



MALAYSIAN REGISTRY OF INTENSIVE CARE



2016 REPORT

Malaysian Registry of Intensive Care

Report for 2016

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FOREWORD

It has been close to 15 years since the Malaysian Registry of Intensive Care was established. It first started out as the National Audit of Adult Intensive Care Unit (NAICU) in 2002 as part of Ministry of Health's quality improvement initiative before becoming part of the Patient Registry under the purview of Clinical Research Centre Ministry of Health in 2009. Among its objective is to construct a database of critically ill adult patients admitted to the intensive care units in Malaysia.

In all field of medicines, including intensive care whereby data are vast, a systematic and structured data collection is of utmost importance. It has helped us to improve the care given to patients by allowing us to study the demographic of our patients, incidence and their outcomes and looking at certain trends. It has also helped in better healthcare resource planning and allocation. It is also needed for us to assess our performance in between hospitals and also internationally.

Thus, undeniably this is an immense responsibility. The ongoing success of this clinical audit is dependent on the hard work and commitment of a large number of individuals, from the members of the technical committee for analysing the data and producing this report to the source data providers and site investigators for collecting and ensuring accuracy of the data within their own intensive care units.

Lastly, I would also like to thank the National Clinical Research Centre, Health Informatics Centre and Medical Development Division, Ministry of Health for their unwavering support.

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No.	Name of hospital	Abbreviation
Sites since 2002		
1.	Hospital Sultanah Bahiyah Alor Setar	AS
2.	Hospital Pulau Pinang	PP
3.	Hospital Raja Permaisuri Bainun Ipoh	IPH
4.	Hospital Kuala Lumpur	KL
5.	Hospital Selayang	SLG
6.	Hospital Tengku Ampuan Rahimah Klang	KLK
7.	Hospital Tuanku Ja'afar Seremban	SBN
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9.	Hospital Sultanah Aminah Johor Bahru	JB
10.	Hospital Tengku Ampuan Afzan Kuantan	KTN
11.	Hospital Sultanah Nur Zahirah Kuala Terengganu	KT
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14.	Hospital Queen Elizabeth Kota Kinabalu	KK
Sites since 2005		
15.	Hospital Sultan Abdul Halim Sungai Petani	SP
16.	Hospital Putrajaya	PJY
17.	Hospital Pakar Sultanah Fatimah Muar	MUR
18.	Hospital Teluk Intan	TI
19.	Hospital Taiping	TPG
20.	Hospital Seberang Jaya	SJ
21.	Hospital Kajang	KJG
22.	Hospital Tuanku Fauziah Kangar	KGR
Sites since 2006		
23.	Hospital Sultan Haji Ahmad Shah Temerloh	TML
24.	Hospital Tuanku Ampuan Najihah Kuala Pilah	KP
25.	Hospital Sri Manjung	SMJ
26.	Hospital Batu Pahat	BP
27.	Hospital Tawau	TW
28.	Hospital Miri	MRI
29.	Hospital Kulim	KLM
30.	Hospital Serdang	SDG
Sites since 2010		
31.	Hospital Sibu	SB
32.	Hospital Duchess of Kent Sandakan	DKS
33.	Hospital Sultan Ismail Johor Bahru	SI
34.	Hospital Sungai Buloh	SBL
35.	Hospital Ampang	AMP
36.	Hospital Wanita dan Kanak-Kanak Sabah	LIK
Sites since 2012		
37.	University Malaya Medical Centre	UMMC
38.	Langkawi	LKW
39.	Bukit Mertajam	BM
40.	Slim River	SLR
41.	Port Dickson	PD
42.	Kuala Krai	KKR
43.	Segamat	SGT
44.	Tanah Merah	TM
45.	Kemaman	KEM
46.	Kuala Lipis	KLP
47.	Labuan	LAB
48.	Keningau	KEN
49.	Bintulu	BIN
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ABBREVIATIONS

Adm.	Admission
AKI	Acute kidney injury
ALI	Acute lung injury
AMO	Assistant medical officer
AOR	At own risk
APACHE II	Acute Physiologic and Chronic Health Evaluation (Version II)
ARDS	Acute respiratory distress syndrome
BOR	Bed occupancy rate
CRBSI	Catheter-related bloodstream infection
CRE	Carbapenem-resistant enterobacteriaceae
CRRT	Continuous renal replacement therapy
CVC	Central venous catheter
CVC-BSI	Central venous catheter-related bloodstream infection
ED	Emergency department
ENT	Otorhinolaryngology
ESBL	Extended spectrum beta-lactamase
HD	Haemodialysis
HDU	High dependency unit
Hosp	Hospital
Hrs	Hours
ICU	Intensive care unit
MOH	Ministry of Health
MRIC	Malaysian Registry of Intensive Care
MRO	Multi-drug resistant organism
MRSA	Methicillin-resistant <i>Staphylococcus aureus</i>
MSSA	Methicillin-sensitive <i>Staphylococcus aureus</i>
NIV	Non-invasive ventilation
No./n	Number
O&G	Obstetrics & Gynaecology
PaCO ₂	Partial pressure of arterial carbon dioxide
PaO ₂	Partial pressure of arterial oxygen
Refer.	Referred
SAPS II	Simplified Acute Physiologic Scoring System (Version II)
SD	Standard deviation
SIRS	Systemic inflammatory response syndrome
SMR	Standardised mortality ratio
SN	Staff nurse
SOFA	Sequential Organ Failure Assessment
Sr	Sister
SPSS	Statistical Package for Social Sciences
VAP	Ventilator-associated pneumonia
VCB	Ventilator care bundle
VRSA	Vancomycin-resistant <i>Staphylococcus aureus</i>
Yrs	Years

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INTRODUCTION

The National Audit on Adult Intensive Care Units (NAICU) was established in 2002 and later renamed the Malaysian Registry of Intensive Care (MRIC).

MRIC is a clinical audit that collects organisational and clinical data on all patients admitted to the general intensive care units in Ministry of Health hospitals in Malaysia. Its objectives are to:

1. provide information on delivery of care
2. compare activities and outcomes between ICUs
3. promote quality improvement

A national report is produced annually that includes summary of bed activity, demographics, diagnosis and severity of illness, organ support, performance indicators, length of stay and mortality outcomes and quality improvement activities. Comparisons between ICUs are made to assess how well they perform against established clinical standards and guidelines.

Data Collection

Data were collected prospectively by trained nurses (source data providers) and doctors (site investigators) guided by a written protocol and entered directly into a central depository via a web-based programme by individual centres. Each centre was responsible for their data accuracy and able to view and download their data and findings.

The data were then merged, cleaned and verified before being analysed using SPSS version 20.0.0.

The total number of admissions to the 50 participating ICUs over a period of a year from 1st January to 31st December 2016 was 40,466, out of which 2,707 (6.7%) were readmissions. Only the first admission was included in the analysis for patients with multiple ICU admissions. Hence, data were presented on 37,759 admissions. A full list of participating ICUs can be found in page 8.

The sum of some variables shown in the tables may not add up to the total number of admissions due to either missing data or data inconsistencies.

Data Limitations

Limitations to the registry data were mainly related to data collection and data entry. Some of the participating ICUs experienced rapid turnover of their site investigators and source data providers resulting in under-reporting and data inconsistency.

SECTION A: BED ACTIVITY

- i. Number of ICU beds
- ii. Bed occupancy rate
- iii. Number of ICU admissions

Findings:

1. The total number of ICU beds in the 50 hospitals in Ministry of Health as of 31st December 2016 was 668 vs. 660 at the same time the previous year.
2. The median bed occupancy rate was 87.7%.
(Currently, there does not appear to be definitive evidence on what the optimal target for ICU occupancy should be, however, it could be around 70–75%. Ref: Thirney LT et.al. Australian Crit Care 2014(27):77-84)
3. The number of ICU admissions was 37759, a decrease of 4.6% when compared to the year 2015. This could be attributed to the lesser number of admissions in Hospital Sultanah Aminah, Johor Bahru following the fire in October 2016. This ICU used to contribute about 5% of total admissions in the previous years but had dropped to 1.6% in 2016.

Table 1: Number of ICU beds and bed occupancy rate, 2012 - 2016

Hospital	Number of functional ICU beds (on 31-12-16)	ICU bed occupancy rate (admission throughput), %				
		2012	2013	2014	2015	2016
AS	10	96.7	93.3	88.8	86.1	70.0
PP	24	88.7	90.9	90.5	94.0	93.5
IPH	25	106.0	104.0	109.0	107.0	83.5
KL	30	111.7	110.6	114.1	112.7	112.7
SLG	25	99.8	101.8	92.7	99.2	101.6
KLG	32	108.3	105.9	112.9	110.8	87.9
SBN	8	114.6	108.3	111.7	112.5	94.0
MLK	22	107.9	97.5	90.7	91.6	92.3
JB	29	105.6	109.4	109.0	107.9	110.1
KTN	27	106.4	106.5	110.3	127.7	104.5
KT	21	103.6	104.6	94.2	105.2	107.6
KB	21	80.0	96.2	109.2	92.2	97.1
KCH	16	125.9	101.0	107.6	104.5	104.8
KK	26	93.4	95.9	90.9	98.6	100.0
SP	16	84.9	92.5	82.7	80.3	74.1
PJY	11	75.2	71.2	84.7	94.7	95.1
MUR	8	97.5	97.5	94.2	90.1	64.4
TI	4	123.8	105.2	114.0	112.0	109.0
TPG	20	92.7	84.7	81.4	102.0	106.6
SJ	13	99.1	80.2	81.3	101.0	86.2
KJG	6	77.2	77.1	84.2	82.5	83.7
KGR	11	77.3	78.1	80.8	94.5	81.7
TML	18	113.0	127.0	88.8	82.1	87.3
KP	8	61.8	72.4	91.7	80.9	82.2
SMJ	6	92.7	85.5	92.4	83.5	92.2
BP	10	87.0	79.6	74.8	72.0	67.0
TW	10	80.7	70.0	78.2	61.6	87.1
MRI	8	76.1	79.6	101.3	95.0	96.3
KLM	8	100.5	95.4	100.2	102.2	96.8
SDG	20	50.4	84.4	85.7	91.6	94.7
SB	17	60.0	120.5	144.0	151.7	118.9
DKS	18	87.9	99.1	82.2	79.2	78.7
SI	21	86.2	90.2	85.1	90.3	82.9
SBL	38	94.6	94.0	115.7	94.6	108.9
AMP	12	45.7	82.9	74.4	90.4	89.0
LIK	9	76.9	106.0	103.4	72.6	82.0
LKW	4	67.0	67.4	59.1	69.0	72.8
BM	7	65.6	106.8	100.9	110.5	113.7
SLR	5	76.0	71.0	79.3	76.0	78.0
PD	4	85.5	65.6	86.0	89.8	80.3
KKR	6	69.8	85.2	87.1	86.0	85.0
SGT	4	58.1	89.7	75.0	70.8	92.8
TM	5	68.7	74.0	113.2	151.4	66.2
KEM	2	59.6	50.9	-	-	-
KLP	4	21.8	53.0	54.2	82.6	81.8
LAB	5	30.7	41.2	45.5	48.5	48.5
KEN	4	90.4	78.0	80.3	70.0	74.5
BIN	6	88.3	63.2	59.7	57.0	66.5
LD	4	104.2	101.2	103.1	88.6	87.5
Total	668	-	-	-	-	-
Median BOR	-	86.2	90.2	90.5	91.6	87.7

Table 2: Number of ICU admissions, 2012 – 2016

Hospital	2012 n (%)	2013 n(%)	2014 n (%)	2015 n (%)	2016 (%)
AS	1201 (3.5)	1347 (3.6)	1331 (3.4)	1363 (3.4)	1135 (3.0)
PP	1287 (3.8)	1121 (3.0)	1134 (2.9)	1172 (3.0)	1293 (3.4)
IPH	926 (2.7)	1203 (3.2)	1217 (3.1)	1328 (3.4)	1040 (2.8)
KL	1971 (5.8)	1905 (5.1)	2144 (5.5)	1985 (5.0)	2003 (5.3)
SLG	1289 (3.8)	1507 (4.0)	1426 (3.7)	1392 (3.5)	1166 (3.1)
KLG	2136 (6.3)	2065 (5.5)	2281 (5.9)	2184 (5.5)	2011 (5.3)
SBN	537 (1.6)	471 (1.3)	541 (1.4)	542 (1.4)	546 (1.4)
MLK	1694 (5.0)	1673 (4.5)	1432 (3.7)	1430 (3.6)	1323 (3.5)
JB	1752 (5.2)	1931 (5.2)	1687 (4.3)	1719 (4.3)	612 (1.6)
KTN	641 (1.9)	837 92.2)	1062 (2.7)	1043 (2.6)	987 (2.6)
KT	1363 (4.0)	1180 (3.2)	1172 (3.0)	1398 (3.5)	1398 (3.7)
KB	1286 (3.8)	1337 (3.6)	1607 (4.1)	1267 (3.2)	1525 (4.0)
KCH	854 (2.5)	950 (2.5)	1140 (2.9)	1143 (2.9)	1067 (2.8)
KK	954 (2.8)	1022 (2.7)	987 (2.5)	925 (2.3)	1011 (2.7)
SP	159 (0.5)	583 (1.6)	953 (2.4)	1015 (2.6)	925 (2.4)
PJY	574 (1.7)	606 (1.6)	654 (1.7)	764 (1.9)	766 (2.0)
MUR	636 (1.9)	675 (1.8)	600 (1.5)	611 (1.5)	545 (1.4)
TI	384 (1.1)	401 (1.1)	406 (1.0)	424 (1.1)	374 (1.0)
TPG	1203 (3.5)	1348 (3.6)	1182 (3.0)	1126 (2.8)	1192 (3.2)
SJ	644 (1.9)	413 (1.1)	409 (1.1)	475 (1.2)	567 (1.5)
KJG	371 (1.1)	321 (0.9)	284 (0.7)	464 (1.2)	470 (1.2)
KGR	350 (1.1)	322 (0.9)	341 (0.9)	355 (0.9)	604 (1.6)
TML	436 (1.3)	599 (1.6)	837 (2.2)	828 (2.1)	863 (2.3)
KP	334 (1.0)	394 (1.1)	512 (1.3)	545 (1.4)	566 (1.5)
SMJ	403 (1.2)	376 (1.0)	432 (1.1)	441 (1.1)	454 (1.2)
BP	415 (1.2)	459 (1.2)	459 (1.2)	546 (1.4)	697 (1.8)
TW	433 (1.3)	449 (1.2)	498 (1.3)	444 (1.1)	439 (1.2)
MRI	478 (1.4)	481 (1.3)	428 (1.1)	377 (1.0)	397 (1.1)
KLM	601 (1.8)	561 (1.5)	555 (1.4)	526 (1.3)	590 (1.6)
SDG	875 (2.6)	851 (2.3)	835 (2.1)	756 (1.9)	776 (2.1)
SB	490 (1.4)	506 (1.4)	431 (1.1)	1275 (3.2)	1392 (3.7)
DKS	526 (1.6)	964 (2.6)	950 (2.4)	923 (2.3)	767 (2.0)
SI	806 (2.4)	970 (2.6)	1131 (2.9)	1473 (3.7)	1189 (3.1)
SBL	1583 (4.7)	1922 (5.1)	2284 (5.9)	2313 (5.8)	2060 (5.5)
AMP	572 (1.7)	566 (1.5)	634 (1.6)	671 (1.7)	661 (1.8)
LIK	270 (0.8)	517 (1.4)	353 (0.9)	154 (0.4)	297 (0.8)
UMMC	474 (1.4)	883 (2.4)	1344 (3.5)	1294 (3.3)	1133 (3.0)
LKW	157 (0.5)	180 (0.5)	165 (0.4)	195 (0.5)	146 (0.4)
BM	38 (0.1)	158 (0.4)	141 (0.4)	218 (0.6)	259 (0.7)
SLR	154 (0.5)	225 (0.6)	223 (0.6)	201 (0.5)	189 (0.5)
PD	204 (0.6)	245 (0.7)	265 (0.7)	230 (0.6)	249 (0.7)
KKR	149 (0.4)	240 (0.6)	260 (0.7)	391 (1.0)	485 (1.3)
SGT	127 (0.4)	159 (0.4)	150 (0.4)	290 (0.7)	323 (0.9)
TM	17 (0.1)	127 (0.3)	160 (0.4)	308 (0.8)	274 (0.7)
KEM	94 (0.3)	105 (0.3)	91 (0.2)	179 (0.5)	124 (0.3)
KLP	7 (0.0)	116 (0.3)	96 (0.2)	107 (0.3)	103 (0.3)
LAB	107 (0.3)	165 (0.4)	166 (0.4)	184 (0.5)	192 (0.5)
KEN	82 (0.2)	161 (0.4)	144 (0.4)	136 (0.3)	106 (0.3)
BIN	213 (0.6)	260 (0.7)	283 (0.7)	315 (0.8)	303 (0.8)
LD	168 (0.5)	244 (0.7)	217 (0.6)	150 (0.4)	165 (0.4)
Total	33892 (100)	37436 (100)	38904 (100)	39595 (100)	37759 (100)

SECTION B: DEMOGRAPHICS

- i. Gender**
- ii. Age**
- iii. Ethnicity**
- iv. Category of patients**

Findings:

- 1. The percentage of males was 59.5%.
- 2. The average age for all patients was 46.0 years (median 47.9 years). For adults (above 18 years of age), the average age at admission was 49.6 years (median 51.0 years).
- 3. Malays, Chinese and Indians made up 58.6%, 14.6% and 9.7% of admissions respectively, while the foreigners contributed 5.5%.
- 4. Two thirds (67.6%) of admissions were categorised as non-operative.
- 5. Seventy percent (70.6%) of operative admissions were emergency in nature.

Figure 1: Gender, 2016

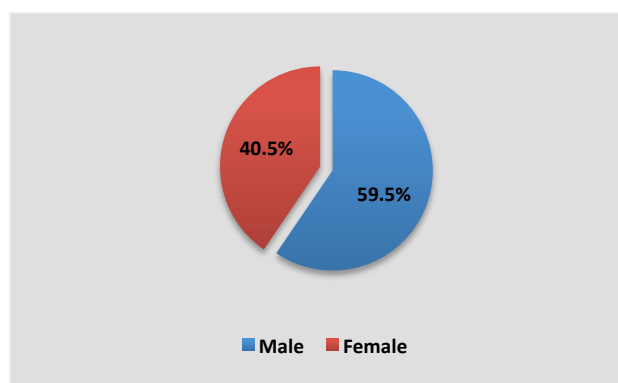


Table 3: Age, 2012 – 2016

Age	2012	2013	2014	2015	2016
All ages, Mean $\pm$ SD yrs	46.6 $\pm$ 20.7	46.5 $\pm$ 20.6	45.9 $\pm$ 20.6	45.9 $\pm$ 20.2	46.0 $\pm$ 20.3
Age $\geq$ 18 years Mean $\pm$ SD yrs	50.3 $\pm$ 17.8	50.3 $\pm$ 17.7	49.7 $\pm$ 17.8	49.5 $\pm$ 17.5	49.6 $\pm$ 17.6

Table 4: Ethnicity, 2016

Ethnic group	n	%
Malay	22067	58.6
Chinese	5511	14.6
Indian	3643	9.7
Bumiputra Sabah/Sarawak	3574	9.5
Foreigner	2070	5.5
Other Malaysian	561	1.5
Orang Asli	212	0.6
Unknown	37	0.1
Total	37759	100

Table 5: Category of patients, 2012 - 2016

Category of patients	2012 (%)	2013 (%)	2014 (%)	2015 (%)	2016 (%)
Non-operative	65.1	66.1	67.8	69.1	67.6
Elective operative	10.3	10.4	9.4	8.8	9.5
Emergency operative	24.6	23.6	22.8	22.0	22.8

SECTION C: DIAGNOSIS AND SEVERITY OF ILLNESS

- i. **Diagnosis leading to ICU admission**
- ii. **Severe sepsis, acute respiratory distress syndrome and acute kidney injury within 24hrs of ICU admission**
- iii. **Organ failure**
- iv. **SAPS II score**
- v. **SOFA score**

Findings:

1. Sepsis, dengue and head injury were the three most common diagnoses leading to ICU admission.
2. About a third (32.5%) of the admissions did not have any organ failure during the first 24 hours of ICU admission. Another third (35.8%) had multiple organ failure (≥ 2 organs).
3. Among those with organ failure, cardiovascular failure (39.8%) was the most common followed by respiratory failure (21.9%).
4. During the first 24 hours of ICU admission, 16.6%, of patients had severe sepsis, while 6.1% and 15.7% had acute respiratory distress syndrome and acute kidney injury respectively.
5. The average SAPS II and SOFA scores had remained similar over the past five years. The average SAPS II score for 2016 was 37.5; which carries a predicted risk of in-hospital mortality of 30.4%.
6. The average SOFA score was 6.5 and the median was 6.0.

Table 6: Ten most common diagnoses leading to ICU admission, 2016

Diagnosis	Number	Percentage
Sepsis	3313	8.8
Head Injury	2816	7.5
Dengue	2760	7.3
Community-acquired pneumonia	2146	5.7
Cerebrovascular disease (infarct, thrombosis, haemorrhage)	1229	3.3
Infection/gangrene of limb (including osteomyelitis, necrotizing fasciitis)	1196	3.2
Diabetic ketoacidosis / diabetic hyperosmolar hyperglycaemic state	1162	3.1
Bronchial asthma	1157	3.1
Chronic lower respiratory disease	1042	2.8
Non-cardiogenic pulmonary oedema	917	2.4

Table 7: Main organ failure on ICU admission, 2016

Organ failure	Number	Percentage
Without organ failure	10314	31.4
Cardiovascular	8977	27.3
Respiratory	4929	15.0
Neurological	4404	13.4
Renal	2220	6.8
Haematological	1675	5.1
Hepatic	314	1.0
Total	32833	100.0

Table 8: Number of organ failure on ICU admission, 2016

No. of organ failure	Number	Percentage
Without	10672	32.5
Single	10418	31.7
Two	7288	22.2
Three	3372	10.3
Four	925	2.8
Five	136	0.4
Six	21	0.1
Total	32832	100.0

Table 9: SAPS II score, 2012 – 2016

Hospital	SAPS II score, mean (median)				
	2012	2013	2014	2015	2016
AS	40.1	39.4	41.0	38.0 (36.0)	38.5 (37.0)
PP	36.5	35.8	36.1	39.0 (37.0)	41.5 (39.5)
IPH	32.0	34.0	34.2	33.8 (31.0)	34.6 (34.0)
KL	38.9	40.4	36.8	37.6 (36.0)	37.3 (35.5)
SLG	36.0	35.7	34.2	29.8 (27.0)	27.7 (25.0)
KLG	36.9	35.3	33.1	33.3 (31.0)	34.5 (32.0)
SBN	39.2	37.3	35.0	32.6 (31.0)	30.2 (27.0)
MLK	36.8	31.8	33.5	34.4 (31.0)	36.4 (34.0)
JB	40.7	31.8	40.2	41.7 (40.0)	38.8 (37.0)
KTN	39.8	38.6	37.1	36.6 (35.0)	34.9 (33.0)
KT	41.5	42.0	40.2	40.8 (38.5)	39.2 (38.0)
KB	34.4	34.3	29.6	32.8 (31.0)	28.7 (26.0)
KCH	33.0	33.7	31.4	33.1 (29.0)	33.6 (29.0)
KK	33.2	35.1	40.6	43.9 (44.0)	46.9 (47.0)
SP	43.3	39.7	37.9	33.9 (31.0)	33.1 (30.0)
PJY	28.0	29.5	32.0	27.7 (23.0)	28.2 (23.0)
MUR	37.6	38.4	39.8	39.2 (37.0)	38.1 (37.0)
TI	41.1	43.7	43.0	37.2 (34.0)	34.6 (30.0)
TPG	40.4	39.7	39.4	41.0 (40.0)	41.7 (39.0)
SJ	38.9	41.9	38.3	43.7 (45.0)	42.7 (41.0)
KJG	31.7	32.9	31.7	28.4 (26.0)	33.6 (29.0)
KGR	35.3	36.6	30.9	31.3 (28.5)	42.5 (38.0)
TML	34.5	31.5	33.7	33.9 (32.0)	34.2 (33.0)
KP	41.2	39.9	37.3	34.7 (32.0)	35.5 (32.0)
SMJ	40.0	40.5	39.8	36.7 (34.0)	40.6 (40.0)
BP	43.4	40.1	41.0	35.8 (33.0)	33.7 (30.0)
TW	41.4	38.8	33.1	33.1 (29.0)	36.6 (34.0)
MRI	35.5	35.6	35.6	37.1 (37.0)	44.7 (44.0)
KLM	42.7	44.6	45.0	44.6 (41.0)	44.6 (43.0)
SDG	41.9	40.8	40.9	39.8 (44.0)	43.5 (45.0)
SB	40.4	43.9	41.7	35.0 (33.0)	35.1 (34.0)
DKS	38.0	39.3	37.7	36.5 (34.0)	39.5 (38.0)
SI	38.1	38.4	33.2	34.0 (33.0)	37.2 (35.0)
SBL	39.1	31.5	34.4	38.3 (40.0)	43.3 (44.0)
AMP	48.6	45.9	45.9	44.6 (43.5)	46.0 (44.0)
LIK	21.1	15.2	15.5	21.3 (17.0)	27.4 (18.0)
UMMC	36.5	36.5	37.4	37.8 (35.0)	37.4 (35.0)
LKW	41.2	29.3	39.2	44.9 (45.0)	41.0 (39.0)
BM	42.8	47.5	54.4	54.7 (55.5)	55.8 (57.0)
SLR	47.9	38.8	46.5	46.1 (47.0)	43.7 (41.0)
PD	31.3	33.8	28.3	32.1 (27.0)	31.7 (29.0)
KKR	36.0	44.0	44.3	43.2 (39.0)	39.7 (30.0)
SGT	39.9	43.8	45.1	43.9 (40.0)	40.5 (35.5)
TM	25.3	35.9	39.6	41.4 (38.0)	43.2 (38.0)
KEM	39.2	38.7	38.3	38.8 (39.0)	42.3 (45.5)
KLP	8.4	26.9	29.7	30.9 (26.0)	36.4 (36.0)
LAB	40.0	45.7	56.3	43.7 (43.0)	34.8 (30.0)
KEN	44.9	34.3	37.3	32.6 (31.0)	29.3 (26.0)
BIN	33.5	32.4	36.6	39.4 (36.0)	36.4 (33.5)
LD	48.8	43.3	45.1	44.9 (45.0)	50.0 (50.0)
Total	37.3	36.5	36.3	36.8 (35.0)	37.5 (35.0)

Table 10: Sequential Organ Failure Assessment (SOFA), 2012 – 2016

Hospital	SOFA score, mean (median)				
	2012	2013	2014	2015	2016
AS	7.3 (7)	7.1 (7)	7.4 (7)	6.8 (7.0)	7.0 (7.0)
PP	6.7 (6)	6.9 (6)	7.1 (7)	7.3 (7.0)	7.4 (7.0)
IPH	5.4 (5)	5.9 (5)	6.1 (5)	6.2 (5.0)	6.6 (6.0)
KL	7.0 (7)	7.2 (7)	6.9 (6)	7.1 (7.0)	6.8 (7.0)
SLG	6.7 (6)	6.8 (6)	6.6 (6)	6.3 (6.0)	5.4 (5.0)
KLG	7.4 (7)	7.0 (7)	6.7 (6)	6.7 (6.0)	6.6 (6.0)
SBN	7.0 (7)	7.3 (7)	6.7 (6)	6.8 (6.0)	6.4 (6.0)
MLK	6.1 (6)	5.1 (4)	4.6 (4)	4.9 (4.0)	5.3 (5.0)
JB	7.4 (7)	7.6 (7)	7.3 (7)	8.0 (8.0)	7.3 (7.0)
KTN	7.0 (7)	7.0 (6)	6.3 (6)	5.9 (5.0)	5.5 (5.0)
KT	6.6 (6)	6.8 (7)	6.6 (6)	7.0 (7.0)	6.9 (7.0)
KB	5.3 (4)	5.5 (5)	4.6 (4)	5.6 (5.0)	4.6 (4.0)
KCH	5.4 (4)	5.7 (5)	5.0 (4)	5.7 (5.0)	5.9 (5.0)
KK	5.7 (5)	6.2 (6)	6.7 (6)	7.2 (6.0)	7.4 (6.0)
SP	6.8 (6)	7.0 (6)	7.3 (7)	6.6 (6.0)	6.5 (6.0)
PJY	4.2 (3)	5.0 (4)	5.1 (4)	4.2 (3.0)	4.2 (3.0)
MUR	5.5 (5)	5.5 (5)	6.0 (5)	5.8 (5.0)	5.6 (5.0)
TI	7.4 (7)	7.8 (7)	8.1 (7)	7.9 (7.0)	7.8 (6.0)
TPG	7.1 (7)	6.8 (6)	7.0 (7)	7.5 (7.0)	7.9 (8.0)
SJ	6.2 (6)	7.3 (7)	6.2 (5)	6.3 (6.0)	6.6 (6.0)
KJG	5.6 (5)	6.1 (5)	6.1 (6)	6.0 (5.0)	6.7 (6.0)
KGR	5.5 (5)	5.6 (5)	4.7 (4)	4.9 (4.0)	6.4 (6.0)
TML	6.1 (5)	5.1 (4)	5.9 (5)	6.3 (6.0)	6.3 (5.0)
KP	7.3 (7)	6.6 (6)	6.5 (6)	6.1 (6.0)	6.2 (6.0)
SMJ	7.3 (7)	7.1 (7)	7.4 (7)	7.2 (7.0)	7.6 (7.0)
BP	7.1 (7)	6.4 (6)	6.4 (6)	4.9 (4.0)	4.1 (3.0)
TW	7.2 (6)	7.4 (7)	6.2 (5)	6.4 (6.0)	6.8 (6.0)
MRI	5.9 (6)	5.8 (5)	5.0 (4)	6.9 (7.0)	6.4 (6.0)
KLM	7.8 (7)	7.3 (7)	7.1 (7)	7.5 (7.0)	7.1 (6.0)
SDG	7.2 (7)	7.2 (7)	7.6 (7)	8.3 (8.0)	8.4 (9.0)
SB	7.6 (7)	7.3 (7)	7.3 (7)	6.1 (5.0)	6.1 (6.0)
DKS	5.8 (5)	5.5 (4)	5.2 (4)	6.0 (5.0)	6.4 (6.0)
SI	6.8 (6)	6.1 (5)	5.7 (5)	6.5 (6.0)	6.9 (6.0)
SBL	7.3 (8)	7.0 (7)	7.7 (7)	7.8 (8.0)	7.4 (7.0)
AMP	8.9 (9)	8.5 (8)	8.2 (8)	8.5 (8.0)	8.3 (8.0)
LIK	2.6 (1)	1.6 (0)	1.5 (0)	2.4 (1.0)	3.2 (2.0)
UMMC	7.6 (7)	7.4 (6)	7.0 (6)	7.1 (7.0)	7.0 (6.0)
LKW	5.7 (5)	3.4 (0)	5.0 (3)	6.9 (7.0)	5.8 (5.0)
BM	9.5 (10)	6.8 (6)	8.8 (8)	9.0 (9.0)	9.1 (9.0)
SLR	7.9 (8)	6.5 (6)	7.6 (8)	8.1 (8.0)	6.9 (7.0)
PD	4.7 (4)	4.9 (4)	4.1 (3)	5.5 (4.0)	5.0 (4.0)
KKR	6.8 (6)	7.5 (7)	6.6 (6)	4.6 (4.0)	5.2 (4.0)
SGT	6.4 (6)	6.6 (6)	7.2 (7)	8.5 (8.0)	6.9 (6.0)
TM	3.1 (3)	6.2 (5)	6.6 (6)	6.8 (6.0)	7.1 (6.0)
KEM	6.0 (5)	6.5 (6)	5.8 (4)	6.8 (6.0)	8.6 (9.0)
KLP	0.8 (1)	3.7 (3)	4.3 (3)	4.8 (4.0)	5.6 (4.0)
LAB	4.2 (2)	5.9 (6)	7.9 (8)	6.3 (6.0)	4.8 (3.0)
KEN	5.9 (5)	6.1 (6)	6.0 (6)	5.2 (4.0)	4.8 (4.0)
BIN	5.7 (5)	4.9 (4)	6.2 (5)	6.3 (6.0)	6.3 (5.0)
LD	8.7 (9)	7.5 (7)	8.0 (8)	6.8 (6.0)	8.1 (7.0)
Total	6.4 (6)	6.4 (6)	6.4 (6)	6.6 (6.0)	6.5 (6.0)

Table 11: Severe sepsis, ARDS and AKI within 24 hours of ICU admission, 2014– 2016

Hospital	2014			2015			2016		
	Severe sepsis n (%)	ARDS n (%)	AKI n (%)	Severe sepsis n (%)	ARDS n (%)	AKI n (%)	Severe sepsis n (%)	ARDS n (%)	AKI n (%)
AS	394 (29.7)	200 (15.1)	290 (21.9)	344 (25.2)	102 (7.5)	236 (17.3)	301 (26.5)	71 (6.3)	247 (21.8)
PP	370 (32.6)	35 (3.1)	293 (25.8)	414 (35.3)	23 (2.0)	294 (25.1)	471 (36.4)	47 (3.6)	422 (32.6)
IPH	148 (12.2)	123 (10.1)	197 (16.2)	188 (14.2)	181 (13.7)	288 (21.7)	250 (12.5)	179 (17.2)	307 (29.5)
KL	694 (32.4)	26 (1.2)	269 (12.6)	345 (17.4)	21 (1.1)	320 (16.1)	156 (13.4)	15 (0.7)	282 (14.1)
SLG	270 (18.9)	189 (13.3)	232 (16.3)	257 (18.5)	116 (8.4)	219 (15.8)	156 (13.4)	58 (5.0)	201 (17.2)
KLG	925 (40.6)	405 (17.8)	353 (15.5)	765 (35.0)	309 (14.1)	408 (18.7)	641 (32)	296 (14.8)	441 (22.0)
SBN	289 (53.6)	130 (24.1)	141 (26.2)	115 (21.2)	140 (25.8)	62 (11.4)	93 (17)	94 (17.2)	50 (9.2)
MLK	37 (2.6)	7 (0.5)	26 (1.8)	45 (3.1)	3 (0.2)	101 (7.1)	118 (9.1)	14 (1.1)	135 (10.4)
JB	510 (30.2)	68 (4.0)	391 (23.2)	542 (31.6)	91 (5.3)	340 (19.8)	174 (28.5)	16 (2.6)	125 (20.5)
KTN	254 (23.9)	146 (13.8)	230 (21.7)	222 (21.3)	147 (14.1)	223 (21.4)	165 (16.7)	100 (10.1)	153 (15.5)
KT	7 (0.6)	3 (0.3)	53 (4.5)	5 (0.4)	0 (0.0)	31 (2.2)	0 (0.0)	0 (0.0)	6 (0.4)
KB	92 (5.7)	232 (14.4)	198 (12.3)	202 (16.0)	137 (10.8)	209 (16.5)	103 (6.8)	86 (5.7)	127 (8.3)
KCH	121 (10.6)	8 (0.7)	63 (5.5)	46 (4.0)	7 (0.6)	30 (2.6)	52 (4.9)	9 (0.8)	48 (4.5)
KK	226 (22.9)	139 (14.1)	230 (23.3)	222 (24.0)	107 (11.6)	222 (24.0)	266 (26.5)	145 (14.4)	269 (26.7)
SP	14 (1.5)	6 (0.6)	88 (9.2)	3 (0.3)	7 (0.7)	55 (5.4)	2 (0.2)	6 (0.6)	64 (6.9)
PJY	126 (19.3)	90 (13.8)	112 (17.2)	115 (15.1)	113 (14.8)	111 (14.5)	123 (16.1)	88 (11.5)	114 (14.9)
MUR	10 (1.7)	96 (16.0)	37 (6.2)	5 (0.8)	69 (11.3)	23 (3.8)	5 (0.9)	17 (3.1)	15 (2.8)
TI	68 (16.8)	2 (0.5)	77 (19.0)	80 (18.9)	2 (0.5)	80 (18.9)	57 (15.2)	5 (1.3)	47 (12.6)
TPG	249 (21.1)	37 (3.1)	108 (9.1)	299 (26.6)	18 (1.6)	74 (6.6)	336 (28.2)	14 (1.2)	47 (3.9)
SJ	132 (32.6)	19 (4.7)	73 (18.0)	86 (18.1)	19 (4.0)	92 (19.4)	84 (14.4)	37 (6.5)	122 (21.5%)
KJG	16 (5.6)	3 (1.1)	36 (12.7)	43 (9.3)	3 (0.6)	66 (14.2)	47 (10.0)	4 (0.9)	41 (8.7)
KGR	6 (1.8)	2 (0.6)	10 (2.9)	4 (1.1)	5 (1.4)	6 (1.7)	59 (9.8)	60 (9.9)	44 (7.3)
TML	62 (7.4)	34 (4.1)	127 (15.2)	87 (10.5)	54 (6.5)	119 (14.4)	54 (6.3)	49 (5.7)	76 (8.8)
KP	208 (40.6)	21 (4.1)	95 (18.6)	252 (46.2)	15 (2.8)	98 (18.0)	259 (45.8)	15 (2.7)	89 (15.7)
SMJ	0 (0.0)	0 (0.0)	1 (0.2)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (0.2)	3 (0.7)
BP	56 (12.2)	15 (3.3)	57 (12.4)	40 (7.3)	8 (1.5)	77 (14.1)	47 (47)	4 (0.6)	78 (11.2)
TW	49 (9.8)	32 (6.4)	29 (5.8)	82 (18.5)	21 (4.7)	57 (12.8)	66 (15.0)	7 (1.6)	55 (12.5)
MRI	53 (12.4)	10 (2.3)	66 (15.4)	61 (16.2)	4 (1.1)	86 (22.9)	81 (20.6)	66 (16.9)	120 (30.6)
KLM	96 (17.3)	48 (8.6)	75 (13.5)	81 (15.4)	31 (5.9)	90 (17.1)	107 (18.1)	23 (3.9)	103 (17.5)
SDG	111 (13.3)	24 (2.9)	193 (23.1)	94 (12.4)	23 (3.0)	132 (17.5)	56 (7.2)	17 (2.2)	140 (18.0)

SB	68 (15.8)	33 (7.7)	80 (18.6)	196 (15.4)	75 (5.9)	161 (12.7)	252 (18.1)	106 (7.6)	234 (16.8)
DKS	37 (3.9)	12 (1.3)	45 (4.7)	101 (10.9)	46 (5.0)	69 (7.5)	40 (5.2)	11 (1.4)	29 (3.8)
SI	319 (28.6)	62 (5.6)	219 (19.7)	364 (25.0)	96 (6.6)	333 (22.9)	327 (28.0)	25 (2.1)	253 (21.7)
SBL	457 (20.0)	423 (18.6)	521 (22.9)	173 (7.5)	55 (2.4)	479 (20.7)	242 (11.8)	170 (8.3)	464 (22.6)
AMP	226 (35.7)	139 (22.0)	145 (22.9)	258 (38.5)	119 (17.8)	109 (16.3)	211 (31.9)	136 (20.6)	129 (19.5)
LIK	7 (2.0)	8 (2.3)	4 (1.1)	10 (6.5)	3 (2.0)	10 (6.5)	30 (10.1)	14 (4.7)	38 (12.8)
UMMC	475 (35.4)	126 (9.4)	270 (20.1)	319 (24.7)	89 (6.9)	238 (18.4)	249 (22.0)	91 (8.0)	247 (21.9)
LKW	19 (11.6)	13 (7.9)	31 (18.9)	18 (9.3)	6 (3.1)	34 (17.6)	24 (16.4)	10 (6.8)	36 (24.7)
BM	16 (11.5)	13 (9.4)	21 (15.1)	72 (33.2)	24 (11.1)	70 (32.1)	83 (32.2)	12 (4.7)	91 (35.3)
SLR	80 (35.9)	72 (32.4)	103 (46.2)	58 (29.0)	47 (23.5)	69 (34.5)	57 (30.2)	26 (13.8)	67 (35.4)
PD	1 (0.4)	0 (0.0)	5 (1.9)	2 (0.9)	2 (0.9)	2 (0.9)	0 (0.0)	0 (0.0)	1 (0.4)
KKR	82 (31.8)	90 (34.7)	40 (15.6)	49 (12.6)	41 (10.5)	24 (6.2)	51 (10.5)	45 (9.3)	28 (5.8)
SGT	29 (19.3)	20 (13.3)	33 (22.1)	66 (22.8)	53 (18.3)	59 (20.3)	91 (10.5)	26 (8.0)	78 (24.1)
TM	15 (9.4)	44 (27.5)	17 (10.6)	26 (8.5)	22 (7.2)	44 (14.3)	25 (9.1)	9 (3.3)	58 (21.2)
KEM	5 (5.5)	4 (4.4)	8 (8.9)	23 (12.8)	12 (6.2)	13 (7.3)	34 (27.4)	20 (16.1)	20 (16.3)
KLP	10 (10.5)	2 (2.1)	10 (10.5)	4 (3.7)	1 (0.9)	28 (26.2)	3 (2.9)	0 (0.0)	37 (35.9)
LAB	46 (27.7)	70 (42.2)	42 (25.3)	32 (17.5)	31 (16.9)	49 (26.8)	17 (8.9)	5 (2.6)	27 (14.1)
KEN	36 (25.0)	5 (3.5)	39 (27.1)	22 (16.2)	4 (2.9)	27 (19.9)	29 (27.6)	4 (3.8)	21 (19.8)
BIN	188 (66.7)	68 (24.0)	70 (24.8)	73 (23.3)	54 (17.4)	79 (25.3)	52 (17.2)	32 (10.6)	53 (17.5)
LD	49 (22.7)	49 (22.7)	64 (29.5)	22 (14.7)	12 (8.0)	31 (20.8)	46 (28)	22 (13.4)	41 (25.0)
Total	7761 (20.0)	3406 (8.8)	5920 (15.2)	6932 (17.5)	2568 (6.5)	6077 (15.4)	6241 (16.6)	2307 (6.1)	5923 (15.7)

* Sepsis refers to documented infection with 2 out of 4 SIRS criteria:

- 1) Temperature >38.3 or < than 36°C
- 2) Total white cell count > 12000 or < 4000
- 3) Heart rate > 90/min
- 4) Respiration rate > 20 breath / minute or PaCO₂ < 32mmHg

Severe sepsis is sepsis with one of the following organ dysfunction:

- (1) Hypotension: Systolic blood pressure < 90 mmHg or mean arterial pressure < 70 mm Hg
- (2) PaO₂/F_iO₂ ≤ 300 mmHg
- (3) Acute decrease in platelet count to < 100 000 u/L
- (4) Acute increase in total bilirubin to > 70 umol/L
- (5) Acute increase in serum creatinine to >170umol/L or urine output < 0.5 mL/kg/hour for > 2 hours
- (6) Serum lactate >4 mmol/l

ARDS refers to a severe form of acute lung injury with a PaO₂/F_iO₂ ratio ≤ 200 mm Hg with diffuse radiologic infiltrates which is not predominantly due to heart failure

^AKI : Serum creatinine x 2 baseline or urine output < 0.5 ml/kg/hr x 12 hours

Section D: ORGAN SUPPORT

- i. Invasive and non-invasive ventilation**
- ii. Tracheostomy**
- iii. Renal replacement therapy**
- iv. Withholding and withdrawal of therapy**

Findings:

1. Invasive ventilation was recorded in 75.9% of admissions, while non-invasive ventilation in 17.3% of admissions.
2. The reintubation rate was 5.9%.
3. The mean and median duration of invasive ventilation was 4.5 and 2.2 days respectively.
4. Tracheostomies were performed in 8.8% of patients receiving invasive ventilation, with a mean time interval of 8.9 days from the initiation of ventilation.
5. About two thirds (70.2%) of tracheostomies were performed surgically rather than percutaneously.
6. Renal replacement therapy was initiated in 15.3% of admissions with either acute or chronic kidney disease.
7. The most common mode of renal replacement therapy was intermittent haemodialysis (69.2%) followed by continuous renal replacement therapy (28.9%).
8. Withholding or withdrawal of therapy was initiated in 36.8% of deaths in ICU.

Table 12 : Invasive ventilation, non-invasive ventilation, duration of ventilation and reintubation, 2016

Hospital	Invasive ventilation		Reintubation n (%)	Non-invasive ventilation n (%)
	n (%)	days, mean (median)		
AS	1059 (93.3)	4.19 (2.28)	46 (4.3)	77 (6.8)
PP	1089 (84.2)	5.11 (2.67)	40 (3.7)	105 (8.1)
IPH	838 (80.6)	6.31 (2.75)	81 (9.7)	195 (18.8)
KL	1418 (70.8)	4.74 (2.37)	113 (8.0)	463 (23.1)
SLG	859 (73.7)	6.03 (2.82)	53 (6.2)	157 (13.5)
KLG	1280 (63.6)	3.14 (1.38)	103 (8.0)	378 (18.8)
SBN	373 (68.3)	5.46 (2.98)	29 (7.8)	95 (17.4)
MLK	866 (65.5)	4.96 (2.59)	13 (1.5)	518 (39.2)
JB	563 (92.0)	4.95 (3.27)	80 (14.3)	61 (10.0)
KTN	839 (85.0)	4.91 (2.50)	35 (4.2)	99 (10.0)
KT	1085 (77.6)	3.28 (1.68)	90 (8.3)	219 (15.7)
KB	1086 (71.2)	3.70 (1.56)	54 (5.0)	312 (20.5)
KCH	871 (81.6)	4.56 (2.07)	41 (4.7)	129 (12.1)
KK	793 (78.4)	5.82 (2.93)	53 (6.7)	139 (13.8)
SP	696 (75.2)	3.82 (1.82)	32 (4.6)	210 (22.7)
PJY	543 (70.9)	2.80 (1.02)	7 (1.3)	157 (20.5)
MUR	441 (80.9)	3.26 (1.71)	13 (3.0)	53 (9.7)
TI	283 (75.7)	2.81 (1.20)	6 (2.1)	101 (27.0)
TPG	936 (78.5)	5.39 (2.66)	36 (3.8)	191 (16.0)
SJ	506 (89.2)	4.53 (2.42)	26 (5.1)	79 (14.0)
KJG	390 (83.0)	2.94 (1.86)	15 (3.8)	89 (19.0)
KGR	494 (81.8)	4.11 (2.05)	19 (3.9)	130 (21.6)
TML	612 (70.9)	5.13 (3.04)	10 (1.6)	167 (19.4)
KP	421 (74.4)	4.10 (1.97)	25 (5.9)	226 (40.0)
SMJ	307 (67.6)	2.64 (1.34)	2 (0.7)	57 (12.7)
BP	596 (85.5)	3.50 (1.93)	28 (4.7)	97 (13.9)
TW	340 (77.4)	3.78 (2.00)	32 (9.4)	9 (2.1)
MRI	344 (86.6)	4.68 (2.88)	7 (2.0)	14 (3.5)
KLM	491 (83.2)	3.32 (1.55)	43 (8.8)	144 (24.4)
SDG	551 (71.0)	5.62 (3.33)	40 (7.3)	230 (29.6)
SB	1119 (80.4)	3.67 (1.71)	88 (7.9)	202 (14.5)
DKS	596 (77.7)	4.91 (2.56)	12 (2.0)	63 (8.2)
SI	951 (80.0)	4.14 (2.52)	45 (4.7)	82 (6.9)
SBL	1527 (74.1)	5.55 (3.92)	115 (7.5)	212 (10.3)
AMP	538 (81.4)	4.12 (1.96)	33 (6.1)	189 (28.6)
LIK	130 (43.8)	3.08 (1.04)	6 (4.6)	39 (13.2)
UMMC	789 (69.6)	5.42 (2.46)	78 (9.9)	380 (33.6)
LKW	119 (81.5)	4.86 (3.59)	5 (4.2)	7 (4.8)
BM	221 (85.3)	5.84 (2.73)	13 (5.9)	67 (25.9)
SLR	151 (79.9)	5.95 (3.09)	21 (13.9)	32 (16.9)
PD	104 (41.8)	2.80 (1.54)	2 (1.9)	46 (18.5)
KKR	293 (60.4)	3.25 (1.77)	3 (1.0)	44 (9.1)
SGT	275 (85.1)	2.27 (1.36)	14 (5.1)	53 (16.4)
TM	173 (63.1)	3.42 (2.26)	10 (5.8)	93 (33.9)
KEM	97 (78.2)	3.10 (2.60)	11 (11.3)	15 (12.1)
KLP	67 (65.0)	6.36 (2.65)	11 (16.4)	32 (31.1)
LAB	119 (62.0)	4.69 (2.55)	15 (12.6)	17 (8.9)
KEN	70 (66.0)	4.29 (2.75)	2 (2.9)	8 (7.5)
BIN	224 (73.9)	3.76 (1.86)	13 (5.9)	31 (10.3)
LD	138 (83.6)	5.38 (2.85)	10 (7.2)	17 (10.4)
Total	28671 (75.9)	4.45 (2.22)	1679 (5.9)	6530 (17.3)

Table 13: Tracheostomy, 2016

Hospital	Tracheostomy n (%)	Tracheostomy in relation to days of ventilation mean (median)	Type of tracheostomy	
			Surgical n (%)	Percutaneous n (%)
AS	97 (9.2)	8.0 (7.2)	74 (76.3)	23 (23.7)
PP	196 (18.0)	7.2 (6.7)	61 (31.1)	135 (68.9)
IPH	141 (16.8)	8.3 (5.9)	48 (34.0)	93 (66.0)
KL	96 (6.8)	10.2 (9.4)	31 (32.3)	65 (67.7)
SLG	81 (9.4)	12.6 (11.6)	63 (77.8)	18 (22.2)
KLG	125 (9.8)	7.7 (5.7)	34 (27.2)	91 (72.8)
SBN	27 (7.3)	15.2 (12.6)	27 (100.0)	0 (0.0)
MLK	41 (4.7)	14.2 (12.0)	41 (100.0)	0 (0.0)
JB	79 (14.0)	8.0 (7.1)	18 (22.8)	61 (77.2)
KTN	73 (8.7)	9.3 (7.1)	52 (71.2)	21 (28.8)
KT	76 (7.0)	6.2 (4.8)	70 (92.1)	6 (7.9)
KB	31 (2.9)	17.7 (18.0)	25 (80.6)	6 (19.4)
KCH	95 (10.9)	7.6 (6.4)	63 (66.3)	32 (33.7)
KK	101 (12.8)	9.7 (7.3)	62 (61.4)	39 (38.6)
SP	49 (7.1)	10.4 (7.4)	49 (100.0)	0 (0.0)
PJY	24 (4.4)	6.9 (6.8)	24 (100.0)	0 (0.0)
MUR	31 (7.0)	7.4 (6.4)	31 (100.0)	0 (0.0)
TI	25 (8.8)	6.2 (7.0)	25 (100.0)	0 (0.0)
TPG	80 (8.5)	9.9 (7.2)	80 (100.0)	0 (0.0)
SJ	37 (7.3)	8.7 (8.6)	36 (97.3)	1 (2.7)
KJG	19 (4.9)	5.8 (5.4)	19 (100.0)	0 (0.0)
KGR	34 (6.9)	6.7 (5.6)	27 (79.4)	7 (20.6)
TML	46 (7.5)	10.1 (8.3)	44 (95.7)	2 (4.3)
KP	17 (4.0)	12.7 (12.2)	17 (100.0)	0 (0.0)
SMJ	16 (5.2)	5.8 (4.5)	3 (18.8)	13 (81.2)
BP	28 (4.7)	6.9 (5.5)	25 (89.3)	3 (10.7)
TW	21 (6.2)	6.6 (5.4)	20 (95.2)	1 (4.8)
MRI	28 (8.2)	9.2 (6.5)	26 (92.9)	2 (7.1)
KLM	41 (8.4)	7.9 (5.6)	41 (100.0)	0 (0.0)
SDG	51 (9.3)	11.2 (8.3)	49 (96.1)	2 (3.9)
SB	174 (15.5)	4.4 (3.7)	174 (100.0)	0 (0.0)
DKS	21 (3.5)	13.5 (9.9)	21 (100.0)	0 (0.0)
SI	72 (7.6)	8.9 (7.5)	68 (94.4)	4 (5.6)
SBL	224 (14.7)	10.4 (9.2)	146 (65.2)	78 (34.8)
AMP	34 (6.3)	8.8 (6.5)	5 (14.7)	29 (85.3)
LIK	3 (2.3)	12.9 (10.4)	3 (100.0)	0 (0.0)
UMMC	58 (7.4)	14.8 (14.4)	42 (72.4)	16 (27.6)
LKW	5 (4.2)	7.3 (5.5)	5 (100.0)	0 (0.0)
BM	33 (14.9)	9.3 (9.9)	33 (100.0)	0 (0.0)
SLR	14 (9.3)	13.4 (12.0)	13 (92.9)	1 (7.1)
PD	1 (1.0)	5.7 (5.7)	1 (100.0)	0 (0.0)
KKR	4 (1.4)	7.3 (7.0)	4 (100.0)	0 (0.0)
SGT	20 (7.3)	3.8 (3.9)	20 (100.0)	0 (0.0)
TM	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
KEM	16 (16.5)	4.1 (4.3)	16 (100.0)	0 (0.0)
KLP	3 (4.5)	21.1 (21.3)	3 (100.0)	0 (0.0)
LAB	8 (6.7)	14.0 (14.1)	7 (87.5)	1 (12.5)
KEN	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
BIN	10 (4.5)	14.0 (13.5)	10 (100.0)	0 (0.0)
LD	15 (10.9)	5.7 (4.1)	15 (100.0)	0 (0.0)
Total	2521 (8.8)	8.9 (7.3)	1771 (70.2)	750 (29.8)

Table 14: Renal replacement therapy and modalities of therapy, 2016

Hospital	AKI (%)	RRT (%)	Mode of therapy		
			PD (%)	IHD (%)	CRRT (%)
AS	247 (21.8)	204 (18.0)	1(0.5)	189 (91.3)	17 (8.2)
PP	422 (32.6)	270 (20.9)	5 (1.7)	201 (67.2)	93 (31.1)
IPH	307 (29.5)	252 (24.3)	5 (1.7)	165 (55.7)	126 (42.6)
KL	282 (14.1)	336 (16.8)	2 (0.5)	222 (57.5)	162 (42.0)
SLG	201 (17.2)	180 (15.4)	0 (0.0)	146 (75.7)	47 (24.4)
KLG	441 (22.0)	334 (16.6)	10 (2.7)	252 (66.7)	116 (30.7)
SBN	50 (9.2)	93 (17.1)	0 (0.0)	49 (50.5)	48 (49.5)
MLK	135 (10.4)	89 (6.8)	2 (2.2)	48 (53.3)	40 (44.4)
JB	125 (20.5)	103 (16.8)	7 (6.1)	57 (49.6)	51 (44.4)
KTN	153 (15.5)	154 (15.7)	0 (0.0)	109 (68.1)	51 (31.9)
KT	6 (0.4)	189 (13.5)	16 (7.7)	136 (65.1)	57 (27.3)
KB	127 (8.3)	239 (15.7)	2 (0.8)	163 (64.4)	88 (34.8)
KCH	48 (4.5)	131 (12.3)	2 (1.3)	60 (38.5)	94 (60.1)
KK	269 (26.7)	248 (24.5)	3 (1.1)	193 (68.9)	84 (30.0)
SP	64 (6.9)	96 (10.4)	1 (1.0)	84 (83.2)	16 (15.8)
PJY	114 (14.9)	43 (5.6)	1 (2.2)	34 (75.6)	10 (22.2)
MUR	15 (2.8)	51 (9.4)	1 (1.9)	29 (54.7)	23 (43.4)
TI	47 (12.6)	49 (13.1)	0 (0.0)	49 (100.0)	0 (0.0)
TPG	47 (3.9)	309 (25.9)	1 (0.3)	309 (99.7)	0 (0.0)
SJ	122 (21.5)	80 (14.1)	0 (0.0)	69 (85.2)	12 (14.8)
KJG	41 (8.7)	44 (9.4)	0 (0.0)	35 (79.6)	9 (20.5)
KGR	44 (7.3)	48 (8.0)	0 (0.0)	48 (100.0)	0 (0.0)
TML	76 (8.8)	116 (13.5)	0 (0.0)	105 (87.5)	15 (12.5)
KP	89 (15.7)	136 (24.0)	0 (0.0)	136 (100.0)	0 (0.0)
SMJ	3 (0.7)	70 (15.5)	0 (0.0)	68 (93.2)	5 (6.9)
BP	78 (11.2)	85 (12.2)	6 (1.2)	85 (98.8)	0 (0.0)
TW	55 (12.5)	24 (5.5)	0 (0.0)	24 (100.0)	0 (0.0)
MRI	120 (30.6)	62 (15.7)	0 (0.0)	37 (55.2)	30 (44.8)
KLM	103 (17.5)	123 (20.8)	3 (2.2)	110 (79.1)	26 (18.8)
SDG	140 (18.0)	194 (25.1)	4 (2.0)	115 (58.1)	79 (39.9)
SB	234 (16.8)	190 (13.6)	18 (8.5)	118 (55.9)	75 (35.6)
DKS	29 (3.8)	118 (15.4)	1 (0.9)	114 (96.6)	3 (2.5)
SI	253 (21.7)	171 (14.4)	3 (1.6)	106 (55.2)	83 (43.2)
SBL	464 (22.6)	208 (10.1)	1 (0.4)	122 (47.8)	132 (51.8)
AMP	129 (19.5)	100 (15.1)	1 (0.4)	75 (67.0)	36 (32.1)
LIK	38 (12.8)	14 (4.8)	0 (0.0)	14 (93.3)	1 (6.7)
UMMC	247 (21.9)	271 (24.0)	2 (0.7)	109 (40.1)	161 (59.2)
LKW	36 (24.7)	9 (6.2)	1 (11.1)	8 (88.9)	0 (0.0)
BM	91 (35.3)	55 (21.2)	0 (0.0)	55 (100.0)	0 (0.0)
SLR	67 (35.4)	44 (23.3)	4 (9.1)	40 (90.9)	0 (0.0)
PD	1 (0.4)	17 (6.8)	0 (0.0)	14 (82.4)	3 (17.7)
KKR	28 (5.8)	19 (4.0)	9 (40.9)	13 (59.1)	0 (0.0)
SGT	78 (24.1)	57 (17.7)	0 (0.0)	56 (98.3)	1 (1.8)
TM	58 (21.2)	34 (12.5)	3 (8.1)	34 (91.9)	0 (0.0)
KEM	20 (16.3)	13 (10.5)	1 (7.1)	13 (92.9)	0 (0.0)
KLP	37 (35.9)	15 (14.6)	0 (0.0)	15 (100)	0 (0.0)
LAB	27 (14.1)	20 (10.4)	0 (0.0)	20 (100)	0 (0.0)
KEN	21 (19.8)	5 (4.7)	0 (0.0)	5 (100)	0 (0.0)
BIN	53 (17.5)	29 (9.6)	6 (18.8)	26 (81.2)	0 (0.0)
LD	41 (25.0)	16 (9.8)	0 (0.0)	16 (100)	0 (0.0)
Total	5923 (15.7)	5757 (15.3)	117 (1.2)	4300 (69.2)	1794 (28.9)

Table 15: Withdrawal and withholding of therapy, 2012 – 2016

Hospital	Withdrawal / withholding of therapy				
	n (%)				
	2012	2013	2014	2015	2016
AS	203 (64.2)	253 (71.5)	317 (84.3)	257 (74.5)	217 (76.4)
PP	191 (91.4)	133 (78.2)	85 (42.7)	139 (61.0)	190 (79.2)
IPH	7 (4.6)	48 (23.1)	39 (19.8)	149 (55.4)	121 (58.2)
KL	299 (83.8)	267 (80.4)	250 (81.4)	248 (69.5)	212 (74.6)
SLG	42 (20.9)	110 (54.7)	71 (37.0)	150 (62.2)	149 (84.2)
KLG	206 (63.2)	137 (49.5)	164 (54.1)	286 (83.6)	254 (86.4)
SBN	61 (52.6)	36 (38.7)	48 (42.9)	43 (43.4)	42 (45.2)
MLK	22 (5.7)	58 (15.4)	146 (52.5)	33 (11.2)	17 (7.1)
JB	278 (75.7)	332 (79.8)	234 (83.0)	294 (84.5)	84 (82.4)
KTN	9 (5.8)	11 (6.0)	12 (6.4)	10 (4.5)	0 (0)
KT	54 (21.5)	48 (19.2)	23 (9.5)	15 (5.8)	56 (21.6)
KB	48 (23.8)	33 (17.5)	23 (12.7)	83 (50.6)	144 (70.6)
KCH	8 (5.4)	7 (4.2)	18 (11.2)	38 (19.7)	20 (9.2)
KK	43 (22.8)	60 (30.9)	121 (72.5)	102 (70.8)	81 (53.3)
SP	0 (0.0)	5 (3.9)	21 (10.0)	9 (5.1)	1 (0.8)
PJY	0 (0.0)	0 (0.0)	0 (0.0)	19 (17.8)	10 (11.2)
MUR	33 (22.4)	38 (29.0)	43 (30.7)	43 (30.9)	34 (25.8)
TI	1 (1.5)	3 (3.7)	2 (2.2)	27 (29.3)	56 (82.4)
TPG	108 (43.2)	100 (43.1)	105 (46.3)	45 (18.8)	24 (8.2)
SJ	67 (48.9)	40 (37.0)	13 (14.3)	17 (20.2)	17 (14.8)
KJG	4 (7.7)	1 (2.0)	0 (0.0)	0 (0.0)	3 (4.5)
KGR	1 (1.8)	0 (0.0)	11 (19.3)	12 (17.9)	3 (2.9)
TML	4 (6.3)	9 (9.6)	11 (7.1)	1 (0.6)	4 (2.9)
KP	19 (20.2)	43 (39.8)	41 (28.5)	40 (30.8)	47 (30.3)
SMJ	27 (28.7)	17 (17.2)	21 (18.4)	5 (6.2)	18 (15.3)
BP	11 (9.2)	28 (26.9)	11 (12.0)	2 (2.3)	14 (11.2)
TW	8 (14.8)	4 (6.0)	0 (0.0)	5 (6.4)	1 (1.1)
MRI	9 (10.6)	7 (7.8)	7 (10.8)	27 (30.0)	7 (6.9)
KLM	66 (54.5)	70 (52.6)	53 (40.8)	56 (46.7)	61 (51.3)
SDG	0 (0.0)	3 (1.9)	1 (0.7)	0 (0.0)	2 (1.5)
SB	58 (54.2)	51 (42.1)	31 (26.7)	160 (80.4)	168 (74.3)
DKS	5 (3.9)	4 (1.7)	23 (12.6)	3 (1.7)	13 (8.8)
SI	11 (5.6)	11 (5.5)	9 (4.1)	68 (24.0)	25 (12.5)
SBL	198 (74.2)	212 (63.9)	262 (63.0)	232 (56.0)	224 (46.8)
AMP	146 (69.2)	46 (26.7)	21 (9.4)	3 (1.3)	0 (0)
LIK	0 (0.0)	3 (14.3)	0 (0.0)	6 (60.0)	4 (15.4)
UMMC	63 (66.3)	89 (62.7)	156 (67.0)	194 (80.5)	140 (72.5)
LKW	11 (25.0)	8 (25.8)	3 (7.5)	47 (87.0)	37 (82.2)
BM	0 (0.0)	0 (0.0)	0 (0.0)	1 (1.9)	0 (0)
SLR	2 (3.4)	0 (0.0)	4 (5.8)	4 (5.6)	9 (17.0)
PD	7 (26.9)	19 (50.0)	1 (2.6)	5 (14.3)	2 (5.7)
KKR	8 (38.1)	24 (42.9)	5 (9.1)	9 (16.7)	1 (1.3)
SGT	1 (3.8)	3 (10.0)	4 (14.8)	5 (8.5)	1 (1.9)
TM	0 (0.0)	1 (3.7)	19 (55.9)	24 (53.3)	16 (48.5)
KEM	3 (33.3)	6 (40.0)	4 (33.3)	4 (22.2)	2 (18.2)
KLP	-	1 (10.0)	1 (9.1)	0 (0.0)	1 (6.7)
LAB	5 (16.7)	0 (0.0)	1 (1.5)	6 (15.4)	3 (10.0)
KEN	0 (0.0)	1 (9.1)	0 (0.0)	0 (0.0)	0 (0)
BIN	6 (16.7)	6 (18.2)	0 (0.0)	0 (0.0)	0 (0)
LD	2 (4.2)	2 (4.3)	7 (13.0)	0 (0.0)	0 (0)
Total	1778 (30.8)	2359 (36.9)	2388 (35.1)	2926 (39.4)	2535 (36.8)

Withdrawal or withholding of therapy refers to the discontinuation/not initiating any of the following: vasoactive drugs, renal replacement therapy, mechanical ventilation, surgery, cardiopulmonary resuscitation

SECTION E: PERFORMANCE INDICATORS

- i. **Unplanned extubation**
- ii. **Ventilator-associated pneumonia**
- iii. **Catheter-related bloodstream infection**
- iv. **Pressure ulcers**

Findings:

1. The rate of unplanned extubation was 0.3 per 100 intubated days (range 0.0 – 1.2).
2. The rate of ventilator-associated pneumonia was 1.7 per 1000 ventilator days (range 0.0 – 9.8).
3. The rate of catheter-related bloodstream infection was 0.3 per 1000 catheter days (range 0.0 – 2.1).
4. The rate of pressure ulcers was 3.4 per 1000 ICU days (range 0 – 14.9).
5. The 3 most common causative organisms in ventilator-associated pneumonia were *Acinetobacter spp* (41.8%), *Pseudomonas aeruginosa* (21.4%) and *Klebsiella spp* (17.2%).
6. The 3 most common causative organisms in catheter-related bloodstream infection were *Klebsiella spp* (23.3%), coagulase negative *Staphylococcus* (20.6%) and *Acinetobacter spp* (16.4%).

Table 16: Unplanned extubation, 2012– 2016

Hospital	Unplanned extubation per 100 intubated days				
	2012	2013	2014	2015	2016
AS	0.3	0.2	0.3	0.3	0.2
PP	0.1	0.2	0.3	0.3	0.4
IPH	0.3	0.4	0.3	0.3	0.4
KL	0.7	0.8	0.4	0.4	1.0
SLG	0.4	0.5	0.3	0.3	0.4
KLG	0.3	0.1	0.1	0.1	0.1
SBN	0.8	1.2	0.5	0.5	0.3
MLK	0.3	0.3	0.1	0.1	0.1
JB	0.9	1.0	1.0	1.0	1.2
KTN	0.2	0.0	0.0	0.0	0.1
KT	0.1	0.3	0.4	0.4	0.7
KB	0.0	0.0	0.0	0.0	0.0
KCH	0.0	0.1	0.0	0.0	0.1
KK	0.1	0.0	0.3	0.3	0.2
SP	0.5	0.6	0.2	0.2	0.1
PJY	0.1	0.0	0.0	0.0	0.1
MUR	0.1	0.0	0.0	0.0	0.1
TI	0.0	0.0	0.1	0.1	0.0
TPG	0.3	0.0	0.1	0.1	0.1
SJ	0.5	0.1	0.1	0.1	0.1
KJG	0.8	0.4	0.0	0.0	0.2
KGR	0.0	0.1	0.0	0.0	0.0
TML	0.3	0.4	0.1	0.1	0.3
KP	0.2	0.1	0.1	0.1	0.2
SMJ	0.3	0.0	0.0	0.0	0.0
BP	0.1	0.1	0.1	0.1	0.0
TW	0.3	0.1	0.1	0.1	0.3
MRI	0.1	0.0	0.3	0.3	0.0
KLM	0.3	0.5	0.1	0.1	0.4
SDG	0.2	0.5	0.1	0.1	0.2
SB	0.2	0.0	0.0	0.0	0.0
DKS	0.3	0.6	0.2	0.2	0.2
SI	0.8	1.2	0.2	0.2	0.3
SBL	0.1	0.2	0.2	0.2	0.2
AMP	1.0	1.1	0.6	0.6	0.4
LIK	0.0	0.0	0.2	0.2	0.0
UMMC	0.9	1.2	0.4	0.4	0.4
LKW	0.6	0.2	0.2	0.2	0.0
BM	0.0	0.0	0.0	0.0	0.0
SLR	0.0	0.2	0.0	0.0	0.0
PD	0.7	0.0	0.0	0.0	0.0
KKR	0.4	0.2	0.0	0.0	0.2
SGT	0.3	0.0	0.0	0.0	0.0
TM	0.0	0.0	0.0	0.0	0.0
KEM	0.0	0.0	0.4	0.4	0.0
KLP	1.9	0.0	0.0	0.0	0.0
LAB	0.5	0.0	0.3	0.3	0.4
KEN	0.2	0.8	0.2	0.2	0.0
BIN	0.5	0.6	0.0	0.0	0.0
LD	0.1	0.1	0.3	0.3	0.0
Total	0.3	0.4	0.2	0.2	0.3

Table 17: Ventilator-associated pneumonia (VAP), 2012 – 2016

Hospital	VAP per 1000 ventilator days				
	2012	2013	2014	2015	2016
AS	3.0	1.3	0.6	1.5	0.0
PP	6.9	4.2	4.4	3.2	2.0
IPH	7.2	8.8	4.4	4.7	4.1
KL	13.5	7.5	6.0	3.3	2.0
SLG	4.6	5.6	3.8	7.0	4.5
KLG	3.6	9.2	3.1	0.4	0.5
SBN	2.4	3.4	2.5	1.7	2.2
MLK	7.0	1.6	0.9	1.1	2.4
JB	4.3	0.9	0.5	0.0	0.0
KTN	2.7	1.2	0.4	0.2	0.3
KT	7.2	2.9	0.8	1.3	0.3
KB	9.2	7.5	4.2	0.0	0.2
KCH	6.3	0.0	2.1	2.1	0.8
KK	0.8	2.4	3.2	2.7	2.1
SP	8.3	4.3	7.2	1.0	0.7
PJY	3.8	8.6	2.6	2.1	4.4
MUR	0.6	0.7	0.6	0.6	0.7
TI	2.0	0.0	4.1	7.1	4.8
TPG	1.1	0.0	0.2	1.3	1.9
SJ	3.5	3.3	5.6	2.9	1.8
KJG	10.3	14.3	4.8	6.1	0.7
KGR	21.0	11.8	8.6	6.6	2.1
TML	0	1.6	4.2	6.3	3.2
KP	0.8	1.9	2.9	1.1	0.0
SMJ	2.9	0.0	1.2	1.2	1.2
BP	1.7	0.6	0.6	0.0	0.0
TW	8.3	8.9	5.4	0.0	0.0
MRI	3.2	3.5	8.4	2.7	0.9
KLM	28.3	8.6	10.3	4.2	5.5
SDG	9.3	7.7	2.8	1.5	3.2
SB	11.3	6.2	7.7	3.3	2.7
DKS	1.6	0.0	2.2	2.5	1.6
SI	16.6	8.3	5.0	0.4	0.8
SBL	7.1	7.6	4.2	4.0	1.9
AMP	35.0	14.5	6.6	2.5	2.1
LIK	4.1	0.0	1.6	0.0	2.5
UMMC	8.5	6.0	7.3	7.1	3.1
LKW	16.2	0.0	0.0	0.1	9.8
BM	-	0.7	0.8	1.3	0.8
SLR	24.9	13.3	11.2	4.8	1.5
PD	17.5	3.0	3.1	2.6	0.0
KKR	9.5	22.2	18.0	5.7	2.9
SGT	16.8	5.1	6.5	0.9	0.0
TM	-	0.0	0.0	1.7	0.0
KEM	-	0.0	0.0	0.0	0.0
KLP	-	0.0	0.0	0.0	0.0
LAB	3.6	2.0	11.1	12.4	8.6
KEN	-	2.3	0.0	1.3	0.0
BIN	22.4	11.2	0.3	2.4	3.2
LD	3.2		1.0	0.0	0.0
Total	7.2	5.4	3.6	2.4	1.7

Table 18: Bacteriological cultures in VAP, 2016

Organisms	n (%)
<i>Acinetobacter spp.</i>	90 (41.8)
MRO	79 (87.8)
Non-MRO	11 (12.2)
<i>Pseudomonas aeruginosa</i>	46 (21.4)
MRO	8 (17.4)
Non-MRO	38 (82.6)
<i>Klebsiella spp.</i>	37 (17.2)
ESBL	22 (59.5)
CRE	2 (5.4)
Non MRO	13 (35.1)
<i>Staphylococcus aureus</i>	9 (4.2)
MSSA	4 (44.4)
MRSA	5 (55.6)
<i>Escherichia coli</i>	8 (3.7)
ESBL	4 (50.0)
CRE	0 (0.0)
Non MRO	4 (50.0)
<i>Enterobacter spp</i>	6 (2.8)
ESBL	4 (66.7)
CRE	1 (16.7)
Non MRO	1 (16.6)
<i>Stenotrophomonas maltophilia</i>	6 (2.8)
Other MRO	4 (1.9)
Other non MRO	9 (4.2)

Table 19: Bacteriological cultures in VAP, 2011 – 2016

Organisms	2011 n (%)	2012 n (%)	2013 n (%)	2014 n (%)	2015 n (%)	2016 n (%)
<i>Acinetobacter spp.</i>	377 (48.2)	351 (44.4)	315 (45.3)	215 (42.5)	154 (44.6)	90 (41.8)
<i>Klebsiella spp.</i>	131 (16.7)	165 (20.8)	149 (21.4)	110 (21.7)	70 (20.3)	37 (17.2)
<i>Pseudomonas aeruginosa</i>	112 (14.3)	139 (17.5)	120 (17.2)	101 (20.0)	52 (15.1)	46 (21.4)
MRSA	31 (3.9)	12 (1.5)	31 (4.5)	12 (2.4)	22 (6.4)	5 (2.3)
MSSA	21 (2.6)	19 (2.4)	11 (1.6)	14 (2.8)	6 (1.7)	4 (1.9)
<i>Stenotrophomonas maltophilia</i>	19 (2.4)	20 (2.5)	17 (2.4)	8 (1.6)	5 (1.4)	6 (2.8)
Other gram negative bacteria	17 (2.1)	16 (2.0)	6 (0.9)	5 (1.0)	17 (4.9)	14 (6.5)
Fungi	21 (2.6)	22 (2.7)	9 (1.3)	9 (1.8)	0 (0)	0 (0)
Coagulase negative <i>Staphylococcus</i>	13 (1.6)	10 (1.2)	4 (0.6)	4 (0.8)	0 (0)	0 (0)
Others	40 (5.1)	36 (4.5)	34 (4.9)	28 (5.5)	18 (5.2)	13 (6.0)

Figure 2 : Causative organisms in VAP, 2016

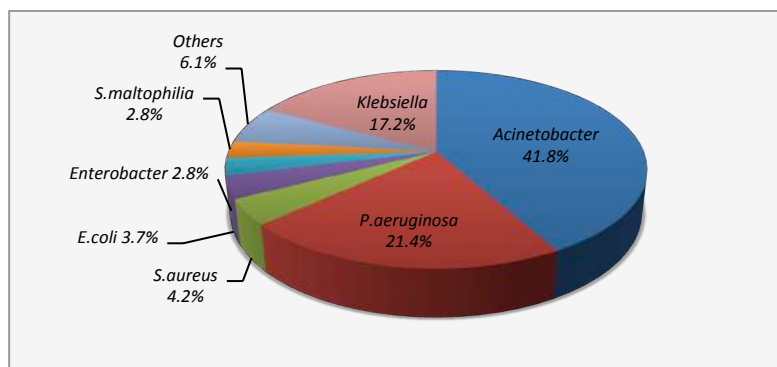


Figure 3 : Isolates of *Acinetobacter* spp in VAP according to antibiotic resistance

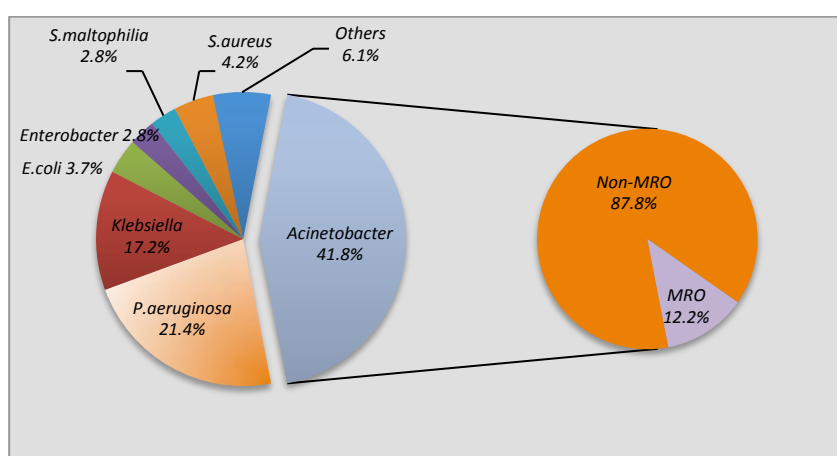


Figure 4 : Isolates of *Pseudomonas aeruginosa* in VAP according to antibiotic resistance

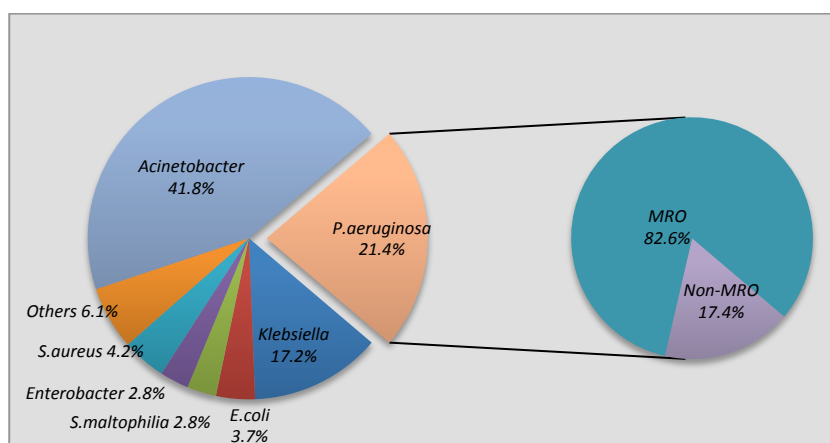


Figure 5 : Isolates of *Klebsiella spp* in VAP according to antibiotic resistance

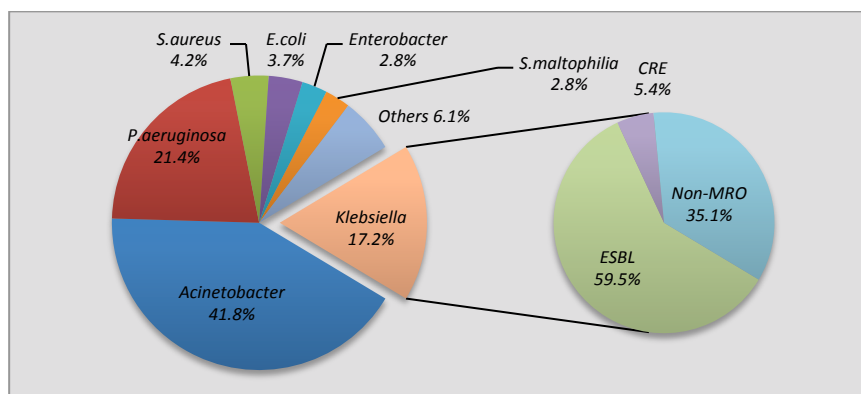


Figure 6 : Isolates of *Staphylococcus aureus* in VAP according to antibiotic resistance

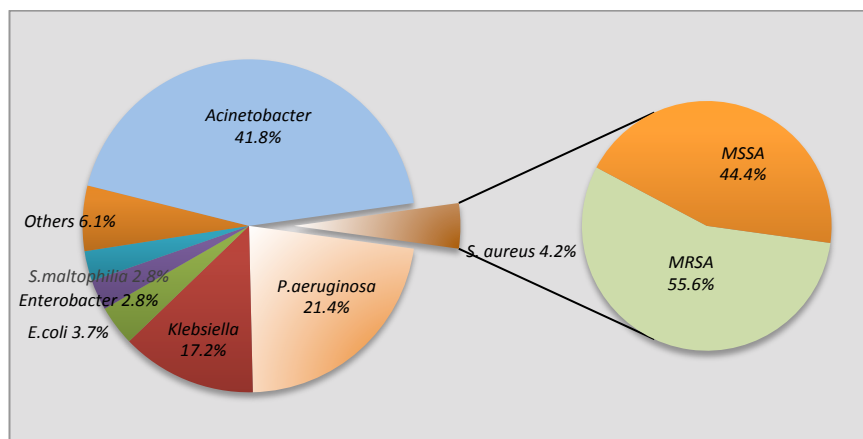


Table 20: Central venous catheter-related bloodstream infection (CVC-BSI), 2013 – 2016

Hospitals	CVC-BSI per 1000 catheter days			
	2013	2014	2015	2016
AS	0.0	0.0	0.0	0.0
PP	2.6	3.5	1.2	0.5
IPH	0.3	0.0	0.2	0.2
KL	1.5	0.2	1.1	1.5
SLG	0.0	0.0	0.3	0.2
KLG	0.0	0.0	0.4	0.0
SBN	0.9	0.7	0.0	0.6
MLK	0.0	0.0	0.0	0.3
JB	16.4	11.3	4.4	1.8
KTN	0.0	0.0	0.1	0.0
KT	0.3	0.3	0.6	0.0
KB	0.4	0.3	0.5	0.0
KCH	0.0	0.0	0.0	0.0
KK	0.2	0.0	0.0	0.3
SP	0.0	0.0	0.2	0.2
PJY	0.7	0.5	0.0	0.0
MUR	0.0	0.0	0.0	0.0
TI	0.0	0.0	0.0	0.0
TPG	0.0	0.0	0.0	0.0
SJ	0.0	1.0	0.0	0.0
KJG	0.0	0.0	0.0	2.1
KGR	0.0	0.0	0.0	0.0
TML	0.4	0.0	0.3	0.0
KP	0.0	0.0	0.0	0.0
SMJ	2.7	0.0	0.0	0.0
BP	2.1	0.0	0.3	0.0
TW	0.0	0.0	0.0	0.0
MRI	0.0	0.0	0.0	0.0
KLM	0.0	0.0	0.9	1.7
SDG	0.0	0.0	0.7	0.0
SB	0.0	0.3	0.0	0.0
DKS	0.0	0.0	0.5	0.0
SI	0.0	0.0	2.2	1.7
SBL	0.4	0.9	0.2	0.1
AMP	0.0	0.0	0.4	0.0
LIK	0.0	0.0	0.0	0.0
UMMC	0.0	0.4	3.2	0.5
LKW	0.0	0.0	0.0	0.0
BM	0.0	0.0	0.0	0.0
SLR	0.0	0.0	0.0	0.0
PD	0.0	0.0	0.0	0.0
KKR	1.2	0.0	0.0	1.0
SGT	2.2	0.0	0.0	0.0
TM	0.0	0.0	0.0	0.0
KEM	0.0	0.0	0.0	0.0
KLP	0.0	0.0	0.0	0.0
LAB	0.0	0.0	2.3	0.0
KEN	0.0	0.0	0.0	0.0
BIN	0.0	0.0	0.0	1.7
LD	0.0	0.0	0.0	0.0
Total	0.6	0.4	0.4	0.3

Table 21: Bacteriological cultures in CVC-BSI, 2016

Organisms	n (%)
<i>Klebsiella spp.</i>	17(23.3)
MRO	15
Non-MRO	2
Coagulase negative <i>Staphylococcus</i>	15 (20.6)
Methicillin resistant	4
Methicillin sensitive	11
<i>Acinetobacter spp.</i>	12 (16.4)
MRO	6
Non-MRO	6
<i>Candida</i>	9 (12.3)
<i>Pseudomonas aeruginosa</i>	6 (8.2)
MRO	3
Non-MRO	3
<i>Enterobacter spp.</i>	3 (4.1)
MRO	1
Non- MRO	2
<i>Stenotrophomonas maltophilia</i>	1 (1.4)
<i>Escherichia coli</i>	1 (1.4)
<i>Staphylococcus aureus</i>	6(8.2)
Methicillin resistant	1
Methicillin sensitive	5
Other non MRO	3 (4.1)
Total	73 (100)

Figure 7: Causative organisms in CVC-BSI, 2016

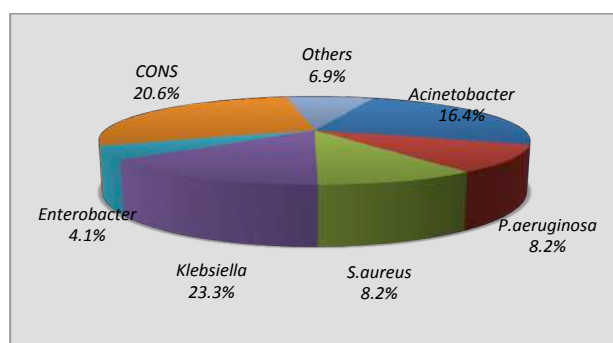


Figure 8: Isolates of *Klebsiella spp* in CVC-BSI according to antibiotic resistance, 2016

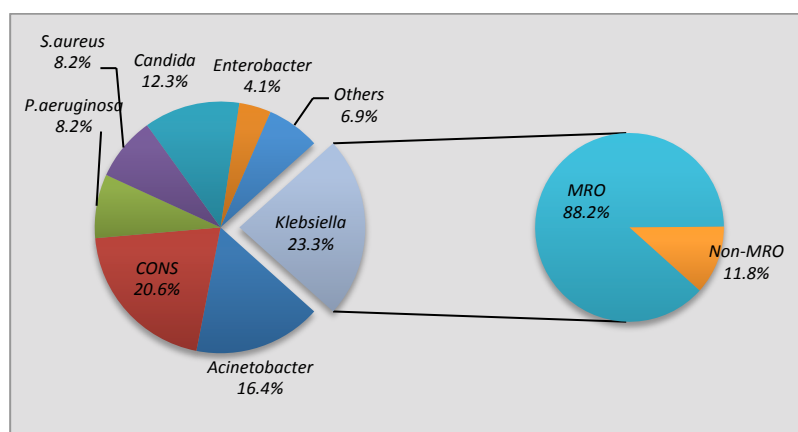


Figure 9: Isolates of coagulase negative *Staphylococcus* in CVC-BSI according to antibiotic resistance, 2016

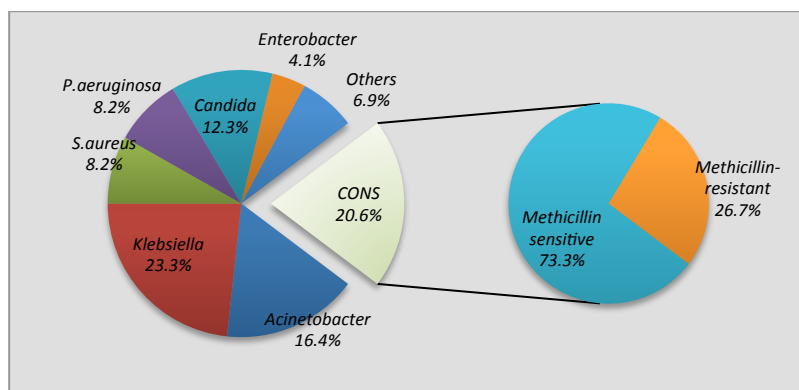


Figure 10: Isolates of *Acinetobacter spp* in CVC-BSI according to antibiotic resistance, 2016

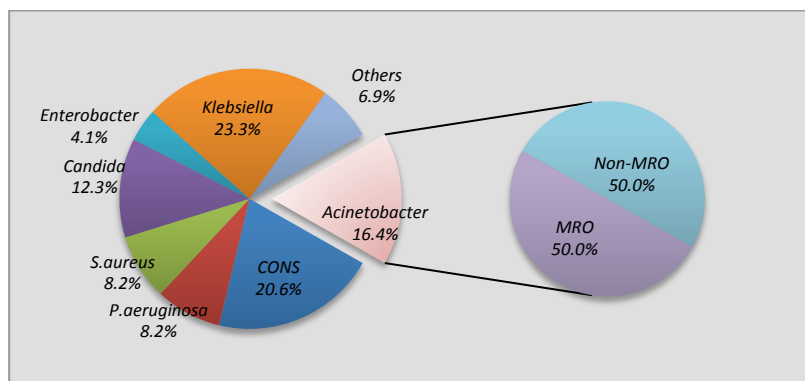


Table 22: Pressure ulcer, 2012 – 2016

Hospital	Pressure ulcer per 1000 ICU days				
	2012	2013	2014	2015	2016
AS	8.6	10.4	4.5	4.1	2.9
PP	6.0	8.4	3.3	11.6	1.3
IPH	8.0	5.2	4.4	6.7	0.0
KL	7.1	9.7	7.3	4.7	3.7
SLG	11.3	16.6	17.8	10.1	9.3
KLG	6.1	6.5	2.3	3.0	0.2
SBN	2.8	4.2	1.9	1.1	1.8
MLK	2.5	1.3	1.9	1.2	2.2
JB	6.7	6.9	13.1	15.9	4.5
KTN	4.2	8.4	10.0	13.1	8.8
KT	1.8	1.3	0.0	0.0	2.4
KB	3.4	1.5	3.0	3.7	2.5
KCH	5.1	7.8	5.6	7.6	2.2
KK	9.8	5.8	5.3	10.2	7.3
SP	3.2	2.2	6.6	7.6	2.7
PJY	4.2	3.2	0.8	1.4	0.3
MUR	0.9	0.5	0.9	1.1	2.6
TI	1.3	0.8	0.8	1.7	3.2
TPG	1.6	1.3	0.7	2.1	2.7
SJ	2.8	10.1	5.3	3.0	5.9
KJG	5.9	2.0	5.2	1.1	0.0
KGR	13.4	14.1	13.3	2.8	5.2
TML	2.4	1.0	1.5	1.2	3.5
KP	11.2	3.7	4.9	7.6	2.5
SMJ	0.0	2.2	0.0	0.7	0.0
BP	3.9	1.9	1.5	1.5	5.6
TW	15.9	21.1	8.5	9.5	5.6
MRI	5.7	12.5	23.2	18.3	8.0
KLM	13.0	7.7	9.8	5.0	1.8
SDG	3.0	6.2	5.5	4.5	7.4
SB	10.0	17.8	13.3	5.3	6.8
DKS	2.1	6.7	2.8	4.4	7.7
SI	13.5	10.7	16.3	7.9	14.9
SBL	8.4	8.7	18.4	13.5	5.9
AMP	7.4	8.5	2.5	3.1	0.7
LIK	5.8	1.7	2.7	17.8	0.0
UMMC	27.0	7.5	5.3	5.2	-
LKW	15.0	1.4	4.9	1.1	3.0
BM	3.7	4.2	4.9	11.8	1.4
SLR	2.7	2.8	11.8	2.4	1.0
PD	9.8	2.8	0.0	1.9	0.5
KKR	6.5	3.7	3.3	5.7	2.2
SGT	8.5	3.8	0.0	4.5	6.2
TM	0.0	4.1	1.5	1.7	0.0
KEM	2.5	2.0	15.4	0.0	1.5
KLP	0.0	11.8	3.5	1.4	0.2
LAB	10.4	9.7	5.9	8.8	4.6
KEN	0.0	4.5	9.0	1.7	0.1
BIN	1.9	5.0	0.0	4.1	3.1
LD	4.5	3.4	5.4	13.1	0.0
Total	6.8	6.6	6.8	6.5	3.4

Pressure ulcer: A circumscribed area in which cutaneous tissue has been destroyed and there is progressive destruction of underlying tissue caused by interference with circulation and nutrition to the area. Signs include blisters or broken skin or sore formation over pressure areas

SECTION F: LENGTH OF STAY AND MORTALITY OUTCOMES

- i. Length of ICU stay**
- ii. Length of hospital stay**
- iii. ICU mortality**
- iv. Hospital mortality**

Findings:

1. The average length of ICU stay was 4.8 days, with a median of 2.6 days.
2. The average length of hospital stay was 14.6 days with a median of 9.0 days.
3. In-ICU and in-hospital mortality rates were 18.6% and 26.2% respectively.
4. Standardised mortality ratio was 0.68 (95% C.I 0.48 – 0.96).
5. All-cause mortality in severe sepsis was 42.3%. The mortality increased in presence of acute kidney injury (57.2%), acute respiratory distress syndrome (53.0%), and both (72.8%).
6. All-cause mortality in patients with acute kidney injury was 40.5%.
7. All-cause mortality in patients with acute respiratory distress syndrome was 29.3%.
8. All-cause mortality rates were high in patients with cerebrovascular disease (39.8%), infection of the limbs (37.3%) and community-acquired pneumonia (34.8%).

Table 23: Length of ICU stay, 2012 – 2016

Hospital	Mean (Median), days				
	2012	2013	2014	2015	2016
AS	5.6 (3.1)	4.9 (2.9)	4.6 (2.8)	4.5 (2.7)	4.9 (3.0)
PP	5.4 (2.6)	5.9 (2.7)	6.2 (2.9)	6.1 (2.9)	5.5 (2.9)
IPH	5.5 (2.9)	5.9 (3.0)	6.1 (3.2)	6.4 (3.3)	6.7 (3.2)
KL	5.1 (2.8)	5.0 (2.7)	4.6 (2.4)	4.9 (2.5)	4.8 (2.6)
SLG	4.5 (2.6)	4.2 (2.0)	4.7 (2.5)	5.1 (2.5)	5.4 (2.7)
KLG	4.1 (2.1)	4.3 (1.9)	4.0 (2.0)	4.5 (2.2)	5.1 (2.3)
SBN	4.9 (2.7)	5.9 (2.9)	5.0 (2.7)	5.0 (2.7)	4.8 (2.6)
MLK	4.1 (2.1)	4.1 (2.1)	4.8 (2.5)	4.6 (2.6)	5.1 (2.7)
JB	5.2 (3.0)	4.7 (2.8)	5.4 (3.1)	5.4 (3.3)	5.3 (3.6)
KTN	6.3 (3.6)	5.6 (3.3)	5.5 (2.8)	6.1 (3.0)	5.4 (2.9)
KT	4.1 (2.2)	4.6 (2.7)	4.1 (2.1)	4.0 (2.0)	3.8 (2.0)
KB	4.7 (2.3)	4.9 (2.3)	4.2 (2.3)	5.4 (2.5)	4.2 (2.0)
KCH	5.2 (2.9)	4.7 (2.6)	3.9 (2.0)	4.0 (2.0)	4.7 (2.4)
KK	6.3 (3.8)	6.2 (3.6)	5.9 (3.6)	7.0 (3.9)	7.3 (4.2)
SP	7.6 (2.2)	4.7 (2.6)	4.8 (2.8)	4.5 (2.6)	4.5 (2.6)
PJY	3.2 (1.5)	3.5 (1.8)	3.9 (1.7)	3.8 (1.7)	3.3 (1.4)
MUR	3.5 (1.8)	3.0 (1.8)	3.7 (1.9)	3.1 (1.9)	3.4 (2.0)
TI	3.5 (2.1)	3.0 (1.8)	3.2 (1.7)	2.8 (1.6)	3.2 (1.7)
TPG	5.1 (2.7)	4.1 (2.7)	4.7 (2.6)	5.2 (2.7)	5.2 (2.7)
SJ	4.2 (2.1)	6.2 (3.1)	6.5 (3.5)	5.0 (2.5)	5.0 (2.8)
KJG	4.6 (2.9)	4.7 (3.2)	4.8 (3.1)	3.8 (2.6)	3.8 (2.5)
KGR	4.3 (2.1)	4.2 (2.6)	4.2 (2.1)	4.0 (2.4)	4.6 (2.7)
TML	6.4 (3.5)	4.8 (2.6)	4.7 (2.7)	5.0 (2.8)	5.1 (2.9)
KP	5.7 (3.0)	5.5 (2.9)	4.7 (2.7)	4.1 (2.6)	4.2 (2.5)
SMJ	3.9 (2.5)	3.6 (2.2)	3.2 (1.9)	3.4 (2.1)	3.1 (1.9)
BP	5.7 (3.3)	4.5 (2.8)	4.4 (2.7)	3.7 (2.4)	3.3 (2.0)
TW	3.5 (2.4)	3.8 (2.5)	4.2 (2.5)	4.7 (2.4)	4.2 (2.2)
MRI	5.2 (2.5)	4.5 (2.6)	4.9 (3.0)	5.1 (3.7)	5.2 (3.0)
KLM	3.3 (1.9)	3.2 (1.7)	3.3 (1.8)	3.8 (2.0)	3.5 (1.8)
SDG	4.8 (2.8)	4.4 (2.2)	4.4 (2.4)	5.6 (2.7)	5.6 (3.3)
SB	5.1 (2.5)	5.4 (3.3)	6.8 (4.0)	4.0 (2.2)	3.8 (2.0)
DKS	5.1 (3.1)	4.5 (2.5)	3.7 (1.9)	4.7 (2.6)	5.1 (2.8)
SI	6.2 (3.3)	5.4 (2.7)	5.1 (2.6)	4.3 (2.1)	4.7 (2.6)
SBL	5.7 (3.1)	5.5 (3.1)	4.8 (2.7)	5.1 (3.0)	5.6 (3.5)
AMP	5.0 (2.9)	5.4 (2.9)	5.7 (3.0)	4.8 (2.7)	4.5 (2.5)
LIK	3.5 (1.8)	3.5 (1.9)	4.1 (2.6)	3.3 (2.0)	3.4 (2.0)
UMMC	7.2 (3.8)	5.6 (3.3)	5.5 (2.6)	5.9 (2.8)	5.4 (2.8)
LKW	5.3 (2.0)	4.1 (2.0)	3.7 (2.1)	4.6 (2.5)	4.8 (3.2)
BM	-	9.0 (4.3)	8.8 (5.6)	5.9 (3.4)	6.7 (3.6)
SLR	6.3 (3.2)	6.3 (3.0)	6.6 (3.0)	6.2 (3.0)	6.1 (3.4)
PD	4.0 (2.5)	4.4 (2.8)	3.5 (2.0)	4.7 (2.7)	3.7 (2.3)
KKR	5.6 (2.9)	5.7 (3.4)	5.8 (3.2)	5.0 (2.9)	3.9 (2.1)
SGT	4.5 (2.8)	3.3 (2.3)	3.7 (2.1)	3.1 (1.9)	2.6 (1.8)
TM	3.5 (1.9)	3.8 (2.5)	4.5 (3.3)	3.8 (2.4)	3.7 (2.3)
KEM	3.3 (2.6)	4.2 (2.8)	5.0 (2.6)	3.0 (2.1)	3.5 (2.2)
KLP	1.3 (0.8)	2.9 (1.5)	3.0 (2.0)	6.9 (3.2)	7.5 (3.0)
LAB	4.6 (2.2)	4.4 (1.9)	4.1 (1.8)	4.9 (2.8)	4.5 (2.4)
KEN	6.5 (2.9)	5.1 (2.9)	5.4 (3.0)	4.5 (2.9)	5.4 (3.3)
BIN	5.4 (2.8)	3.9 (2.1)	3.9 (2.3)	3.8 (2.2)	3.7 (1.9)
LD	5.7 (2.7)	4.8 (2.7)	5.1 (3.4)	6.1 (3.9)	5.2 (3.2)
Total	4.8 (2.6)	4.7 (2.5)	4.7 (2.5)	4.8 (2.6)	4.8 (2.6)

Table 24: Length of hospital stay, 2012 – 2016

Hospital	Mean (Median), days				
	2012	2013	2014	2015	2016
AS	15.1 (9.2)	14.6 (8.8)	13.1 (7.9)	13.4 (8.8)	14.1 (9.5)
PP	19.5 (12.0)	19.2 (12.0)	20.2 (12.5)	18.2 (11.9)	18.4 (11.4)
IPH	16.0 (10.6)	15.2 (9.8)	15.3 (10.0)	15.4 (9.8)	15.7 (10.1)
KL	17.7 (10.7)	16.5 (10.2)	14.8 (8.6)	15.3 (8.4)	15.8 (9.4)
SLG	17.3 (12.1)	15.2 (10.5)	15.2 (9.9)	16.5 (10.3)	17.2 (11.1)
KLG	12.2 (7.6)	12.5 (7.80)	11.5 (7.4)	13.5 (8.4)	14.7 (9.0)
SBN	17.0 (10.6)	18.5 (10.7)	17.5 (10.4)	18.4 (11.1)	17.9 (9.0)
MLK	16.0 (10.0)	14.4 (8.6)	16.2 (9.6)	14.4 (8.7)	16.7 (10.7)
JB	14.7 (9.9)	13.6 (9.3)	14.2 (9.4)	13.5 (9.3)	14.4 (9.6)
KTN	18.0 (12.3)	15.8 (10.8)	16.6 (10.4)	15.8 (10.0)	14.8 (10.6)
KT	14.5 (9.7)	14.6 (9.80)	13.5 (8.8)	12.9 (8.5)	12.6 (8.3)
KB	16.5 (10.0)	14.4 (9.6)	12.0 (8.0)	16.1 (9.6)	14.0 (8.8)
KCH	21.4 (13.7)	19.2 (12.1)	19.5 (11.8)	19.4 (12.0)	19.8 (12.0)
KK	19.9 (11.7)	17.7 (11.1)	16.4 (10.9)	18.4 (10.8)	19.0 (12.0)
SP	14.0 (8.2)	12.9 (8.9)	12.6 (8.4)	11.9 (8.0)	12.6 (8.6)
PJY	11.7 (8.6)	13.2 (8.2)	12.4 (7.4)	12.4 (7.6)	12.5 (7.5)
MUR	22.0 (10.5)	13.6 (8.4)	13.6 (9.1)	13.7 (8.6)	12.7 (8.3)
TI	14.2 (9.6)	11.4 (8.2)	11.3 (7.5)	10.0 (7.0)	10.2 (6.9)
TPG	12.6 (8.3)	10.7 (7.8)	11.7 (8.0)	12.7 (8.2)	12.5 (8.4)
SJ	13.0 (8.2)	14.3 (9.7)	15.9 (11.1)	14.1 (9.1)	13.7 (9.4)
KJG	13.5 (8.3)	12.5 (8.6)	13.4 (8.7)	10.1 (7.0)	11.3 (7.4)
KGR	18.3 (10.9)	14.2 (9.7)	13.8 (7.9)	11.6 (8.6)	14.2 (9.4)
TML	14.5 (10.7)	13.1 (9.3)	11.9 (8.0)	11.8 (7.6)	13.2 (8.4)
KP	15.5 (9.3)	13.6 (8.5)	13.3 (8.0)	11.3 (7.1)	10.7 (7.4)
SMJ	12.0 (7.2)	10.5 (7.1)	8.4 (6.1)	9.2 (6.3)	9.9 (5.8)
BP	13.6 (9.5)	14.0 (9.0)	15.9 (9.7)	11.2 (7.6)	11.3 (7.1)
TW	13.0 (8.4)	14.1 (9.1)	13.5 (8.6)	13.7 (7.8)	11.8 (7.4)
MRI	14.0 (10.8)	12.4 (9.9)	13.1 (10.0)	14.8 (10.7)	15.5 (10.2)
KLM	12.6 (7.8)	11.7 (7.9)	11.6 (7.6)	13.2 (8.0)	11.5 (7.7)
SDG	14.6 (9.4)	14.3 (8.1)	13.2 (7.5)	14.8 (7.8)	14.9 (9.1)
SB	13.1 (8.3)	15.7 (10.5)	15.3 (10.0)	13.9 (8.3)	12.9 (7.9)
DKS	12.4 (8.2)	11.4 (7.6)	11.8 (6.8)	13.5 (8.0)	13.7 (8.3)
SI	16.0 (9.7)	14.6 (9.2)	15.3 (9.3)	13.4 (8.0)	13.3 (8.2)
SBL	19.2 (10.8)	17.0 (9.8)	15.4 (7.9)	16.3 (9.2)	17.5 (9.9)
AMP	15.4 (10.5)	15.1 (10.7)	16.1 (10.5)	14.2 (10.4)	15.2 (10.1)
LIK	18.4 (9.7)	15.3 (10.9)	15.0 (10.6)	11.1 (7.5)	11.6 (7.8)
UMMC	25.2 (16.2)	22.0 (12.4)	19.7 (11.4)	19.4 (11.8)	18.7 (11.3)
LKW	12.7 (6.4)	12.5 (6.6)	10.5 (5.9)	10.1 (6.7)	11.8 (9.3)
BM	20.9 (10.1)	16.3 (10.3)	14.8 (11.5)	11.8 (8.8)	12.3 (8.3)
SLR	12.1 (7.9)	12.2 (6.6)	13.3 (8.2)	12.9 (8.2)	11.6 (7.3)
PD	10.2 (5.9)	10.9 (7.4)	10.2 (5.9)	11.8 (7.0)	9.3 (6.4)
KKR	12.5 (9.6)	13.6 (8.6)	11.4 (7.0)	11.1 (8.0)	9.9 (7.3)
SGT	14.8 (8.3)	10.4 (7.1)	10.7 (7.6)	10.1 (6.5)	10.5 (7.0)
TM	12.0 (8.2)	9.1 (6.3)	12.5 (7.3)	10.7 (7.1)	11.1 (7.8)
KEM	9.6 (7.8)	12.3 (8.0)	11.9 (8.0)	8.7 (7.2)	11.1 (9.3)
KLP	6.3 (6.9)	11.4 (6.9)	11.3 (7.5)	16.6 (10.5)	16.2 (9.6)
LAB	14.4 (6.4)	10.0 (4.3)	9.4 (5.9)	11.8 (9.5)	10.9 (6.6)
KEN	19.2 (10.4)	15.0 (9.6)	15.1 (10.4)	17.2 (10.0)	19.1 (10.2)
BIN	21.5 (12.6)	14.2 (10.3)	13.4 (7.9)	17.1 (10.6)	15.6 (9.0)
LD	12.8 (7.7)	13.2 (8.3)	14.2 (9.5)	18.3 (12.6)	15.1 (9.1)
Total	15.5 (9.5)	14.4 (9.0)	14.2 (8.7)	14.4 (8.8)	14.6 (9.0)

Table 25: Crude in-ICU and in-hospital mortality, 2012 – 2016

Hospital	Crude in-ICU mortality (in-hospital mortality) %				
	2012	2013	2014	2015	2016
AS	26.7 (44.5)	27.3 (37.3)	28.9 (39.7)	25.4 (41.7)	25.7 (38.7)
PP	16.5 (26.9)	15.6 (25.0)	18.3 (25.7)	19.7 (29.6)	18.9 (31.0)
IPH	16.5 (25.5)	18.5 (25.6)	16.7 (24.7)	20.1 (29.2)	20.0 (28.4)
KL	18.4 (27.0)	17.5 (25.8)	14.3 (21.9)	18.1 (25.2)	14.2 (22.9)
SLG	16.5 (27.1)	17.2 (24.5)	15.7 (20.8)	16.2 (21.0)	15.2 (18.9)
KLG	15.5 (22.9)	13.6 (21.7)	13.3 (19.3)	15.7 (20.2)	15.1 (21.2)
SBN	22.1 (30.4)	19.7 (25.7)	21.1 (27.9)	18.5 (26.4)	17.0 (22.5)
MLK	13.5 (32.1)	19.9 (28.2)	20.0 (27.7)	20.0 (26.5)	18.2 (27.4)
JB	21.4 (30.0)	22.2 (29.9)	17.4 (25.5)	20.3 (28.2)	17.2 (26.5)
KTN	24.1 (34.9)	22.2 (32.2)	17.8 (25.5)	21.3 (28.6)	17.3 (24.2)
KT	18.5 (28.1)	22.0 (32.0)	21.0 (30.0)	17.9 (25.3)	18.5 (28.0)
KB	16.0 (22.6)	15.0 (21.3)	11.6 (16.1)	13.1 (23.5)	13.5 (19.8)
KCH	17.4 (24.3)	18.0 (24.0)	13.9 (17.7)	16.4 (23.2)	20.3 (26.4)
KK	21.7 (34.0)	19.5 (25.3)	17.2 (22.5)	15.7 (23.0)	15.0 (20.2)
SP	26.9 (38.4)	23.3 (32.6)	22.8 (30.4)	17.6 (24.5)	14.5 (24.3)
PJY	16.9 (19.3)	19.9 (22.9)	15.9 (19.6)	14.4 (17.9)	11.9 (15.0)
MUR	24.1 (33.8)	20.7 (24.7)	24.2 (26.2)	22.4 (28.8)	24.6 (29.0)
TI	17.7 (31.9)	21.9 (34.6)	23.4 (34.7)	21.9 (27.4)	18.2 (27.3)
TPG	21.4 (35.3)	19.3 (30.1)	20.9 (28.8)	20.0 (31.8)	24.6 (37.4)
SJ	23.2 (35.5)	29.3 (40.2)	24.2 (28.4)	17.7 (19.6)	21.9 (26.6)
KJG	15.0 (23.8)	15.9 (26.8)	12.0 (21.1)	13.9 (21.0)	14.3 (22.3)
KGR	16.3 (22.1)	18.0 (24.5)	17.0 (17.3)	18.4 (21.3)	17.4 (19.4)
TML	14.7 (21.0)	16.0 (22.5)	19.1 (25.7)	20.1 (27.5)	16.2 (22.9)
KP	28.9 (42.4)	28.7 (38.0)	30.5 (37.1)	25.8 (33.5)	30.2 (34.8)
SMJ	24.3 (29.6)	27.6 (32.7)	30.1 (36.1)	17.9 (25.1)	28.0 (40.3)
BP	29.8 (40.7)	22.7 (31.0)	20.0 (34.6)	16.1 (28.0)	17.9 (30.1)
TW	13.7 (24.3)	17.8 (29.6)	16.3 (23.7)	15.2 (21.2)	20.0 (24.4)
MRI	18.3 (24.1)	18.7 (22.0)	15.4 (16.8)	24.7 (25.9)	25.7 (30.2)
KLM	21.0 (32.5)	25.8 (39.0)	26.5 (40.0)	23.7 (34.9)	21.0 (32.4)
SDG	17.7 (25.9)	18.3 (26.3)	16.6 (22.6)	18.7 (23.6)	18.3 (25.3)
SB	22.8 (30.2)	24.9 (39.5)	27.1 (35.3)	16.0 (24.3)	18.0 (23.9)
DKS	25.5 (26.8)	26.9 (31.3)	22.3 (31.5)	18.6 (25.1)	20.6 (30.4)
SI	24.6 (28.6)	21.2 (26.5)	20.2 (26.1)	19.1 (26.2)	17.2 (25.1)
SBL	17.2 (25.2)	18.6 (26.9)	18.7 (24.1)	18.0 (24.5)	23.6 (29.8)
AMP	37.9 (47.8)	31.1 (42.1)	35.6 (44.0)	33.9 (43.7)	32.5 (41.1)
LIK	5.6 (6.5)	4.1 (6.0)	2.3 (4.0)	6.5 (7.3)	8.8 (10.4)
UMMC	20.3 (31.8)	16.7 (24.8)	18.4 (25.8)	18.8 (26.5)	17.7 (26.0)
LKW	28.6 (36.2)	17.8 (22.3)	26.1 (33.3)	25.9 (31.9)	30.8 (39.7)
BM	13.2 (21.1)	29.8 (34.8)	19.9 (22.2)	23.9 (35.1)	32.8 (42.9)
SLR	42.8 (52.6)	27.6 (31.1)	32.7 (39.0)	35.3 (42.9)	28.0 (37.0)
PD	14.6 (18.4)	15.9 (23.0)	15.5 (20.0)	15.5 (17.0)	14.1 (19.7)
KKR	15.0 (24.4)	23.7 (28.7)	21.5 (21.5)	13.7 (15.9)	16.3 (17.3)
SGT	24.5 (30.4)	21.4 (34.5)	18.0 (25.3)	19.1 (23.5)	16.7 (23.9)
TM	5.9 (11.8)	23.7 (24.4)	22.5 (24.4)	15.1 (18.2)	12.4 (20.4)
KEM	9.9 (12.6)	15.3 (17.1)	13.2 (23.1)	10.2 (18.9)	8.9 (21.0)
KLP	0 (0.0)	8.6 (11.2)	12.5 (14.6)	7.1 (9.2)	14.6 (22.3)
LAB	29.7 (34.3)	35.7 (40.0)	40.4 (43.4)	20.9 (24.8)	15.6 (21.4)
KEN	11.4 (20.0)	6.8 (12.4)	9.7 (12.5)	6.0 (10.4)	5.7 (11.3)
BIN	17.8 (27.7)	12.7 (17.7)	14.5 (19.8)	13.7 (22.3)	10.6 (18.8)
LD	29.8 (38.1)	23.0 (35.3)	29.5 (40.6)	15.4 (28.8)	16.4 (26.1)
Total	19.4 (27.9)	19.9 (27.7)	19.0 (25.7)	18.7 (26.0)	18.6 (26.2)

Table 26: Standardised mortality ratio, 2012 – 2016

Hospital	Standardised mortality ratio (95% CI)				
	2012	2013	2014	2015	2016
AS	1.07 (0.81-1.39)	1.01 (0.76-1.32)	0.91 (0.68-1.20)	1.06 (0.80-1.40)	0.98 (0.73 – 1.30)
PP	0.74 (0.51-1.01)	0.71 (0.49-0.99)	0.69 (0.49-0.98)	0.72 (0.52-1.00)	0.70 (0.50 – 0.94)
IPH	0.83 (0.58-1.17)	0.74 (0.51-1.04)	0.75 (0.52-1.05)	0.87 (0.61-1.18)	0.80 (0.54 – 1.15)
KL	0.63 (0.44-0.88)	0.60 (0.42-0.84)	0.58 (0.39-0.82)	0.63 (0.44-0.89)	0.59 (0.40 – 0.84)
SLG	0.75 (0.54-1.05)	0.68 (0.48-0.97)	0.63 (0.43-0.91)	0.77 (0.53-1.11)	0.77 (0.47 – 1.18)
KLG	0.60 (0.41-0.86)	0.54 (0.37-0.80)	0.57 (0.38-0.84)	0.59 (0.40-0.87)	0.60 (0.40 – 0.86)
SBN	0.73 (0.50-1.03)	0.71 (0.51-0.99)	0.79 (0.56-1.10)	0.77 (0.54-1.09)	0.76 (0.53 – 1.11)
MLK	0.81 (0.58 – 1.10)	0.86 (0.61-1.21)	0.82 (0.59-1.15)	0.75 (0.53-1.06)	0.73 (0.50 – 1.00)
JB	0.71 (0.51-0.97)	0.66 (0.47-0.91)	0.61 (0.42-0.85)	0.63 (0.44-0.87)	0.58 (0.40 – 0.82)
KTN	0.84 (0.62-1.21)	0.82 (0.58-1.09)	0.69 (0.49-0.97)	0.77 (0.54-1.05)	0.71 (0.49 – 0.99)
KT	0.65 (0.46-0.89)	0.72 (0.53-0.98)	0.73 (0.54-1.00)	0.58 (0.41-0.82)	0.68 (0.49 – 0.95)
KB	0.67 (0.46-0.95)	0.62 (0.44-0.92)	0.60 (0.39-0.91)	0.78 (0.54-1.10)	0.80 (0.53 – 1.14)
KCH	0.75 (0.51-1.06)	0.69 (0.47-0.98)	0.56 (0.36-0.84)	0.72 (0.49-1.02)	0.77 (0.54 – 1.10)
KK	1.00 (0.70-1.38)	0.8 (0.55-1.14)	0.51 (0.36-0.74)	0.49 (0.34-0.70)	0.39 (0.27 – 0.57)
SP	0.77 (0.57-1.03)	0.75 (0.54-1.02)	0.79 (0.56-1.07)	0.72 (0.47-1.06)	0.76 (0.53 – 1.08)
PJY	0.69 (0.45-1.03)	0.80 (0.54-1.14)	0.59 (0.40-0.88)	0.70 (0.47-1.06)	0.57 (0.36 – 0.87)
MUR	0.89 (0.63-1.23)	0.55 (0.37-0.79)	0.63 (0.44-0.88)	0.68 (0.46-0.98)	0.72 (0.51 – 0.99)
TI	0.72 (0.53-0.99)	0.65 (0.46-0.88)	0.74 (0.53-1.00)	0.67 (0.46-0.94)	0.74 (0.51 – 1.04)
TPG	0.80 (0.58-1.07)	0.64 (0.45-0.89)	0.68 (0.49-0.95)	0.72 (0.52-0.98)	0.84 (0.60 – 1.14)
SJ	0.87 (0.64-1.17)	0.95 (0.73-1.25)	0.70 (0.49-0.95)	0.40 (0.25-0.62)	0.57 (0.40 – 0.80)
KJG	0.85 (0.55-1.14)	0.88 (0.61-1.20)	0.73 (0.50-1.05)	0.85 (0.57-1.20)	0.72 (0.48 – 1.00)
KGR	0.62 (0.42-0.89)	0.64 (0.44-0.90)	0.61 (0.40-0.91)	0.77 (0.51-1.08)	0.42 (0.27 – 0.60)
TML	0.64 (0.43-0.90)	0.80 (0.56-1.15)	0.83 (0.59-1.15)	0.82 (0.57-1.12)	0.74 (0.51 – 1.03)
KP	0.95 (0.72-1.25)	0.95 (0.71-1.26)	0.98 (0.74-1.33)	0.98 (0.71-1.32)	0.96 (0.70 – 1.29)
SMJ	0.70 (0.51-0.97)	0.69 (0.49-0.95)	0.82 (0.60-1.10)	0.64 (0.44-0.90)	0.93 (0.68 – 1.21)
BP	0.87 (0.65-1.14)	0.69 (0.47-0.97)	0.79 (0.58-1.06)	0.75 (0.54-1.05)	0.93 (0.67 – 1.27)
TW	0.67 (0.47-0.93)	0.76 (0.53-1.03)	0.65 (0.43-0.93)	0.77 (0.54-1.10)	0.71 (0.49 – 0.98)
MRI	0.65 (0.42-0.96)	0.62 (0.43-0.89)	0.50 (0.32-0.73)	0.62 (0.43-0.88)	0.66 (0.46 – 0.91)
KLM	0.69 (0.50-0.94)	0.75 (0.56-1.00)	0.79 (0.58-1.04)	0.72 (0.53-0.97)	0.66 (0.47 – 0.88)
SDG	0.61 (0.44-0.85)	0.65 (0.46-0.90)	0.57 (0.41-0.81)	0.57 (0.40-0.81)	0.56 (0.40 – 0.78)
SB	0.75 (0.54-1.01)	0.87 (0.65-1.14)	0.78 (0.56-1.04)	0.73 (0.51-1.03)	0.46 (0.66 – 0.96)
DKS	0.74 (0.52-1.01)	0.76 (0.52-1.06)	0.83 (0.61-1.14)	0.69 (0.48-0.96)	0.77 (0.55 – 1.04)
SI	0.73 (0.52-1.01)	0.78 (0.55-1.10)	0.78 (0.55-1.11)	0.80 (0.57-1.13)	0.68 (0.49 – 0.96)
SBL	0.63 (0.45-0.90)	0.92 (0.65-1.28)	0.67 (0.48-0.97)	0.61 (0.40-0.85)	0.65 (0.47 – 0.89)
AMP	0.90 (0.69-1.17)	0.89 (0.69-1.15)	0.9 (0.69-1.17)	0.93 (0.71-1.22)	0.86 (0.65 – 1.13)
LIK	0.27 (0.14-0.57)	0.58 (0.30-1.08)	0.28 (0.11-0.57)	0.43 (0.19-0.86)	0.45 (0.28 – 0.75)
UMMC	0.83 (0.60-1.14)	0.65 (0.44-0.91)	0.65 (0.44-0.90)	0.68(0.45-0.98)	0.66 (0.46 – 0.93)
LKW	0.96 (0.71-1.25)	0.74 (0.48-1.08)	0.84 (0.61-1.12)	0.68 (0.49-0.91)	0.91 (0.67 – 1.19)
BM	0.54 (0.36-0.79)	0.58 (0.41-0.79)	0.33 (0.22-0.48)	0.54 (0.39-0.72)	0.65 (0.49 – 0.86)
SLR	0.98 (0.76-1.26)	0.71 (0.51-0.99)	0.80 (0.59-1.04)	0.88 (0.66-1.15)	0.78 (0.57 – 1.04)
PD	0.60 (0.40-0.92)	0.74 (0.51-1.05)	0.75 (0.48-1.08)	0.56 (0.36-0.82)	0.54 (0.34 – 0.80)
KKR	0.68 (0.47-0.96)	0.64 (0.46-0.88)	0.40 (0.27-0.60)	0.35 (0.23-0.54)	0.48 (0.30 – 0.75)
SGT	0.74 (0.51-1.03)	0.73 (0.54-0.99)	0.50 (0.35-0.71)	0.51 (0.34-0.71)	0.60 (0.41 – 0.84)
TM	0.76 (0.49-1.13)	0.68 (0.46-0.96)	0.60 (0.41-0.84)	0.41 (0.27-0.61)	0.44 (0.29 – 0.63)
KEM	0.30 (0.17-0.46)	0.44 (0.28-0.65)	0.67 (0.48-0.94)	0.49 (0.32-0.70)	0.47 (0.32 – 0.67)
KLP	0 (0)	0.53 (0.31-0.83)	0.65 (0.43-0.96)	0.30 (0.17-0.52)	0.66 (0.46 – 0.94)
LAB	0.87 (0.64-1.16)	0.94 (0.72-1.23)	0.83 (0.64-1.06)	0.55 (0.39-0.77)	0.55 (0.36 – 0.80)
KEN	0.55 (0.39-0.77)	0.41 (0.25-0.63)	0.33 (0.20-0.51)	0.42 (0.27-0.68)	0.47 (0.29-0.75)
BIN	1.15 (0.84-1.51)	0.6 (0.40-0.87)	0.60 (0.42-0.87)	0.61 (0.43-0.86)	0.58 (0.40-0.84)
LD	0.68 (0.5-0.9)	0.77 (0.54-1.06)	0.90 (0.67-1.17)	0.62 (0.44-0.84)	0.46 (0.32-0.63)
Total	0.83 (0.60-1.14)	0.72 (0.51-1.00)	0.69 (0.48-0.95)	0.69 (0.47-0.95)	0.68 (0.48 – 0.96)

Table 27: In-hospital mortality for 10 most common diagnoses leading to ICU admission, 2011 – 2016

Diagnosis	In-hospital mortality (%)					
	2011	2012	2013	2014	2015	2016
Sepsis	58.9	54.4	53.4	52.8	51.2	52.0
Head injury	25.2	23.1	22.1	22.2	22.0	19.7
Dengue infection	6.4	5.6	5.6	7.1	8.9	8.5
Community-acquired pneumonia	40.6	39.0	38.9	36.2	33.5	34.8
Cerebral vascular disease	41.9	40.5	45.5	41.1	42.8	39.8
Infection/gangrene of limbs	41.8	39.6	37.7	36.9	37.0	37.3
DKA/HHS	-	-	21.1	19.3	16.9	18.2
Bronchial asthma	10.9	7.5	8.1	7.6	6.1	7.4
Chronic lower respiratory disease	24.9	23.6	22.1	18.8	18.7	20.6
Non-cardiogenic pulmonary oedema	22.3	18.9	21.4	21.6	17.5	17.7

Table 28: In-hospital mortality for severe sepsis, ARDS and AKI within 24hrs of ICU admission, 2012 - 2016

	In-hospital mortality (%)				
	2012	2013	2014	2015	2016
Severe sepsis	43.1	41.6	35.5	41.1	42.3
ARDS	37.3	36.6	35.9	33.3	29.3
AKI	41.4	43.9	38.0	38.5	40.5
Severe sepsis + ARDS	67.1	60.3	62.7	58.2	53.0
Severe sepsis + AKI	61.3	59.3	61.5	59.5	57.2
Severe sepsis + ARDS + AKI	80.4	73.4	73.7	77.5	72.8

SECTION G: QUALITY IMPROVEMENT ACTIVITIES

- i. Ventilator Care Bundle**
- ii. Central Venous Catheter Care Bundle**
- iii. Early Mobility**
- iv. SSKIN Bundle**

Findings:

- 1. Compliance to ventilator and CVC care bundles were both 99%.
- 2. Compliance to early mobility and SSKIN bundles were 74.5% and 92.3% respectively.
- 3. The ventilator utilisation ratio was 0.7 (means that of the total patient days, 70% were ventilator days).
- 4. The CVC utilisation ratio was 0.6.
- 5. No trend was observed between ventilator utilisation ratio and VAP. Neither was there any trend observed between ventilator care bundle compliance and VAP.
- 6. Similarly, no trend was observed between catheter utilisation ratio or catheter care bundle and CVC-BSI.

Table 29: Ventilator utilisation ratio, ventilator care bundle compliance and ventilator-associated pneumonia, 2016

Hospital	Ventilator utilisation ratio	Ventilator care bundle compliance, %	VAP per 1000 ventilator-days
AS	0.8	100.0	0.0
PP	0.8	95.5	2.0
IPH	0.8	95.1	4.1
KL	0.7	99.2	2.0
SLG	0.8	96.9	4.5
KLG	0.4	98.0	0.5
SBN	0.8	100.0	2.2
MLK	0.6	100.0	2.4
JB	0.9	98.4	0.0
KTN	0.8	99.5	0.3
KT	0.7	100.0	0.3
KB	0.6	100.0	0.2
KCH	0.8	100.0	0.8
KK	0.6	100.0	2.0
SP	0.7	98.5	0.7
PJY	0.6	100.0	4.4
MUR	0.8	100.0	0.7
TI	0.7	100.0	4.8
TPG	0.8	99.3	1.9
SJ	0.8	100.0	1.8
KJG	0.7	100.0	0.7
KGR	0.7	100.0	2.1
TML	0.7	100.0	3.2
KP	0.7	99.0	0.0
SMJ	0.6	100.0	1.2
BP	0.9	100.0	0.0
TW	0.7	100.0	0.0
MRI	0.8	100.0	0.9
KLM	0.8	97.8	5.5
SDG	0.7	100.0	3.2
SB	0.8	100.0	2.7
DKS	0.8	100.0	1.6
SI	0.7	99.0	0.8
SBL	0.7	100.0	1.9
AMP	0.7	98.7	2.1
LIK	0.4	100.0	2.5
UMMC	0.7	100.0	3.1
LKW	0.8	100.0	9.8
BM	0.8	100.0	0.8
SLR	0.8	96.0	1.5
PD	0.3	100.0	0.0
KKR	0.5	100.0	2.9
SGT	0.7	100.0	0.0
TM	0.6	100.0	0.0
KEM	0.7	100.0	0.0
KLP	0.6	100.0	0.0
LAB	0.7	100.0	8.6
KEN	0.5	100.0	0.0
BIN	0.7	100.0	3.2
LD	0.7	100.0	0.0
Total	0.7	99.0	1.8

Table 30: Catheter utilisation ratio, central venous catheter care bundle compliance and central venous catheter-related blood stream infection (CVC-BSI), 2016

Hospital	Central venous catheter utilisation ratio	CVC care bundle compliance %	CVC-BSI per 1000 catheter days
AS	0.6	100.0	0.0
PP	0.5	100.0	0.5
IPH	0.8	93.2	0.2
KL	0.4	97.1	1.5
SLG	0.8	100.0	0.2
KLG	0.3	100.0	0.0
SBN	0.7	100.0	0.6
MLK	0.5	97.4	0.3
JB	0.5	89.2	1.8
KTN	0.9	100.0	0.0
KT	0.4	100.0	0.0
KB	0.6	100.0	0.0
KCH	0.8	100.0	0.0
KK	0.5	91.0	0.3
SP	0.9	100.0	0.2
PJY	0.5	100.0	0.0
MUR	0.4	100.0	0.0
TI	0.9	100.0	0.0
TPG	0.6	100.0	0.0
SJ	0.6	100.0	0.0
KJG	0.2	100.0	2.1
KGR	0.7	100.0	0.0
TML	0.3	100.0	0.0
KP	0.5	100.0	0.0
SMJ	0.6	100.0	0.0
BP	0.5	100.0	0.0
TW	0.4	100.0	0.0
MRI	0.6	100.0	0.0
KLM	0.4	100.0	1.7
SDG	0.7	100.0	0.0
SB	0.5	100.0	0.0
DKS	0.7	100.0	0.0
SI	0.9	99.0	1.7
SBL	0.7	100.0	0.1
AMP	0.8	97.9	0.0
LIK	0.5	100.0	0.0
UMMC	-	100.0	0.5
LKW	0.5	100.0	0.0
BM	0.6	100.0	0.0
SLR	0.1	100.0	0.0
PD	0.2	100.0	0.0
KKR	0.5	100.0	1.0
SGT	0.4	91.1	0.0
TM	0.3	100.0	0.0
KEM	0.6	100.0	0.0
KLP	0.8	100.0	0.0
LAB	0.7	100.0	0.0
KEN	0.8	100.0	0.0
BIN	0.6	100.0	1.7
LD	0.8	100.0	0.0
Total	0.61	99.0	0.3

Table 31: Pressure ulcer, and compliance to early mobility and SSKIN bundles, 2016

Hospital	Early mobility compliance, %	SSKIN compliance, %	Pressure ulcer per 1000 ICU days
AS	60.1	83.8	2.9
PP	96.2	100.0	1.3
IPH	83.2	94.9	0.0
KL	85.6	78.8	3.7
SLG	72.3	93.4	9.3
KLG	82.0	84.9	0.2
SBN	66.8	100.0	1.8
MLK	68.3	87.2	2.2
JB	86.7	82.0	4.5
KTN	32.7	97.2	8.8
KT	49.1	100.0	2.4
KB	80.6	88.0	2.5
KCH	32.1	100.0	2.2
KK	97.5	92.7	7.3
SP	44.7	60.2	2.7
PJY	86.9	98.9	0.3
MUR	60.0	71.0	2.6
TI	35.1	95.6	3.2
TPG	69.8	64.0	2.7
SJ	88.1	100.0	5.9
KJG	81.5	100.0	0.0
KGR	93.4	100.0	5.2
TML	54.7	97.3	3.5
KP	85.0	100.0	2.5
SMJ	55.9	68.8	0.0
BP	84.1	100.0	5.6
TW	78.4	98.0	5.6
MRI	88.7	100.0	8.0
KLM	73.8	100.0	1.8
SDG	55.5	74.2	7.4
SB	97.8	93.0	6.8
DKS	82.7	87.1	7.7
SI	90.3	93.1	14.9
SBL	76.0	100.0	5.9
AMP	62.9	98.8	0.7
LIK	92.0	100.0	0.0
LKW	-	84.4	3.0
BM	93.0	100.0	1.4
SLR	81.3	100.0	1.0
PD	81.0	100.0	0.5
KKR	78.7	97.0	2.2
SGT	56.1	69.8	6.2
TM	100.0	100.0	0.0
KEM	-	100.0	1.5
KLP	-	-	0.2
LAB	92.0	100.0	4.6
KEN	97.8	98.0	0.1
BIN	28.0	100.0	3.1
LD	90.5	100.0	0.0
Total	74.5	92.3	3.4

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