

ESM Table 2. Monthly Infection and CVC Utilisation metrics For Adult (AICU) and Paediatric (PICU) ICUs

Year	2009									2010											TOTAL or MEAN	
Calendar Month	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec		
Cluster	1									+ 2 & 3				+ 4								
N° ICUs submitting infection data	AICUs	14	14	15	12	14	15	15	130	140	139	145	147	169	176	180	184	184	185	180	176	
	PICUs	4	4	4	4	4	4	4	14	14	14	16	15	19	18	18	18	19	18	17	17	
	Total	18	18	19	16	18	19	19	144	154	153	161	162	188	194	198	202	203	203	197	193	
N° pre-ICU-infections (CABSI + CRBSI)	AICUs	0	0	0	1	0	3	0	10	19	16	18	12	13	13	9	10	9	11	12	15	171
	PICUs	0	0	1	1	0	2	1	8	5	1	2	2	1	2	2	3	3	0	2	1	37
	Total	0	0	1	2	0	5	1	18	24	17	20	14	14	15	11	13	12	11	14	16	208
N° ICU-acquired infections (CABSI+CRBSI)	AICUs	9	10	5	4	4	8	5	73	93	50	51	52	47	48	52	62	34	47	53	54	761
	PICUs	2	1	3	0	3	0	1	10	6	7	11	9	16	3	6	12	9	7	5	12	123
	Total	11	11	8	4	7	8	6	83	99	57	62	61	63	51	58	74	43	54	58	66	884
% ICUs reporting zero infections (CABSI+CRBSI)	AICUs	64%	64%	80%	83%	79%	73%	67%	66%	60%	73%	75%	76%	78%	77%	81%	74%	83%	80%	79%	77%	
	PICUs	50%	75%	50%	100%	75%	100%	75%	57%	71%	71%	63%	53%	58%	89%	83%	72%	74%	67%	76%	59%	
	Total	61%	67%	74%	88%	78%	79%	68%	65%	61%	73%	74%	74%	76%	78%	81%	74%	82%	79%	79%	75%	
N° CVC-patient days	AICUs	2,150	2,117	2,284	1,673	2,048	2,282	2,279	25,671	27,967	24,527	27,176	26,166	30,151	30,527	30,917	30,985	31,777	34,476	33,105	35,974	404 252
	PICUs	349	393	345	326	359	261	295	2,117	2,118	1,871	2,508	2,172	2,870	2,558	2,645	2,604	2,726	2,799	2,384	2,935	34 635
	Total	2,499	2,510	2,629	1,999	2,407	2,543	2,574	27,788	30,085	26,398	29,684	28,338	33,021	33,085	33,562	33,589	34,503	37,275	35,489	38,909	438,887
N° patient days, & % ICUs submitting this data	AICUs	-	-	-	-	-	-	-	3,202	10,437	8,850	13,703	19,258	36,087	47,620	48,401	48,402	49,169	52,107	52,258	53,647	443,141
	PICUs	-	-	-	-	-	-	-	1,040	1,069	1,217	1,347	1,160	2,662	3,782	4,314	4,063	4,311	4,480	4,139	5,029	38,613
	Total	-	-	-	-	-	-	-	4,242	11,506	10,067	15,050	20,418	38,749	51,402	52,715	52,465	53,480	56,587	56,397	58,676	481 754
% ICUs submitting	0%	0%	0%	0%	0%	0%	0%	10%	25%	24%	32%	46%	76%	99%	100%	98%	98%	98%	100%	99%		
CVC-BSI rate: (CVC-BSIs / CVC-patient days X 1000)	AICUs	4.19	4.72	2.19	2.39	1.95	3.51	2.19	2.84	3.33	2.04	1.88	1.99	1.56	1.57	1.68	2.00	1.07	1.36	1.60	1.5	1.88
	PICUs	5.73	2.54	8.7	0	8.36	0	3.39	4.72	2.83	3.74	4.39	4.14	5.57	1.17	2.27	4.61	3.3	2.5	2.1	4.09	3.58
	Total	4.40	4.38	3.04	2.00	2.91	3.15	2.33	2.99	3.29	2.16	2.09	2.15	1.91	1.54	1.73	2.20	1.25	1.45	1.63	1.70	2.01
CVC utilisation ratio: (CVC-patient days / Patient days) x 100	AICUs	-	-	-	-	-	-	-	71%	65%	63%	63%	65%	65%	64%	64%	63%	63%	65%	63%	66%	
	% AICUs submitting	-	-	-	-	-	-	-	9%	24%	23%	32%	48%	78%	99%	100%	98%	98%	98%	100%	99%	
	PICUs	-	-	-	-	-	-	-	55%	63%	67%	58%	54%	62%	68%	61%	64%	63%	62%	58%	58%	
	% PICUs submitting	-	-	-	-	-	-	-	27%	32%	44%	31%	29%	57%	100%	100%	100%	100%	100%	100%	100%	
	Total CVC-U-Ratio	-	-	-	-	-	-	-	67%	65%	64%	62%	64%	65%	64%	63%	63%	63%	65%	63%	66%	

AICU = Adult Intensive Care Unit. PICU = Paediatric Intensive Care Unit. CVC = central venous catheter. BSI = blood stream infection; U-ratio = utilisation ratio

ESM 1: DEFINITIONS FOR BLOOD STREAM INFECTION, CATHETER-LINKED INFECTION, AND CENTRAL VENOUS CATHETER

LABORATORY-CONFIRMED BLOOD STREAM INFECTION *must meet at least one of the two criteria below*

Criterion 1

- Patient has one or more recognized pathogens cultured from ≥ 1 blood culture

Criterion 2

If the microorganism is a common skin organism (ie, diphtheroids [*Corynebacterium* spp], *Bacillus* [not *B anthracis*] spp, *Propionibacterium* spp, coagulase-negative staphylococci [(CNS), excludes sensitive *Staph aureus*], viridans group streptococci, *Aerococcus* spp, *Micrococcus* spp), *then...*

- It must have been cultured from 2 or more blood cultures drawn on separate occasions, or from one blood culture in a patient in whom antimicrobial therapy has been started, *and*
- Patient has ≥ 1 of the following: fever of $>38^{\circ}\text{C}$, chills, or hypotension

CATHETER-ASSOCIATED BLOOD STREAM INFECTION (CABSI)

Criterion

- One of the criteria for BSI above, and
- The presence of one or more central venous catheters at the time of the blood culture, or up to 48 hrs following removal of the CVC and
- The signs & symptoms & positive laboratory results including pathogen cultured from the blood are not primarily related to an infection at another site.

CATHETER-RELATED BLOOD STREAM INFECTION (CRBSI)

Criterion

- One of the criteria for BSI above, and
- The presence of one or more central venous catheters at the time of the blood culture, or up to 48 hrs following removal of the CVC, and
- One of the following:
 - i. a positive semiquantitative (>15 CFU/catheter segment) or quantitative ($>10^3$ CFU /ml or $>10^3$ CFU/catheter segment) culture whereby the same organism (species and antibiogram) is isolated from blood sampled from the CVC or from the catheter tip, and peripheral blood;
 - ii. simultaneous quantitative blood cultures with a $>5:1$ ratio CVC versus peripheral.

CATHETER-SUSPECTED BLOOD STREAM INFECTION

Criterion

- NEGATIVE blood cultures in the presence of parenteral antimicrobials, and
- Clinical evidence of a systemic response to infection, and
- Clinical condition improves following removal of CVC, and
- No other likely source of infection

CENTRAL VENOUS CATHETER (CVC)

Criterion

- An intravascular device terminating in one of the great veins or pulmonary artery, including those in, or near, the right atrium, and those inserted via a femoral vein.
- Includes PICCs, haemodialysis catheters, parenteral nutrition catheters

ESM 1 (Cont): DEFINITIONS**PAEDIATRIC SYSTEMIC INFLAMMATORY RESPONSE SYNDROME:****The presence of at least 2 of the following four criteria, one of which must be abnormal temperature or leukocyte count:**

- Core temperature of >38.5 or <36 degrees Celsius;
- Tachycardia defined as a mean heart rate >2SD above normal for age in the absence of external stimulus, chronotropic drugs or painful stimuli OR 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 ;
- 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

AGE SPECIFIC VITAL SIGNS AND LABORATORY VARIABLES (LOWER VALUES FOR HEART RATE, LEUKOCYTE COUNT AND SYSTOLIC BP ARE FOR THE 5TH PERCENTILE, AND UPPER VALUES FOR HEART RATE, RESPIRATION RATE OR LEUKOCYTE COUNT FOR THE 95TH PERCENTILE)

	Heart Rate		Respiratory rate	Leukocyte count	Systolic BP
Age group	Tachycardia	Bradycardia	Breaths/min	Leukocytes x 10 ³ /mm	mm Hg
0 days-1 week	>180	<100	>50	>34	<65
1 week to 1 month	>180	<100	>40	>19.5 or <5	<75
1 month to 1 year	>180	<90	>34	>17.5 or <5	<100
2-5 years	>140	NA	>22	>15.5 or <5	<94
6-12 years	>130	NA	>18	>13.5 or <4.5	<105
13 - <18 years	>110	NA	>14	>11 or <4.5	<117

*Goldstein B et al. International pediatric sepsis consensus conference: Definitions for sepsis and organ dysfunction in pediatrics. Pediatric Critical Care Medicine 2005;6:2-8***CLASSIFICATION OF CVC-BSIs AS PRE-ICU OR ICU-ACQUIRED**

- **Pre-ICU:** diagnosed within 48hrs of ICU admission
- **ICU-acquired:** diagnosed after 48hrs of ICU admission and within 48 hrs of ICU discharge

MEASURES OF EXPOSURE: Recorded at a daily census in each ICU, and summed over one month

- **CVC-patient days:** the number of patients with one or more CVCs at the census time-point, and summed over one month
- **Total CVC days:** the total number of CVCs in use at the census time point, and summed over one month
- **Total patient days:** the number of patients in the ICU at the census time-point, and summed over one month
- **CVC-BSI rate:** the sum of CRBSIs and CABSIs expressed per 1000 CVC-patient days.
- **CVC utilization ratio:** CVC-patient days per 100 patient days