

Web-appendix

Table 1. Criteria for differentiation between true pathogens and contaminants

	True pathogens	Potential contaminants
Types of organism isolated on culture	<i>Staphylococcus aureus</i> , <i>Streptococcus pneumoniae</i> , <i>Escherichia coli</i> and other Enterobacteriaceae, <i>Pseudomonas aeruginosa</i> , <i>Candida albicans</i> , <i>Streptococcus pyogenes</i> , <i>Streptococcus agalactiae</i> , <i>Listeria monocytogenes</i> , <i>Neisseria meningitidis</i> , <i>Neisseria gonorrhoeae</i> , <i>Haemophilus influenzae</i> , <i>Bacteroides fragilis</i> group, all <i>Candida</i> species, and <i>Cryptococcus neoformans</i>	Coagulase-negative staphylococci, <i>Corynebacterium</i> species, <i>Bacillus</i> species other than <i>Bacillus anthracis</i> , <i>Propionibacterium</i> species, <i>Micrococcus</i> species, <i>viridians</i> group streptococci, <i>Diphtheroids</i>
Time to culture positivity	≤ 5 days	> 5 days
Clinical signs and symptoms of infection	General - fever or other signs of sepsis syndrome including hypothermia (temperature <36°C), leukocyte counts of < 4,000 or > 20,000 leukocytes/μl, hypotension Specific – new onset of cough or respiratory distress, new radiographic changes of consolidation on chest x-ray, leukocytes in urine, new onset of diarrhea	No signs or symptoms of obvious infection
Number of positive culture sites	When the same organism grows at the multiple culture sets	When the different organism grows at the same culture set

Table 2. Nosocomial infections according to the ward the patient was located in the pre-and-post intervention periods

Type of infections	PICU (n=509 patients)				Infectious ward (n=916 patients)				Non-infectious ward (n=1221 patients)			
	Patients n (%)		Episodes of NI		Patients n (%)		Episodes of NI		Patients n (%)		Episodes of NI	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Culture-positive BSI	58 (11.4)	29 (5.7)	62	29	43 (4.7)	18 (2)	43	18	16 (1.3)	6 (0.5)	16	6
Culture-negative likely BSI	9 (1.8)	4 (0.8)	9	4	19 (2.1)	17 (1.8)	19	17	22 (1.7)	18 (1.5)	22	18
VAP/pneumonia	32 (6.3)	5 (1)	32	5	4 (0.4)	0	4	0	3 (0.2)	1 (0.08)	3	1
CAUTI/UTI	20 (3.9)	6 (1.2)	20	6	22 (2.4)	5 (0.5)	22	5	23 (1.9)	3 (0.2)	23	3
SSI	4 (0.8)	4 (0.8)	4	4	3 (0.3)	1 (0.1)	3	1	12 (1)	1 (0.08)	12	1
GI	10 (2)	0	10	0	8 (0.9)	1 (0.1)	8	1	4 (0.3)	2 (0.1)	4	2
Phlebitis	13 (2.6)	0	13	0	10 (1.1)	3 (0.3)	10	3	8 (0.7)	1 (0.08)	8	1
URTI	0	0	0	0	6 (0.6)	0	6	0	7 (0.6)	0	7	0
Total	103	48	150	48	93	44	115	45	81	31	95	32

CI=confidence interval, NI=nosocomial infection, VAP=ventilator associated pneumonia, CAUTI=catheter-associated urinary tract infection, UTI=nosocomial urinary tract infection, SSI=surgical site infection, GI=nosocomial gastrointestinal, URTI=nosocomial upper respiratory tract infection

^a Number of patients with nosocomial infection (site-specific number)

^b Percentage of patients with nosocomial infection (site-specific incidence)

^c Number of nosocomial infections

^d Percentage of total number of nosocomial infections (relative percentage)

Table 3. Pathogens isolated in patients with nosocomial bloodstream infections

	PICU		Infectious ward		Non-infectious ward	
	Pre (n=62)	Post (n=29)	Pre (n=43)	Post (n=18)	Pre (n=16)	Post (n=6)
<i>P. aeruginosa</i>	35	14	30	4	6	4
<i>K. pneumoniae</i>	4	-	2	2	1	-
<i>S. marcescens</i>	8	1	-	-	2	-
<i>B. cepacia</i>	-	3	-	9	-	2
Coagulase-negative staphylococci (CONS)	6	1	5	3	4	-
<i>E. coli</i>	-	-	-	-	1	-
<i>Enterobacter</i> spp.	2	-	3	-	1	-
<i>Acinetobacter</i> spp.	3	3	1	-	-	-
<i>Enterococcus</i> spp.	1	-	-	-	-	-
<i>Pseudomonas</i> spp.	2	2	1	-	1	-
<i>Klebsiella</i> spp.	-	-	1	-	-	-
<i>C. albicans</i>	1	3	-	-	-	-
<i>Candida</i> spp.	-	2	-	-	-	-

Table 4. Pathogens isolated in patients with nosocomial pneumonia including ventilator-associated pneumonia

	PICU		Infectious ward		Non-infectious ward	
	Pre (n=32)	Post (n=5)	Pre (n=4)	Post (n=0)	Pre (n=3)	Post (n=1)
<i>P. aeruginosa</i>	12	1	-	-	-	-
<i>K. pneumoniae</i>	6	-	-	-	-	-
CONS	2	2	1	-	-	-
<i>S. aureus</i>	-	-	-	-	1	-
No bacteria*	12	2	3	-	2	1

*Clinical manifestation and chest x-ray only

Table 5. Pathogens isolated in patients with nosocomial urinary tract infection (UTI) including catheter-associated UTI

	PICU		Infectious ward		Non-infectious ward	
	Pre (n=20)	Post (n=6)	Pre (n=22)	Post (n=5)	Pre (n=23)	Post (n=3)
<i>P. aeruginosa</i>	1	2	2	1	6	-
<i>K. pneumoniae</i>	3	-	3	2	0	2
<i>S. marcescens</i>	-	-	-	-	1	-
<i>Enterococcus</i> spp.	1	-	-	-	-	-
CONS	-	-	2	1	2	-
<i>Candida</i> spp.	4	-	-	-	-	-
<i>E. coli</i>	1	-	1	-	-	-
<i>Enterobacter</i> spp.	-	-	-	-	4	-
<i>C. neoformans</i>	-	1	-	-	-	-
<i>Pseudomonas</i> spp.	-	-	1	-	-	-
<i>Klebsiella</i> spp.	-	-	-	-	1	-
<i>C. albicans</i>	2	3	-	-	3	-
No bacteria*	8	-	13	1	6	1

*Clinical manifestation and positive dipstick only

Table 6. Multivariable analysis of the factors affecting intervention to reduce nosocomial infections

A multifaceted intervention	OR (95%CI)	p value
Crude OR	0.32 (0.26 – 0.41)	< 0.001
Adjusted for age	0.32 (0.25 – 0.39)	< 0.001
Adjusted for gender	0.32 (0.26 – 0.41)	< 0.001
Adjusted for syndrome	0.31 (0.25 – 0.39)	< 0.001
Adjusted for immunocompromized	0.33 (0.26 – 0.41)	< 0.001
Adjusted for referral status	0.32 (0.25 – 0.40)	< 0.001
Adjusted for sepsis	0.32 (0.26 – 0.41)	< 0.001
Adjusted for malnutrition	0.32 (0.25 – 0.40)	< 0.001
Adjusted for bacteraemia	0.31 (0.23 – 0.41)	< 0.001
Adjusted for all above	0.28 (0.21 – 0.38)	< 0.001

Table 7. Multivariable analysis of the factors affecting intervention to reduce mortality

A multifaceted intervention	OR (95%CI)	p value
Crude OR	0.76 (0.58 – 0.98)	0.04
Adjusted for age	0.74 (0.56 – 0.97)	0.03
Adjusted for gender	0.76 (0.58 – 0.98)	0.04
Adjusted for syndrome	0.73 (0.56 – 0.96)	0.02
Adjusted for immunocompromized	0.76 (0.58 – 0.99)	0.04
Adjusted for referral status	0.75 (0.53 – 0.98)	0.04
Adjusted for sepsis	0.76 (0.58 – 0.98)	0.04
Adjusted for malnutrition	0.75 (0.57 – 0.98)	0.03
Adjusted for all above	0.72 (0.54 – 0.94)	0.02