

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

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	
Discitis	Inflammation of the invertebral disc space.
Bursitis	Inflammation of one or more barsae of synovial fluid in the body.
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	Infection at the site of prosthetic valve.
Pacemaker	Infection of subcutaneous pocket or pacemaker lead.
Vascular graft	Infection at a site of graft, patch, stent, etc.
Prosthetic joint	Infection at the site of prosthetic joint.
e.g. Deep abscess(es)/haematoma	
Central nervous system infection	Infections related to the meninges, subdural or extradural, and involving the spinal column.
Genitourinary infection	Infections and deep abscesses in reproductive and urinary system organs, including kidneys.
Hepatobiliary infection	Infections related to the liver, gallbladder, hepatic duct and bile duct.
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	More than one deep-seated/metastatic infection – please record sites in comments section.
Not known	Site not known.

Site of deep-seated/metastatic infection	Specific infections (not exhaustive)
None	No evidence of deep-seated/metastatic infection.
Other: see comments	Any infection source that has not been specified already.

APPENDIX 4 - Risk factors for *S. aureus* bacteraemia

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 device (VAD)	Includes: non-tunnelled CVC, tunnelled CVC, dialysis lines, PICC lines, PVCs & fistulas.	In the 30 days prior to the date the positive blood culture was taken.
Indwelling medical device other than VAD	Includes, but not exclusively: chest drains, surgical drains, tracheostomy, epidural anaesthetic devices, spinal anaesthetic devices, nephrostomy, urethral catheter, suprapubic catheter, self catheterisation, PEG tubes.	In the 30 days prior to the date the positive blood culture was taken.
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.
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.
IM, IV, sub cutaneus 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.
Related to IV illicit drug use	Includes IM illicit drug use	
Diabetes mellitus		At the time the positive blood culture was taken.
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:**	At the time the positive blood culture was taken.

Risk factor	Qualification and examples	Time period
	(Anakinra, Tocilizumab) **B-cell inhibitors:** (Belimumab) **T-cell inhibitors:** (Abatacept).	
Skin & soft tissue	Includes, but not exclusively: infections of skin (pressure sores, trauma, ulcers, cuts, grazes, surgical incisions, burns and eczema), subcutaneous tissue, fascia and muscle. Does **not** include deep-seated/metastatic soft tissue infection.	At the time the positive blood culture was taken.
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.
Previous hospital admission	Overnight stay in hospital.	In the 30 days prior to the positive blood culture being taken.
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.

APPENDIX 5 - Parallel testing process (April – June 2016)

In addition to completion of the Enhanced Data on the web tool, for the first quarter (Q2 April – June), each Infection Prevention & Control Team (IP&CT) in each Health Board is also responsible for capturing the data required by the Enhanced SAB Surveillance in the Microsoft® Excel spreadsheet provided.

The completed spreadsheet should be sent to HPS in a quarterly basis as detailed in Table 1.

Table 2 Submission dates for electronic transfer of data to HPS

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

The Microsoft® Excel spreadsheet must be filled out and sent by email to HPS to the secure email address NSS.HPSSAB@nhs.net by the deadlines outlined in Table 1. The email should be headed "For the attention of SSHAIP surveillance team" The sender MUST ensure their email address is secure to maintain data protection. Accounts ending in nhs.net are secure and can be used.

Method for local data collector/data in-putter

The data MUST be entered into the Microsoft® Excel spreadsheet provided. To enforce integrity some columns have limited options available from a drop down menu or validation to prevent invalid data being entered into the cells. DO NOT COPY AND PASTE ANY DATA INTO THE SPREADSHEET.
Information below explains and details the requirement for each column.

Q1. Column A
Enter the Health Board where the blood culture was taken from the drop down menu.

AA	Ayrshire & Arran
BR	Borders
DG	Dumfries & Galloway
GGC	Greater Glasgow & Clyde
FF	Fife
FV	Forth Valley
GR	Grampian
HG	Highland
LO	Lothian
LN	Lanarkshire
NWTC	National Waiting Times Centre
OR	Orkney
SH	Shetland
TY	Tayside
WI	Western Isles

Non NHS Scotland

Q2. Column B
Enter the individual's CHI number in this column. If the CHI number is not available enter the six digit date of birth (DDMMYY).

Q3. Column C
Enter the individual's forename in this column.

Q4. Column D
Enter the individual's surname in this column.

Q5. Column E
Enter the gender of the individual in this column. There is a drop down menu.

Q6. Column F and G
Enter the first part of the individual's post code YYNN into Column F and the second part of the post code NNYY into Column G.

Q7. Column H
Enter date of admission to hospital during SAB episode DDMMYY.

Q8. Column I
An option to fill in the ward name where the blood sample was aspirated.

Q9. Column J
Enter the hospital where positive blood culture was aspirated. There is a drop down menu. The hospital drop down menu will not be shown unless Health Board (Column A) is entered.

Q10. Column K
Enter date of the first positive blood cultured aspirated (DDMMYY).

Q11. Column L
Enter specimen number from first positive blood culture.

Q12. Column M
There are only two options for this column (MSSA or MRSA) and they are available from the drop down menu.

Q13. Column N
Enter the clinical specialty where positive blood culture was aspirated. There is a drop down menu.

Q14. Column O
Enter origin of infection using drop down menu.

Q14a. Column P
Enter the hospital the bacteraemia attributed to if different from the hospital entered in Column J. There is a drop down menu listing all hospitals.

Q14b. Column Q
Enter the clinical specialty the bacteraemia was attributed to if different from the clinical specialty entered in Column N. There is a drop down menu.

Q15. Column R and S

In Column R enter the SAB entry point. There is a drop down menu. If the SAB entry point is not present on the drop down menu then use "Other" and record in Column S.

Q16. Column T and U

In Column T enter if a deep-seated/metastatic infection was present. There is a drop down menu. If there are multiple sites of infection then record as multiple and record the types under "Comments" column AA. If there is no evidence of deep-seated/metastatic infection then record as "None". If the Deep-seated/metastatic infection is not present on the drop down menu then use "Other" and record in Column U. Refer to Appendix 2 for guidance.

Q17. Column V and W

In Column V enter all the device risk factors from the menu in Row 2. This column does not have a drop down menu instead enter the letter codes (A to N) with a comma between each letter. If the device risk factor is not present in the list then use letter code "N" for "Other" and record in Column W. If no device risks factors have been inserted in the last 30 days record as O for None.

Q18. Column X and Y

Enter all the skin & soft tissue risk factors from the menu in Row 2. This column does not have a drop down menu instead enter the letter codes (A to I) with a comma between each. If the skin & soft tissue risk factor is not present in the list then use letter code "I" for "Other" and record in Column Y. If no skin & soft tissue risks factors present record as "J" for "None".

Q19. Column Z

Enter all the other recognised risk factors from the menu in Row 2. This column does not have a drop down menu instead enter the letter codes (A to I) with a comma between each letter. If no other risk factors present record as "J" for "None".

Q20. Column AA

This column is for free text comments which can be used to expand on the SAB episode. If "Multiple sites of metastatic infection" has been selected in column T provide more information here,