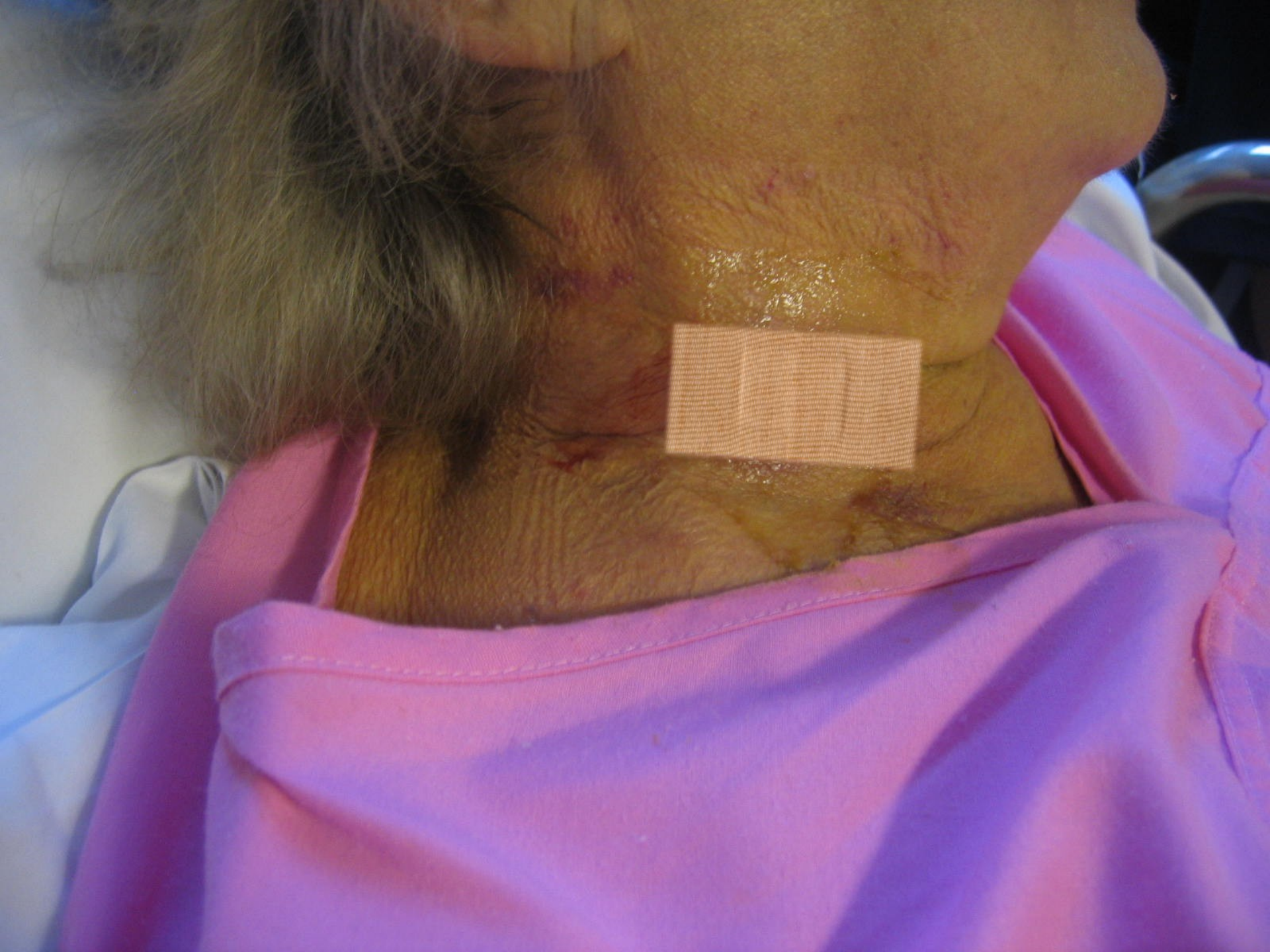
Public Health England

Protecting and improving the nation's health

The national Infection in Critical Care Quality Improvement Programme for England



CVC-blood stream infections

- Blood stream infections (BSIs) from central venous catheters (CVCs) increase morbidity, mortality and the costs of care
- Widely used in patients in ICUs
- Evidence suggests rates of CVC-BSIs are modifiable
- Michigan keystone project of 103 ICUs in the USA
  - March 2004 – September 2005
  - Study intervention targeting clinician's use of 5 evidence-based procedures & programme to improve safety culture
  - Mean rate of CVC-BSI decreased from 7.7 to 2.3 infections per 1,000 CVC-days
- In 2008, the NHS Next Stage Review announced that the National patient Safety Agency would run a national patient safety initiative to tackle CVC related BSI, using Michigan Keystone Project
- In 2009, Department of Health funded "*Matching Michigan*"

Matching Michigan

- England-wide study to reduce blood stream infections (BSIs) from central venous catheters (CVC)
- Three components:
  1. Technical interventions (evidence-based measures for reducing risk of CVC-BSIs)
  2. Non-technical interventions (behaviour change in culture and systems)
  3. Establishing standardised national reporting system for CVC-BSIs
- 2-year, 4-cluster, prospective stepped-wedge, interventional, non-randomised study in 196 adult and 19 paediatric ICUs
- RESULTS published in BMJQ&S 2012
- **Rates of CVC-BSIs declined from first quarter to last quarter of the study (adults: 3.7 to 1.48 CVC-BSIs/1,000 CVC-days)**

HOWEVER each cluster that joined study had similar pre-entry CVC-BSI rates to post-interventional rates of clusters already in study

AND pre-ICU CVC-BSIs declined at the same rate as ICU-acquired CVC-BSIs, indicating a system-wide phenomenon

Matching Michigan

- Ethnographic study of 17/196 adult ICUs in England that participated in *Matching Michigan (MM)* and 2 units that did not participate.
- *MM* not exact replica of original Michigan Keystone (MK) project
  - MM led by NPSA; KM led by healthcare professionals
  - Technical interventions in MM not fresh as they were in MK
    - Care bundles from Dept. of Health already in place
  - Organisation of studies differed significantly – including training days and follow-up of participating staff
- Infection Prevention & Control measures found to be good
- Use of non-technical interventions very variable between ICUs
- *MM* viewed as a top-down government-led initiative
  - may have prevented engagement – units where senior medical and nursing staff believed in programme and worked together, had greater impact than units whose senior staff did not.

ICCQIP: conception

Conclusions from MM:

- A permanent standardised national infection surveillance & reporting system in the ICU was needed
- Strong professional ownership required for sustainable success

- In 2011, a national collaboration of organisations representing adult, paediatric and neonatal intensive care medicine, microbiology and infections control was formed, under the aegis of Public Health England (PHE)

Infection in Critical Care Quality Improvement Programme (ICCQIP)

ICCQIP Participants

Professional organisations	Audit organisations	Government agencies
Faculty of Intensive Care Medicine	Intensive Care National Audit & Research Centre	Public Health England
Intensive Care Society		Department of Health
Scottish Intensive Care Society	Scottish Intensive Care Society Audit Group	Antimicrobial Resistance and Healthcare Associated Infection Committee
Welsh Intensive Care Society		NHS England
British Association of Critical Care Nurses		
Paediatric Intensive Care Society	PICANet	
British Association of Perinatal Medicine		
UK Neonatal Collaborative	National Neonatal Audit Programme	
National Neonatal Audit Programme		
Neonatal Data Analysis Unit		
Royal College of Paediatrics and Child Health	Neonatal Data Analysis Unit	
Infection Prevention Society		
Healthcare Infection Society		
Patient representative		
British Infection Association		

NDAU
Neonatal Data Analysis Unit

NHS Improvement

The Faculty of Intensive Care Medicine

BAOCN British Association of Critical Care Nurses

icnarc intensive care national audit & research centre

PICS Paediatric Intensive Care Society

Public Health England

HEALTHCARE INFECTION SOCIETY

ips Infection Prevention Society

BIAM British Infection Association

ICCQIP: establishment

- Develop voluntary web-based data capture system for ICUs in England.
- Data owned by ICUs, governance by PHE through a Board composed of representatives of professional organisations in adult, paediatric and neonatal intensive care, microbiology & infection control.
- Survey to launch ICCQIP, determine clinical engagement and priorities for the improvement programme (Dec 2012)
  - 763 respondents, 141/160 NHS Trusts in England, 7 in Wales, 4 in NI
    - 80% ICU clinicians
    - 8% nurses
    - 5% microbiologists

ICCQIP – survey results

- 94% supported establishing a surveillance programme
- How to find work of data collection?
  - 48% within existing resources
  - 33% additional funding required
- 80% favoured linkage to patient outcomes through existing NHS information systems
- CVC-associated infections & multi-resistant infections considered the highest priority
- Respondents wanted data on infection patterns and organisms, case-mix comparisons and benchmarking between ICUs and regions.
  - Also linkage to antimicrobial use and patient outcomes

Development of CVC-BSI surveillance tools

- In *MM* clinicians reported aggregate number of CVC-associated or CVC-related BSIs and selected the definition they had applied to their data
- For ICCQIP, respondents wanted patient-level data to be collected
  - allowing for the application of numerous internationally comparable definitions
  - removes any subjectivity
- In 2013 a paper-based pilot surveillance tool was designed
- In 2014 an online data capture system was developed

Development of CVC-BSI surveillance tools

- Pilot February-May 2015
- 6 Trusts entered data
- 80 bacteraemia episodes in 77 patients
  - 50% episodes were ICU-associated (occurring ≥ 2 days after ICU admission)
  - 43% (n=39/90) skin commensals
  - 14% (n=13/90) *E. coli*
  - 13% (n=10) polymicrobial (mixed culture growth), of 2 organisms
  - 41% episodes defined as BSIs
- Workload: Data entry for 30-bed ICU = 1.5 days/m including daily bed census
- Feedback sought from participating Trusts on how to improve the software
- Revised programme tested in sentinel surveillance programme

Sentinel surveillance scheme

- NHS Trusts received a letter from the ICCQIP Board inviting them to register interest in participating in sentinel surveillance scheme
- 58 units from 43 NHS Trusts registered their interest
  - Contacted January 2016 with formal invitation and asking for nominations for Local Administrator(s) for the Trust
  - 8 Trusts withdrew (2 due to lack of resources)
  - 28 completed Local Administrator training
- New online surveillance tool released April 2016
  - Surveillance protocol and user guides
  - Registration process for access to Data Collection System

Experience of large university hospital

- How to collect denominator data (CVC & patient days)?
- Consultant lead unable to repeat pilot without Trust support
- No obvious enthusiasm from nurses
- Trainee appointed to develop as a QI project
- Discovered that senior night nurses had been collecting CVC data since 2010 for MM project and continued to do so. No one could explain where the data was stored or whether it was analysed. When this was pointed out, nurses promptly stopped collecting data.
- Matron agreed that data collection could be restarted (in simplified form)
- Senior nurses refused ('It would be demotivating to start data collection again')
- Two months of discussion, followed by charm offensive produced reluctant agreement; two more months of patchy data collection
- Data collection now embedded as a routine

Sentinel scheme registration process

1. Trusts need to provide ICU name to be loaded onto system AND to nominate Local Administrator(s) to act as organisations manager for staff access to Data Collection System (DCS)
2. Local Administrators contacted with online link to training materials and their details and who nominated/authorised them as Local Administrators within the organisation
   - Copy sent to “authoriser” for confirmation
3. Once training completed, a link to the DCS is sent, to apply for online account
4. Email sent from the DCS to new user to verify user’s professional email address
5. PHE authorises account request of Local Administrators, providing access for the Trust
6. Data Entry users apply for accounts, Local Administrators for their Trust manage these account requests

Data collection: The Numerator (BSIs)

Patient/Specimen

1. Patient Information

NHS No. *

DoB *

Age: 0 ()

First name*

Surname*

Gender* Male Female

Hospital No.*

ICU Admission Date*

ICU Admission Time

Patient Postcode

2. Positive Blood Culture

Specimen Date*

Organism 1 *

Specimen Time

(time received in lab if time taken is not available)

Organism 2

Organism 3

Specimen No.*

Organism 4

Save

Clinical Symptoms

⚠ At least one sign or symptom or "Patient has no signs / symptoms" must be selected

Patient has no signs / symptoms

Adults (patients aged ≥ 13 years) | Paediatrics (Age > 28 days and < 13 years) | Neonates (<=28 days or patient of any age in neonatal ICU)

⚠ The selected patient group and the actual patient age do not match

Adults (patients aged ≥ 13 years)

- ☐ Fever > 38°C
- ☐ Chills/rigors
- ☐ Low SPB (systolic blood pressure)

Save

Repeat Positive Blood Culture

Was a repeat blood culture taken? * Yes | No | Taken, nothing cultured

Date taken

ICU Admission Date: 07/02/2017
First Specimen Date: 13/02/2017

Time Taken

(time received in lab if time taken is not available)

Organism 1

Organism 2

Organism 3

Organism 4

Save

Treatment

Did this positive blood culture require treatment with a course of antimicrobial therapy?

Yes | No | Don't know

Save

CVC Data

1. Was a CVC in situ for at least 2 days at the time the first blood culture was drawn? Yes | No

2. If no, was a CVC removed the day before the first blood culture was drawn? Yes | No

3. If the answer to either of the above is 'Yes', answer all of the following questions:

- Quantitative CVC culture >=10^3 CFU/ml or semi-quantitative CVC culture > 15CFU? Yes | No | N/A
- Quantitative blood culture ratio CVC blood sample/peripheral blood sample > 5? Yes | No | N/A
- Differential delay of positivity of blood culture drawn at same time (CVC sample positive >= 2 hours before PVC)? Yes | No | N/A
- Positive culture with same micro-organism from pus from insertion site? Yes | No | N/A
- Symptoms improve within 48 hours of removal of CVC? Yes | No | N/A

Save

Source of infection

1. Was there evidence of a secondary infection (excluding CVC) at another site?

Yes	No	No data available

2. If yes, what level is the evidence for the secondary infection? Please tick all that apply

- Microbiologically confirmed (same organism, different site) ☐
- Clinical syndrome ☐
- Radiological or other diagnostic procedure ☐

3. Which is the most likely site?

Pulmonary
Skin/soft tissue
Genito-urinary
Bone/joint
Digestive (inc liver)
Central Nervous System
Surgical Site Infection
Cardio-vascular system
Other

Save

Data collection: the denominator (Patient days and CVC days)

- To calculate infection rates, denominator data required
- 3 ways to do this:
  - Daily bed census
  - Daily unit census
  - Monthly summary

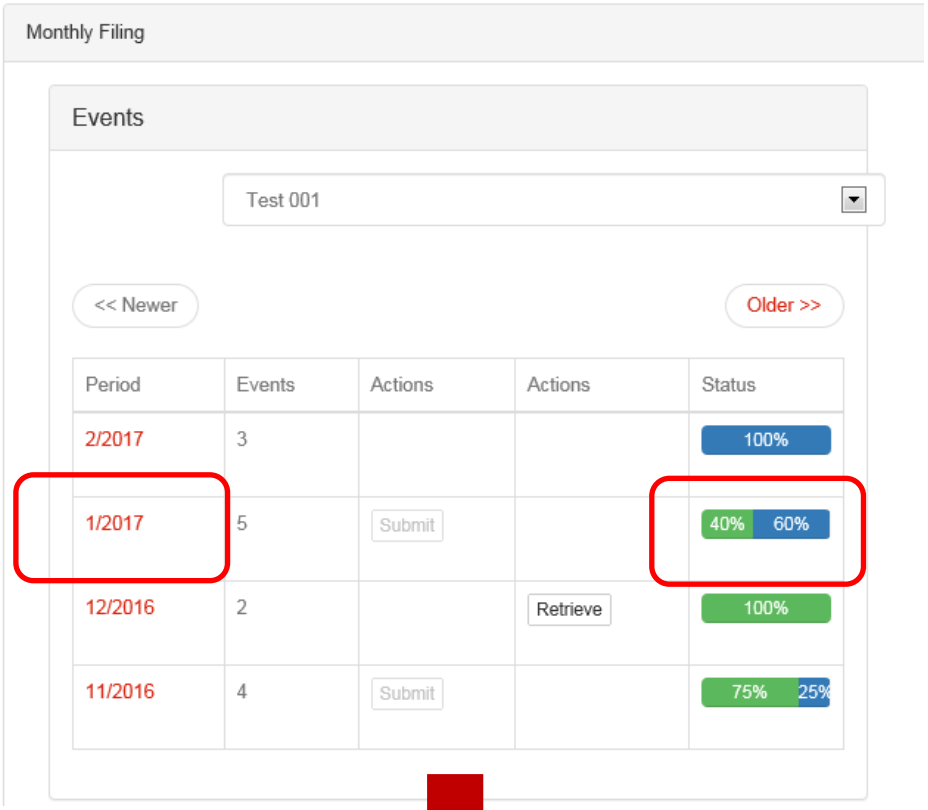
1. Total number of patients in the unit each night
2. Total number of patients in the unit each night, who had been there for more than 2 nights
3. Total number of patients in the unit each night, who had been there for more than 2 nights and had 1 or more CVC in place

- Data entered onto daily bed census automatically aggregated on DCS to populate the daily unit census
- Data from both the daily bed census and daily unit census can be aggregated by the DCS to populate the monthly summary
- Minimum requirement – that there are data in monthly summary (direct entry or via daily entry aggregation)

CVC- BSI Definitions

CVC-Associated BSI (surveillance definition)	
	a) One of the criteria for bloodstream infection
AND	b) The presence of one or more central venous catheters at the time of the positive blood culture, or CVC removed within 48 hrs before positive blood cultures
AND	c) The signs and symptoms, and the positive laboratory results, including pathogen cultured from the blood, are not primarily related to an infection at another site

CVC-Related BSI ('clinical' definition)	
	a) One of the criteria for bloodstream infection
AND	b) The presence of one or more CVCs at the time of the blood culture, or CVC removed within 48 hrs before positive blood cultures
AND	c) One of the following where the same culture was identified*: • quantitative CVC culture ≥10^3 CFU/ml or semi-quantitative CVC culture > 15 CFU • quantitative blood culture ratio CVC blood sample/peripheral blood sample > 5 • differential delay of positivity of blood cultures: CVC blood sample culture positive ≥ 2 hours before peripheral blood culture (blood samples drawn at the same time) • positive culture with the same micro-organism from pus from insertion site • symptoms improve within 48hr of removal of CVC



January 2017

ID	Date Entered	Unit	Specimen Date	Specimen No.	Surname	First Name	Gender	DoB	NHS No.	ICU Admission Date	Can Submit?
11816	20/01/2017	Test 001	16/01/2017	99999	Test	Test	F	17/05/1985	999-999-9999	15/01/2017	True
11819	20/01/2017	Test 001	16/01/2017	99999	Test	Test	F	17/05/1985	999-999-9999	15/01/2017	False
11809	19/01/2017	Test 001	04/01/2017	ddd	Test	Test	M	01/01/1900	999-999-9999	01/01/2017	False
11810	19/01/2017	Test 001	04/01/2017	hhh	Test	Test	M	01/01/1900	999-999-9999	01/01/2017	False
12933	14/02/2017	Test 001	03/01/2017	123456789	Test	RBC dates	M	02/10/2016	999-999-9999	01/01/2017	True

Sentinel BSI surveillance programme data capture system – Monthly filing

- We ask users to “file” both their denominator data and event (positive blood culture data) once the data entry for a month has been completed
- This lets the data managers and analysts at PHE know that the data entry for the unit for the month is completed
- A period cannot be filed until specific mandatory fields have been completed – so this also helps both users and PHE data managers with data quality and completeness
- Users can see which cases require action by using the date hyperlink in the filing screen

Periods which have been filed can be retrieved if data needs to be altered or cases need to be added/removed

LA: Local Administrator BSI: Blood Stream Infection

Help

Hyperlink to user guide

User Management

- Register New LA Account User Guide
- Manage Account Requests LA User Guide
- Manage User Accounts LA User Guide
- Register New Account User Guide
- Self Account Management User Guide
- Self Help User Guide
- Roles and Permissions User Guide

Report

- Line Listings Report User Guide
- Denominators Report User Guide

Case Capture

- Case Capture BSI Event User Guide
- Case Capture Denominators User Guide
- Submit or Retrieve Period User Guide
- Delete BSI User Guide
- Search User Guide

Dashboard

- Dashboard User Guide

Protocol and Quick Start Guide

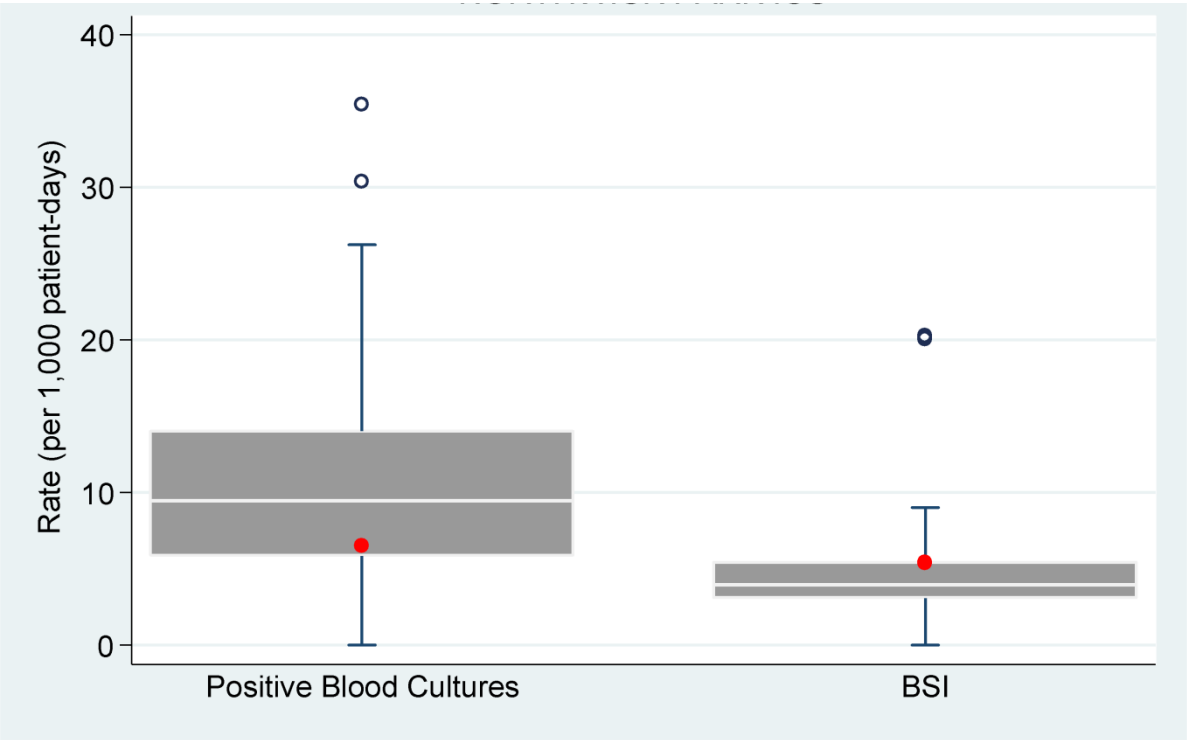
- Quick Start User Guide
- Surveillance of Blood Stream Infections in Patients Attending ICUs in England Protocol

Sentinel BSI surveillance Reporting Outputs

- Currently the DCS only provides the download or export of line listings for the positive blood cultures or the three denominator data collections
- There are no graphical or rates-based reports online at this time so PHE provide offline tailor-made reports to participating units, providing data from their unit and the overall data from units of the same type (adult, paediatric or neonatal)
  - Tabulated counts and rates of various metrics, i.e.:
    - Rate of BSI per 1,000 patient-days
    - Rate of BSI per 1,000 blood culture sets taken
    - Rate of ICU BSI per 1,000 patient days (restricted to patients in ICU >2 nights)
    - Rate of CVC-associated and CVC-related ICU-associated BSI per 1,000 CVC days (restricted to patients in ICU >2 nights)
    - CVC utilsation rate
    - Counts of positive blood cultures which are of skin commensals, mixed growth (polymicrobial), top 5 organisms

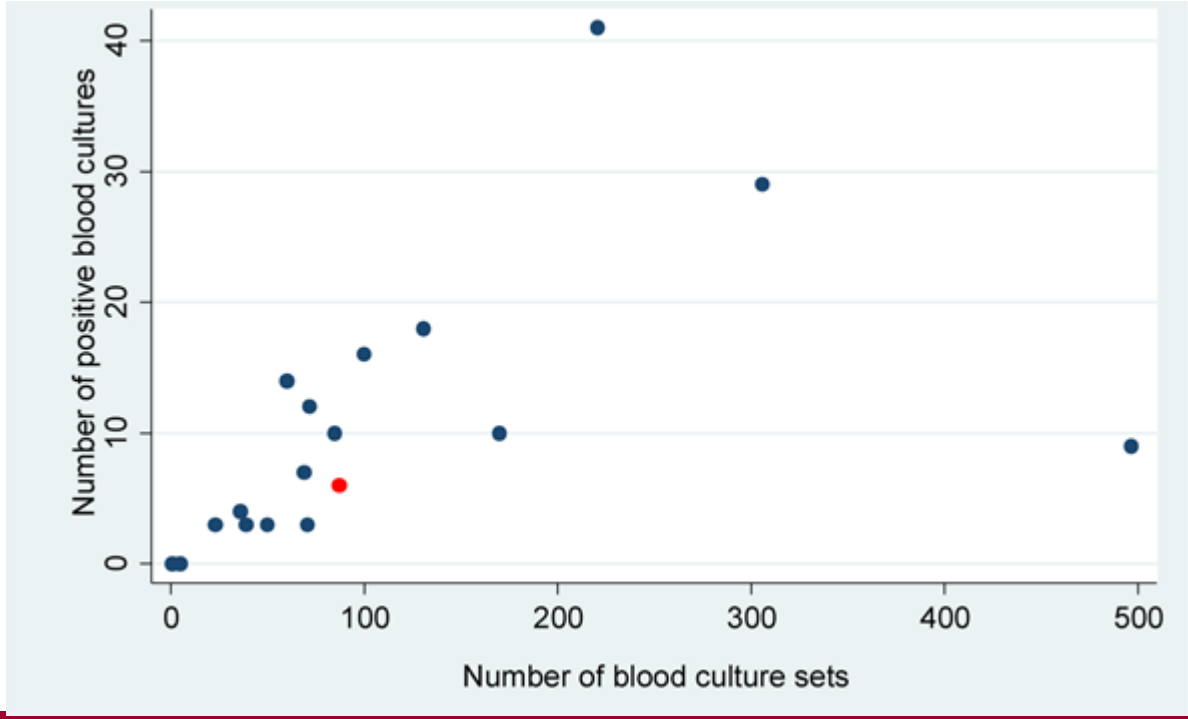
Sentinel BSI surveillance Reporting Outputs

- Graphical displays: box and whisker plots showing range of rate of positive blood culture and BSIs with the specific ICU highlighted (red dot)



Sentinel BSI surveillance Reporting Outputs

- Graphical displays: box and whisker plots showing range of rate of positive blood culture and BSIs with the specific ICU highlighted (red dot)
- Scatter plot of the number of blood culture sets taken per unit vs. number of positive blood cultures



Sentinel BSI surveillance programme
Results May-October 2016

- 25 Trusts entered data (37 units)
  - 29 adults
  - 6 paediatric
  - 2 neonatal
- 501 positive blood culture-episodes reported:
  - 431 adults, 44 paediatrics, 26 neonates
  - 48% Coag-Neg Staph
  - 10% *E. coli*
  - 6% *K. pneumoniae*
  - 9% polymicrobial infections: 553 organisms reported

Sentinel BSI surveillance programme
Results May-October 2016

- 51% met definitions for BSI (n=256/501 +ve blood cultures)
- 59% ICU-associated (n=152/256)
- 49% ICU-associated CVC-associated (n=74/152)
- 16% ICU-associated CVC-related (n=24/152)

Sentinel BSI surveillance programme
Results May-October 2016

	Adult CCUs	Paediatric CCUs	Neonatal CCUs
Total number of positive blood cultures*	400	44	26
Total number of patient days	33,394	6,998	6,982
Total number of blood culture sets taken	4,406	756	461
Rate of positive blood cultures per 1,000 patient days	12.0	6.3	3.7
Rate of positive blood cultures per 1,000 blood culture sets taken	90.8	58.2	56.4
Total number of BSIs*	214	15	3
Rate of BSI per 1,000 patient days	6.4	2.1	0.4

*Including only numerator data from units who provided denominator data

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Sentinel BSI surveillance programme

Results May-October 2016

	Adult CCUs	Paediatric CCUs	Neonatal CCUs
Number of ICU-associated BSIs*	121	8	2
Number of patient days, amongst patients in the ICU>2 days	23,042	2,125	6,036
Rate of ICU-associated BSI per 1,000 patient days	5.3	3.8	0.3
Number of CVC-associated ICU-associated BSIs*	62	2	1
Number of CVC days, amongst patients in the ICU>2 days	13,412	1,482	1,299
Rate of CVC-associated ICU-associated BSI per 1,000 ICU-CVC days	4.6	1.3	0.8
Number of CVC-related ICU-associated BSI*	20	2	1
Rate of CVC-related ICU-associated BSI per 1,000 ICU-CVC days	1.5	1.3	0.8
CVC utilisation	58.2	69.7	21.5

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Are we really that bad?

Personal anecdote – again!

Sentinel BSI surveillance programme – National roll-out

- In November 2016, letters were sent to all acute Trust CEOs from Professor Dame Sally C Davies (CMO) and Professor Paul Cosford CB, Director for Health Protection and Medical Director of PHE
  - Thank you to participating Trusts
  - Invitation to non-participating Trusts to sign up & submit data to the surveillance scheme
- Of 154 acute Trusts in England:
  - 103 have provided the unit names to be loaded onto the system (184 ICUs)
  - 64 have Local Administrators registered (127 ICUs)
  - 29 entering data (47 units)

AIM: to increase number of Trusts signed up to the system & entering data

Sentinel BSI surveillance programme – Feedback of scheme

- Survey to be sent out to participating Trusts for feedback on:
  - Ease of contributing to sentinel surveillance scheme
  - Value of surveillance sentinel scheme
  - Content of offline reports
- Survey to be sent to Trusts who registered interest but did not enter data
  - Blockers for participating in the sentinel surveillance scheme

National BSI surveillance programme – New Data Collection System

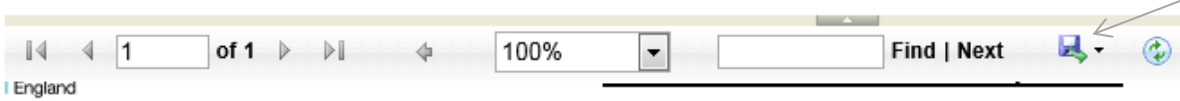
- Launch during FY
- New features:
  - Data upload wizard – allowing all data for a month to be batch uploaded for a specific unit
  - Live on-demand reporting features available
    - Tabular and graphic
    - Counts and rates
    - Device utilisation rates
    - Data can be stratified by a variety of user-selected parameters
    - Aggregate-level so can look at data from all units and also for sub-national and national groups
    - Exported as multiple different file types

Counts or Rates of Infection Episodes

Period From	01/01/2015	Period To	01/12/2015
Organisation Type	Public Health England (National)	Summarisation Type	Count
Region	NATIONAL	Output Type	Table
Organisation	PUBLIC HEALTH ENGLAND	Data Collection	MRSA
Patient Age From	0	Denominator	Not Applicable
Patient Age To	150	Denominator Period	Not Applicable
Frequency	Monthly	Signed Off	-All-
Entered After Sign-Off	-All-	Sector	NHS
Limit report to	-All-		

View Report

Filters to change data you want in report



Ability to export output as a .csv, Excel file, PowerPoint file or PDF

Region	**NATIONAL**	Data Collection	**MRSA**	Signed - Off	**-All-**
Organisation Type	**Public Health England (National)**	Period From	**01/01/2015**	Entered After Sign -Off	**-All-**
Organisation	**-All-**	Period To	**01/12/2015**	Limit report to	**-All-**
Denominator	**Not Applicable**	Patient Age From	**0**	Frequency	**Monthly**
Denominator Period	**Not Applicable**	Patient Age To	**150**	Summarisation Type	**Count**
Sector	**NHS**	Output Type	**Table**		

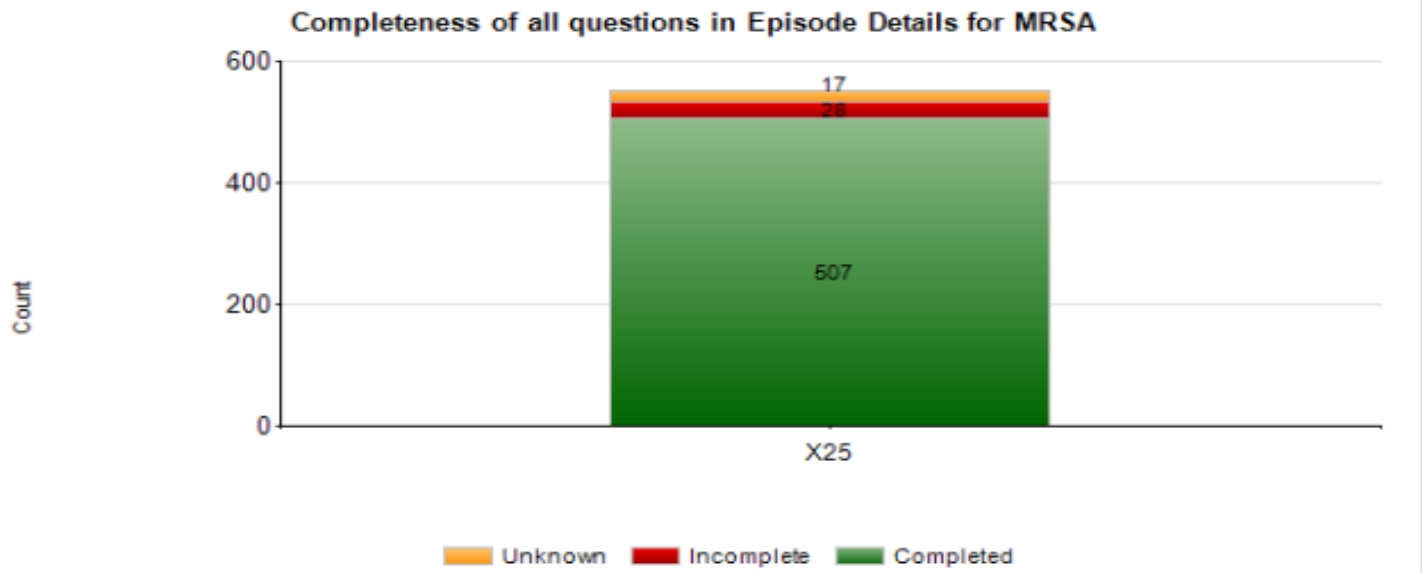
On-screen output with parameters selected as a header

Organisation Name	Code	Jan-2015	Feb-2015	Mar-2015	Apr-2015	May-2015	Jun-2015	Jul-2015	Aug-2015	Sep-2015	Oct-2015
PUBLIC HEALTH ENGLAND	X25	79	65	78	76	73	60	55	86	61	70
Total		**79**	**65**	**78**	**76**	**73**	**60**	**55**	**86**	**61**	**70**

Period From	01/02/2017	**Period To**	16/02/2017
Region	NATIONAL	**Summarisation Type**	Count
Organisation Type	Public Health England (National)	**Field Status**	-All-
Organisation	PUBLIC HEALTH ENGLAND	**Data Collection**	MRSA
Category	Episode Details	**Sector**	NHS
Field Listing	Episode Details-Reporting Organ		

1 of 1

Data Collection Field Completeness by Organisation



Organisation	Org Code	Total No. Episodes	Completed	Unknown	Incomplete
PUBLIC HEALTH ENGLAND	X25	21	507	17	28

National BSI surveillance programme – launch with new DCS

- This software has an inbuilt organisational hierarchy (e.g. ICU -> NHS Trust -> PHE Centre -> PHE Region -> PHE National)
- More roles available – Local Administrators, Data Entry, Report Only etc allowing for more flexibility about who can view the data and perform associated actions
- It has a security model based on both organisation and role
  - A user can only access data based on the organisation and the role(s) they are registered with
  - Data Entry roles will only be available for ICUs. Case-level data with PII, can only be viewed by users with PII roles who have rights to see data from that ICU (as per above, in the geographical hierarchy)
  - Cases will be mapped to CCGs, who commission the care of the patient and can be viewed this way too (e.g. Patient -> CCG -> NHS Local Office -> NHS England)

National BSI surveillance programme – launch with new DCS

- Sign-off will replace the monthly filing feature – user will be assigned a “sign-off” role. At the end of a month, data can be signed-off signalling data entry and quality check completion

- Contact Us directly through website

National BSI surveillance programme – launch with new DCS

- While there will be a new DCS for the collection of this data, the case capture questions will be the same
- Updated protocol and user guides to be produced for the launch of the new software
- Data collected during the sentinel surveillance will be migrated to the new software – data trends can be viewed by units

So it is worth signing up for sentinel programme as data will be migrated to new system - reports can then be run instantly

Linkage with other datasets

- Most existing critical care audits do not capture the relevant infection data for the ICU CVC-BSI surveillance
  - Hence need for standalone ICU DCS
- To reduce burden of data entry, limited data items collected via ICU DCS
  - Positive blood cultures & CVC use
  - Internationally-comparable definitions of BSIs & CVC-associated/related BSIs
  - Patient identifiers permitting linkage with other national datasets
- Case-mix adjustment of BSI rates: via eventual linkage of ICCQIP to existing critical care audits (ICNARC – adults, PICANET – paediatric cases, NDS – neonates, via NDAU and BadgerNet)
- Data on antimicrobial susceptibility via linkage with PHE's Second Generation Surveillance System (SGSS)

Linkage with neonatal critical care audit

- Comprehensive neonatal data audit in place (via BadgerNet software)
- Specific data on BSIs and CVCs, allowing for internationally comparable definitions to be applied, is missing
- Working with BadgerNet developers who have added required fields as an additional module of their data capture system
- Currently a small short-term trial of neonatal units entering data onto both ICCQIP ICU DCS and the neonatal data audit to assess completion and timeliness of data flow to PHE
- **Concept:** to have all data entry via BadgerNet. Data will then be uploaded by PHE to the new ICU DCS so neonatal units have access to on-demand reports and benchmarking facilities, but will not have to enter data into multiple systems

Case-mix adjusted rates on new ICU DCS

- **Concept:** Phase 2 of new ICU DCS build to include case-mix adjusted rates via linkage with existing critical care audits
  - To add new on-demand reports and benchmarking options.

- Likely ICCQIP will form working groups to look at interventions where data highlights any issues

Review requirements for further ICU surveillance

- Via professional engagement, determine if there is a demand for the ICCQIP ICU surveillance to be extended to other aspects
  - Urinary catheter associated infections
  - Ventilator associated pneumonia
- This would only occur if felt of value by intensivists
- Clinician-led

Conclusions

- Data for 1st 6 months shows:
  - High number/percentage of positive blood cultures which are skin commensals
    - Potential target for QI of methods of blood cultures?
    - Cannot assume all/majority are contaminates?
- Rate of ICU-associated CVC-BSI at end of *Matching Michigan* was 1.5 in adults and 2.9 in paediatric patients.
- In first 6 months, the sentinel surveillance shows ICU-associated CVC-associated BSI rates of 6.4 in adults and 2.1 among paediatric patients
  - Some differences in definitions, MM asked clinician to report number of infections based on a definition. ICCQIP surveillance scheme applies definitions to raw data – may impact rates
  - Primary goal of surveillance is to provide data for action
  - If rates have reverted, we need to re-introduce sustainable methods to reduce/abolish CVC-BSIs
  - Monitoring and benchmarking your ICU provides the foundation for optimising patient care

Contact information

If you have any questions about the surveillance protocol, or wish to sign up and start submitting data, send queries to:

ICCQIP.surveillance@phe.gov.uk

Acknowledgements

Thank you to all units participating in the sentinel surveillance scheme

Together we can reduce CVC-BSIs and antimicrobial resistant infections

Definitions: BSI by age range (1)

Adults (≥13 years)	Paediatrics (<13yrs)
Meets one of the following criteria:	***Meets one of the following criteria:***
a) A recognised pathogen from at least one blood culture	a) A recognised pathogen from at least one blood culture
OR	**OR**
a) A common skin microorganism* from 2 blood cultures drawn on separate occasions and taken within a 48hr period **AND** The patient has at least ONE symptom of fever >38^{o}C, chills or hypotension	a) A common skin microorganism* from 2 blood cultures drawn on separate occasions and taken within a 48hr period **AND** The patient has at least TWO symptoms of paediatric SIRS: tachycardia, bradycardia (<1yr), temperature >38.5^{o}C <36^{o}C, elevated respiratory rate, leukocytes (elevated/depressed for age), leukocyte count (if leucocyte is selected)

Definitions: BSI by age range (2)

Neonates (<28 days)
Meets one of the following criteria:
a) A recognised pathogen from at least one blood culture **OR** a) A common skin microorganism* is cultured from blood AND Patient has ONE of: C-reactive protein >2.0 mg/dL , immature/total neutrophil ratio (I/T ratio) >0.2 , leukocytes <5/nL , platelets <100/nL
AND
At least TWO of: temperature >38°C or <36.5°C or temperature instability, tachycardia or bradycardia Apnoea, extended recapillarisation time , metabolic acidosis, hyperglycaemia , other sign of BSI such as apathy

Definitions: CVC-associated BSI (CABSI)

Meets ALL of the following criteria:
a) One of the criteria for bloodstream infection
AND
(b) The presence of at least one central venous catheters at the time of the positive blood culture, **or** CVC removed within 48 hrs before positive blood cultures
AND
(c) The signs and symptoms, and the positive laboratory results, including pathogen cultured from the blood, are not primarily related to an infection at another site

Definitions: CVC-related BSI (CRBSI)

Meets ALL of the following criteria:
(a) One of the criteria for bloodstream infection
AND
(b) The presence of at least one central venous catheters at the time of the positive blood culture **or** CVC removed within 48 hrs before positive blood cultures
AND
(c) At least one of the following where the same culture was identified*: I) quantitative CVC culture 103 CFU/ml or semi-quantitative CVC culture > 15 CFU II) quantitative blood culture ratio CVC blood sample/peripheral blood sample> 5 III) differential delay of positivity of blood cultures: CVC blood sample culture positive 2 hours or more before peripheral blood culture (blood samples drawn at the same time) IV) positive culture with the same micro-organism from pus from insertion site V) symptoms improve within 48hr of removal of CVC