

**May 2016-April 2017**

**Counts and rates of positive blood cultures and blood stream infections which meet the case definition in your critical care unit and for all adult critical care units, May 2016-April 2017**

	Q 1 (May-July 2016)		Q 2 (August-October 2016)		Q 3 (November 2016-January 2017)		Q 4 (February-April 2017)	
	Your Unit	Adult CCUs <sup>§</sup>	Your Unit	Adult CCUs <sup>§</sup>	Your Unit	Adult CCUs <sup>§</sup>	Your Unit	Adult CCUs <sup>§</sup>
Total number of positive blood cultures		181		237		369		505
Total number of patient days		20,142		24,866		33,875		52,559
Total number of blood culture sets taken		2,127		2,935		5,033		6,506
Rate of positive blood cultures per 1,000 patient days		9		9.5		10.9		9.6
Rate of positive blood cultures per 1,000 blood culture sets taken		85.1		80.7		73.3		77.6
Total number of BSIs <sup>¥</sup>		86		139		230		269
Rate of BSI per 1,000 patient days		4.3		5.6		6.8		5.1

<sup>§</sup> 24, 30, 47, and 59 units provided full denominator and event data and are included in the total Adult CCU metrics in Q1, Q2, Q3 and Q4 respectively. Additional units provided only event data and so could not be included in the overall totals and overall rates.

<sup>¥</sup> see appendix for definitions

**Counts and rates of ICU-associated blood stream infections, CVC-associated ICU-associated BSI and CVC-related ICU-associated BSI in your critical care unit and all adult critical care units, May 2016-April 2017**

	Q 1 (May-July 2016)		Q 2 (August-October 2016)		Q 3 (November 2016-January 2017)		Q 4 (February-April 2017)	
	Your Unit	Adult CCUs <sup>§</sup>	Your Unit	Adult CCUs <sup>§</sup>	Your Unit	Adult CCUs <sup>§</sup>	Your Unit	Adult CCUs <sup>§</sup>
Number of ICU-associated BSIs <sup>‡</sup>		50		84		149		150
Number of patient days, amongst patients in the ICU>2 days		14,359		18,535		23,696		36,540
Rate of ICU-associated BSI per 1,000 patient days*		3.5		4.5		6.3		4.1
Number of CVC-associated ICU-associated BSIs <sup>‡</sup>		12		16		29		18
Number of CVC days, amongst patients in the ICU>2 days		9,194		12,719		15,025		21,694
Rate of CVC-associated ICU-associated BSI per 1,000 ICU-CVC days*		1.3		1.3		1.9		0.8
Number of CVC-related ICU-associated BSI <sup>‡</sup>		11		14		28		32
Rate of CVC-related ICU-associated BSI per 1,000 ICU- CVC days*		1.2		1.1		1.9		1.5
CVC utilisation*		64%		68.6%		63.4%		59.4%

<sup>§</sup>24, 30, 47, and 59 units provided full denominator and event data and are included in the total Adult CCU metrics in Q1, Q2, Q3 and Q4 respectively. Additional units provided only event data and so could not be included in the overall totals and overall rates.

<sup>‡</sup>see appendix for definitions

\*calculated from patients in the ICU >2 nights

Counts and percentages of species identified through positive blood cultures in your ICU and for all adult critical care units, May 2016-April 2017

	Q 1 (May-July 2016)				Q 2 (August-October 2016)				Q 3 (November 2016-January 2017)				Q 4 (February-April 2017)			
	Your Unit		Adult CCUs <sup>§</sup>		Your Unit		Adult CCUs <sup>§</sup>		Your Unit		Adult CCUs <sup>§</sup>		Your Unit		Adult CCUs <sup>§</sup>	
	No. of patients*	% of +ve BC**	No. of patients*	% of +ve BC**	No. of patients*	% of +ve BC**	No. of patients*	% of +ve BC**	No. of patients*	% of +ve BC**	No. of patients*	% of +ve BC**	No. of patients*	% of +ve BC**	No. of patients*	% of +ve BC**
Positive blood cultures			181	100.0			237	100.0			369	100.0			505	100.0
Recognised pathogens			86	47.5			136	57.4			222	60.2			263	52.1
Skin commensals			100	55.2			111	46.8			162	43.9			259	51.3
Skin commensals which meet the BSI case definition <sup>°</sup>			0				4	1.7			8	2.2			6	1.2
Polymicrobial infections			16	8.8			24	10.1			40	10.8			49	9.7
Coagulase negative Staphylococci			94	51.9			101	42.6			148	40.1			242	47.9
<i>C. albicans</i>			4	2.2			4	1.7			8	2.2			7	1.4
<i>E. cloacae</i>			2	1.1			6	2.5			12	3.3			12	2.4
<i>E. faecium</i>			15	8.3			5	2.1			31	8.4			22	4.4
<i>E. coli</i>			11	6.1			36	15.2			42	11.4			50	9.9
<i>K. pneumonia</i>			10	5.5			16	6.8			16	4.3			20	4.0
<i>P. aeruginosa</i>			8	4.4			9	3.8			14	3.8			15	3.0
<i>S. aureus</i>			6	3.3			4	1.7			27	7.3			46	9.1
Staphylococci other			3	1.7			9	3.8			17	4.6			26	5.1

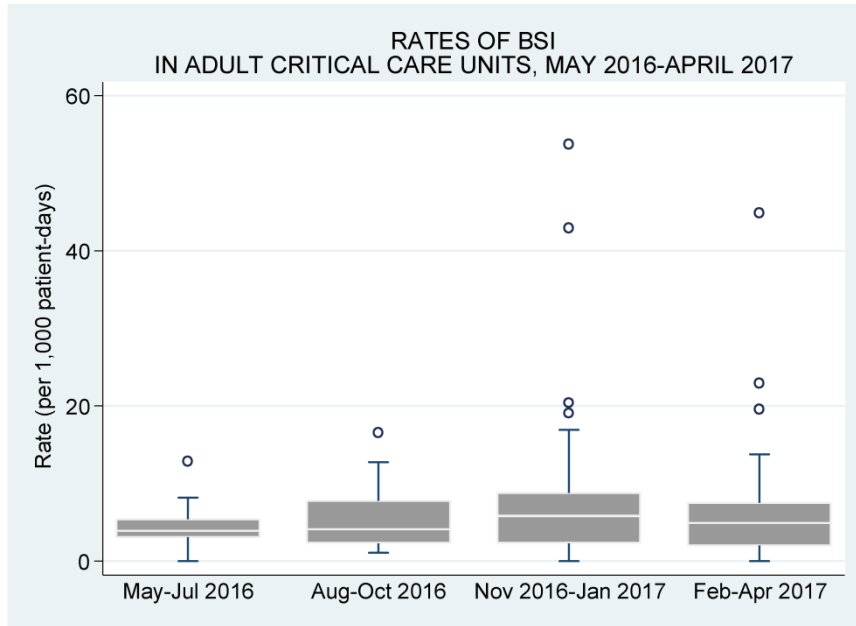
<sup>§</sup>24, 30, 47, and 59 units provided full denominator and event data and are included in the total Adult CCU metrics in Q1, Q2, Q3 and Q4 respectively. Additional units provided only event data and so could not be included in the overall totals and overall rates.

\*patients can have polymicrobial blood cultures, meaning that the sum of the types of positive blood culture may exceed the total number of patients.

\*\*positive blood cultures

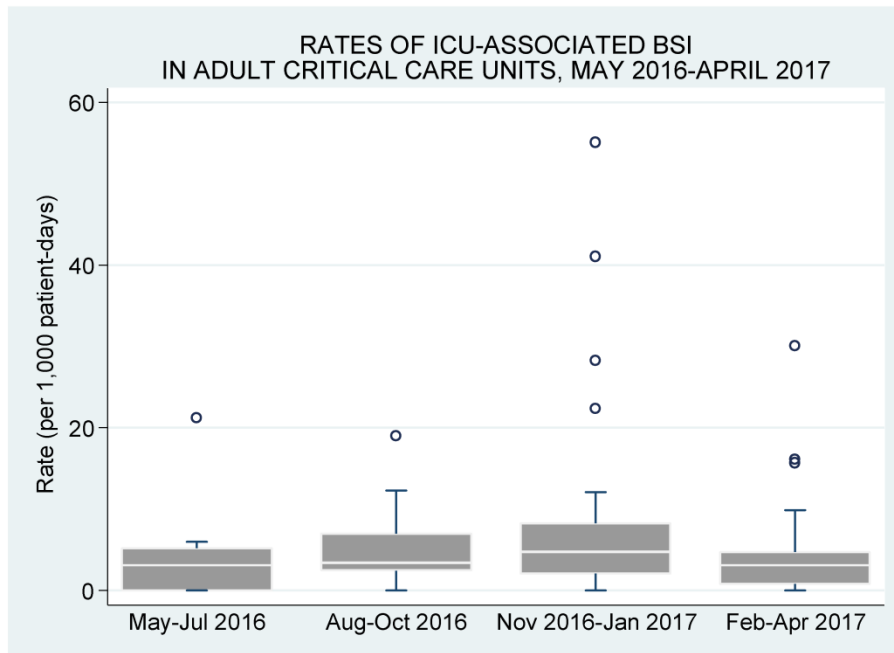
<sup>°</sup> See appendix for definitions

**Box and whisker plots of the rate of BSIs per 1,000 patient days in adult critical care units, May 2016 – April 2017**



The red dots on the box and whisker plots represent the rates for your unit. If the red dot is missing from any of the plots, it is because rates could not be calculated for your unit due to non-participation, missing data or zeros entered for denominators.

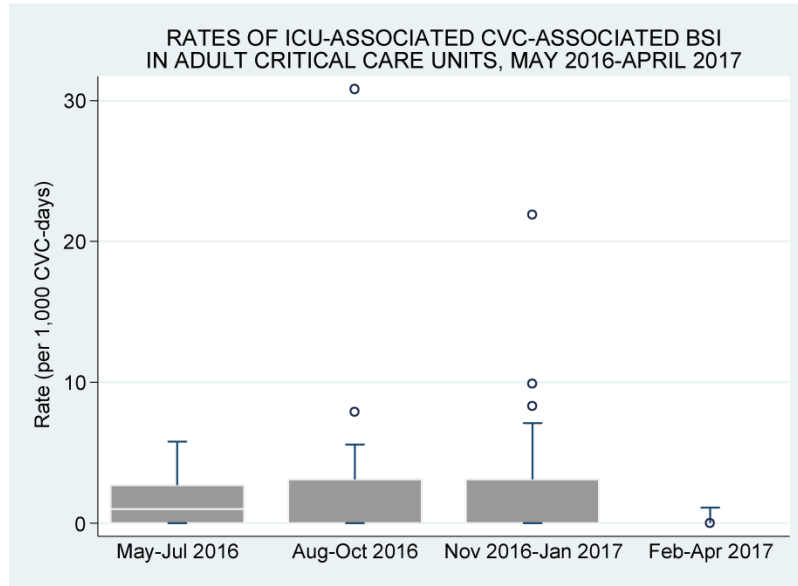
**Box and whisker plots of the rate of ICU-BSIs per 1,000 ICU patient days\* in adult critical care units, May 2016 – April 2017**



\*ICU-patient days calculated from patients in the ICU >2 nights.

The red dots on the box and whisker plots represent the rates for your unit. If the red dot is missing from any of the plots, it is because rates could not be calculated for your unit due to non-participation, missing data or zeros entered for denominators.

**Box and whisker plots of the rate of ICU-CABSI per 1,000 ICU CVC days\* in adult critical care units, May 2016 – April 2017**

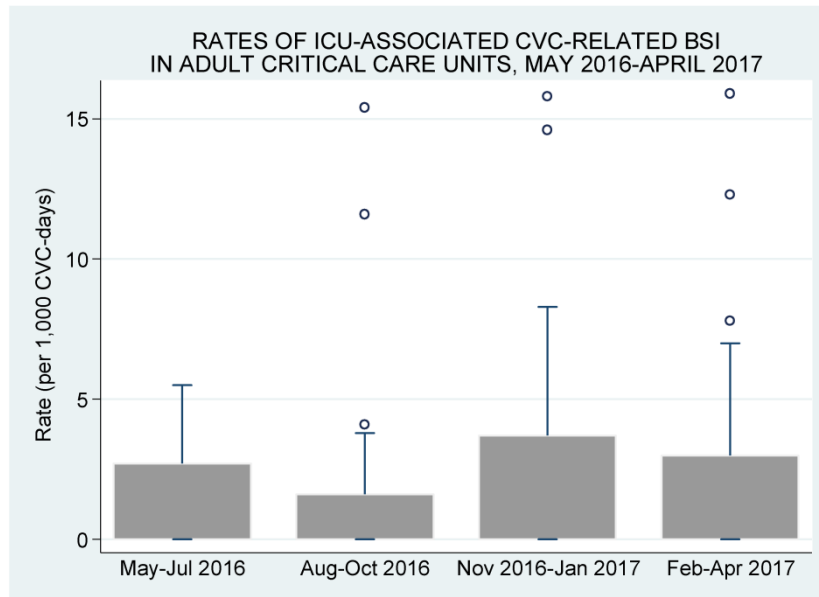


\*ICU-CVC days calculated from patients with at least 1 CVC in the ICU >2 nights.

The red dots on the box and whisker plots represent the rates for your unit. If the red dot is missing from any of the plots, it is because rates could not be calculated for your unit due to non-participation, missing data or zeros entered for denominators.

Please note, for quarter 4 (February-April 2017) the grey box is missing from the box and whisker plots as the median and interquartile range (25<sup>th</sup> and 75<sup>th</sup> percentile) values were all 0.

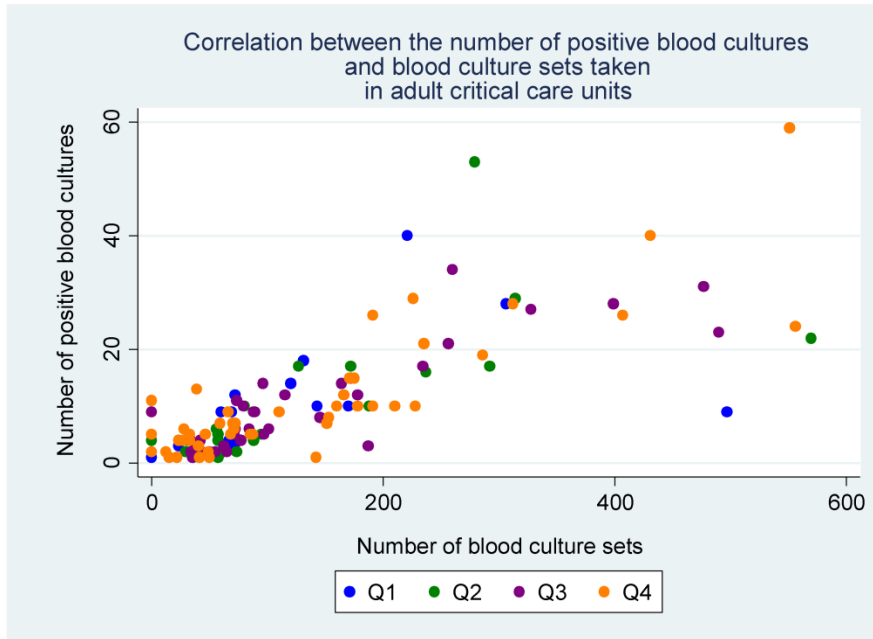
**Box and whisker plots of the rate of ICU-CRBSIs per 1,000 ICU CVC days\* in adult critical care units, May 2016 – April 2017**



\*ICU-CVC days calculated from patients with at least 1 CVC in the ICU >2 nights.

The red dots on the box and whisker plots represent the rates for your unit. If the red dot is missing from any of the plots, it is because rates could not be calculated for your unit due to non-participation, missing data or zeros entered for denominators.

**Correlation between the number of positive blood cultures and the number of blood culture sets in adult critical care units, May 2016-April 2017**



The red dots on the correlation plots represent the data for your unit. If the red dots are missing from the plot, it is because one of the data items used to create the plot was missing for your unit

## Appendix: Case Definitions

### 1. Blood stream infections (BSIs)

**Table A1: Criteria for case definitions for bloodstream infections in adults and paediatrics**

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

\*coagulase-negative *Staphylococci*, *Micrococcus* sp., *Propionibacterium acnes*, *Bacillus* sp., *Corynebacterium* sp. etc

‡The presence of at least TWO of the following four criteria (one of which must be abnormal temperature or leukocyte count):

- Tachycardia defined as a mean heart rate >2SD above normal for age in the absence of external stimulus, chronotropic drugs or painful stimuli
- For children <1 year old bradycardia defined as a mean heart rate <10th percentile for age in the absence of external vagal stimuli, beta blocker drugs or congenital heart disease
- Core temperature of >38.5 or <36 degrees Celsius
- Mean respiratory rate >2SD above normal for age or mechanical ventilation for an acute process not related to underlying neuromuscular disease or receipt of general anaesthesia
- Leukocyte count elevated or depressed for age (not secondary to chemotherapy induced leukopenia) or >10% immature neutrophils

**Table A2: Criteria for case definitions for bloodstream infections in neonates**

**Neonates (<28 days)**

*Meets one of the following criteria:*

- a) A recognised pathogen from at least one blood culture

**OR**

- b) 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



**Table A3: Criteria for Neonatal Data Analysis Unit Definition**

**Neonates (<28 days): Neonatal Data Analysis Unit Definition<sup>2</sup>**

Meets one of the following criteria:

- a) A single recognised pathogen from at least one blood culture

**OR**

- b) Growth of mixed organisms or skin commensals\*

**AND**

Three or more predefined clinical signs:

- Increase in apnoea or bradycardia
- Temperature instability
- Impaired peripheral perfusion (CRT > 3s pallor/mottling/core-peripheral temp gap >2°C)
- Metabolic acidosis/base deficit < -10mmol/L
- Lethargy/irritability/poor handling
- Increased oxygen requirement or ventilator support
- Ileus/onset of feed intolerance
- Fall in urine output
- Hypotension
- Glucose intolerance

\**Aerococcus Sp., Bacillus sp. other, Corynebacterium sp., Coagulase-negative staphylococci not specified, Coagulase-negative staphylococci other, Micrococcus sp., Propionibacterium sp., Staphylococcus Epidermidis, Staphylococcus Haemolyticus, Streptococcus (Viridans group)*

Lower values for heart rate, leukocyte count and systolic BP = 5<sup>th</sup> percentile; upper values for heart & respiratory rate, leukocyte count = 95<sup>th</sup> percentile

<sup>†</sup>NDAU Definitions for catheter association BSI accessed 15<sup>th</sup> April 2016:

[https://www1.imperial.ac.uk/resources/99F3B656-C321-4881-8E24-](https://www1.imperial.ac.uk/resources/99F3B656-C321-4881-8E24-EA1F4355B276/definitionforcabsiv3.pdf)

[EA1F4355B276/definitionforcabsiv3.pdf](https://www1.imperial.ac.uk/resources/99F3B656-C321-4881-8E24-EA1F4355B276/definitionforcabsiv3.pdf)

<sup>2</sup> NDAU Definitions for catheter association BSI accessed 15<sup>th</sup> April 2016:

<https://www1.imperial.ac.uk/resources/99F3B656-C321-4881-8E24-EA1F4355B276/definitionforcabsiv3.pdf>

## 2. Central catheter-bloodstream infection (CVC-BSI)

### a. Catheter-associated BSI (CABS I)

**Table A4: Criteria for defining catheter-associated BSI (CABS I)**

<i>Meets ALL of the following criteria:</i>	
a)	One of the criteria for bloodstream infection
<b>AND</b>	
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
<b>AND</b>	
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

### b. Catheter-related BSI (CRBSI)

**Table A5: Criteria for defining catheter-related BSI (CRBSI)**

<i>Meets ALL of the following criteria:</i>	
a)	One of the criteria for bloodstream infection
<b>AND</b>	
b)	The presence of at least one central venous catheters at the time of the positive blood culture <b>or</b> CVC removed within 48 hrs before positive blood cultures
<b>AND</b>	
c)	At least <u>one</u> of the following where the same culture was identified: <ul style="list-style-type: none"> <li>I) quantitative CVC culture <math>\geq 10^3</math> CFU/ml or semi-quantitative CVC culture &gt; 15 CFU</li> <li>II) quantitative blood culture ratio CVC blood sample/peripheral blood sample &gt; 5</li> <li>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)</li> <li>IV) positive culture with the same micro-organism from pus from insertion site</li> <li>V) symptoms improve within 48hr of removal of CVC</li> </ul>