

GiViTI

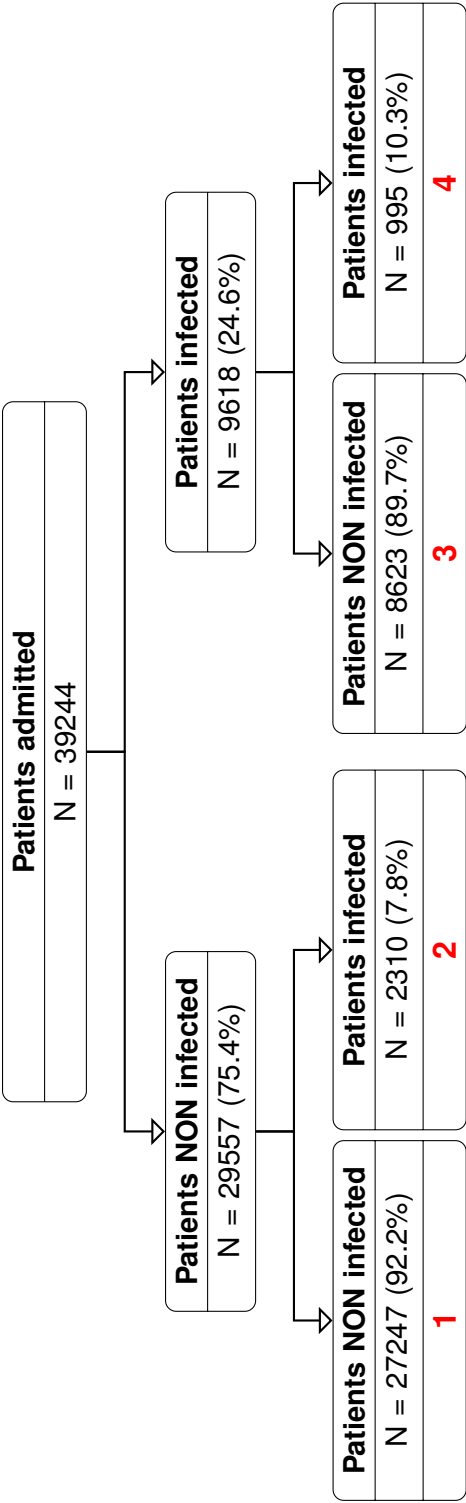
Gruppo Italiano per la Valutazione degli Interventi In Terapia Intensiva

Report

PROSAFE project - INFECTION petal

Year 2016

Overall population (122 ICUs)



	1	3	4	2	3+4	2+4
	Patients NON infected N=27247 (69.4%)	Patients infected on admission ONLY N=8623 (22.0%)	Patients infected on admission and during the stay N=995 (2.5%)	Patients infected during the stay ONLY N=2310 (5.9%)	Patients infected on admission N=9618 (24.5%)	Patients infected during the stay N=3305 (8.4%)
ICU stay (days) Median; Q1-Q3	2; 1–4	5; 2–10	22; 13–37	17; 11–28	6; 2–12	19; 11–30
Hospital stay (days) Median; Q1-Q3	12; 6–21	17; 9–30	35; 21–57	29; 18–46	18; 9–33	31; 18–50
ICU mortality N; % {CI 95%}	3799; 13.9% {13.5–14.4}	2262; 26.2% {25.3–27.2}	354; 35.6% {32.6–38.7}	532; 23.1% {21.4–24.8}	2616; 27.2% {26.3–28.1}	886; 26.8% {25.3–28.4}
Hospital mortality N; % {CI 95%}	5312; 20.0% {19.5–20.5}	2883; 35.5% {34.4–36.5}	396; 44.0% {40.8–47.4}	664; 29.7% {27.8–31.7}	3279; 36.3% {35.3–37.3}	1060; 33.8% {32.2–35.5}
Maximum severity of infection N; % (‡ ICU mortality; ¶ Hospital mortality)		2556; 30.0% (‡ 11.3; ¶ 21.0)	146; 14.7% (‡ 18.5; ¶ 27.4)	823; 37.2% (‡ 12.7; ¶ 20.3)	2702; 28.4% (‡ 11.7; ¶ 21.3)	969; 30.2% (‡ 13.5; ¶ 21.4)
Infection with or without SIRS		2766; 32.4% (‡ 17.0; ¶ 26.5)	314; 31.6% (‡ 24.3; ¶ 32.6)	1016; 45.9% (‡ 21.1; ¶ 28.3)	3080; 32.3% (‡ 17.7; ¶ 27.1)	1330; 41.4% (‡ 21.8; ¶ 29.3)
SEVERE SEPSIS		3211; 37.6% (‡ 46.3; ¶ 54.7)	535; 53.8% (‡ 46.9; ¶ 55.5)	375; 16.9% (‡ 53.2; ¶ 57.2)	3746; 39.3% (‡ 46.4; ¶ 54.8)	910; 28.4% (‡ 49.5; ¶ 56.2)
Septic shock						

Are considered as adhering the ICUs with at least 4 months of valid compilation.

National report (122 ICUs) - Year 2016

Patients admitted

Patients admitted (N): 39244

Sex	N	%
Male	23264	59.3
Female	15980	40.7
Missing	0	

Age (years)	N	%
<17	541	1.4
17-45	4631	11.8
46-65	10012	25.5
66-75	9932	25.3
>75	14128	36.0
Missing	0	

Stay before ICU (days)		
Mean	4.6	
SD	11.3	
Median	1	
Q1–Q3	0–4	
Missing	58	

Ward of admission	N	%
Medical ward	5692	14.6
Surgical ward	16457	42.2
Emergency room	13527	34.7
Other ICU	2266	5.8
High dependency care unit	1047	2.7
Neonatology	0	0.0
Missing	255	

Trauma	N	%
No	34160	87.1
Yes	5037	12.9
Missing	47	

Surgical status	N	%
Non surgical	20178	51.5
Elective surgical	9765	24.9
Emergency surgical	9255	23.6
Missing	46	

Reason for admission	N	%
Monitoring/Weaning	15696	40.1
Admission for procedures/treatments	0	0.0
Intensive Treatment	23222	59.3
Palliative Sedation	167	0.4
Diagnosis of death/Organ donation	76	0.2
Missing	83	

Neurologic failure	N	%
None	26927	82.6
Cerebral coma	2931	9.0
Metabolic coma	1019	3.1
Postanoxic coma	1453	4.5
Toxic coma	253	0.8
Missing or not evaluable	6661	

GCS (first 24 hours)		
Mean	12.6	
SD	3.9	
Median	15	
Q1–Q3	11–15	
Not evaluable	5588	
Missing	70	

Neurological failure occurred	N	%
None	38781	99.0
Cerebral coma	224	0.6
New Metabolic coma	104	0.3
Postanoxic coma	70	0.2
Missing	68	

ICU mortality	N	%
Alive	32222	82.2
Dead	6954	17.8
Missing	68	

Hospital mortality *	N	%
Alive	28570	75.5
Dead	9265	24.5
Missing	155	

ICU stay (days)		
Mean	6.1	
SD	9.9	
Median	2	
Q1–Q3	1–7	
Missing	66	

Hospital stay (days) *		
Mean	19.9	
SD	22.0	
Median	14	
Q1–Q3	7–25	
Missing	168	

Patients infected (N=11928)

Maximum severity of infection	N	%
Infection with or without SIRS	3525	30.0
SEVERE SEPSIS	4096	34.9
Septic shock	4121	35.1
Missing	186	

Mortality by infection severity (%)	In ICU	In H
Infection with or without SIRS	11.9	21.1
SEVERE SEPSIS	18.6	27.4
Septic shock	47.0	55.0

* Statistics computed excluding readmissions from ward (N=37990).

National report (122 ICUs) - Year 2016
Patients NON infected

Patients NON infected (N): 27247

Sex	N	%
Male	15943	58.5
Female	11304	41.5
Missing	0	

Age (years)	N	%
<17	427	1.6
17-45	3374	12.4
46-65	6798	24.9
66-75	6616	24.3
>75	10032	36.8
Missing	0	

Stay before ICU (days)		
Mean	3.7	
SD	9.6	
Median	1	
Q1–Q3	0–3	
Missing	15	

Ward of admission	N	%
Medical ward	2922	10.8
Surgical ward	13286	49.0
Emergency room	9245	34.1
Other ICU	1141	4.2
High dependency care unit	530	2.0
Neonatology	0	0.0
Missing	123	

Trauma	N	%
No	23186	85.1
Yes	4061	14.9
Missing	0	

Surgical status	N	%
Non surgical	12382	45.4
Elective surgical	9157	33.6
Emergency surgical	5708	20.9
Missing	0	

Reason for admission	N	%
Monitoring/Weaning	13893	51.1
Admission for procedures/treatments	0	0.0
Intensive Treatment	13108	48.2
Palliative Sedation	140	0.5
Diagnosis of death/Organ donation	73	0.3
Missing	33	

Neurologic failure	N	%
None	19053	83.9
Cerebral coma	1887	8.3
Metabolic coma	484	2.1
Postanoxic coma	1069	4.7
Toxic coma	204	0.9
Missing or not evaluable	4550	

GCS (first 24 hours)		
Mean	12.9	
SD	3.8	
Median	15	
Q1–Q3	13–15	
Not evaluable	3456	
Missing	8	

Neurological failure occurred	N	%
None	27054	99.3
Cerebral coma	122	0.4
New Metabolic coma	31	0.1
Postanoxic coma	42	0.2
Missing	0	

ICU mortality	N	%
Alive	23439	86.1
Dead	3799	13.9
Missing	9	

Hospital mortality *	N	%
Alive	21242	80.0
Dead	5312	20.0
Missing	51	

ICU stay (days)		
Mean	3.5	
SD	5.2	
Median	2	
Q1–Q3	1–4	
Missing	10	

Hospital stay (days) *		
Mean	16.8	
SD	19.0	
Median	12	
Q1–Q3	6–21	
Missing	53	

* Statistics computed excluding readmissions from ward (N=26605).

National report (122 ICUs) - Year 2016

Patients infected on admission

Patients infected on admission (N): 9618

Ward of admission	N	%
Medical ward	2467	25.9
Surgical ward	2727	28.6
Emergency room	3043	32.0
Other ICU	843	8.9
High dependency care unit	442	4.6
Neonatology	0	0.0
Missing	96	

Trauma	N	%
No	9337	97.1
Yes	281	2.9
Missing	0	

Surgical status	N	%
Non surgical	6336	65.9
Elective surgical	445	4.6
Emergency surgical	2837	29.5
Missing	0	

Reason for admission	N	%
Monitoring/Weaning	1557	16.2
Admission for procedures/treatments	0	0.0
Intensive Treatment	8031	83.5
Palliative Sedation	25	0.3
Diagnosis of death/Organ donation	3	0.0
Missing	2	

Infections on admission (top 10)	N	%
Pneumonia	3496	36.3
NON-surgical secondary peritonitis	960	10.0
NON-surgical urinary tract infection	875	9.1
L.R.T.I. other than pneumonia	702	7.3
Post-surgical peritonitis	606	6.3
Clinical sepsis	483	5.0
Primary bacteraemia of unknown origin	472	4.9
NON-surgical skin/soft tissue infection	456	4.7
Cholecystitis/cholangitis	441	4.6
NON-surgical CNS infection	294	3.1
Missing	0	

Multi-site infections	N	%
No	8624	89.7
Yes	994	10.3
Missing	0	

Infection severity on admission	N	%
Infection with or without SIRS	3095	32.5
SEVERE SEPSIS	3107	32.6
Septic shock	3328	34.9
Missing	88	

Patients with PERITONITIS on admission (N): 1915

Type	N	%
Primary peritonitis	292	15.2
NON-surgical secondary peritonitis	960	50.1
Tertiary peritonitis	57	3.0
Post-surgical peritonitis	606	31.6
Missing	0	

Type of infection	N	%
Extrahospital	918	48.2
Hospital provider (not in ICU)	964	50.6
Acquired in another ICU	23	1.2
Missing	6	

Bacteremic	N	%
No	1730	90.8
Yes	175	9.2
Missing	6	

Multi-site infections	N	%
No	1721	89.9
Yes	194	10.1
Missing	0	

Infection severity on admission °	N	%
Infection with or without SIRS	467	27.1
SEVERE SEPSIS	399	23.2
Septic shock	855	49.7
Missing	0	

ICU mortality	N	%
Alive	1377	71.9
Dead	537	28.1
Missing	1	

Hospital mortality *	N	%
Alive	1039	60.1
Dead	691	39.9
Missing	4	

ICU stay (days)	
Mean (SD)	8.7 (14.3)
Median (Q1–Q3)	4 (2–10)
Missing	1

Hospital stay (days) *	
Mean (SD)	28.8 (28.6)
Median (Q1–Q3)	21 (11–37)
Missing	6

° Statistics computed excluding patients with multiple infections (N=1721).

* Statistics computed excluding readmissions from ward (N=1734).

National report (122 ICUs) - Year 2016**Patients infected on admission****Patients with PNEUMONIA on admission (N): 3496**

Trauma	N	%
No	3379	96.7
Yes	117	3.3
Missing	0	

Surgical status	N	%
Non surgical	3153	90.2
Elective surgical	84	2.4
Emergency surgical	259	7.4
Missing	0	

Type of infection	N	%
Extrahospital	2195	63.0
Hospital provider (not in ICU)	1093	31.4
Acquired in another ICU	198	5.7
Missing	10	

Bacteremic	N	%
No	2978	85.5
Yes	504	14.5
Missing	14	

Multi-site infections	N	%
No	2993	85.6
Yes	503	14.4
Missing	0	

Infection severity on admission °	N	%
Infection with or without SIRS	1016	33.9
SEVERE SEPSIS	1167	39.0
Septic shock	810	27.1
Missing	0	

ICU mortality	N	%
Alive	2401	68.7
Dead	1095	31.3
Missing	0	

Hospital mortality *	N	%
Alive	2005	60.2
Dead	1323	39.8
Missing	15	

ICU stay (days)	
Mean (SD)	11.2 (12.5)
Median (Q1–Q3)	7 (3–14)
Missing	0

Hospital stay (days) *	
Mean (SD)	24.1 (25.4)
Median (Q1–Q3)	18 (9–31)
Missing	15

° Statistics computed excluding patients with multiple infections (N=2993).

* Statistics computed excluding readmissions from ward (N=3343).

National report (122 ICUs) - Year 2016
Patients infected on admission

Infections with isolated microorganism	All infections			Pneumonia (ALL)			Pneumonia (H/another ICU)		
	N	% isolated, N=5284	N	%	N	%	N	%	% group
No	3778	41.7	1650	47.3	504	39.0			
Yes	5284	58.3	1836	52.7	787	61.0			
Total number of microorganisms isolated	6604		2300		1018				
Missing	551		10		0				

Responsible microorganisms isolated (MDR) ***												
	N	% isolated, N=5284	N	% group	N	% isolated, N=1836	N	% group	N	% isolated, N=787	N	% group
Bacteria												
Gram +	2003	37.9	481	24.0	715	38.9	172	24.1	236	30.0	98	41.5
Staphylococcus	956	18.1			360	19.6			179	22.7		
Staphylococcus Aureus (MRSA)	696	13.2	305	43.8	312	17.0	135	43.3	160	20.3	83	51.9
Coagulase negative s. (methicillin resistant)	225	4.3	123	54.7	41	2.2	20	48.8	16	2.0	10	62.5
Streptococcus	514	9.7			309	16.8			25	3.2		
Pneumococcus (penicillin resistant)	367	6.9	20	5.4	274	14.9	14	5.1	21	2.7	2	9.5
Enterococcus	523	9.9			61	3.3			36	4.6		
E. faecalis (vancomycin resistant)	296	5.6	13	4.4	42	2.3	3	7.1	22	2.8	3	13.6
E. faecium (vancomycin resistant)	224	4.2	25	11.2	16	0.9	1	6.2	13	1.7	1	7.7
Clostridium difficile	78	1.5			1	0.1			0	0.0		
Gram -	3066	58.0	1229	40.1	995	54.2	414	41.6	530	67.3	289	54.5
Klebsiella (prod. ESBL)	708	13.4	358	50.6	224	12.2	94	42.0	131	16.6	68	51.9
Enterobacter (prod. ESBL)	183	3.5	28	15.3	64	3.5	11	17.2	35	4.4	8	22.9
Serratia (prod. ESBL)	83	1.6	15	18.1	33	1.8	5	15.2	21	2.7	3	14.3
Pseudomonas aer.	610	11.5			284	15.5			170	21.6		
MDR pseudomonas aer. sensitive to carbapenems			141	23.1			73	25.7			47	27.6
MDR pseudomonas aer. resistant to carbapenems			157	25.7			65	22.9			43	25.3
Escherichia coli (prod. ESBL)	1171	22.2	293	25.0	200	10.9	60	30.0	95	12.1	29	30.5
Proteus (prod. ESBL)	161	3.0	43	26.7	31	1.7	9	29.0	20	2.5	7	35.0
Acinetobacter (resistant to carbapenems)	253	4.8	215	85.0	105	5.7	90	85.7	78	9.9	73	93.6
Stenotrophomonas			79	100.0			39	100.0			33	100.0
Haemophilus influenzae	95	1.8			72	3.9			21	2.7		
Legionella	70	1.3			79	4.3			8	1.0		
Citrobacter (prod. ESBL)	43	0.8	5	11.6	17	0.9	2	11.8	8	1.0	0	0.0
Neisseria meningitidis	39	0.7			1	0.1			0	0.0		
Fungi												
Candida	393	7.4			110	6.0			57	7.2		
Candida albicans (azole resistant)	239	4.5	12	5.0	63	3.4	3	4.8	31	3.9	1	3.2
Candida non albicans (azole resistant)	161	3.0	33	20.5	51	2.8	5	9.8	27	3.4	3	11.1
Aspergillus sp.	67	1.3			58	3.2			27	3.4		
Pneumocistis carinii	30	0.6			33	1.8			12	1.5		
Virus	171	3.2			106	5.8			25	3.2		
Other												
Mycobacteria	22	0.4			12	0.7			6	0.8		
Mycobacteria (atypical pneumonia)	19	0.4			17	0.9			1	0.1		
Other	290	5.5			75	4.1			26	3.3		
Total			1680	31.8			569	31.0			373	47.4
Total (coagulase negative s. methicillin resistant excluded)			1568	29.7			553	30.1			367	46.6

*** For information about how to read the table, see Appendix.

National report (122 ICUs) - Year 2016

Patients infected on admission

	All infections		Pneumonia (ALL)		Pneumonia (H/another ICU)	
Infections with isolated microorganism	N	%	N	%	N	%
No	3778	41.7	1650	47.3	504	39.0
Yes	5284	58.3	1836	52.7	787	61.0
Total number of microorganisms isolated	6604		2300		1018	
Missing	551		10		0	

Responsible microorganisms isolated (MDR) ***	N	% group	% isolated, N=5284	N	% group	% isolated, N=1836	N	% group	% isolated, N=787
Gram -									
<i>Klebsiella</i>	708		13.4	224		12.2	131		16.6
Klebsiella prod. ESBL	358	50.6*	6.8	94	42.0*	5.1	68	51.9*	8.6
Klebsiella res. carb.	232	32.8*	4.4	61	27.2*	3.3	46	35.1*	5.8
Klebsiella res. Colistine	44	19.6°	0.8	9	14.8°	0.5	7	15.2°	0.9
Klebsiella res. Tigecycline	87	45.1°	1.6	18	40.0°	1.0	12	36.4°	1.5
Klebsiella res. Gentamicine	117	52.7°	2.2	38	66.7°	2.1	27	64.3°	3.4
Klebsiella res. Col+Tig+Gent	14	6.2°	0.3	3	5.0°	0.2	2	4.3°	0.3
<i>Enterobacter</i>	183		3.5	64		3.5	35		4.4
Enterobacter prod. ESBL	28	15.3*	0.5	11	17.2*	0.6	8	22.9*	1.0
Enterobacter res. carb.	3	1.6*	0.1	1	1.6*	0.1	0	0.0*	0.0
Enterobacter res. Colistine	0	0.0°	0.0	0	0.0°	0.0	0	0.0°	0.0
Enterobacter res. Tigecycline	1	50.0°	0.0	0	0.0°	0.0	0	0.0°	0.0
Enterobacter res. Gentamicine	2	66.7°	0.0	1	100.0°	0.1	0	0.0°	0.0
Enterobacter res. Col+Tig+Gent	0	0.0°	0.0	0	0.0°	0.0	0	0.0°	0.0
<i>Serratia</i>	83		1.6	33		1.8	21		2.7
Serratia prod. ESBL	15	18.1*	0.3	5	15.2*	0.3	3	14.3*	0.4
Serratia res. carb.	1	1.2*	0.0	0	0.0*	0.0	0	0.0*	0.0
Serratia res. Colistine	1	100.0°	0.0	0	0.0°	0.0	0	0.0°	0.0
Serratia res. Tigecycline	1	100.0°	0.0	0	0.0°	0.0	0	0.0°	0.0
Serratia res. Gentamicine	1	100.0°	0.0	0	0.0°	0.0	0	0.0°	0.0
Serratia res. Col+Tig+Gent	1	100.0°	0.0	0	0.0°	0.0	0	0.0°	0.0
<i>Pseudomonas aer.</i>	610		11.5	284		15.5	170		21.6
Pseudomonas aer. res. carb.	157	25.7*	3.0	65	22.9*	3.5	43	25.3*	5.5
Pseudomonas res. Colistine	8	5.1°	0.2	5	7.7°	0.3	1	2.3°	0.1
<i>Escherichia Coli</i>	1171		22.2	200		10.9	95		12.1
Escherichia Coli prod. ESBL	293	25.0*	5.5	60	30.0*	3.3	29	30.5*	3.7
Escherichia Coli res. carb.	19	1.6*	0.4	3	1.5*	0.2	2	2.1*	0.3
Escherichia Coli res. Colistine	2	14.3°	0.0	0	0.0°	0.0	0	0.0°	0.0
Escherichia Coli res. Tigecycline	4	25.0°	0.1	0	0.0°	0.0	0	0.0°	0.0
Escherichia Coli res. Gentamicine	5	29.4°	0.1	1	33.3°	0.1	1	50.0°	0.1
Escherichia Coli res. Col+Tig+Gent	1	5.9°	0.0	0	0.0°	0.0	0	0.0°	0.0
<i>Proteus</i>	161		3.0	31		1.7	20		2.5
Proteus prod. ESBL	43	26.7*	0.8	9	29.0*	0.5	7	35.0*	0.9
Proteus res. carb.	5	3.1*	0.1	1	3.2*	0.1	1	5.0*	0.1
Proteus res. Colistine	3	60.0°	0.1	1	100.0°	0.1	1	100.0°	0.1
Proteus res. Tigecycline	4	80.0°	0.1	1	100.0°	0.1	1	100.0°	0.1
Proteus res. Gentamicine	1	20.0°	0.0	0	0.0°	0.0	0	0.0°	0.0
Proteus res. Col+Tig+Gent	0	0.0°	0.0	0	0.0°	0.0	0	0.0°	0.0
<i>Citrobacter</i>	43		0.8	17		0.9	8		1.0
Citrobacter prod. ESBL	5	11.6*	0.1	2	11.8*	0.1	0	0.0*	0.0
Citrobacter res. carb.	0	0.0*	0.0	0	0.0*	0.0	0	0.0*	0.0
Citrobacter res. Colistine	0	0.0°	0.0	0	0.0°	0.0	0	0.0°	0.0
Citrobacter res. Tigecycline	0	0.0°	0.0	0	0.0°	0.0	0	0.0°	0.0
Citrobacter res. Gentamicine	0	0.0°	0.0	0	0.0°	0.0	0	0.0°	0.0
Citrobacter res. Col+Tig+Gent	0	0.0°	0.0	0	0.0°	0.0	0	0.0°	0.0
<i>Acinetobacter</i>	253		4.8	105		5.7	78		9.9
Acinetobacter res. carb.	215	85.0*	4.1	90	85.7*	4.9	73	93.6*	9.3
Acinetobacter res. Colistine	13	6.2°	0.2	6	6.7°	0.3	4	5.5°	0.5
Acinetobacter res. Tigecycline	88	63.8°	1.7	34	59.6°	1.9	29	61.7°	3.7
Acinetobacter res. Col+Tig	9	4.3°	0.2	5	5.7°	0.3	4	5.5°	0.5

* % calculated on the number of microorganisms of the same type

°% calculated on the number of microorganisms resistant to carbapenems of the same type. The % includes only microorganisms tested for resistance.

*** For information about how to read the table, see Appendix.

National report (122 ICUs) - Year 2016

Patients infected during the stay

Patients infected during the stay (N): 3305

Sex	N	%
Male	2165	65.5
Female	1140	34.5
Missing	0	

Age (years)	N	%
<17	19	0.6
17-45	453	13.7
46-65	1011	30.6
66-75	874	26.4
>75	948	28.7
Missing	0	

Stay before ICU (days)		
Mean	5.8	
SD	15.0	
Median	1	
Q1–Q3	0–5	
Missing	2	

Ward of admission	N	%
Medical ward	547	16.6
Surgical ward	674	20.5
Emergency room	1495	45.5
Other ICU	441	13.4
High dependency care unit	131	4.0
Neonatology	0	0.0
Missing	17	

Trauma	N	%
No	2549	77.1
Yes	756	22.9
Missing	0	

Surgical status	N	%
Non surgical	2116	64.0
Elective surgical	192	5.8
Emergency surgical	997	30.2
Missing	0	

Reason for admission	N	%
Monitoring/Weaning	296	9.0
Admission for procedures/treatments	0	0.0
Intensive Treatment	3005	91.0
Palliative Sedation	1	0.0
Diagnosis of death/Organ donation	0	0.0
Missing	3	

Neurologic failure	N	%
None	1710	65.9
Cerebral coma	594	22.9
Metabolic coma	112	4.3
Postanoxic coma	168	6.5
Toxic coma	12	0.5
Missing or not evaluable	709	

GCS (first 24 hours)		
Mean	10.5	
SD	4.4	
Median	11	
Q1–Q3	6–15	
Not evaluable	771	
Missing	2	

Neurological failure occurred	N	%
None	3208	97.1
Cerebral coma	51	1.5
New Metabolic coma	35	1.1
Postanoxic coma	11	0.3
Missing	0	

ICU mortality	N	%
Alive	2414	73.2
Dead	886	26.8
Missing	5	

Hospital mortality *	N	%
Alive	2072	66.2
Dead	1060	33.8
Missing	26	

ICU stay (days)		
Mean	23.6	
SD	18.9	
Median	19	
Q1–Q3	11–30	
Missing	5	

Hospital stay (days) *		
Mean	38.1	
SD	28.8	
Median	31	
Q1–Q3	18–50	
Missing	24	

Patients infected during the stay ONLY (N=2310)

Maximum severity of infection	N	%
Infection with or without SIRS	823	37.2
SEVERE SEPSIS	1016	45.9
Septic shock	375	16.9
Missing	96	

Mortality by infection severity (%)	In ICU	In H
Infection with or without SIRS	12.7	20.3
SEVERE SEPSIS	21.1	28.3
Septic shock	53.2	57.2

* Statistics computed excluding readmissions from ward (N=3308).

National report (122 ICUs) - Year 2016

Patients infected during the stay

Infections during the stay (top 10)	N	%
Pneumonia	1232	37.3
L.R.T.I. other than pneumonia	714	21.6
NON-surgical urinary tract infection	486	14.7
Catheter-related bacteremia (CR-BSI)	363	11.0
Primary bacteraemia of unknown origin	314	9.5
Post-surgical peritonitis	131	4.0
Clinical sepsis	120	3.6
Post-surgical skin/soft tissue infection	105	3.2
F.U.O. fever of unknown origin	103	3.1
Upper respiratory tract infection	99	3.0
Missing	0	

Multi-site infections	N	%
No	2609	78.9
Yes	696	21.1
Missing	0	

Infections during the stay	
Total number of infection episodes*	3951
Total number of microorganisms isolated	4538

Days before infection onset	
Mean	8.2
SD	8.1
Median	6
Q1–Q3	3–11
Missing	1

Incidencia di infezioni durante la degenza (1)	
<i>(Pts. infected during the stay/1000 days pre-infection)</i>	
Estimate	16.3
CI (95%)	15.7–16.9

Incidencia di infezioni durante la degenza (2)	
<i>(Pts. infected during the stay/pts. with LOS=7 days)</i>	
Estimate	11.4%
CI (95%)	11.0–11.8

L'incidenza di infezioni in TI, completata dall'intervallo di confidenza al 95%, è calcolata con le formule seguenti:

$$\text{Incidenza infezioni in degenza} = \frac{\text{Numero di pazienti con infezione in degenza}}{(\text{Giornate di degenza pre - infezione})} \times 1000 \quad (1)$$

$$\text{Incidenza infezioni in degenza} = \frac{\text{Numero di pazienti con infezione in degenza}}{(\text{Giornate di degenza pre - infezione})/7} \times 100 \quad (2)$$

dove la variabile *Giornate di degenza pre-infezione* è pari alla somma, per tutti i pazienti ammessi in TI, delle giornate di degenza sino all'insorgenza dell'infezione o alla dimissione del paziente. E' quindi pari alla degenza totale se il paziente non sviluppa infezione mentre è pari alla differenza tra la data di insorgenza dell'infezione e la data di ingresso in TI se il paziente è infetto. Il secondo tasso è una rielaborazione del primo e risponde alla domanda: 'Su 100 pazienti ricoverati per 7 giorni in TI, quanti sviluppano infezione in degenza?'.

* Multiple episodes in the same site are not considered.

National report (122 ICUs) - Year 2016 Patients infected during the stay

Episodes with microorganisms isolated	Patients infected during the stay only			Pts infected on adm. and during the stay		
	N	%		N	%	
No	287	10.7		115	9.1	
Yes	2390	89.3		1151	90.9	
Total number of microorganisms isolated	3095			1443		
Missing	7			1		

Responsible microorganisms isolated (MDR) ***						
Bacteria	MDR			MDR		
	N	% isolated, N=2390	% group	N	% isolated, N=1151	% group
Gram +	872	36.5	28.9	326	28.3	39.6
Staphylococcus	611	25.6		185	16.1	
Staphylococcus Aureus (MRSA)	423	17.7	31.9	101	8.8	60.4
Coagulase negative s. (methicillin resistant)	180	7.5	58.3	80	7.0	70.0
Streptococcus	60	2.5		14	1.2	
Pneumococcus (penicillin resistant)	36	1.5	5.6	6	0.5	0.0
Enterococcus	203	8.5		114	9.9	
E. faecalis (vancomycin resistant)	137	5.7	2.9	58	5.0	5.2
E. faecium (vancomycin resistant)	66	2.8	12.1	59	5.1	15.3
Clostridium difficile	27	1.1		26	2.3	
Gram -	1644	68.8	36.4	745	64.7	64.8
Klebsiella (prod. ESBL)	442	18.5	44.1	211	18.3	69.7
Enterobacter (prod. ESBL)	182	7.6	9.9	43	3.7	18.6
Serratia (prod. ESBL)	103	4.3	7.8	30	2.6	23.3
Pseudomonas aer.	367	15.4		208	18.1	
MDR pseudomonas aer. sensitive to carbapenems			21.3			24.0
MDR pseudomonas aer. resistant to carbapenems			18.8			38.0
Escherichia coli (prod. ESBL)	402	16.8	17.4	159	13.8	44.0
Proteus (prod. ESBL)	71	3.0	39.4	37	3.2	35.1
Acinetobacter (resistant to carbapenems)	173	7.2	87.3	145	12.6	91.7
Stenotrophomonas			100.0			100.0
Haemophilus influenzae	77	3.2		3	0.3	
Legionella	0	0.0		0	0.0	
Citrobacter (prod. ESBL)	48	2.0	8.3	7	0.6	14.3
Neisseria meningitidis	0	0.0		1	0.1	
Fungi						
Candida	150	6.3		153	13.3	
Candida albicans (azole resistant)	97	4.1	9.3	99	8.6	4.0
Candida non albicans (azole resistant)	51	2.1	23.5	54	4.7	29.6
Aspergillus sp.	15	0.6		16	1.4	
Pneumocistis carinii	1	0.0		0	0.0	
Virus	11	0.5		4	0.3	
Other						
Mycobacteria	1	0.0		0	0.0	
Mycobacteria (atypical pneumonia)	3	0.1		0	0.0	
Other	84	3.5		37	3.2	
Total						
Total (coagulase negative s. methicillin resistant excluded)	835	34.9		603	52.4	
	739	30.9		551	47.9	

*** For information about how to read the table, see Appendix.

National report (122 ICUs) - Year 2016

Patients infected during the stay

Patients infected during the stay only Pts infected on adm. and during the stay

Episodes with microorganisms isolated	N	%	N	%
No	287	10.7	115	9.1
Yes	2390	89.3	1151	90.9
Total number of microorganisms isolated	3095		1443	
Missing	7		1	

Responsible microorganisms isolated (MDR)	N	% group	% isolated, N=2390	N	% group	% isolated, N=1151

Gram -						
<i>Klebsiella</i>	442		18.5	211		18.3
Klebsiella prod. ESBL	195	44.1*	8.2	147	69.7*	12.8
Klebsiella res. carb.	124	28.1*	5.2	106	50.2*	9.2
Klebsiella res. Colistine	26	21.3°	1.1	28	26.9°	2.4
Klebsiella res. Tigecycline	54	54.5°	2.3	51	52.0°	4.4
Klebsiella res. Gentamicine	70	57.4°	2.9	62	60.2°	5.4
Klebsiella res. Col+Tig+Gent	8	6.8°	0.3	13	13.0°	1.1
<i>Enterobacter</i>	182		7.6	43		3.7
Enterobacter prod. ESBL	18	9.9*	0.8	8	18.6*	0.7
Enterobacter res. carb.	0	0.0*	0.0	2	4.7*	0.2
Enterobacter res. Colistine	0	0.0°	0.0	0	0.0°	0.0
Enterobacter res. Tigecycline	0	0.0°	0.0	1	50.0°	0.1
Enterobacter res. Gentamicine	0	0.0°	0.0	1	50.0°	0.1
Enterobacter res. Col+Tig+Gent	0	0.0°	0.0	0	0.0°	0.0
<i>Serratia</i>	103		4.3	30		2.6
Serratia prod. ESBL	8	7.8*	0.3	7	23.3*	0.6
Serratia res. carb.	0	0.0*	0.0	2	6.7*	0.2
Serratia res. Colistine	0	0.0°	0.0	2	100.0°	0.2
Serratia res. Tigecycline	0	0.0°	0.0	2	100.0°	0.2
Serratia res. Gentamicine	0	0.0°	0.0	2	100.0°	0.2
Serratia res. Col+Tig+Gent	0	0.0°	0.0	2	100.0°	0.2
<i>Pseudomonas aer.</i>	367		15.4	208		18.1
Pseudomonas aer. res. carb.	69	18.8*	2.9	79	38.0*	6.9
Pseudomonas res. Colistine	0	0.0°	0.0	2	2.6°	0.2
<i>Escherichia Coli</i>	402		16.8	159		13.8
Escherichia Coli prod. ESBL	70	17.4*	2.9	70	44.0*	6.1
Escherichia Coli res. carb.	2	0.5*	0.1	8	5.0*	0.7
Escherichia Coli res. Colistine	0	0.0°	0.0	0	0.0°	0.0
Escherichia Coli res. Tigecycline	0	0.0°	0.0	1	12.5°	0.1
Escherichia Coli res. Gentamicine	0	0.0°	0.0	2	25.0°	0.2
Escherichia Coli res. Col+Tig+Gent	0	0.0°	0.0	0	0.0°	0.0
<i>Proteus</i>	71		3.0	37		3.2
Proteus prod. ESBL	28	39.4*	1.2	13	35.1*	1.1
Proteus res. carb.	1	1.4*	0.0	1	2.7*	0.1
Proteus res. Colistine	0	0.0°	0.0	0	0.0°	0.0
Proteus res. Tigecycline	0	0.0°	0.0	1	100.0°	0.1
Proteus res. Gentamicine	1	100.0°	0.0	0	0.0°	0.0
Proteus res. Col+Tig+Gent	0	0.0°	0.0	0	0.0°	0.0
<i>Citrobacter</i>	48		2.0	7		0.6
Citrobacter prod. ESBL	4	8.3*	0.2	1	14.3*	0.1
Citrobacter res. carb.	0	0.0*	0.0	0	0.0*	0.0
Citrobacter res. Colistine	0	0.0°	0.0	0	0.0°	0.0
Citrobacter res. Tigecycline	0	0.0°	0.0	0	0.0°	0.0
Citrobacter res. Gentamicine	0	0.0°	0.0	0	0.0°	0.0
Citrobacter res. Col+Tig+Gent	0	0.0°	0.0	0	0.0°	0.0
<i>Acinetobacter</i>	173		7.2	145		12.6
Acinetobacter res. carb.	151	87.3*	6.3	133	91.7*	11.6
Acinetobacter res. Colistine	7	4.7°	0.3	5	3.8°	0.4
Acinetobacter res. Tigecycline	33	30.0°	1.4	57	59.4°	5.0
Acinetobacter res. Col+Tig	3	2.0°	0.1	3	2.3°	0.3

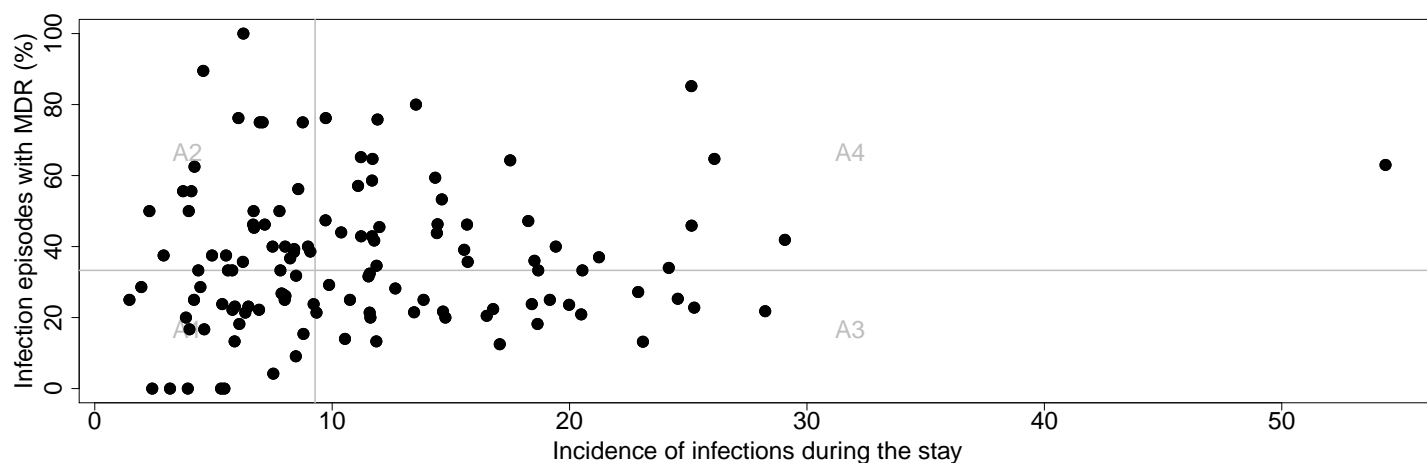
* % calculated on the number of microorganisms of the same type

°% calculated on the number of microorganisms resistant to carbapenems of the same type. The % includes only microorganisms tested for resistance.

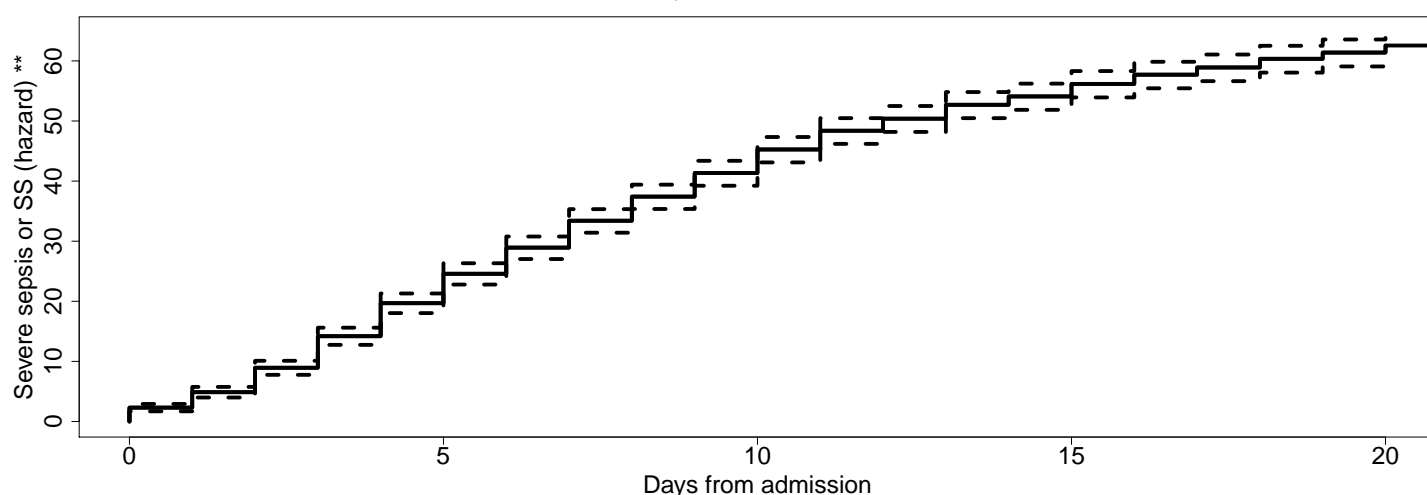
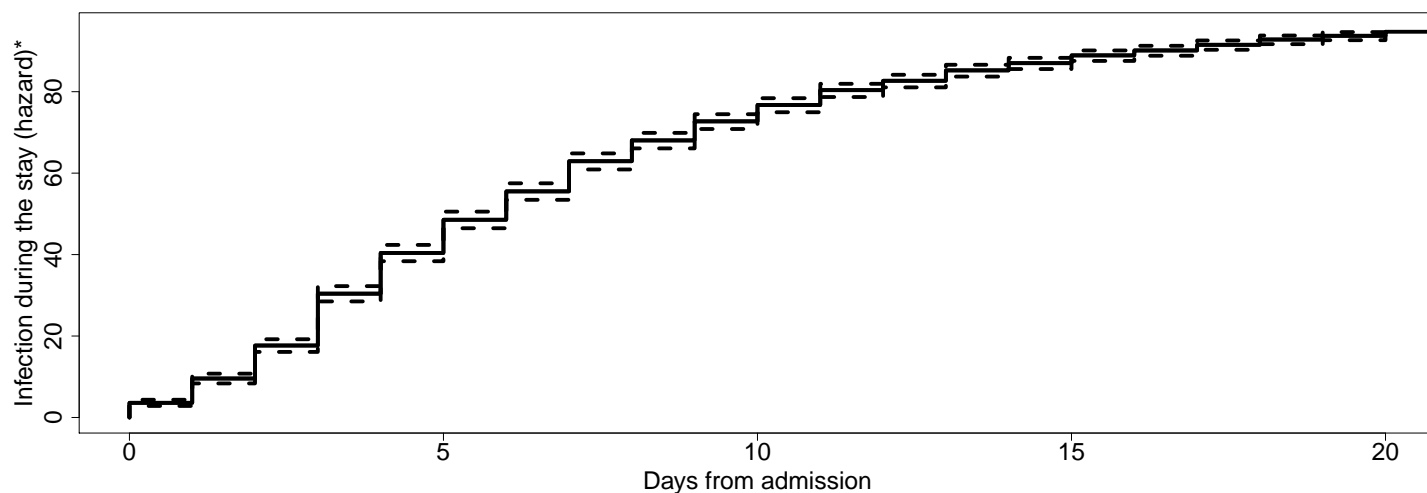
*** For information about how to read the table, see Appendix.

National report (122 ICUs) - Year 2016

Patients infected during the stay



Il grafico sovrastante incrocia le variabili *Incidenza di infezioni in degenza* e *Percentuale di infezioni multiresistenti* (ad esclusione del germe *S. Coagulasi negativo meticillina resistente*). La nuvola nera di punti racchiude i dati delle TI nazionali. 2 linee grigie intersecano il grafico in corrispondenza dei valori mediani nazionali e delineano 4 aree. L'area **A1** identifica i centri che sembrano praticare un'efficace prevenzione delle infezioni e una buona gestione dell'antibiotico terapia. Per contro a cadere nell'area **A4** sono i centri che, osservando un'elevata incidenza di infezioni in degenza ed un'alta percentuale di multiresistenze, paiono non riuscire a controllare efficacemente i fenomeni. E' bene sottolineare che ad influire notevolmente su tali statistiche sono i case-mix delle TI. E' pertanto importante valutare con estrema cautela tale grafico e quella appena fornita è solo una delle tante possibili chiavi di lettura.



I due grafici sovrastanti mostrano le curve di rischio di contrarre una infezione e una sepsi severa/shock settico in TI all'aumentare dei giorni trascorsi in reparto. Come è logico, il rischio aumenta all'aumentare della degenza del paziente. Per esempio, la probabilità di aver contratto un'infezione in TI è pari circa al XX% alla decima giornata di degenza. Tale probabilità sfiora il XX% se il paziente rimane ricoverato per almeno 20 giorni (dati nazionali). Entrambi i grafici sono 'troncati' alla ventesima giornata di degenza poichè le stime successive, basate sui pochi pazienti con degenza superiore a 20 giorni, sarebbero risultate instabili. Le linee tratteggiate delineano l'intervallo di confidenza al 95% delle stime.

* Patients not infected at admission (N=29557).

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Patients infected during the stay

Patients with PNEUMONIA during the stay (N): 1232

Trauma	N	%
No	891	72.3
Yes	341	27.7
Missing	0	

Surgical status	N	%
Non surgical	807	65.5
Elective surgical	50	4.1
Emergency surgical	375	30.4
Missing	0	

Bacteremic	N	%
No	977	79.6
Yes	250	20.4
Missing	5	

Multi-site infections	N	%
No	898	72.9
Yes	334	27.1
Missing	0	

New episodes beyond the first	N	%
No	950	77.4
Yes	277	22.6
Missing	5	

Ventil. Associat. Pneumonia (VAP) °	N	%
No	165	13.4
Yes	1065	86.6
Missing	2	

° _

Patients with VAP during the stay (N): 1065

Early VAP	N	%
No	558	52.4
Yes	507	47.6
Missing	0	

Diagnosis	N	%
Possible	363	34.2
Probable - certain	699	65.8
Missing	3	

Microbiological diagnostic criteria	N	%
Probable - certain: Serology/molecular biology techniques/urinary antigens (legionella etc.)	7	0.7
Probable - certain: Non-protected quantitative distal sample (nonbronchoscopic BAL)	11	1.0
Possible: Non-protected qualitative distal sample (nonbronchoscopic BAL)	14	1.3
Possible: Protected qualitative distal sample (BAL, PSB)	59	5.6
Probable - certain: Protected quantitative distal sample (BAL, PSB)	165	15.5
Probable - certain: Quantitative tracheal aspirate ≥ 10 to the 5th power CFU/ml	450	42.4
Probable - certain: Qualitative tracheal aspirate + Agreed haemoculture and/or pleural liquid	63	5.9
Possible: Qualitative tracheal aspirate	222	20.9
Possible: Etiologic agent NOT sought or NOT isolated	71	6.7
Missing	3	

Risk factors (N=39244) NULL

Invasive ventilation	N	%
No	13282	33.9
Yes	25907	66.1
At first day	24791	63.2
Missing	55	

Length (days)	
Mean (SD)	5.4 (9.2)
Median (Q1–Q3)	1 (1–6)
Missing	17

Length/ICU LOS (%)	
Mean (SD)	75.0 (29.5)
Median (Q1–Q3)	93.3 (50–100)
Missing	21

IV days pre-VAP

	N	1065
Mean (SD)	9.2 (8.2)	
Median (Q1–Q3)	7 (4–11)	
Missing	0	

Incidence of VAP (3)

(Pts. with VAP/1000 days of VM pre-VAP)

Estimate	8.9
CI (95%)	8.4–9.5

Incidence of VAP (4)

(Pts. with VAP/pts. ventilated for 8 days)

Estimate	7.1%
CI (95%)	6.7–7.6

National report (122 ICUs) - Year 2016
Patients infected during the stay

Patients with VAP during the stay (continua)

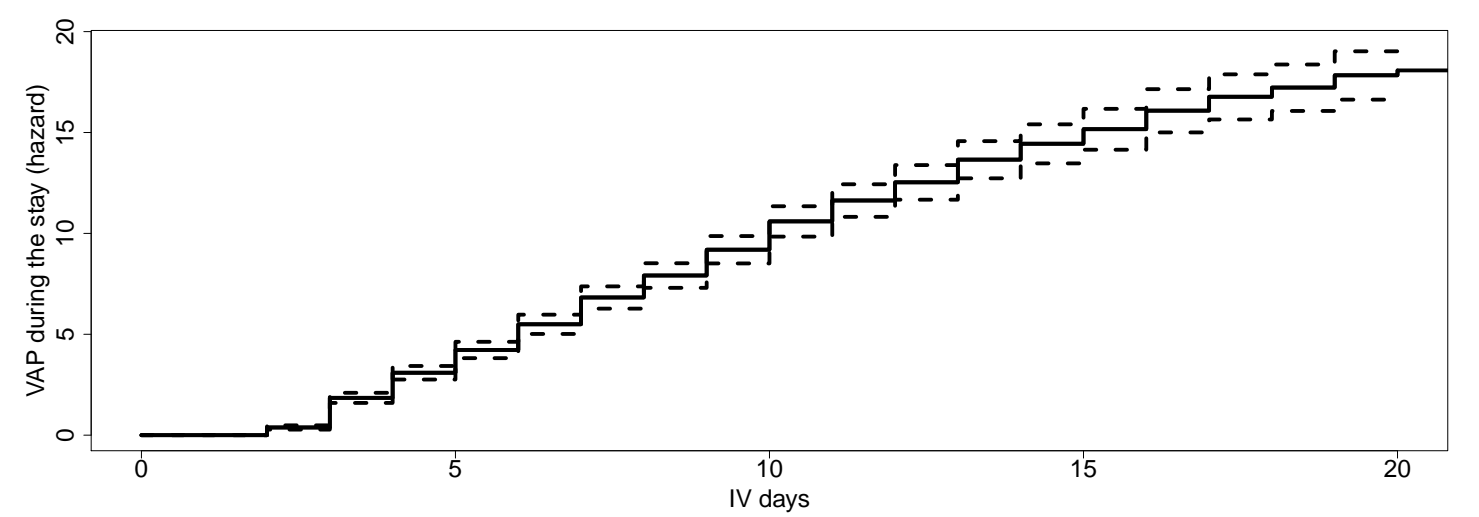
Di seguito le formule utilizzate per il calcolo dei due tassi di incidenza:

$$\text{Incidenza VAP in TI} = \frac{\text{Numero di pazienti con VAP in degenza}}{\text{Giornate di ventilazione meccanica pre - VAP}} \times 1000 \tag{3}$$

dove la variabile *Giornate di ventilazione meccanica pre-VAP* è pari alla somma delle giornate di ventilazione meccanica pre-VAP di tutti i pazienti ammessi in reparto. E' pari alla durata totale della ventilazione meccanica per i pazienti che non sviluppano VAP e alla differenza tra la data di insorgenza della VAP e la data di inizio della ventilazione meccanica per i pazienti infetti. Sono esclusi dal denominatore i giorni di ventilazione meccanica dei pazienti dimessi o deceduti entro 2 giorni dall'inizio della ventilazione.

$$\text{Incidenza VAP in TI} = \frac{\text{Numero di pazienti con VAP in degenza}}{(\text{Giornate di ventilazione meccanica pre - VAP})/8} \times 100 \tag{4}$$

Il secondo tasso è solo una rielaborazione del precedente, per permettere una lettura più semplice del dato. Risponde infatti alla domanda: 'Su 100 pazienti ventilati per 8 giorni in TI, quanti sviluppano VAP?'. Il cutoff di 8 giorni è stato stabilito per convenzione. I tassi sono corredati dagli intervalli di confidenza al 95%.



ICU mortality	N	%
Alive	741	69.6
Dead	324	30.4
Missing	0	

Hospital mortality *	N	%
Alive	642	62.9
Dead	378	37.1
Missing	8	

ICU stay (days)	Mean (SD)	27.0 (18.4)
	Median (Q1–Q3)	22 (15–34)
	Missing	0

Hospital stay (days) *	Mean (SD)	39.0 (28.6)
	Median (Q1–Q3)	32 (20–51)
	Missing	7

* Statistics computed excluding readmissions from ward (N=1028).

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Patients infected during the stay

VAP with isolated microorganism		N		%		N		%		N		%	
No		70		6.6		0		0.0		55		22.1	
Yes		992		93.4		699		100.0		194		77.9	
Total number of microorganisms isolated		1324				935				267			
Missing		3				0				0			

Responsible microorganisms isolated (MDR) ***													
Bacteria		MDR				MDR				MDR			
Gram +		N	% isolated, N=992	N	% group	N	% isolated, N=699	N	% group	N	% isolated, N=194	% group	
Staphylococcus		287	28.9	78	27.2	214	30.6	53	24.8	34	17.5	11	32.4
Staphylococcus Aureus (MRSA)		246	24.8			183	26.2			24	12.4		
Coagulase negative s. (methicillin resistant)		220	22.2	66	30.0	173	24.7	50	28.9	21	10.8	10	47.6
Streptococcus		24	2.4	8	33.3	8	1.1	1	12.5	3	1.5	1	33.3
Pneumococcus (penicillin resistant)		20	2.0			15	2.1			2	1.0		
Enterococcus		16	1.6	1	6.2	12	1.7	1	8.3	1	0.5	0	0.0
E. faecalis (vancomycin resistant)		27	2.7			20	2.9			8	4.1		
E. faecium (vancomycin resistant)		19	1.9	2	10.5	15	2.1	0	0.0	6	3.1	0	0.0
Clostridium difficile		10	1.0	1	10.0	7	1.0	1	14.3	2	1.0	0	0.0
		0	0.0			0	0.0			0	0.0		
Gram -		785	79.1	365	46.5	554	79.3	235	42.4	160	82.5	98	61.3
Klebsiella (prod. ESBL)		211	21.3	92	43.6	148	21.2	59	39.9	50	25.8	36	72.0
Enterobacter (prod. ESBL)		69	7.0	3	4.3	50	7.2	2	4.0	10	5.2	4	40.0
Serratia (prod. ESBL)		44	4.4	6	13.6	34	4.9	2	5.9	8	4.1	2	25.0
Pseudomonas aer.		215	21.7			157	22.5			59	30.4		
MDR pseudomonas aer. sensitive to carbapenems				44	20.5			30	19.1			11	18.6
MDR pseudomonas aer. resistant to carbapenems				49	22.8			30	19.1			19	32.2
Escherichia coli (prod. ESBL)		120	12.1	34	28.3	84	12.0	24	28.6	10	5.2	4	40.0
Proteus (prod. ESBL)		33	3.3	11	33.3	18	2.6	1	5.6	11	5.7	3	27.3
Acinetobacter (resistant to carbapenems)		138	13.9	124	89.9	90	12.9	80	88.9	47	24.2	39	83.0
Stenotrophomonas				40	100.0			27	100.0			12	100.0
Haemophilus influenzae		44	4.4			37	5.3			1	0.5		
Legionella		0	0.0			0	0.0			0	0.0		
Citrobacter (prod. ESBL)		16	1.6	1	6.2	12	1.7	1	8.3	3	1.5	0	0.0
Neisseria meningitidis		0	0.0			0	0.0			0	0.0		
Fungi													
Candida		39	3.9			23	3.3			10	5.2		
Candida albicans (azole resistant)		27	2.7	3	11.1	18	2.6	2	11.1	7	3.6	1	14.3
Candida non albicans (azole resistant)		12	1.2	5	41.7	5	0.7	3	60.0	3	1.5	2	66.7
Aspergillus sp.		16	1.6			10	1.4			2	1.0		
Pneumocistis carinii		1	0.1			1	0.1			0	0.0		
Virus		6	0.6			6	0.9			0	0.0		
Other													
Mycobacteria		1	0.1			0	0.0			1	0.5		
Mycobacteria (atypical pneumonia)		3	0.3			1	0.1			1	0.5		
Other		28	2.8			16	2.3			8	4.1		
Total				424	42.7			276	39.5			109	56.2
Total (coagulase negative s. methicillin resistant excluded)				419	42.2			276	39.5			108	55.7

*** For information about how to read the table, see Appendix.

National report (122 ICUs) - Year 2016

Patients infected during the stay

VAP with isolated microorganism	VAP		Probable - certain VAP		VAP (new episode)	
	N	%	N	%	N	%
No	70	6.6	0	0.0	55	22.1
Yes	992	93.4	699	100.0	194	77.9
Total number of microorganisms isolated	1324		935		267	
Missing	3		0		0	

Responsible microorganisms isolated (MDR) ***	N	% group	% isolated, N=992	N	% group	% isolated, N=699	N	% group	% isolated, N=194
Gram -									
<i>Klebsiella</i>	211		21.3	148		21.2	50		25.8
Klebsiella prod. ESBL	92	43.6*	9.3	59	39.9*	8.4	36	72.0*	18.6
Klebsiella res. carb.	57	27.0*	5.7	31	20.9*	4.4	25	50.0*	12.9
Klebsiella res. Colistine	11	19.3°	1.1	6	19.4°	0.9	3	12.0°	1.5
Klebsiella res. Tigecycline	21	41.2°	2.1	12	44.4°	1.7	8	33.3°	4.1
Klebsiella res. Gentamicine	34	60.7°	3.4	16	53.3°	2.3	19	76.0°	9.8
Klebsiella res. Col+Tig+Gent	4	7.0°	0.4	2	6.5°	0.3	1	4.0°	0.5
<i>Enterobacter</i>	69		7.0	50		7.2	10		5.2
Enterobacter prod. ESBL	3	4.3*	0.3	2	4.0*	0.3	4	40.0*	2.1
Enterobacter res. carb.	0	0.0*	0.0	0	0.0*	0.0	2	20.0*	1.0
Enterobacter res. Colistine	0	0.0°	0.0	0	0.0°	0.0	1	50.0°	0.5
Enterobacter res. Tigecycline	0	0.0°	0.0	0	0.0°	0.0	1	50.0°	0.5
Enterobacter res. Gentamicine	0	0.0°	0.0	0	0.0°	0.0	2	100.0°	1.0
Enterobacter res. Col+Tig+Gent	0	0.0°	0.0	0	0.0°	0.0	1	50.0°	0.5
<i>Serratia</i>	44		4.4	34		4.9	8		4.1
Serratia prod. ESBL	6	13.6*	0.6	2	5.9*	0.3	2	25.0*	1.0
Serratia res. carb.	0	0.0*	0.0	0	0.0*	0.0	0	0.0*	0.0
Serratia res. Colistine	0	0.0°	0.0	0	0.0°	0.0	0	0.0°	0.0
Serratia res. Tigecycline	0	0.0°	0.0	0	0.0°	0.0	0	0.0°	0.0
Serratia res. Gentamicine	0	0.0°	0.0	0	0.0°	0.0	0	0.0°	0.0
Serratia res. Col+Tig+Gent	0	0.0°	0.0	0	0.0°	0.0	0	0.0°	0.0
<i>Pseudomonas aer.</i>	215		21.7	157		22.5	59		30.4
Pseudomonas aer. res. carb.	49	22.8*	4.9	30	19.1*	4.3	19	32.2*	9.8
Pseudomonas res. Colistine	1	2.0°	0.1	0	0.0°	0.0	0	0.0°	0.0
<i>Escherichia Coli</i>	120		12.1	84		12.0	10		5.2
Escherichia Coli prod. ESBL	34	28.3*	3.4	24	28.6*	3.4	4	40.0*	2.1
Escherichia Coli res. carb.	2	1.7*	0.2	1	1.2*	0.1	0	0.0*	0.0
Escherichia Coli res. Colistine	0	0.0°	0.0	0	0.0°	0.0	0	0.0°	0.0
Escherichia Coli res. Tigecycline	0	0.0°	0.0	0	0.0°	0.0	0	0.0°	0.0
Escherichia Coli res. Gentamicine	0	0.0°	0.0	0	0.0°	0.0	0	0.0°	0.0
Escherichia Coli res. Col+Tig+Gent	0	0.0°	0.0	0	0.0°	0.0	0	0.0°	0.0
<i>Proteus</i>	33		3.3	18		2.6	11		5.7
Proteus prod. ESBL	11	33.3*	1.1	1	5.6*	0.1	3	27.3*	1.5
Proteus res. carb.	1	3.0*	0.1	0	0.0*	0.0	1	9.1*	0.5
Proteus res. Colistine	0	0.0°	0.0	0	0.0°	0.0	1	100.0°	0.5
Proteus res. Tigecycline	0	0.0°	0.0	0	0.0°	0.0	1	100.0°	0.5
Proteus res. Gentamicine	1	100.0°	0.1	0	0.0°	0.0	1	100.0°	0.5
Proteus res. Col+Tig+Gent	0	0.0°	0.0	0	0.0°	0.0	1	100.0°	0.5
<i>Citrobacter</i>	16		1.6	12		1.7	3		1.5
Citrobacter prod. ESBL	1	6.2*	0.1	1	8.3*	0.1	0	0.0*	0.0
Citrobacter res. carb.	0	0.0*	0.0	0	0.0*	0.0	0	0.0*	0.0
Citrobacter res. Colistine	0	0.0°	0.0	0	0.0°	0.0	0	0.0°	0.0
Citrobacter res. Tigecycline	0	0.0°	0.0	0	0.0°	0.0	0	0.0°	0.0
Citrobacter res. Gentamicine	0	0.0°	0.0	0	0.0°	0.0	0	0.0°	0.0
Citrobacter res. Col+Tig+Gent	0	0.0°	0.0	0	0.0°	0.0	0	0.0°	0.0
<i>Acinetobacter</i>	138		13.9	90		12.9	47		24.2
Acinetobacter res. carb.	124	89.9*	12.5	80	88.9*	11.4	39	83.0*	20.1
Acinetobacter res. Colistine	2	1.6°	0.2	2	2.5°	0.3	4	10.3°	2.1
Acinetobacter res. Tigecycline	33	36.3°	3.3	26	48.1°	3.7	12	37.5°	6.2
Acinetobacter res. Col+Tig	1	0.8°	0.1	1	1.2°	0.1	3	7.7°	1.5

* % calculated on the number of microorganisms of the same type

°% calculated on the number of microorganisms resistant to carbapenems of the same type. The % includes only microorganisms tested for resistance.

*** For information about how to read the table, see Appendix.

National report (122 ICUs) - Year 2016
Patients infected during the stay

Patients with BACTERAEMIA during the stay (N): 1105

Trauma	N	%
No	877	79.4
Yes	228	20.6
Missing	0	

Surgical status	N	%
Non surgical	735	66.5
Elective surgical	65	5.9
Emergency surgical	305	27.6
Missing	0	

Type	N	%
Primary bacteraemia of unknown origin	314	28.4
Catheter-related bacteremia (CR-BSI)	363	32.9
Secondary bacteraemia	535	48.4
Missing	0	

New episodes beyond the first	N	%
No	566	86.4
Yes	89	13.6
Missing	4	

Patients with BACTERAEMIA (UNKNOWN ORIGIN) during the stay (N): 314

Multi-site infections	N	%
No	163	51.9
Yes	151	48.1
Missing	0	

Incidence of bacteraemia (unknown origin)

(Pts. infected during the stay/pts. with LOS=7 days)

Estimate	0.9%
CI (95%)	0.8–1.0

ICU mortality	N	%
Alive	220	70.1
Dead	94	29.9
Missing	0	

Hospital mortality *	N	%
Alive	182	61.9
Dead	112	38.1
Missing	2	

ICU stay (days)

Mean (SD)	30.8 (25.6)
Median (Q1–Q3)	24 (13–40.8)
Missing	0

Hospital stay (days) *

Mean (SD)	45.9 (33.8)
Median (Q1–Q3)	37.5 (22–61.5)
Missing	2

Patients with CATHETER BACTERAEMIA during the stay (CR-BSI) (N): 363

Multi-site infections	N	%
No	164	45.2
Yes	199	54.8
Missing	0	

Catheter-related local infection	N	%
(N=39244)		
No	39176	100.0
Yes	19	0.0
Missing	49	

Risk factors (N=39244) NULL

Central Venous Catheter	N	%
No	13865	35.4
Yes	25324	64.6
At first day	23763	60.6
Missing	55	

Length (days)

Mean (SD)	7.7 (10.4)
Median (Q1–Q3)	4 (2–10)
Missing	19

Length/ICU LOS (%)

Mean (SD)	94.3 (14.2)
Median (Q1–Q3)	100 (100–100)
Missing	20

CVC days pre-bacteraemia

N	355
Mean (SD)	13.2 (12.1)
Median (Q1–Q3)	10 (5–18)
Missing	8

Incidence of CR-BSI

(Pts. with CR-BSI/1000 days of CVC pre-CR-BSI)

Estimate	1.9
CI (95%)	1.7–2.1

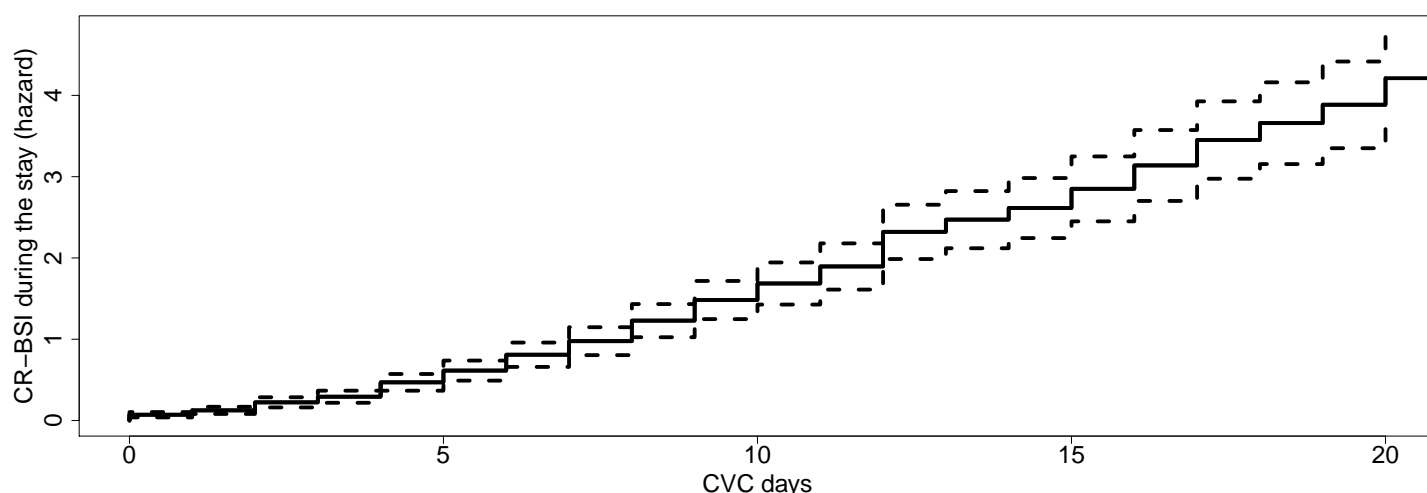
Incidence of CR-BSI

(Pts. with CR-BSI/pts. catheterized for 12 days)

Estimate	2.3%
CI (95%)	2.1–2.5

National report (122 ICUs) - Year 2016**Patients infected during the stay**

Patients with CATHETER BACTERAEMIA during the stay (continua)



ICU mortality	N	%
Alive	259	71.5
Dead	103	28.5
Missing	1	

ICU stay (days)	Mean (SD)	31.7 (25.1)
Median (Q1–Q3)	25 (16–41)	
Missing	1	

Hospital mortality *	N	%
Alive	214	64.5
Dead	118	35.5
Missing	4	

Hospital stay (days) *	Mean (SD)	47.3 (33.7)
Median (Q1–Q3)	38 (25.8–57)	
Missing	4	

Patients with SECONDARY BACTERAEMIA during the stay (N): 535

Associated infections (top 10)	N	%
Pneumonia	250	46.7
L.R.T.I. other than pneumonia	75	14.0
NON-surgical urinary tract infection	53	9.9
Post-surgical peritonitis	37	6.9
Post-surgical skin/soft tissue infection	22	4.1
Upper respiratory tract infection	21	3.9
NON-surgical skin/soft tissue infection	16	3.0
NON-surgical endocarditis	13	2.4
Cholecystitis/cholangitis	12	2.2
Other fungal infections	11	2.1
Missing	25	

Hospital mortality *	N	%
Alive	289	58.3
Dead	207	41.7
Missing	6	

ICU stay (days)	Mean (SD)	28.9 (22.3)
Median (Q1–Q3)	24 (15–36)	
Missing	1	

ICU mortality	N	%
Alive	348	65.2
Dead	186	34.8
Missing	1	

Hospital stay (days) *	Mean (SD)	43.3 (30.9)
Median (Q1–Q3)	35 (22–58)	
Missing	6	

* Statistics computed excluding readmissions from ward.

National report (122 ICUs) - Year 2016 **Patients infected during the stay**

Bacteraemia with isolated microorganism	Primary bacteraemia of unknown origin				Catheter-related bacteremia (CR-BSI)				Bacteraemia (new episode)			
	N	%	N	%	N	%	N	%	N	%	N	%
No	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Yes	314	100.0	363	100.0	363	100.0	92	100.0	92	100.0	119	100.0
Total number of microorganisms isolated	314		363		363		92		92		119	
Missing	0		0		0		0		0		0	

Responsible microorganisms isolated (MDR) ***	MDR				MDR				MDR			
	N	% isolated, N=314	N	% group	N	% isolated, N=363	N	% group	N	% isolated, N=92	N	% group
Bacteria												
Gram +												
Staphylococcus	135	43.0	64	47.4	173	47.7	98	56.6	33	35.9	21	63.6
Staphylococcus Aureus (MRSA)	100	31.8			146	40.2			23	25.0		
Coagulase negative s. (methicillin resistant)	30	9.6	19	63.3	43	11.8	25	58.1	4	4.3	4	100.0
Streptococcus	69	22.0	45	65.2	98	27.0	71	72.4	18	19.6	16	88.9
Pneumococcus (penicillin resistant)	8	2.5			4	1.1			3	3.3		
Enterococcus	1	0.3	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
E. faecalis (vancomycin resistant)	29	9.2			32	8.8			7	7.6		
E. faecium (vancomycin resistant)	18	5.7	1	5.6	23	6.3	1	4.3	4	4.3	0	0.0
Clostridium difficile	11	3.5	1	9.1	9	2.5	1	11.1	2	2.2	1	50.0
	0	0.0			0	0.0			0	0.0		
Gram -	162	51.6	74	45.7	172	47.4	102	59.3	57	62.0	39	68.4
Klebsiella (prod. ESBL)	67	21.3	38	56.7	66	18.2	48	72.7	26	28.3	20	76.9
Enterobacter (prod. ESBL)	24	7.6	6	25.0	29	8.0	9	31.0	7	7.6	2	28.6
Serratia (prod. ESBL)	13	4.1	0	0.0	13	3.6	1	7.7	6	6.5	0	0.0
Pseudomonas aer.	22	7.0			21	5.8			13	14.1		
MDR pseudomonas aer. sensitive to carbapenems			5	22.7			7	33.3			3	23.1
MDR pseudomonas aer. resistant to carbapenems			9	40.9			8	38.1			5	38.5
Escherichia coli (prod. ESBL)	19	6.1	5	26.3	21	5.8	4	19.0	5	5.4	0	0.0
Proteus (prod. ESBL)	4	1.3	1	25.0	9	2.5	6	66.7	0	0.0	0	0.0
Acinetobacter (resistant to carbapenems)	14	4.5	13	92.9	23	6.3	21	91.3	12	13.0	12	100.0
Stenotrophomonas			1	100.0			3	100.0			2	100.0
Haemophilus influenzae	2	0.6			0	0.0			0	0.0		
Legionella	0	0.0			0	0.0			0	0.0		
Citrobacter (prod. ESBL)	5	1.6	1	20.0	2	0.6	1	50.0	0	0.0	0	0.0
Neisseria meningitidis	0	0.0			0	0.0			0	0.0		
Fungi												
Candida	26	8.3			33	9.1			9	9.8		
Candida albicans (azole resistant)	21	6.7	1	4.8	20	5.5	3	15.0	6	6.5	1	16.7
Candida non albicans (azole resistant)	4	1.3	1	25.0	14	3.9	4	28.6	4	4.3	2	50.0
Aspergillus sp.	0	0.0			0	0.0			0	0.0		
Pneumocistis carinii	0	0.0			0	0.0			0	0.0		
Virus	0	0.0			0	0.0			1	1.1		
Other												
Mycobacteria	0	0.0			0	0.0			0	0.0		
Mycobacteria (atypical pneumonia)	0	0.0			0	0.0			0	0.0		
Other	17	5.4			6	1.7			4	4.3		
Total			139	44.3			198	54.5			58	63.0
Total (coagulase negative s. methicillin resistant excluded)			96	30.6			131	36.1			45	48.9

*** For information about how to read the table, see Appendix.

National report (122 ICUs) - Year 2016

Patients infected during the stay

	Primary bacteraemia of unknown origin		Catheter-related bacteremia (CR-BSI)		Bacteraemia (new episode)	
Bacteraemia with isolated microorganism	N	%	N	%	N	%
No	0	0.0	0	0.0	0	0.0
Yes	314	100.0	363	100.0	92	100.0
Total number of microorganisms isolated	355		412		119	
Missing	0		0		0	

Responsible microorganisms isolated (MDR) ***	N	% group	% isolated, N=314	N	% group	% isolated, N=363	N	% group	% isolated, N=92
Gram -									
<i>Klebsiella</i>	67		21.3	66		18.2	26		28.3
Klebsiella prod. ESBL	38	56.7*	12.1	48	72.7*	13.2	20	76.9*	21.7
Klebsiella res. carb.	26	38.8*	8.3	33	50.0*	9.1	14	53.8*	15.2
Klebsiella res. Colistine	9	36.0°	2.9	8	24.2°	2.2	2	14.3°	2.2
Klebsiella res. Tigecycline	9	42.9°	2.9	12	40.0°	3.3	6	50.0°	6.5
Klebsiella res. Gentamicine	15	60.0°	4.8	21	65.6°	5.8	10	71.4°	10.9
Klebsiella res. Col+Tig+Gent	2	9.1°	0.6	3	9.4°	0.8	1	7.7°	1.1
<i>Enterobacter</i>	24		7.6	29		8.0	7		7.6
Enterobacter prod. ESBL	6	25.0*	1.9	9	31.0*	2.5	2	28.6*	2.2
Enterobacter res. carb.	2	8.3*	0.6	0	0.0*	0.0	1	14.3*	1.1
Enterobacter res. Colistine	0	0.0°	0.0	0	0.0°	0.0	0	0.0°	0.0
Enterobacter res. Tigecycline	1	50.0°	0.3	0	0.0°	0.0	1	100.0°	1.1
Enterobacter res. Gentamicine	1	50.0°	0.3	0	0.0°	0.0	0	0.0°	0.0
Enterobacter res. Col+Tig+Gent	0	0.0°	0.0	0	0.0°	0.0	0	0.0°	0.0
<i>Serratia</i>	13		4.1	13		3.6	6		6.5
Serratia prod. ESBL	0	0.0*	0.0	1	7.7*	0.3	0	0.0*	0.0
Serratia res. carb.	0	0.0*	0.0	0	0.0*	0.0	0	0.0*	0.0
Serratia res. Colistine	0	0.0°	0.0	0	0.0°	0.0	0	0.0°	0.0
Serratia res. Tigecycline	0	0.0°	0.0	0	0.0°	0.0	0	0.0°	0.0
Serratia res. Gentamicine	0	0.0°	0.0	0	0.0°	0.0	0	0.0°	0.0
Serratia res. Col+Tig+Gent	0	0.0°	0.0	0	0.0°	0.0	0	0.0°	0.0
<i>Pseudomonas aer.</i>	22		7.0	21		5.8	13		14.1
Pseudomonas aer. res. carb.	9	40.9*	2.9	8	38.1*	2.2	5	38.5*	5.4
Pseudomonas res. Colistine	0	0.0°	0.0	0	0.0°	0.0	1	20.0°	1.1
<i>Escherichia Coli</i>	19		6.1	21		5.8	5		5.4
Escherichia Coli prod. ESBL	5	26.3*	1.6	4	19.0*	1.1	0	0.0*	0.0
Escherichia Coli res. carb.	1	5.3*	0.3	1	4.8*	0.3	0	0.0*	0.0
Escherichia Coli res. Colistine	0	0.0°	0.0	0	0.0°	0.0	0	0.0°	0.0
Escherichia Coli res. Tigecycline	0	0.0°	0.0	0	0.0°	0.0	0	0.0°	0.0
Escherichia Coli res. Gentamicine	1	100.0°	0.3	0	0.0°	0.0	0	0.0°	0.0
Escherichia Coli res. Col+Tig+Gent	0	0.0°	0.0	0	0.0°	0.0	0	0.0°	0.0
<i>Proteus</i>	4		1.3	9		2.5	0		0.0
Proteus prod. ESBL	1	25.0*	0.3	6	66.7*	1.7	0	0.0*	0.0
Proteus res. carb.	0	0.0*	0.0	0	0.0*	0.0	0	0.0*	0.0
Proteus res. Colistine	0	0.0°	0.0	0	0.0°	0.0	0	0.0°	0.0
Proteus res. Tigecycline	0	0.0°	0.0	0	0.0°	0.0	0	0.0°	0.0
Proteus res. Gentamicine	0	0.0°	0.0	0	0.0°	0.0	0	0.0°	0.0
Proteus res. Col+Tig+Gent	0	0.0°	0.0	0	0.0°	0.0	0	0.0°	0.0
<i>Citrobacter</i>	5		1.6	2		0.6	0		0.0
Citrobacter prod. ESBL	1	20.0*	0.3	1	50.0*	0.3	0	0.0*	0.0
Citrobacter res. carb.	0	0.0*	0.0	0	0.0*	0.0	0	0.0*	0.0
Citrobacter res. Colistine	0	0.0°	0.0	0	0.0°	0.0	0	0.0°	0.0
Citrobacter res. Tigecycline	0	0.0°	0.0	0	0.0°	0.0	0	0.0°	0.0
Citrobacter res. Gentamicine	0	0.0°	0.0	0	0.0°	0.0	0	0.0°	0.0
Citrobacter res. Col+Tig+Gent	0	0.0°	0.0	0	0.0°	0.0	0	0.0°	0.0
<i>Acinetobacter</i>	14		4.5	23		6.3	12		13.0
Acinetobacter res. carb.	13	92.9*	4.1	21	91.3*	5.8	12	100.0*	13.0
Acinetobacter res. Colistine	2	16.7°	0.6	0	0.0°	0.0	1	8.3°	1.1
Acinetobacter res. Tigecycline	3	37.5°	1.0	6	40.0°	1.7	2	28.6°	2.2
Acinetobacter res. Col+Tig	1	8.3°	0.3	0	0.0°	0.0	1	8.3°	1.1

* % calculated on the number of microorganisms of the same type

° % calculated on the number of microorganisms resistant to carbapenems of the same type. The % includes only microorganisms tested for resistance.

*** For information about how to read the table, see Appendix.