

**GiViTi**

Gruppo Italiano per la Valutazione degli Interventi In Terapia Intensiva

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**Report  
PROSAFE project**

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**Year 2016**

**National report for general ICUs (166 ICUs)**

**ITALY**

**PROSAFE project - National report for general ICUs (166 ICUs) - ITALY**

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## The project

The PROSAFE project was conceived as an observational project for the continuous electronic collection of data on patients admitted to intensive care units (ICUs). The objectives of the project are to:

- standardize the procedures for collecting data on admitted patients;
- analyse the activity carried out in terms of both clinical results achieved and resources used;
- gather information on the collected case series for research and/or routine clinical management purposes;
- promote comparison among ICUs, on the basis of detailed epidemiological research work, with a view to improving the quality of the care provided.

In addition to these general objectives, the PROSAFE project provides a tool that serves as the operating base for all research projects undertaken by the individual ICUs, both under the umbrella of the GiViTI group and at local level. The PROSAFE program, by virtue of its modular structure, is designed to smoothly integrate the collection of basic data (the PROSAFE 'core') with the collection of specific data for research projects focused on various different topics (the PROSAFE 'petals').

The Petals functioning in 2016 in Italy were:

- the Infections Surveillance Petal, designed to describe the epidemiology of infections in ICUs in Italy, focusing specifically on the identification and study of the main risk and prognostic factors for infections, with a view to comparing the various ICUs in terms of incidence of infections and their severity, prevalent bacterial flora and multiresistant germs;
- the Cardiosurgical Petal, whose aim is to describe in detail the characteristics of patients admitted to the ICU and subject to cardiosurgical procedures;
- the StART Petal, whose objective is to assess the appropriateness of ICU bed utilization by comparing the level of care required by admitted patients with the level of care that can be provided using available resources.
- the CReACTIVE Petal (Collaborative REsearch on ACute Traumatic brain Injury in intensiVe care medicine in Europe), that aims to collect relevant information to better characterize patients admitted to the ICU for a traumatic brain injury (european collaborative project FP7-HEALTH-2013-INNOVATION-1).
- the COMPACT 2 Petal, designed to randomize eligible patients and collect data for the clinical trial.

The information currently collected in the program 'core' refers to personal patient data, information on origin, reason for admission and whatever else GiViTI has, over the years, determined to be needed to best describe patients admitted to intensive care.

## Data collection

The PROSAFE software is distributed free of charge to all ICUs taking part in the project. To date 325 ICUs collected data during 2016, 284 Italian and 41 foreign ICUs, for a total of 104374 patients registered in PROSAFE. Only the ICUs that collected valid data (251) for a period of over 4 months were included in the aggregate analyses. On the whole, therefore, the assessment was based on a total of 95511 patients admitted to intensive care during 2016.

## The reports

The Coordinating Centre (GiViTI) produces the following reports (only for subgroups composed of at least 5 ICUs):

1. The (Italian) national report on the general (medical/surgical) ICUs. This first report includes the logistic regression model to assess performance in the various ICUs taking part in the project. The statistics for the most representative regions can be downloaded from the GiViTI website ([www.giviti.marionegri.it](http://www.giviti.marionegri.it)).
2. The (Italian) national report on the surgical ICUs.
3. The (Italian) national report on the neurosurgical ICUs.
4. The (Italian) national report on the high dependency units.
5. The personalized report for each individual centre, in Italian or English, which has different sections according to type of ICU and a similar structure to the national report, is designed to foster precise but user-friendly interpretation of the various values for predicting hospital mortality.

All reports (except for the personalized reports, sent to the project Contact person and the Director of the ICU) can be downloaded from the PROSAFE Project section of the GiViTI website ([www.giviti.marionegri.it](http://www.giviti.marionegri.it)). The participating ICUs can access an online tool, the Analyzer (<http://givitiweb.marionegri.it/Analyzer/>), to perform analyses both on their own data and on the whole national dataset. An analysis application form is available on the GiViTI website to obtain more complex analyses.

## Description of the statistics

### Project participation and location of Italian participating ICUs

The table on page 17 summarizes the participation in the project of the 251 ICUs which collected valid data in 2016 for a period of at least 4 months.

The map on page 19 shows the geographical location of the Italian ICUs assessed in the report.

### Description of the hospitals and ICUs

This section presents the organizational-structural features of the ICUs included in the report. The information (except for the information shown on page 23, which is the result of joint analysis of structural data and those collected during the year via the software) is taken from the 'Structural Data' form (available on the GiViTI portal at <https://givitiweb.marionegri.it/>). Absolute numbers, percentages and the number of missing data are reported for the categorical variables; the mean, standard deviation, median and Q1 (first quartile: the value below which lie 25% of the population) and Q3 (third quartile: the value below which lie 75% of the population) serve as indicators for the continuous variables. Below are a few tips on how to correctly interpret the statistics.

**Number of accredited beds** Number of beds officially accredited.

**Number of available beds** Number of beds actually available in ICU. This number is the sum of the beds declared in each single room ('Structural Data' form, section 'Icu rooms'). This number is used for computing utilization indicators.

**ICU Structure** We define as 'OPEN-SPACE' a ward where each room can be 'monitored' from any other. A room can be 'monitored' from another room when all the beds located in the other room can be visually and instrumentally controlled.

**Available beds per physician (average) e Available beds per nurse (average)** The mean is computed taking into account the differences between daily shifts of personnel.

**Indicators of utilization** Data on the number of available beds, total admissions in 2016 and ICU stay days were used to calculate indicators of utilization, i.e. indicators able to measure utilization levels and healthcare facility activity levels.

- The bed **occupation rate** expresses bed occupancy as a percentage value, by dividing total ICU stay days recorded at a given time by the total number of days in the period in question multiplied by the number of staffed beds. The product corresponds to the ICU's total availability for admissions (daily number of available beds); the closer total ICU stay days are to total availability, the more the occupation rate tends towards 100%. Occupation rate can even exceed 100% when a new patient is admitted to a bed that became vacant on the same day.

$$\text{Occupation rate} = \frac{\text{ICU stay days}}{\text{Days} \times \text{Number of beds}} \quad (1)$$

- The **rotation index** expresses the mean number of patients 'staying' in a bed in one year. It is calculated by dividing the number of admissions by the number of beds. Data collected for less than one year have to be extrapolated.

$$\text{Rotation index} = \frac{\text{Number of patients}}{\text{Number of beds}} \quad (2)$$

- The **turnover interval** expresses the period of time in which a bed remains vacant between two consecutive patients. It is calculated by dividing the number of days with vacant beds by the number of patients admitted during the period in question, giving mean unoccupied time per bed. It is calculated by dividing the number of days with unoccupied beds by the number of patients admitted in the period in question. This gives the mean unoccupied time per bed. This indicator is expressed in hours.

$$\text{Turnover} = 24 \times \frac{(\text{Number of beds} \times \text{Days}) - \text{ICU stay days}}{\text{Number of patients}} \quad (3)$$

**Occupied beds per physician (average) e Occupied beds per nurse (average)** The mean is computed taking into account the differences between daily shifts of personnel. Daily occupied beds are considered in the calculations. This number is obtained by multiplying the average number of beds available per operator for the occupation rate (preliminarily divided by 100).

## Study flow-chart

The flow chart, or tree diagram, on page 25 presents the various subgroups of analysed patients. PROSAFE has a very accurate indicator of the completeness and validity of the data entered on each patient, i.e. status.

The program envisages 5 status levels:

- status 1 - the patient record presents errors or unsolved warnings;
- status 2 - the record is incomplete, there are still missing data;
- status 3 - the patient has been discharged from the ICU, the clinical data are all entered and have undergone congruency checks; only hospital outcome is missing;

- status 4 - record complete and free of errors;
- status 5 - record free of errors but incomplete; the missing data are irretrievable.

Patients with status 1, 2 and 5 data are clearly incomplete.

It would be wrong to omit only patients with incomplete data (in status 1, 2 and 5) from the analyses since this could skew the estimates because of a so-called 'selection bias'. Patients with incomplete data may instead represent a special population subgroup. If only these patients were omitted from the analysed group, the statistics would no longer represent the whole group. It is plausible to assume, for example, that the majority of the patients for whom hospital outcome is missing were discharged alive from hospital, since it is much easier and quicker to retrieve information on hospital outcome when a patient has died. Calculating statistics on hospital mortality in the whole group of patients would result in mortality being incorrectly overestimated.

To address this problem it was decided to omit from each individual ICU's data any patients recruited during months when the validity percentages were below a high threshold (approximately 90%). Another check performed to reduce the risk of selection bias is to analyse the number of patients admitted per month. If the number of patients admitted in one or more months differs significantly from the mean number of monthly admissions (with a threshold arbitrarily set at a mean of  $\pm 2$  trimmed SD), or if the variability in the number of admissions is too high (variation coefficient above 40%), a warning message will appear asking for the entered data to be checked. To correctly participate in the PROSAFE project, all patients consecutively admitted to the ICU must be registered in the software on a continuous basis throughout the year; any marked swings in the number of admissions should suggest that there may be patient registration 'gaps'. It is, however, impossible to distinguish between registration 'gaps' and periods in which there is a real reduction/increase in admissions. Hence our objective is to draw attention to potential problems by asking each individual centre for feedback.

To more clearly illustrate the selection methods used in the choice of valid data, we present an extract from the data validity report of a randomly selected, anonymized ICU.

From January to December, Centre XX000 recruits a total of 619 patients. The first table and the bar graph show the number of monthly admissions to intensive care. In this case, a warning will appear at the bottom of the bar graph asking for confirmation of the entered data.

#### Centre XX000 - Year 2014

##### Data validity

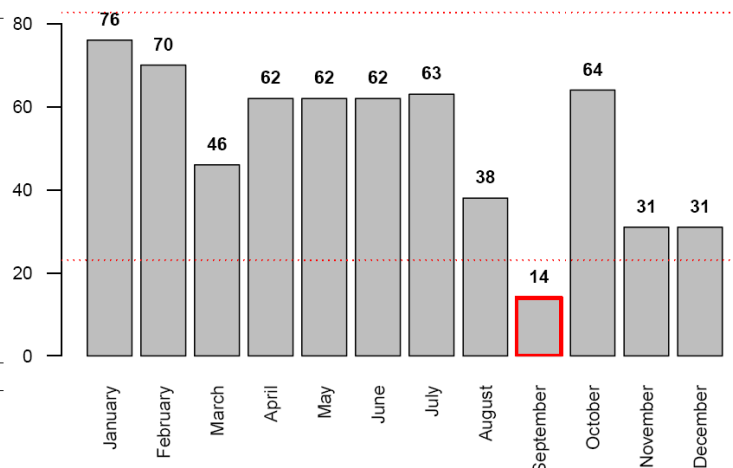
Patients admitted: 619

Month	N	%
January	76	12.3
February	70	11.3
March	46	7.4
April	62	10.0
May	62	10.0
June	62	10.0
July	63	10.2
August	38	6.1
September	14	2.3
October	64	10.3
November	31	5.0
December	31	5.0

##### Admissions

Mean	51.6
Median	62.0
SD	19.1
VC	37.1

##### Admissions



**WARNING!** The highlighted months have a number of patients quite different from the average. Please verify the correctness of the data and, particularly, that all consecutive patients have been registered in the Prosafe software.

The second table divides the recruited patients by admission month and form completion status. Overall, the ICU in

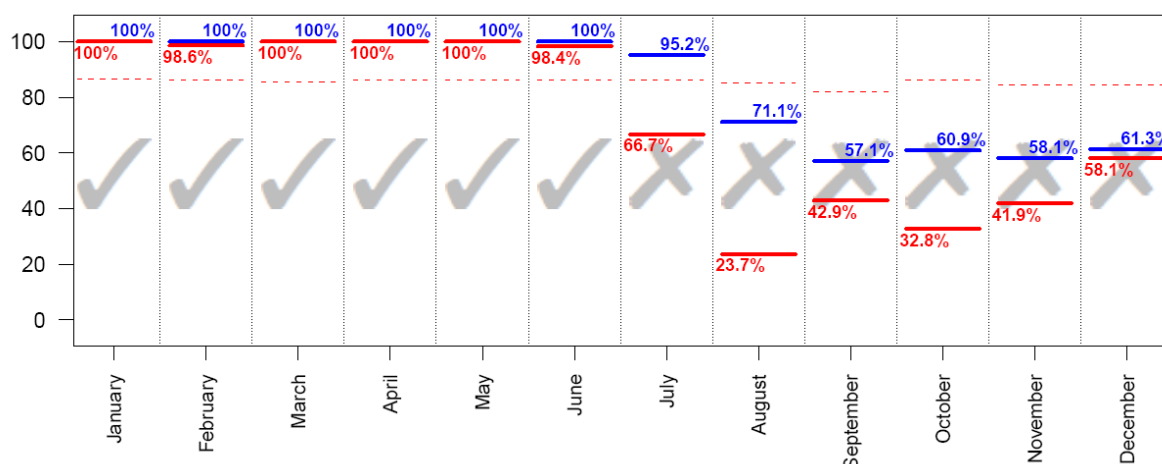


question presents complete data for 485 patients. 134 patients still present incomplete data.

Status (N)								
Month	1	2	3	4	5	Total	% Pts. in status 3/4	% Pts. in status 4
January	0	0	0	76	0	76	100.0	100.0
February	0	0	1	69	0	70	100.0	98.6
March	0	0	0	46	0	46	100.0	100.0
April	0	0	0	62	0	62	100.0	100.0
May	0	0	0	62	0	62	100.0	100.0
June	0	0	1	61	0	62	100.0	98.4
July	0	3	18	42	0	63	95.2	66.7
August	0	11	18	9	0	38	71.1	23.7
September	0	6	2	6	0	14	57.1	42.9
October	4	21	18	21	0	64	60.9	32.8
November	0	13	5	13	0	31	58.1	41.9
December	0	12	1	18	0	31	61.3	58.1
Total	4	66	64	485	0	619	88.7	78.4

The final graph shows level of data completeness in the various months. Percentages of patients with records in status 3 or 4 and in status 4 are shown in blue and red respectively.

According to our elimination criterion, the overall analysis will exclude those patients admitted in the months of August, September, October, November and December since they present a validity percentage below the defined threshold (dashed line). Accordingly, 441 patients have valid data for the analysis. Regarding analysis of hospital mortality, patients admitted in July will also be excluded (in that month the % of patients with record not in status 4 is still too high). Hence, the analysis on hospital outcome will involve 378 patients on 619 admitted.



Patients admitted in months with % of patients in status 3 or 4 over the threshold (drawn in the graph with a dashed line): **441**; patients in status 4: **378**.

## Description of patients

These sections of the report present the results of the analyses conducted on the group of patients with valid data. Patients admitted in the months with This part presents patient characteristics at ICU admission and during ICU stay, severity scores, process indicators, and outcomes for the various patient subgroups.

Absolute number, percentage and number of missing data are reported for the categorical data, while mean, standard deviation, median, interquartile range (Q1-Q3) and minimum and maximum range are reported for continuous variables. The acronym 95% CI indicates the 95% confidence interval of the estimate.

Below are a few tips on how to correctly interpret the analyses.

**BMI** The calculation of Body Mass Index is based on weight and height values, with the following formula:

$$BMI = \frac{\text{weight (kg)}}{\text{height (m)}^2} \quad (4)$$

The categories of underweight, overweight and obese are determined according to the following criteria: underweight if  $BMI < 20$  (males) or  $BMI < 19$  (females); normal weight if  $20 \leq BMI \leq 25$  (males) or  $19 \leq BMI \leq 24$  (females); overweight if  $25 < BMI \leq 30$  (males) or  $24 < BMI \leq 29$  (females); obese if  $BMI > 30$  (males) or  $BMI > 29$  (females).

**Stay before ICU** Days spent between admission to hospital and admission to ICU.

**Reason for transfer from other ICU** The reported items refer to the following reasons:

- Specialist expertise -> specialist expertise within the hospital;
- Step-up care -> management of high complexity critical patient;
- Logistical/organizational reasons -> continuation of treatment in stabilized patient (transfer for logistic/ organizational reasons);
- Step-down care -> continuation of treatment in a non-specialist environment.

**Surgical interventions on admission (top 10)** This lists the top 10 surgical interventions, divided by elective surgery and emergency surgery patients, operated between 7 days prior to and one day after admission to the ICU. Each single intervention (even more than one per patient) is counted.

**Timing of surgical interventions on admission** The timing of surgical interventions on admissions is specified. Each single intervention (even more than one per patient) is counted. It may happen that the percentages exceed the threshold of 100 % if patients underwent more than one intervention in the specified time periods.

**Multiple trauma** The category multiple trauma is defined by the presence of trauma in two or more regions.

**SAPSII** The score cannot be calculated if GCS (first 24 hours) is unassessable.

The SAPSII score for individual patients can become the probability of dying in hospital. This is performed by the following formula:

$$\text{Predicted hospital mortality} = \frac{e^{\text{Logit}}}{1 + e^{\text{Logit}}} \quad (5)$$

where

$$\text{Logit} = -7.763 + 0.074 \times \text{SAPSII} + 0.997 \times \ln(\text{SAPSII} + 1) \quad (6)$$

**PELOD** The PELOD score for individual pediatric patients can become the probability of dying in ICU. This is performed by the following formula:

$$\text{Predicted ICU mortality} = \frac{1}{1 + e^{7.64 - 0.30 \times \text{PELOD}}} \quad (7)$$

**PIM 2/PIM 3** The PIM score for individual pediatric patients can become the probability of dying in ICU. This is performed by the following formula:

$$\text{Predicted ICU mortality} = \frac{e^{\text{PIM}}}{1 + e^{\text{PIM}}} \quad (8)$$

**Severity evolution (of infections)** The severity of infection on admission is shown in the rows. Maximum severity reached during ICU stay is indicated in the columns. The table reports the absolute numbers and row percentages by which to assess the evolution of infection severity. For example, in the case below, the severity of the infection did not worsen during ICU stay in 15 out of the 17 patients admitted with SEVERE SEPSIS (15/17=88.2%). Conversely, the condition of SEVERE SEPSIS developed into SEPTIC SHOCK in 2 patients (2/17=11.8%).

Evoluzione della gravità		Degenza				
N (R %)		Nessuna	Infezione con o senza SIRS	SEPSI GRAVE	SHOCK SETTICO	TOT
Ammissione	Nessuna	173 (93.0%)	9 (4.8%)	1 (0.5%)	3 (1.6%)	186
	Infezione con o senza SIRS	-	19 (95.0%)	0 (0.0%)	1 (5.0%)	20
	SEPSI GRAVE	-	-	15 (88.2%)	2 (11.8%)	17
	SHOCK SETTICO	-	-	-	36 (100.0%)	36
	TOT	173	28	16	42	259

**VAP** Forms of pneumonia associated with invasive ventilation are defined as VAP (pneumonia onset after the 2nd day of ventilation or developing within 2 days of the end of ventilation).

**Incidence of VAP** Two different incidence rates are presented:

$$\text{Incidence of VAP} = \frac{\text{Number of patients with VAP during stay}}{\text{Mechanical ventilation days pre VAP}} \times 1000 \quad (9)$$

where the variable *mechanical ventilation days pre-VAP* corresponds to the total number of mechanical ventilation days pre-VAP of all patients admitted to the ICU. It is equal to the total duration of mechanical ventilation for patients who do not develop VAP and to the difference between the date of onset of VAP and the start date of mechanical ventilation for infected patients. The mechanical ventilation days in patients who were discharged or died within 2 days of the start of ventilation are excluded from the denominator.

$$\text{Incidence of VAP} = \frac{\text{Number of patients with VAP during stay}}{(\text{Mechanical ventilation days pre VAP})/8} \times 100 \quad (10)$$

The second rate is only a reworking of the previous one, to simplify interpretation of the data. It answers the question: 'Out of 100 patients ventilated for 8 days in the ICU, how many develop VAP?'. The 8-day cut off has been set by convention. The rates are accompanied by 95% confidence intervals.

**Incidence of CR-BSI** Just like VAP, two incidence rates are presented for catheter-related blood stream infections:

$$\text{Incidence of CRBSI} = \frac{\text{Number of patients with CRBSI during stay}}{\text{CVC days pre CRBSI}} \times 1000 \quad (11)$$

$$\text{Incidence of CRBSI} = \frac{\text{Number of patients with CRBSI during stay}}{(\text{CVC days pre CRBSI})/12} \times 100 \quad (12)$$

The second one responds to the question 'Out of 100 theoretical patients catheterized for 12 days in the ICU, how many will develop catheter-related blood stream infections?'.

**Invasive ventilation (approach)** The reported items refer to the following scenarios:

- Due to pulmonary failure -> invasive ventilation in a patient with hypoxic and/or hypercapnic respiratory failure;
- For airway maintenance -> invasive ventilation in a patient without respiratory failure, to support airways (e.g. coma patient);
- In weaning -> final part of invasive ventilation in a patient admitted for weaning from ventilation.

**Non invasive ventilation (approach)** The reported items refer to the following scenarios:

- Non invasive ventilation only -> non-invasive ventilation as the only ventilatory approach to the patient;
- Non invasive ventilation failed -> non-invasive ventilation immediately followed by patient intubation;
- For weaning -> non-invasive ventilation started within one day of the end of invasive ventilation.

**Surgical interventions during stay (top 10)** The surgical interventions performed from the second day of stay.

**Reason of transfer to other ICU** See the item 'Reason of transfer from other ICU'.

**Hospital mortality** Statistics on hospital outcome (indicated with an asterisk, where necessary) involve the subgroup of patients with valid data for this variable or patients admitted during the months when over a defined % of patients were in status 4, after excluding readmissions from another hospital ward.

**Last hospital mortality** For patients transferred to other ICU or to rehabilitation/high dependency care unit in other hospital, is the outcome at the last hospital discharge.

**Readmissions** Only readmissions from other hospital wards are considered.

**ICU stay (days)** Length of pre-ICU, post-ICU and hospital stay are simply calculated as the difference between dates. Calculation of ICU stay can be optimized by using time of patient admission and discharge. The difference between the discharge date and the admission date is calculated. 1 is added if the patient is admitted before 12:00 and discharged after this time. Conversely, 1 is subtracted if the patient is admitted after midday and discharged before midday. If the length of stay in the ICU is equal to 0, length of stay is entered as 1.

**Analysis of mortality:** This section presents indicators or graphs useful for a detailed analysis of mortality. The diagram lists the reference models used for the calculation of expected mortality according to the type of patients evaluated. All the predictive models involve the subgroup of patients admitted during the months when over a defined % of patients were in status 4. Analyses involving adult patients exclude cardiac surgery patients, patients admitted for diagnosis of death/organ donation and readmissions.

Patients	Model	Mortality
Adults non CS	GiViTI 2016	Last hospital mortality
Pediatric	PIM 2	ICU mortality
	PIM 3	ICU mortality
	PELOD	ICU mortality

**Analysis of mortality: forest plot** The graph shows the various O/E scores of the ICUs involved in the project. The O/E score is given by the ratio between the total number of observed deaths and the total number of expected deaths (according to the indicated reference model). The dotted line, in correspondence to the value of 1, separates the ICUs with lower or higher mortality than predicted by the model. Each estimate is accompanied by a 95% confidence interval.



## Statistics





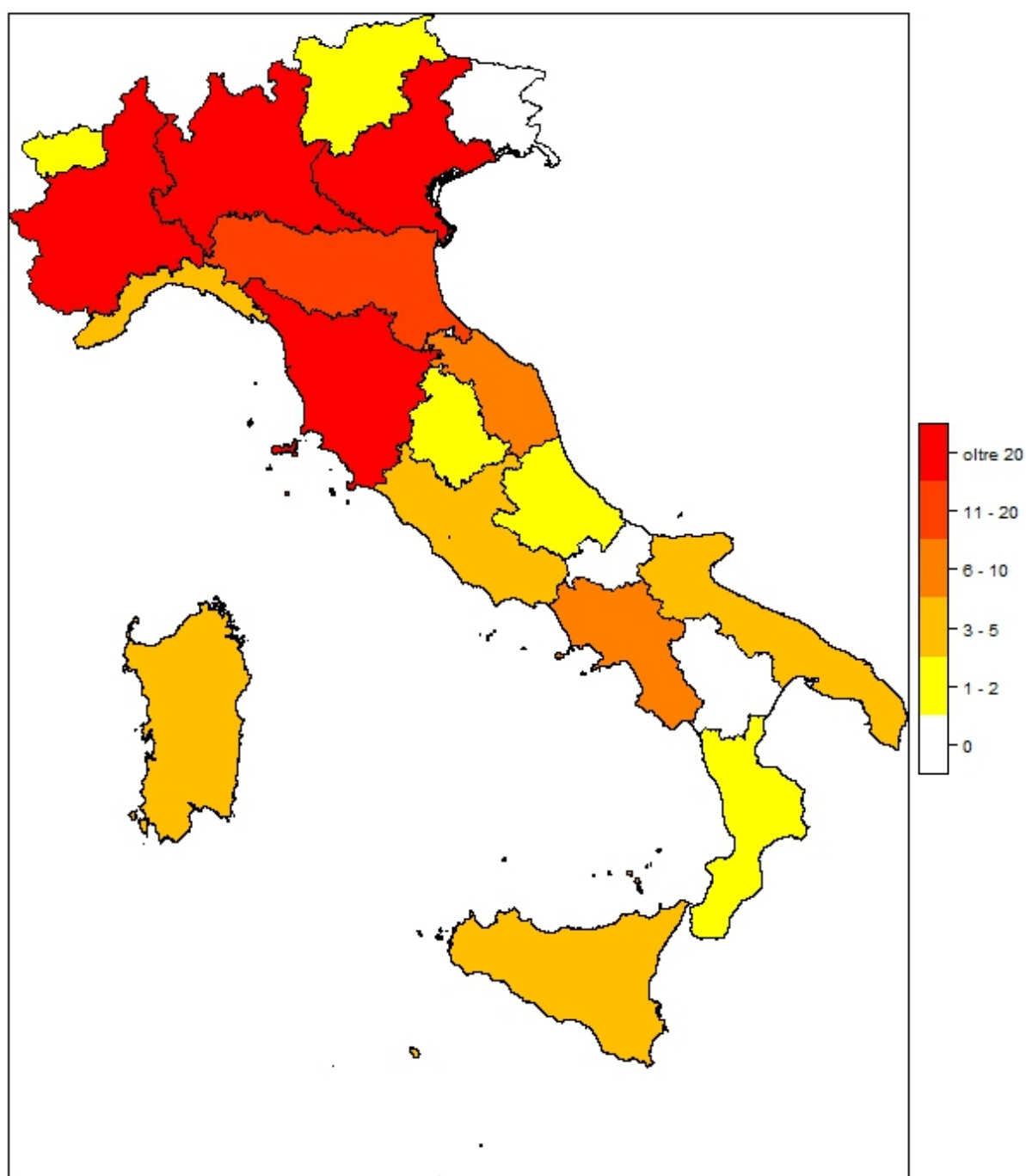
Nation	TYPE							Total
	General	Cardiosurgical	Surgical	Neurosurgical	Pediatrics	HDC	Other	
 Cyprus	2 ICUs 1116 patients							2 ICUs 1116 patients
 Greece	5 ICUs 1096 patients				1 ICUs 152 patients			6 ICUs 1248 patients
 Hungary	1 ICUs 523 patients			1 ICUs 355 patients				2 ICUs 878 patients
 Israel					3 ICUs 1315 patients			3 ICUs 1315 patients
 Italy	<b>166 ICUs</b> <b>56797 patients</b>	21 ICUs 12855 patients	13 ICUs 6842 patients	11 ICUs 4512 patients	4 ICUs 1438 patients	7 ICUs 2859 patients	7 ICUs 2787 patients	229 ICUs 88090 patients
 Poland	1 ICUs 171 patients				1 ICUs 100 patients			2 ICUs 271 patients
 Slovenia			5 ICUs 1818 patients				2 ICUs 775 patients	7 ICUs 2593 patients
<b>Total</b>	<b>175 ICUs</b> <b>59703 patients</b>	<b>21 ICUs</b> <b>12855 patients</b>	<b>18 ICUs</b> <b>8660 patients</b>	<b>12 ICUs</b> <b>4867 patients</b>	<b>9 ICUs</b> <b>3005 patients</b>	<b>7 ICUs</b> <b>2859 patients</b>	<b>9 ICUs</b> <b>3562 patients</b>	<b>251 ICUs</b> <b>95511 patients</b>

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



## Location of Italian participating ICUs (N=166)

## ICUs per region



Region	N	%
Abruzzo	2	1.2
Basilicata	0	0
Calabria	1	0.6
Campania	9	5.4
Emilia Romagna	18	10.8
Friuli-Venezia Giulia	0	0
Lazio	3	1.8
Liguria	5	3
Lombardia	38	22.9
Marche	7	4.2
Molise	0	0
Piemonte	23	13.9
Puglia	4	2.4
Sardegna	3	1.8
Sicilia	5	3

Region	N	%
Toscana	23	13.9
Trentino Alto Adige	1	0.6
Umbria	1	0.6
Valle d'Aosta	1	0.6
Veneto	22	13.3

Geographical area	N	%
Northern Italy	108	65.1
Central Italy	36	21.7
Southern Italy	22	13.3



## Description of hospitals (N=166) - Year 2016

Number of beds in hospital	N	%
< 300 beds	66	40.2
300 - 800 beds	78	47.6
> 800 beds	20	12.2
Missing	2	

Type of ICUs present in hospital	N	%
General	165	99.4
Medical	5	3.0
Surgical	5	3.0
Neurological/neurosurgical	16	9.6
Cardiosurgical	34	20.5
Burns	7	4.2
Post-transplantations	9	5.4
Other	33	19.9

Type of subICUs present in hospital	N	%
General	25	15.1
Surgical	8	4.8
Cardiological	113	68.1
Respiratory	30	18.1
Neurological (stroke unit)	68	41.0
Other	12	7.2

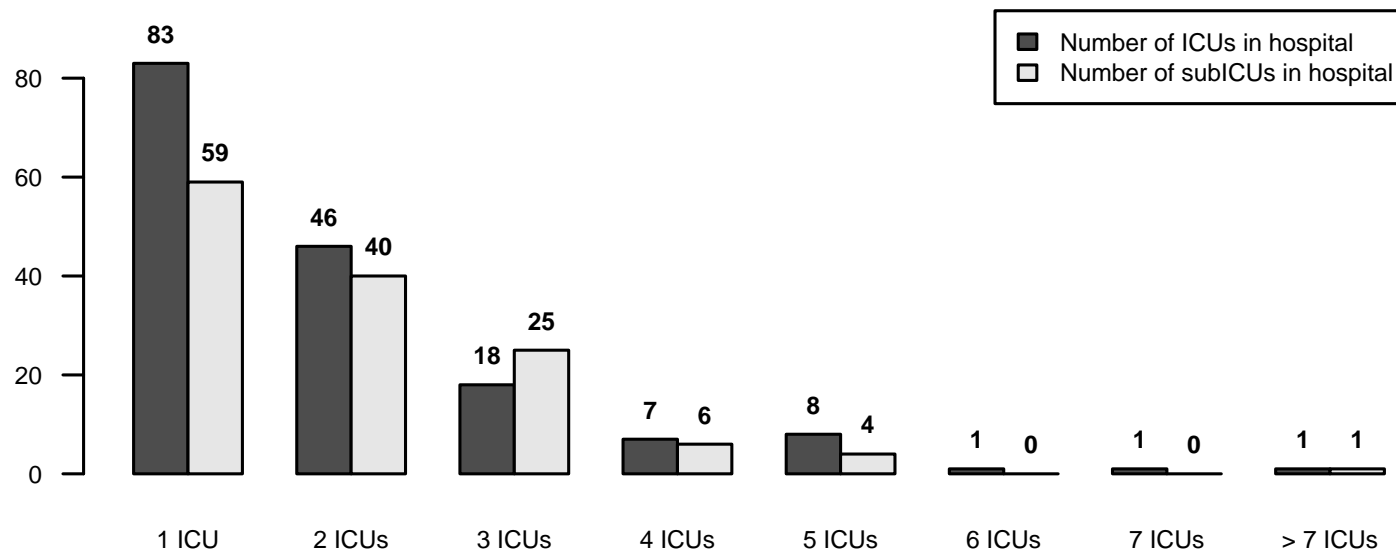
Non surgical specialties	N	%
Cardiology	156	94.5
Pulmonology	84	51.2
Nephrology	133	81.1
Infection disease	68	41.2
Pediatric	130	79.8
Neonatology	90	54.9
Neurology	121	73.3
Haematology	70	42.7
Emergency room	162	98.2
Traumatology	116	70.3
Emergency medical	91	55.2

Surgical specialties (independent ward)	N	%
Neurosurgery	53	31.9
Cardiosurgery	37	22.3
Major vascular surgery	78	47.0
Thoracic surgery	48	28.9
Pediatric surgery	35	21.1
Transplantation activities	27	16.3

Surgical specialties (procedures only)	N	%
Neurosurgery	12	7.2
Cardiosurgery	3	1.8
Major vascular surgery	27	16.3
Thoracic surgery	42	25.3
Pediatric surgery	30	18.1
Transplantation activities	15	9.0

Services/activities available in H (h24)	N	%
Neuroradiology	35	21.1
Interventional neuroradiology	23	13.9
Interventional vascular radiology	33	19.9
CT scan	97	58.4
MRI	47	28.3
Interventional hemodynamic	51	30.7
Endoscopy	66	39.8
Bronchoscopy	37	22.3
Hyperbaric chamber	8	4.8

Services/activities available in H (rep.)	N	%
Neuroradiology	8	4.8
Interventional neuroradiology	3	1.8
Interventional vascular radiology	18	10.8
CT scan	1	0.6
MRI	36	21.7
Interventional hemodynamic	6	3.6
Endoscopy	32	19.3
Bronchoscopy	38	22.9
Hyperbaric chamber	1	0.6



## Description of ICUs (N=166) - Year 2016

Number of activable beds		
Mean (SD)	7.9 (3.2)	
Median (Q1–Q3)	7.7 (6–10)	
Missing	71	

Number of beds declared to hospital		
Mean (SD)	45.0 (154.2)	
Median (Q1–Q3)	7.3 (5.8–10)	
Missing	68	

University affiliation	N	%
Yes	56	33.9
No	109	66.1
Missing	1	

Square meter per bed		
Mean (SD)	15.6 (19.8)	
Median (Q1–Q3)	12.2 (9–18)	
Missing	4	

Clinical psychologist	N	%
No	130	78.8
For relatives	33	20.0
For patients	24	14.5
For personnel	16	9.7

ICU Structure	N	%
NON OPEN-SPACE	63	38.9
OPEN-SPACE (or alike)	99	61.1
Missing	4	

Physicians	N	%
Dedicated to ICU only	15	15.8
Dedicated to ICU on a rotation basis	19	20.0
Dedicated to ICU only and on a rotation basis	61	64.2
Missing	71	

Declared beds per physician (average)		
Mean (SD)	34.9 (109.4)	
Median (Q1–Q3)	4.7 (3.9–6)	
Missing	70	

Nurses	N	%
Dedicated to ICU only	61	66.3
Dedicated to ICU on a rotation basis	2	2.2
Dedicated to ICU only and on a rotation basis	29	31.5
Missing	74	

Declared beds per nurse (average)		
Mean (SD)	14.4 (45.1)	
Median (Q1–Q3)	2 (1.9–2.4)	
Missing	70	

Number of hours conceded for relatives' visits	N	%
1	17	10.4
2	34	20.7
3-4	32	19.5
5-12	72	43.9
13-20	2	1.2
>20	7	4.3
Missing	2	

Maximum number of visitors per patient	N	%
One	64	39.0
Two	93	56.7
Three or more	7	4.3
Missing	2	

Biomedical devices per declared bed	Median	Q1-Q3	<5 Years (mean %)
Basic ICU monitors (ECG, NIPB, SaO2)	0.3	0.0–1.2	67.8
Advanced ICU monitors	1.1	0.3–1.3	75.2
Invasive monitoring of cardiac output (Swan-Ganz)	0.2	0.0–0.3	60.7
Invasive monitoring of cardiac output (PiCCO)	0.2	0.0–0.2	79.2
Invasive monitoring of cardiac output (Vigileo)	0.0	0.0–0.2	74.0
Non-invasive monitoring of cardiac output (impedentiometry)	0.0	0.0–0.0	93.9
Defibrillators	0.2	0.2–0.4	70.9
Both invasive and non invasive ventilators	1.2	1.0–1.4	74.1
Invasive ventilators	0.1	0.0–1.0	66.2
Non invasive ventilators	0.0	0.0–0.2	67.8
Syringe pumps	5.0	3.2–6.2	76.9
Peristaltic pumps	2.0	1.2–3.0	78.2

Biomedical equipment in ICU	N	%
Transoesophageal echo	60	36.6
Basic ultrasounds	157	95.7
Advanced ultrasounds	143	87.2
Blood-gas analyzer	163	99.4
Haemodialysis - Haemofiltration	138	84.1
Transport ventilator	155	94.5
Fiberscope	163	99.4
Extracorporeal circulation system	23	14.0

Routine microbiological surveillance cultures	N	%
Yes	155	94.5
No	9	5.5
Missing	2	

## Description of ICUs (N=166) - Year 2016

**Patients admitted**

Mean (SD)	346.4 (189.3)
Median	319
Q1–Q3	207.6–429.8
Missing	10

**Occupancy rate (%)**

Mean (SD)	83.0 (14.8)
Median	84.5
Q1–Q3	74.6–93.5
Missing	78

**Rotation index (patients/bed)**

Mean (SD)	46.1 (15.1)
Median	45.7
Q1–Q3	37.1–53.1
Missing	78

**Turnover (hours)**

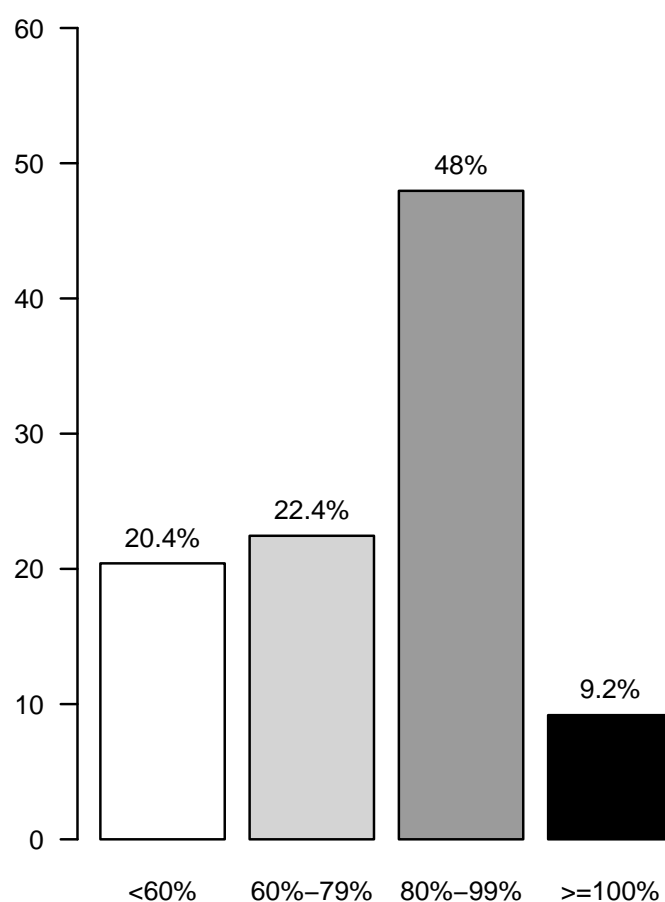
Mean (SD)	44.1 (65.3)
Median	26.9
Q1–Q3	12.5–55.7
Missing	78

**Occupied beds per physician (average)**

Mean (SD)	8.1 (41.5)
Median	3.8
Q1–Q3	2.8–4.6
Missing	70

**Occupied beds per nurse (average)**

Mean (SD)	3.5 (17.7)
Median	1.7
Q1–Q3	1.6–2
Missing	70

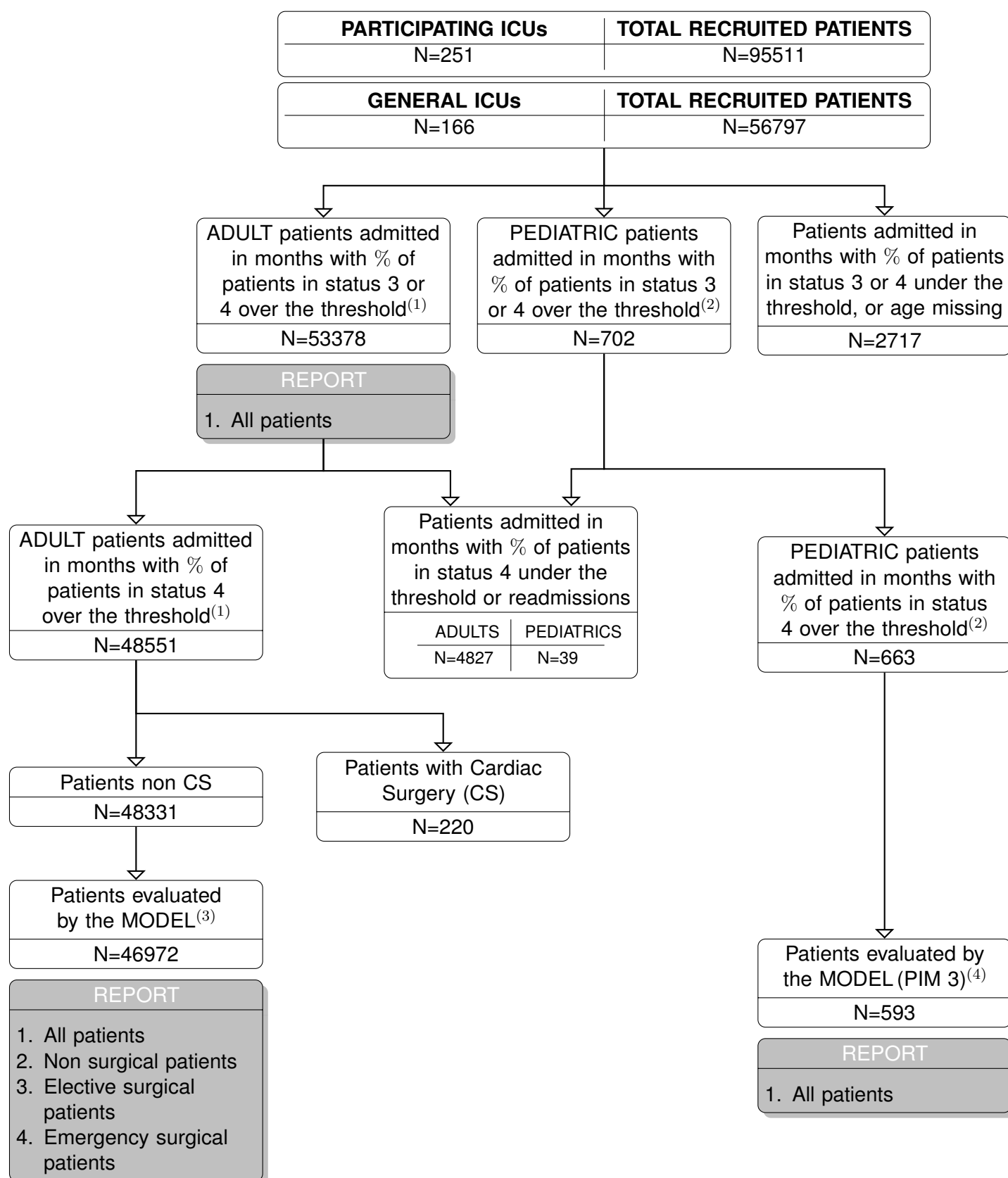
**Occupancy rate (%)**





## National report for general ICUs (166 ICUs) - Year 2016

## Study flow-chart



(1) Patients older than 17 years are considered ADULT patients.

(2) Patients under 17 years of age are considered PEDIATRIC patients.

(3) Patients evaluated by the GiViTI model of hospital mortality are those with all the variables of the model completed, including the hospital outcome. Patients admitted for diagnosis of death/organ donation and readmissions are excluded.

(4) Patients transferred to other ICU are excluded.



**National report for general ICUs - Year 2016**  
**Characteristics on admission - Adult patients**

**Patients (N): 53378**

<b>Sex</b>	<b>N</b>	<b>%</b>
Male	31713	59.4
Female	21646	40.6
Missing	19	

<b>Age (years)</b>	<b>N</b>	<b>%</b>
17-45	6412	12.0
46-65	14014	26.3
66-75	13709	25.7
>75	19243	36.1
Missing	0	
Mean	66.7	
SD	16.4	
Median	70	
Q1–Q3	57–79	
Min–Max	17–102	

<b>Body mass Index (BMI)</b>	<b>N</b>	<b>%</b>
Underweight	3047	5.8
Normal	23662	44.7
Overweight	16368	31.0
Obese	9808	18.5
Missing	493	

<b>Pregnancy status</b>	<b>N</b>	<b>%</b>
<b>Females (N=21646)</b>		
Not fertile	11519	53.3
Not pregnant/Unknown	9529	44.1
Currently pregnant	89	0.4
Post partum	487	2.3
Missing	22	

<b>Comorbidities</b>	<b>N</b>	<b>%</b>
No	7967	15.0
Yes	45310	85.0
Missing	101	

<b>Comorbidities (top 10)</b>	<b>N</b>	<b>%</b>
Hypertension	27801	52.2
Arrhythmia	9070	17.0
Moderate COPD	7867	14.8
Diabetes Type II without insulin tr.	6882	12.9
Myocardial infarction	6872	12.9
Any tumour without metastasis	6193	11.6
Cerebrovascular disease	5796	10.9
NYHA class II-III	5702	10.7
Peripheral vascular disease	5144	9.7
Moderate or severe renal disease	4836	9.1
Missing	101	

<b>Stay before ICU (days)</b>		
Mean	4.7	
SD	11.7	
Median	1	
Q1–Q3	0–4	
Missing	133	

<b>Source of admission</b>	<b>N</b>	<b>%</b>
Same hospital	46703	87.6
Other hospital	6345	11.9
Long-term chronic care hospital	256	0.5
Directly from the community	8	0.0
Missing	66	

<b>Ward of admission</b>	<b>N</b>	<b>%</b>
<b>Hospital (N=53048)</b>		
Medical ward	7766	14.6
Surgical ward	22426	42.3
Emergency room	18348	34.6
Other ICU	3180	6.0
High dependency care unit	1323	2.5
Missing	5	

<b>Reason for transfer from</b>	<b>N</b>	<b>%</b>
<b>Other ICU (N=3180)</b>		
Specialist expertise	799	25.1
Step-up care	659	20.7
Logistical/organizational reasons	1662	52.3
Step-down care	60	1.9
Missing	0	

<b>Ward of admission</b>	<b>N</b>	<b>%</b>
<b>Same hospital (N=46703)</b>		
Medical ward	6932	14.8
Surgical ward	21993	47.1
Emergency room	15510	33.2
Other ICU	1061	2.3
High dependency care unit	1202	2.6
Missing	5	

<b>Ward of admission</b>	<b>N</b>	<b>%</b>
<b>Other hospital (N=6345)</b>		
Medical ward	834	13.1
Surgical ward	433	6.8
Emergency room	2838	44.7
Other ICU	2119	33.4
High dependency care unit	121	1.9
Missing	0	

<b>Scheduled admission</b>	<b>N</b>	<b>%</b>
No	42876	80.5
Yes	10393	19.5
Missing	109	

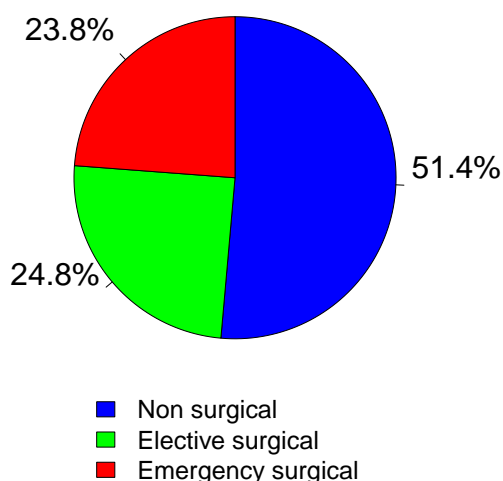
## National report for general ICUs - Year 2016

## Characteristics on admission - Adult patients

Trauma	N	%
No	46492	87.3
Yes	6784	12.7
Multiple trauma	2798	5.3
Missing	102	

Surgical status	N	%
Non surgical	27377	51.4
Elective surgical	13199	24.8
Emergency surgical	12701	23.8
Missing	101	

Surgical status



Source of admission	N	%
<b>Surgical pt. (N=25900)</b>		
Operating theatre of surgical ward	18995	73.4
Operating theatre of emergency room	2167	8.4
Surgical ward	1368	5.3
Other	3351	12.9
Missing	19	

Surgical interventions (top 10)	N	%
<b>Elective surgical (N=13199)</b>		
Gastrointestinal surgery	3659	27.7
Orthopaedic surgery	1860	14.1
Nephro/Urological surgery	1646	12.5
Neurosurgery	983	7.4
ENT surgery	844	6.4
Thoracic surgery	728	5.5
Gynaecological surgery	683	5.2
Abdominal vascular surgery	603	4.6
Hepatic surgery	570	4.3
Pancreatic surgery	460	3.5
Missing	1163	

Timing	N	%
<b>Elective surgical (N=13199)</b>		
From -7 to -3 days	310	2.3
From -2 to -1 days	398	3.0
On ICU admission day	13142	99.6
The day after ICU admission	155	1.2
Missing	22	

Surgical interventions (top 10)	N	%
<b>Emergency surgical (N=12701)</b>		
Gastrointestinal surgery	5520	43.5
Neurosurgery	1868	14.7
Orthopaedic surgery	1442	11.4
Nephro/Urological surgery	608	4.8
Abdominal vascular surgery	545	4.3
Biliary tract surgery	511	4.0
Peripheral vascular surgery	490	3.9
Obstetric surgery	360	2.8
ENT surgery	332	2.6
Splenectomy	317	2.5
Missing	708	

Timing	N	%
<b>Emergency surgical (N=12701)</b>		
From -7 to -3 days	366	2.9
From -2 to -1 days	1332	10.5
On ICU admission day	11197	88.2
The day after ICU admission	556	4.4
Missing	54	

Non surgical interventions	N	%
None	48882	91.8
Elective	662	1.2
Emergency	3719	7.0
Missing	115	

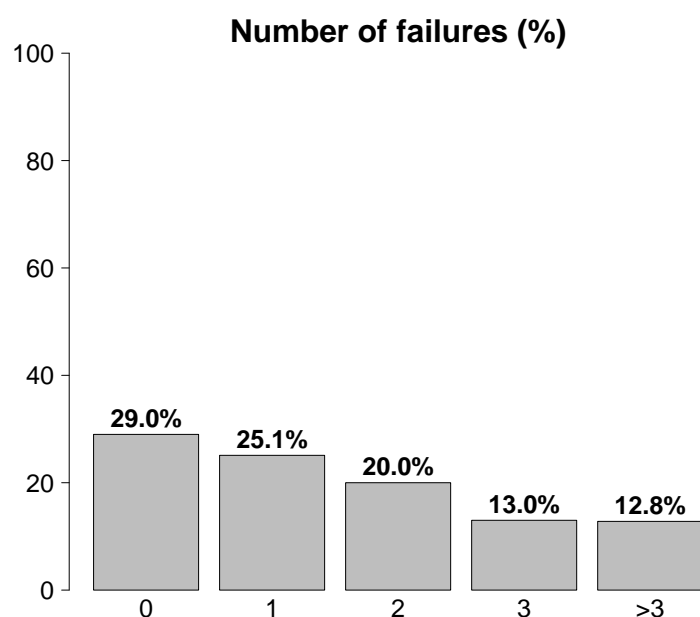
Non surgical interventions	N	%
<b>Elective (N=662)</b>		
Interventional endoscopy	218	32.9
Interventional radiology	146	22.1
Interventional cardiology	118	17.8
Interventional neuroradiology	85	12.8
Missing	95	

Non surgical interventions	N	%
<b>Emergency (N=3719)</b>		
Interventional cardiology	1464	39.4
Interventional radiology	865	23.3
Interventional endoscopy	821	22.1
Interventional neuroradiology	529	14.2
Missing	40	

## National report for general ICUs - Year 2016

## Characteristics on admission - Adult patients

Reason for admission	N	%
Monitoring/Weaning	20976	39.4
Post surgical weaning	7201	13.6
Surgical monitoring	7735	14.6
Post interventional weaning	175	0.3
Interventional monitoring	765	1.4
Non surgical monitoring	4892	9.2
Missing	208	
Admission for procedures/treatments	0	0.0
Intensive Treatment	31971	60.0
Only ventilatory support	17380	32.6
Only cardiovascular support	2206	4.1
Ventilatory and cardiovascular support	12384	23.2
Missing	1	
Palliative Sedation	240	0.5
Diagnosis of death/Organ donation	87	0.2
Missing	104	



Failures on admission	N	%
No	15489	29.0
Yes	37888	71.0
A: Respiratory failure	29763	55.8
B: Cardiovascular failure	14590	27.3
C: Neurological failure	7564	14.2
D: Hepatic failure	421	0.8
E: Renal failure	18870	35.4
F: Acute skin failure	34	0.1
G: Metabolic failure	12924	24.2
H: Coagulation failure	823	1.5
Missing	1	

Failures on admission (top 10)	N	%
A	8400	15.7
ABEG	3589	6.7
E	3231	6.1
AB	2621	4.9
AC	2557	4.8
AE	2548	4.8
ABE	1830	3.4
AEG	1448	2.7
ABCEG	1387	2.6
EG	1168	2.2
Missing	1	

Respiratory failure	N	%
None	23614	44.2
Only hypoxic failure	9168	17.2
Only hypercapnic failure	1596	3.0
Hypoxic-hypercapnic failure	3847	7.2
Intubation for airway maint.	15152	28.4
Missing	1	

Cardiovascular failure	N	%
None	38788	72.7
Without shock	2690	5.0
Cardiogenic shock	3121	5.8
Septic shock	3880	7.3
Haemorrhagic/hypovolemic shock	1937	3.6
Hypovolemic shock	1079	2.0
Anaphylactic shock	45	0.1
Neurogenic shock	438	0.8
Other shock	553	1.0
Mixed shock	846	1.6
Missing	1	

Neurologic failure	N	%
None	35670	82.5
Cerebral coma	3872	9.0
Metabolic coma	1423	3.3
Postanoxic coma	1926	4.5
Toxic coma	342	0.8
Missing or not evaluable	10145	

Renal failure (AKIN)	N	%
None	34309	64.5
Mild	9329	17.5
Moderate	4410	8.3
Severe	5132	9.7
Missing	198	

Metabolic failure	N	%
None	40239	75.7
pH $\leq$ 7.3, PaCO <sub>2</sub> $<$ 45 mmHg	3871	7.3
Base deficit $\geq$ 5 mmol/L, lactate $>$ 1.5x	9053	17.0
Missing	215	

# National report for general ICUs - Year 2016

## Characteristics on admission - Adult patients

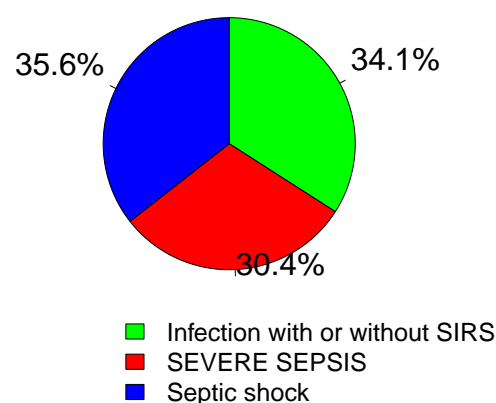
Clinical conditions on admission	N	%
Respiratory	10251	19.2
Acute exacerbation of COPD	2696	5.1
Pleural effusion	2108	4.0
Atelectasis	1263	2.4
Aspiration pneumonia	1091	2.0
Upper respiratory tract disease	844	1.6
Cardiovascular	10567	19.8
Cardiac arrest	2606	4.9
Left heart failure with pulmonary edema	2108	4.0
Left heart failure without pulm. edema	1489	2.8
Acute severe arrhythmia: tachycardias	1231	2.3
Acute ischaemia	859	1.6
Neurological	7598	14.3
Spontaneous Intraparenchymal bleeding	1728	3.2
Cerebral artery stroke	1360	2.6
Seizures	1161	2.2
Metabolic/postanoxic encephalopathy	890	1.7
Spontaneous Subarachnoid haemorrhage	881	1.7
Gastrointestinal and hepatic	11129	20.9
Digestive tract malignancy	2865	5.4
Gastrointestinal perforation	1723	3.2
Intestinal occlusion	1661	3.1
Acute bile-duct disease	833	1.6
Gastrointestinal bleeding: upper tract	821	1.5
Trauma (anatomical districts)	6784	12.7
Pelvis/bone/joint & muscle	3066	5.8
Head	2791	5.2
Chest	2516	4.7
Spine	1517	2.8
Abdomen	1167	2.2
Major vessels injury	253	0.5
Miscellaneous	111	0.2
Other	13249	24.9
Other disease	2999	5.6
Metabolic disorder	2757	5.2
Nephrourologic disease	2700	5.1
Orthopaedic disease	1335	2.5
Acute intoxication	1167	2.2
Post transplantation	359	0.7
Renal transplantation	164	0.3
Liver transplantation	123	0.2
Infections	13047	24.5
Pneumonia	4730	8.9
NON-surgical secondary peritonitis	1303	2.4
NON-surgical urinary tract infection	1124	2.1
L.R.T.I. other than pneumonia	1004	1.9
Post-surgical peritonitis	845	1.6
Clinical sepsis	614	1.2
Primary bacteraemia of unknown origin	605	1.1
NON-surgical skin/soft tissue infection	592	1.1
Cholecystitis/cholangitis	573	1.1
Primary peritonitis	412	0.8
Missing	108	

Trauma (anatomical districts)	N	%
Head	2791	5.2
Maxillofacial fracture	942	1.8
Traumatic subarachnoid haemorrhage	921	1.7
Traumatic Subdural haematoma	780	1.5
Skull fracture	684	1.3
Cerebral contusion/laceration	620	1.2
Spine	1517	2.8
Vertebral fracture, without deficit	1263	2.4
Tetraplegia	83	0.2
Cervical injury, incomplete deficit	77	0.1
Chest	2516	4.7
Other injuries of the chest	1275	2.4
Traum. haemothorax/pneumothorax	1055	2.0
Severe lung contusion/laceration	741	1.4
Abdomen	1167	2.2
Minor injuries of the abdomen	326	0.6
Spleen: Moderate-Severe laceration	313	0.6
Liver: Moderate-Severe laceration	243	0.5
Pelvis/bone/joint & muscle	3066	5.8
Long bone fracture	2456	4.6
Multiple fracture of the pelvis	790	1.5
Very severe or open fracture of the pelvis	139	0.3
Major vessels injury	253	0.5
Proximal limbs vessels: transection	76	0.1
Neck vessels: dissection/transection	68	0.1
Major abdominal vessels: transection	52	0.1
Miscellaneous	111	0.2
Burns (>30% BSA)	75	0.1
Inhalation injury	45	0.1
Missing	108	

Infection severity on admission	N	%
None	40223	75.7
Infection with or without SIRS	4410	8.3
SEVERE SEPSIS	3929	7.4
Septic shock	4600	8.7
Missing	216	

### Infection severity on admission

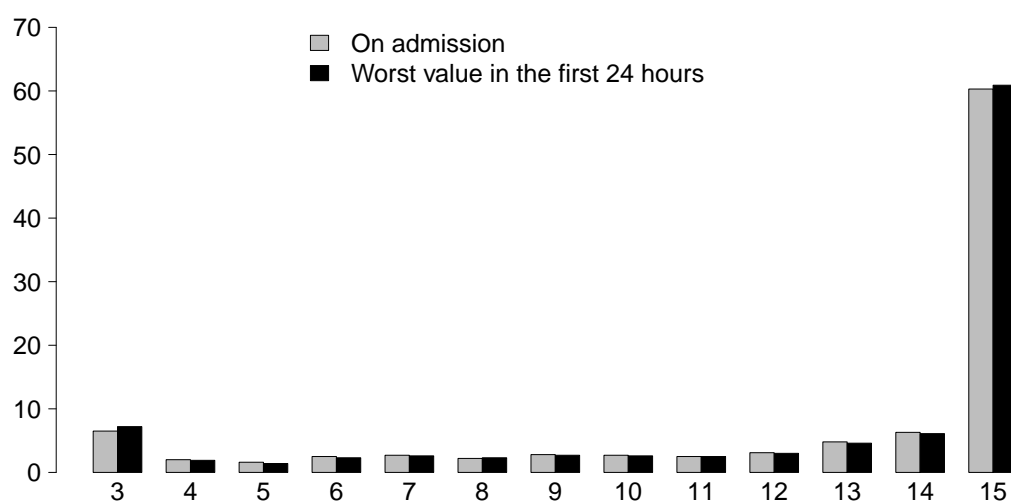
Patients infected (N=12939)



## National report for general ICUs - Year 2016

## Severity scores - Adult patients

## Glasgow Coma Scale (%)



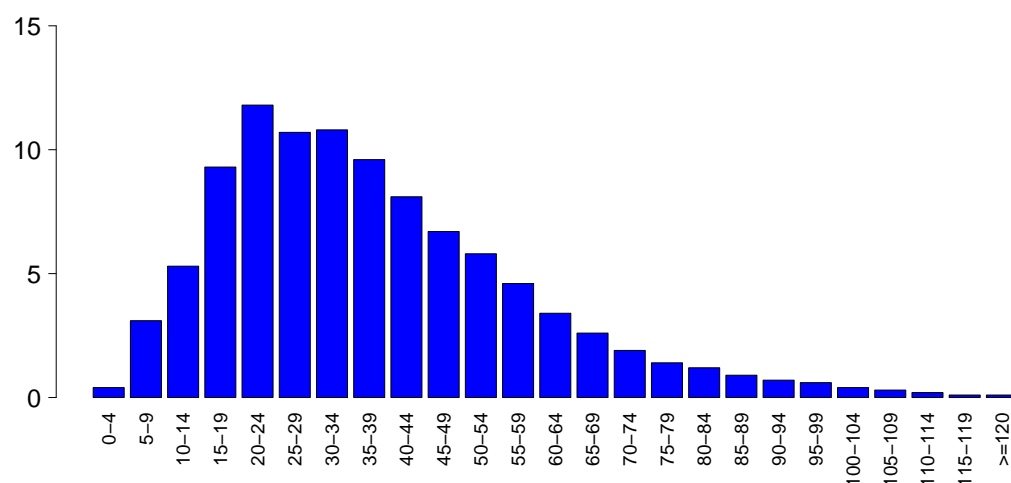
## GCS (admission)

Median	15
Q1–Q3	11–15
Not evaluable	10014
Missing	131

## GCS (first 24 hours)

Median	15
Q1–Q3	11–15
Not evaluable	8472
Missing	172

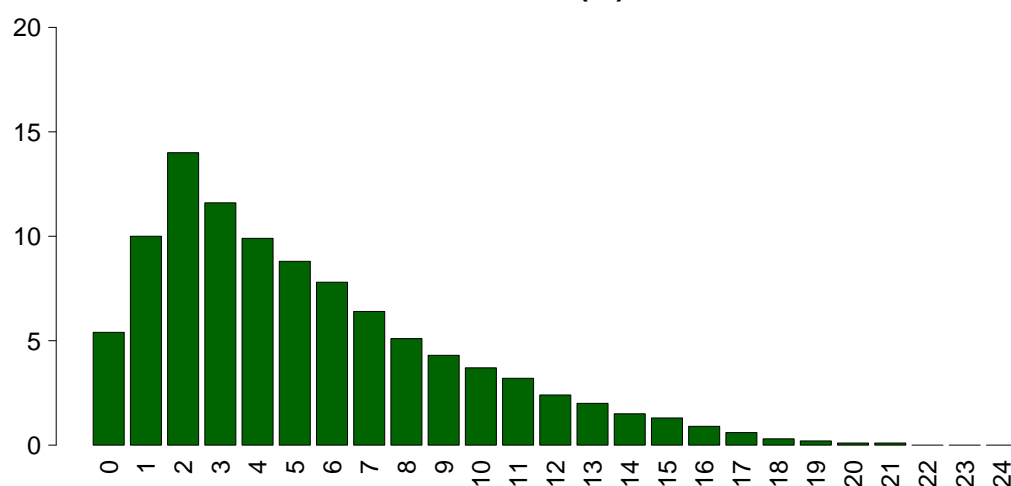
## SAPS II (%)



## SAPSII

Mean	37.6
SD	20.3
Median	34
Q1–Q3	23–49
Not evaluable	8472
Missing	204

## SOFA (%)



## SOFA

Mean	5.4
SD	4.1
Median	4
Q1–Q3	2–8
Not evaluable	8472
Missing	205

## National report for general ICUs - Year 2016

## Characteristics during the stay - Adult patients

Complications during the stay	N	%
No	37440	70.4
Yes	15746	29.6
Missing	192	

Failures during the stay	N	%
No	46701	87.5
Yes	6676	12.5
A: Respiratory failure	2583	4.8
B: Cardiovascular failure	3278	6.1
C: Neurological failure	542	1.0
D: Hepatic failure	235	0.4
E: Renal failure (AKIN)	2010	3.8
F: Acute skin failure	15	0.0
G: Metabolic failure	537	1.0
H: Coagulation failure	314	0.6
Missing	1	

Failures during the stay (top 10)	N	%
B	1795	3.4
A	1425	2.7
E	857	1.6
AB	457	0.9
BE	381	0.7
G	303	0.6
ABE	180	0.3
C	167	0.3
AE	153	0.3
AC	100	0.2
Missing	1	

Respiratory failure occurred	N	%
None	50603	95.1
Intubation for airway maint.	720	1.4
Hypoxic failure	1788	3.4
Hypercapnic failure	498	0.9
Missing	192	

Cardiovascular failure occurred	N	%
None	49908	93.8
Cardiogenic shock	983	1.8
Hypovolemic shock	251	0.5
Haemorrhagic/hypovolemic shock	284	0.5
Septic shock	1510	2.8
Anaphylactic shock	5	0.0
Neurogenic shock	205	0.4
Other shock	219	0.4
Missing	192	

Neurological failure occurred	N	%
None	52644	99.0
Cerebral coma	308	0.6
Metabolic coma	148	0.3
Postanoxic coma	94	0.2
Missing	192	

Renal failure occurred (AKIN)	N	%
None	51176	96.2
Mild	268	0.5
Moderate	304	0.6
Severe	1438	2.7
Missing	192	

Complications during the stay	N	%
Respiratory	2900	5.5
Pleural effusion	1058	2.0
Atelectasis	688	1.3
Severe ARDS	424	0.8
Pneumothorax/Pneumomediastinum	311	0.6
Moderate ARDS	193	0.4
Cardiovascular	4384	8.2
Acute severe arrhythmia: tachycardias	1601	3.0
Cardiac arrest	1446	2.7
Left heart failure w/o pulm. edema	370	0.7
Acute severe arrhythmia: bradycardias	318	0.6
Pulmonary edema	314	0.6
Neurological	2988	5.6
Drowsiness/agitation/delirium	1266	2.4
Intracranial hypertension	547	1.0
Seizures	532	1.0
Brain edema	455	0.9
New ischaemic stroke	225	0.4
Gastrointestinal and hepatic	1547	2.9
Gastrointestinal bleeding: upper tract	256	0.5
Bowel ischaemia	212	0.4
Paralytic Ileus	192	0.4
Liver Dysfunction Syndrome	191	0.4
Gastrointestinal bleeding: lower tract	174	0.3
Other	1319	2.5
Metabolic disorder	537	1.0
Nephrourologic disease	379	0.7
Other disease	267	0.5
Other skin and/or soft tissue pathology	70	0.1
Category/Stage II: Partial Thickness Skin Loss	56	0.1
Category/Stage III: Full Thickness Skin Loss	33	0.1
Extremity compartment syndrome (severe)	31	0.1
Infections	4604	8.7
Pneumonia	1669	3.1
L.R.T.I. other than pneumonia	1039	2.0
NON-surgical urinary tract infection	634	1.2
Catheter-related bacteremia (CR-BSI)	432	0.8
Primary bacteraemia of unknown origin	416	0.8
Post-surgical peritonitis	190	0.4
Clinical sepsis	169	0.3
Upper respiratory tract infection	147	0.3
F.U.O. fever of unknown origin	139	0.3
Post-surgical skin/soft tissue infection	133	0.3
Missing	192	



**National report for general ICUs - Year 2016**  
**Characteristics during the stay - Adult patients**

Infections	N	%
None	36897	69.4
Only on admission	11682	22.0
On admission and during ICU stay	1344	2.5
Only during ICU stay	3260	6.1
Missing	195	

Maximum severity of infection	N	%
None	36897	69.7
Infection with or without SIRS	5132	9.7
SEVERE SEPSIS	5172	9.8
Septic shock	5749	10.9
Missing	428	

**Severity evolution**

Severity evolution		During the stay				
		N (R %)	None	Infection with or without SIRS	SEVERE SEPSIS	Septic shock
Admission	None	36897 (92.2%)	1316 (3.3%)	1265 (3.2%)	544 (1.4%)	40022
	Infection with or without SIRS	-	3814 (86.6%)	429 (9.7%)	161 (3.7%)	4404
	SEVERE SEPSIS	-	-	3476 (88.5%)	449 (11.4%)	3926
	Septic shock	-	-	-	4592 (100.0%)	4592
	TOT	36897	5131	5170	5746	52944

Ventil. Associat. Pneumonia (VAP)	N	%
No	51872	97.3
Yes	1435	2.7
Missing	71	

**Incidence of VAP**

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

Estimate	8.5
CI (95%)	8.1–9.0

**Incidence of VAP**

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

Estimate	6.8%
CI (95%)	6.5–7.2

Catheter Bacteraemia (CR-BSI)	N	%
No	52754	99.2
Yes	432	0.8
Missing	192	

**Incidence of CR-BSI**

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

Estimate	1.6
CI (95%)	1.5–1.8

**Incidence of CR-BSI**

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

Estimate	2.0%
CI (95%)	1.8–2.2

**National report for general ICUs - Year 2016**  
**Process indicators - Adult patients**

Procedures and/or treatments (Missing=116)	Use		On admission		On discharge		Length (days)			Days from admission		
	N	%	N	%	N	%	Median	Q1-Q3	Missing	Median	Q1-Q3	Missing
<b>Procedures (antibiotics excluded)</b>	50103	94.1										
Invasive ventilation	35687	67.0	26214	49.2	7613	14.3	2	1-6	79	0	0-0	8
Non invasive ventilation	8306	15.6	1846	3.5	1604	3	1	1-3	9	0	0-2	3
Tracheostomy	5928	11.1	1504	2.8	5025	9.4	10	5-19	29	8	4-12	2
iNO (inhaled nitric oxide)	122	0.2	7	0	31	0.1	3	1-7	0	1	0-3	0
Central Venous Catheter	34785	65.3	16939	31.8	27823	52.2	4	2-10	77	0	0-0	8
PICC	972	1.8	349	0.7	813	1.5	4	2-10	1	5	1-17	0
Arterial Catheter	40908	76.8	19814	37.2	11036	20.7	3	1-7	82	0	0-0	8
Vasoactive drugs	18010	33.8	7892	14.8	4386	8.2	2	1-5	27	0	0-0	3
Antiarrhythmics	4057	7.6	1204	2.3	2144	4	3	1-7	6	1	0-2	1
IABP	373	0.7	268	0.5	126	0.2	2	1-3	0	0	0-0	0
Invasive monitoring of C.O.	1719	3.2	295	0.6	384	0.7	4	2-8	1	0	0-1	1
Continuous monitoring of ScVO2	113	0.2	34	0.1	29	0.1	3	1-6	0	0	0-1	0
Temporary pacing	198	0.4	116	0.2	94	0.2	2	1-5	0	0	0-2	0
Ventricular assistance	4	0.0	2	0	2	0	6	4-7	0	0	0-0	0
DC-shock	1067	2.0								0	0-1	0
CPR	1612	3.0								0	0-1	0
Massive blood transfusion	831	1.6								0	0-0	0
ICP monitoring without liquor-drainage	401	0.8	165	0.3	74	0.1	7	4-10	2	0	0-1	0
ICP monitoring with liquor-drainage	430	0.8	226	0.4	226	0.4	8	3-15	5	0	0-1	0
External ventricular drainage without ICP	208	0.4	120	0.2	106	0.2	9	3-16	1	0	0-1	0
Haemofiltration	2061	3.9	204	0.4	579	1.1	3	2-8	3	1	0-2	1
Haemodialysis	1216	2.3	215	0.4	484	0.9	3	1-8	4	1	0-3	0
ECMO	161	0.3	57	0.1	72	0.1	5	1-12	0	0	0-3	0
Hepatic clearance techniques	15	0.0										
Clearance techniques during sepsis	365	0.7	14	0	70	0.1	2	1-4	0	1	0-1	0
IAP (intra-abdominal pressure)	643	1.2										
Hypothermia	528	1.0										
Enteral nutrition	16937	31.8	2645	5	11213	21.1	7	3-14	43	1	0-2	9
Parenteral nutrition	10269	19.3	1553	2.9	6132	11.5	4	2-8	15	1	0-2	3
SDD (Topical, Topical and systemic)	265	0.5										
Patient restraint	1395	2.6										
Peridural catheter	1670	3.1	1475	2.8	1328	2.5	1	1-2	1	0	0-2	0
Electrical cardioversion	306	0.6								1	0-3	0
Vacuum therapy	256	0.5										
<b>Antibiotics</b>	35432	66.5										
Antibiotics for surgical prophylaxis	15084	28.3	12377	23.2	9485	17.8	1	1-2	17	0	0-0	3
Antibiotics for medical prophylaxis	8235	15.5	3121	5.9	4763	8.9	4	2-7	16	0	0-0	2
Empirical antibiotic therapy	10484	19.7	4618	8.7	4834	9.1	3	2-6	21	0	0-1	3
Targeted antibiotic therapy	7245	13.6	1448	2.7	4554	8.6	7	4-13	15	4	2-8	4

## National report for general ICUs - Year 2016

## Process indicators - Adult patients

			Length (days)				
Invasive ventilation (N=35687)	N	%	Mean	SD	Median	Q1-Q3	Missing
Due to pulmonary failure	12073	31.2	7.7	11.5	4	1–9	18
For airway maintenance	14921	38.6	5.7	9.1	2	1–7	37
In weaning	7426	19.2	0.3	0.5	0	0–1	0
Not evaluable	4271	11.0	4.6	7.9	1	1–5	3068
Reintubation within 48 hours	620	1.6	8.0	9.7	5	2–10	0
Non invasive ventilation (N=8306)	N	%	Number of surgical interventions				
Non invasive ventilation only	4433	53.4				0	50937 95.7
Non invasive ventilation failed	1402	16.9				1	1812 3.4
For weaning	2173	26.2				2	308 0.6
Other	298	3.6				3	106 0.2
Missing	0					>3	88 0.2
						Missing	127
Tracheostomy not present on admission (N=4424)	N	%	Surgical interventions				
Surgical	891	20.1	Days from admission				
Percutwist	494	11.2				Mean	9.8
Ciaglia	620	14.0				SD	13.0
Monodil. Ciaglia	1411	31.9				Median	6
Fantoni	234	5.3				Q1–Q3	3–12
Griggs	550	12.4				Missing	17
Other Kind	187	4.2	Surgical interventions (top 10)				
Unknown	31	0.7				N	%
Missing	6					Gastrointestinal surgery	1081 2.0
						Orthopaedic surgery	596 1.1
						Neurosurgery	363 0.7
						ENT surgery	227 0.4
						Other surgery	124 0.2
						Thoracic surgery	112 0.2
						Maxillo-Facial surgery	105 0.2
						Plastic surgery	102 0.2
						Nephro/Urological surgery	90 0.2
						Organ donation	69 0.1
						Missing	127
Tracheostomy - Days after the beginning of inv. vent. Not present on admission (N=4360)			Non surgical interventions				
Mean	9.0					N	%
SD	6.8					No	52220 98.1
Median	8					Yes	1016 1.9
Q1–Q3	4–12					Missing	142
Missing	8		Non surgical interventions				
			Days from admission				
						Mean	12.5
						SD	15.7
						Median	8
						Q1–Q3	4–15
						Missing	43
Invasive monitoring of C.O. (N=1719)	N	%	Non surgical interventions				
Swan Ganz	363	21.1				N	%
PICCO	1083	63.0				Interventional endoscopy	651 1.2
LIDCO	4	0.2				Interventional radiology	260 0.5
Vigileo-PRAM	218	12.7				Interventional cardiology	184 0.3
Other	51	3.0				Interventional neuroradiology	100 0.2
Missing	0					Missing	142
SDD (N=265)	N	%					
Topical	211	79.6					
Topical and systemic	54	20.4					
Missing	0						
Antibiotic therapy							
Pt. infected in ICU only (N=3260)	N	%					
Only empirical	661	24.5					
Only targeted	1105	41.0					
Targeted after empirical	790	29.3					
Other	140	5.2					
Missing	564						
Surgical interventions	N	%					
No	50937	95.7					
Yes	2314	4.3					
Missing	127						

## National report for general ICUs - Year 2016

## Outcome indicators - Adult patients

ICU outcome	N	%
Dead	9580	18.0
Transferred to same hospital	38334	72.1
Transferred to other hospital	4588	8.6
Discharged home	480	0.9
Disch. terminally ill	196	0.4
Missing	200	

Transferred to (N=42922)	N	%
Ward	34609	80.6
Other ICU	3216	7.5
High dependency care unit	3599	8.4
Rehabilitation	1112	2.6
Day hospital or Long-term care	386	0.9
Missing	0	

Reason of transfer to Other ICU (N=3301)	N	%
Specialist expertise	1372	41.6
Step-up care	266	8.1
Logistical/organizational reasons	1550	47.0
Step-down care	112	3.4
Missing	1	

Transferred to Same hospital (N=38334)	N	%
Ward	33287	86.8
Other ICU	1301	3.4
High dependency care unit	3406	8.9
Rehabilitation	219	0.6
Day hospital or Long-term care	121	0.3
Missing	0	

Transferred to Other hospital (N=4588)	N	%
Ward	1322	28.8
Other ICU	1915	41.7
High dependency care unit	193	4.2
Rehabilitation	893	19.5
Day hospital or Long-term care	265	5.8
Missing	0	

ICU mortality	N	%
Alive	43402	81.6
Dead	9776	18.4
Missing	200	

Timing of ICU mortality (N=9776)	N	%
Daytime (08:00AM - 07:59PM)	6550	67.0
Nighttime (08:00PM - 07:59AM)	3222	33.0
Weekdays (Monday - Friday)	7268	74.4
Weekend (Saturday - Sunday)	2507	25.6
Missing	4	

C.A.M. activation (N=9776)	N	%
Yes, with organ donation	520	5.4
Yes, without organ donation	562	5.9
No, with organ donation	22	0.2
No, without organ donation	8474	88.5
Missing	198	

Tissue removal (N=9776)	N	%
Yes, with C.A.M. activation	370	3.8
Yes, without C.A.M. activation	469	4.8
No	8936	91.4
Missing	1	

Hospital mortality *	N	%
Dead	11590	24.0
Transf. to other acute-care hospital	4461	9.2
Transf. to other type of hosp. stay	7215	14.9
Nursing home	968	2.0
Voluntary discharge	333	0.7
Discharged home	23709	49.1
Missing	275	

To other type of H stay* (N=7215)	N	%
Rehabilitation in the same institute	1181	16.4
Rehabilitation in other institute	3793	52.6
DH/long-term care, same inst.	671	9.3
DH/long-term care, other inst.	1568	21.7
Missing	2	

Disch. terminally ill* (N=36686)	N	%
Yes	540	1.5
No	36137	98.5
Missing	9	

Hospital mortality *	N	%
Alive	36137	74.9
Dead	12130	25.1
Missing	284	

Timing of hosp. mortality * (N=12130)	N	%
In ICU	8808	72.7
Within 24 hours after ICU	244	2.0
24-47 hours after ICU	208	1.7
48-71 hours after ICU	193	1.6
72-95 hours after ICU	177	1.5
After 95 hours after ICU	2493	20.6
Missing	7	

Timing of hosp. mortality (days from ICU disch.) * Discharged alive from ICU (N=3322)		
Mean		17.0
SD		21.7
Median		11
Q1-Q3		4-22
Missing		4

\* Statistics computed on patients admitted in months with % of patients in status 4 over the threshold (readmissions excluded) (N=48551).

## National report for general ICUs - Year 2016

## Outcome indicators - Adult patients

Last hospital mortality *	N	%
Alive	35780	74.3
Dead	12380	25.7
Missing	391	

Readmission from ward	N	%
No	51085	96.8
Yes	1695	3.2
Missing	598	

Number of readmissions (N=1695)	N	%
1	1542	91.0
2	135	8.0
>2	18	1.1
Missing	0	

Timing of readmission (N=1695)	N	%
Within 48 hours	400	24.1
48-71 hours	161	9.7
72-95 hours	150	9.0
After 95 hours	949	57.2
Missing	35	

Timing readmission (days)	N	
Mean	10.2	
SD	20.9	
Median	4.8	
Q1–Q3	1.9–10.5	

ICU stay (days)		
Mean	6.2	
SD	10.0	
Median	2	
Q1–Q3	1–7	
Missing	186	

ICU stay (days) Alive (N=43402)		
Mean	5.9	
SD	9.6	
Median	2	
Q1–Q3	1–6	
Missing	5	

ICU stay (days) Dead (N=9776)		
Mean	7.7	
SD	11.4	
Median	3	
Q1–Q3	1–10	
Missing	1	

Stay after ICU (days) *		
Alive (N=39608)		
Mean	13.4	
SD	17.6	
Median	9	
Q1–Q3	4–16	
Missing	167	

Hospital stay (days) *		
Mean	20.2	
SD	22.1	
Median	14	
Q1–Q3	7–26	
Missing	291	

Hospital stay (days) *		
Alive (N=36137)		
Mean	21.4	
SD	22.1	
Median	15	
Q1–Q3	8–27	
Missing	13	

Hospital stay (days) *		
Dead (N=12130)		
Mean	16.5	
SD	21.6	
Median	9	
Q1–Q3	3–22	
Missing	9	

\* Statistics computed on patients admitted in months with % of patients in status 4 over the threshold (readmissions excluded) (N=48551).



## National report for general ICUs - Year 2016

## Characteristics on admission - Adult patients evaluated in the GiViTI model

Patients (N): 46972

Sex	N	%
Male	27764	59.1
Female	19199	40.9
Missing	9	

Age (years)	N	%
17-45	5674	12.1
46-65	12220	26.0
66-75	12033	25.6
>75	17045	36.3
Missing	0	
Mean	66.8	
SD	16.4	
Median	70	
Q1–Q3	57–79	
Min–Max	17–102	

Body mass Index (BMI)	N	%
Underweight	2664	5.7
Normal	20964	44.6
Overweight	14564	31.0
Obese	8771	18.7
Missing	9	

Pregnancy status	N	%
Females (N=19199)		
Not fertile	10226	53.3
Not pregnant/Unknown	8439	44.0
Currently pregnant	81	0.4
Post partum	453	2.4
Missing	0	

Comorbidities	N	%
No	7089	15.1
Yes	39883	84.9
Missing	0	

Comorbidities (top 10)	N	%
Hypertension	24533	52.2
Arrhythmia	7989	17.0
Moderate COPD	6915	14.7
Diabetes Type II without insulin tr.	6121	13.0
Myocardial infarction	6075	12.9
Any tumour without metastasis	5481	11.7
Cerebrovascular disease	5160	11.0
NYHA class II-III	5022	10.7
Peripheral vascular disease	4524	9.6
Moderate or severe renal disease	4199	8.9
Missing	0	

Stay before ICU (days)		
Mean	4.0	
SD	10.2	
Median	1	
Q1–Q3	0–3	
Missing	0	

Source of admission	N	%
Same hospital	41347	88.0
Other hospital	5625	12.0
Long-term chronic care hospital	0	0.0
Directly from the community	0	0.0
Missing	0	

Ward of admission	N	%
Hospital (N=46972)		
Medical ward	6749	14.4
Surgical ward	19629	41.8
Emergency room	16707	35.6
Other ICU	2733	5.8
High dependency care unit	1154	2.5
Missing	0	

Reason for transfer from	N	%
Other ICU (N=2733)		
Specialist expertise	665	24.3
Step-up care	548	20.1
Logistical/organizational reasons	1469	53.8
Step-down care	51	1.9
Missing	0	

Ward of admission	N	%
Same hospital (N=41347)		
Medical ward	6020	14.6
Surgical ward	19246	46.5
Emergency room	14184	34.3
Other ICU	855	2.1
High dependency care unit	1042	2.5
Missing	0	

Ward of admission	N	%
Other hospital (N=5625)		
Medical ward	729	13.0
Surgical ward	383	6.8
Emergency room	2523	44.9
Other ICU	1878	33.4
High dependency care unit	112	2.0
Missing	0	

Scheduled admission	N	%
No	37487	79.8
Yes	9485	20.2
Missing	0	

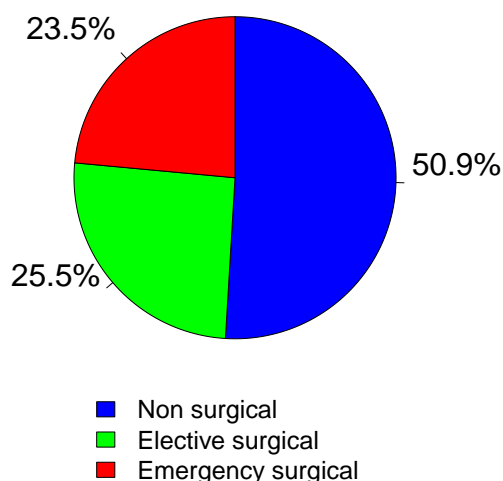
## National report for general ICUs - Year 2016

## Characteristics on admission - Adult patients evaluated in the GiViTI model

Trauma	N	%
No	40955	87.2
Yes	6017	12.8
Multiple trauma	2468	5.3
Missing	0	

Surgical status	N	%
Non surgical	23914	50.9
Elective surgical	12001	25.5
Emergency surgical	11057	23.5
Missing	0	

Surgical status



Source of admission	N	%
<b>Surgical pt. (N=23058)</b>		
Operating theatre of surgical ward	17043	73.9
Operating theatre of emergency room	2018	8.8
Surgical ward	1127	4.9
Other	2870	12.4
Missing	0	

Surgical interventions (top 10)	N	%
<b>Elective surgical (N=12001)</b>		
Gastrointestinal surgery	3330	27.7
Orthopaedic surgery	1710	14.2
Nephro/Urological surgery	1535	12.8
Neurosurgery	899	7.5
ENT surgery	787	6.6
Thoracic surgery	653	5.4
Gynaecological surgery	637	5.3
Abdominal vascular surgery	557	4.6
Hepatic surgery	529	4.4
Pancreatic surgery	432	3.6
Missing	932	

Timing	N	%
<b>Elective surgical (N=12001)</b>		
From -7 to -3 days	214	1.8
From -2 to -1 days	322	2.7
On ICU admission day	12070	100.6
The day after ICU admission	116	1.0
Missing	13	

Surgical interventions (top 10)	N	%
<b>Emergency surgical (N=11057)</b>		
Gastrointestinal surgery	4768	43.1
Neurosurgery	1607	14.5
Orthopaedic surgery	1299	11.7
Nephro/Urological surgery	554	5.0
Abdominal vascular surgery	488	4.4
Biliary tract surgery	471	4.3
Peripheral vascular surgery	445	4.0
Obstetric surgery	338	3.1
ENT surgery	285	2.6
Splenectomy	276	2.5
Missing	526	

Timing	N	%
<b>Emergency surgical (N=11057)</b>		
From -7 to -3 days	294	2.7
From -2 to -1 days	1173	10.6
On ICU admission day	9744	88.1
The day after ICU admission	481	4.4
Missing	41	

Non surgical interventions	N	%
None	43028	91.6
Elective	571	1.2
Emergency	3373	7.2
Missing	0	

Non surgical interventions	N	%
<b>Elective (N=571)</b>		
Interventional endoscopy	188	32.9
Interventional radiology	132	23.1
Interventional cardiology	102	17.9
Interventional neuroradiology	63	11.0
Missing	86	

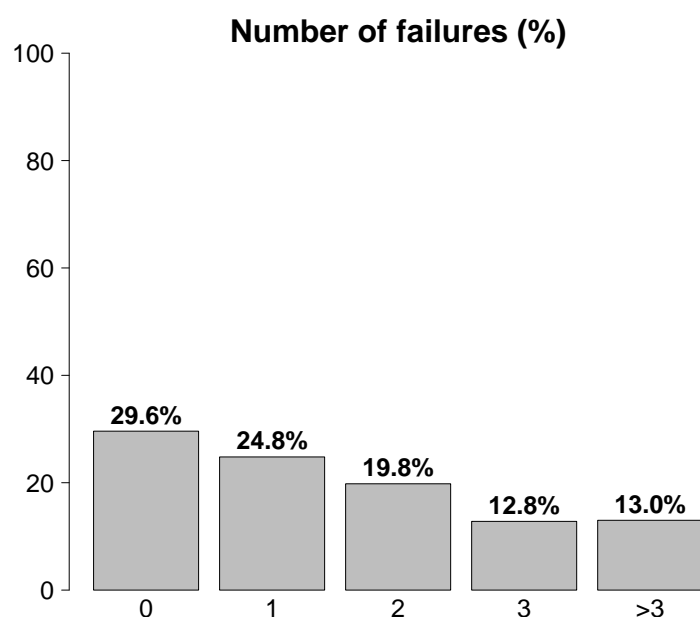
Non surgical interventions	N	%
<b>Emergency (N=3373)</b>		
Interventional cardiology	1371	40.6
Interventional radiology	765	22.7
Interventional endoscopy	736	21.8
Interventional neuroradiology	468	13.9
Missing	33	



## National report for general ICUs - Year 2016

## Characteristics on admission - Adult patients evaluated in the GiViTI model

Reason for admission	N	%
Monitoring/Weaning	18969	40.4
Post surgical weaning	6560	14.0
Surgical monitoring	7036	15.0
Post interventional weaning	152	0.3
Interventional monitoring	696	1.5
Non surgical monitoring	4356	9.3
Missing	169	
Admission for procedures/treatments	0	0.0
Intensive Treatment	28003	59.6
Only ventilatory support	15180	32.3
Only cardiovascular support	1921	4.1
Ventilatory and cardiovascular support	10902	23.2
Missing	0	
Palliative Sedation	0	0.0
Diagnosis of death/Organ donation	0	0.0
Missing	0	



Failures on admission	N	%
No	13916	29.6
Yes	33056	70.4
A: Respiratory failure	26081	55.5
B: Cardiovascular failure	12823	27.3
C: Neurological failure	6588	14.0
D: Hepatic failure	374	0.8
E: Renal failure	16462	35.0
F: Acute skin failure	31	0.1
G: Metabolic failure	11374	24.2
H: Coagulation failure	734	1.6
Missing	0	

Failures on admission (top 10)	N	%
A	7303	15.5
ABEG	3177	6.8
E	2849	6.1
AC	2276	4.8
AB	2264	4.8
AE	2213	4.7
ABE	1574	3.4
ABCEG	1262	2.7
AEG	1240	2.6
EG	1003	2.1
Missing	0	

Respiratory failure	N	%
None	20890	44.5
Only hypoxic failure	8048	17.1
Only hypercapnic failure	1392	3.0
Hypoxic-hypercapnic failure	3283	7.0
Intubation for airway maint.	13358	28.4
Missing	1	

Cardiovascular failure	N	%
None	34149	72.7
Without shock	2290	4.9
Cardiogenic shock	2787	5.9
Septic shock	3412	7.3
Haemorrhagic/hypovolemic shock	1692	3.6
Hypovolemic shock	970	2.1
Anaphylactic shock	42	0.1
Neurogenic shock	406	0.9
Other shock	488	1.0
Mixed shock	736	1.6
Missing	0	

Neurologic failure	N	%
None	31927	82.9
Cerebral coma	3339	8.7
Metabolic coma	1231	3.2
Postanoxic coma	1705	4.4
Toxic coma	313	0.8
Missing or not evaluable	8457	

Renal failure (AKIN)	N	%
None	30510	65.0
Mild	8157	17.4
Moderate	3810	8.1
Severe	4495	9.6
Missing	0	

Metabolic failure	N	%
None	35598	75.8
pH $\leq$ 7.3, PaCO <sub>2</sub> $<$ 45 mmHg	3304	7.0
Base deficit $\geq$ 5 mmol/L, lactate $>$ 1.5x	8070	17.2
Missing	0	

**National report for general ICUs - Year 2016****Characteristics on admission - Adult patients evaluated in the GiViTI model**

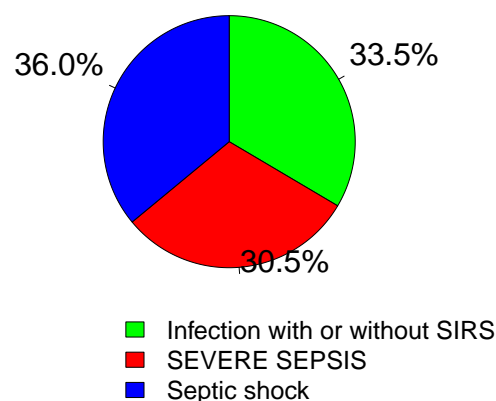
<b>Clinical conditions on admission</b>	<b>N</b>	<b>%</b>
Respiratory	8826	18.8
Acute exacerbation of COPD	2371	5.0
Pleural effusion	1779	3.8
Atelectasis	1050	2.2
Aspiration pneumonia	956	2.0
Upper respiratory tract disease	705	1.5
Cardiovascular	9305	19.8
Cardiac arrest	2327	5.0
Left heart failure with pulmonary edema	1859	4.0
Left heart failure without pulm. edema	1337	2.8
Acute severe arrhythmia: tachycardias	1057	2.3
Acute ischaemia	782	1.7
Neurological	6657	14.2
Spontaneous Intraparenchymal bleeding	1486	3.2
Cerebral artery stroke	1235	2.6
Seizures	1007	2.1
Metabolic/postanoxic encephalopathy	794	1.7
Brain tumour	756	1.6
Gastrointestinal and hepatic	9865	21.0
Digestive tract malignancy	2617	5.6
Intestinal occlusion	1507	3.2
Gastrointestinal perforation	1505	3.2
Acute bile-duct disease	768	1.6
Gastrointestinal bleeding: upper tract	713	1.5
Trauma (anatomical districts)	6017	12.8
Pelvis/bone/joint & muscle	2744	5.8
Head	2448	5.2
Chest	2244	4.8
Spine	1347	2.9
Abdomen	1024	2.2
Major vessels injury	220	0.5
Miscellaneous	83	0.2
Other	11864	25.3
Other disease	2563	5.5
Nephrourologic disease	2451	5.2
Metabolic disorder	2421	5.2
Orthopaedic disease	1211	2.6
Acute intoxication	1088	2.3
Post transplantation	280	0.6
Renal transplantation	128	0.3
Liver transplantation	77	0.2
Infections	11279	24.0
Pneumonia	4120	8.8
NON-surgical secondary peritonitis	1196	2.5
NON-surgical urinary tract infection	991	2.1
L.R.T.I. other than pneumonia	848	1.8
Post-surgical peritonitis	631	1.3
Clinical sepsis	537	1.1
Cholecystitis/cholangitis	535	1.1
NON-surgical skin/soft tissue infection	532	1.1
Primary bacteraemia of unknown origin	512	1.1
Primary peritonitis	370	0.8
Missing	0	

<b>Trauma (anatomical districts)</b>	<b>N</b>	<b>%</b>
Head	2448	5.2
Maxillofacial fracture	821	1.7
Traumatic subarachnoid haemorrhage	809	1.7
Traumatic Subdural haematoma	681	1.4
Skull fracture	609	1.3
Cerebral contusion/laceration	537	1.1
Spine	1347	2.9
Vertebral fracture, without deficit	1128	2.4
Tetraplegia	71	0.2
Cervical injury, incomplete deficit	68	0.1
Chest	2244	4.8
Other injuries of the chest	1139	2.4
Traum. haemothorax/pneumothorax	936	2.0
Severe lung contusion/laceration	657	1.4
Abdomen	1024	2.2
Minor injuries of the abdomen	280	0.6
Spleen: Moderate-Severe laceration	273	0.6
Liver: Moderate-Severe laceration	213	0.5
Pelvis/bone/joint & muscle	2744	5.8
Long bone fracture	2204	4.7
Multiple fracture of the pelvis	698	1.5
Very severe or open fracture of the pelvis	134	0.3
Major vessels injury	220	0.5
Proximal limbs vessels: transection	69	0.1
Neck vessels: dissection/transection	62	0.1
Major abdominal vessels: transection	45	0.1
Miscellaneous	83	0.2
Burns (>30% BSA)	54	0.1
Inhalation injury	35	0.1
Missing	0	

<b>Infection severity on admission</b>	<b>N</b>	<b>%</b>
None	35693	76.1
Infection with or without SIRS	3749	8.0
SEVERE SEPSIS	3418	7.3
Septic shock	4027	8.6
Missing	85	

**Infection severity on admission**

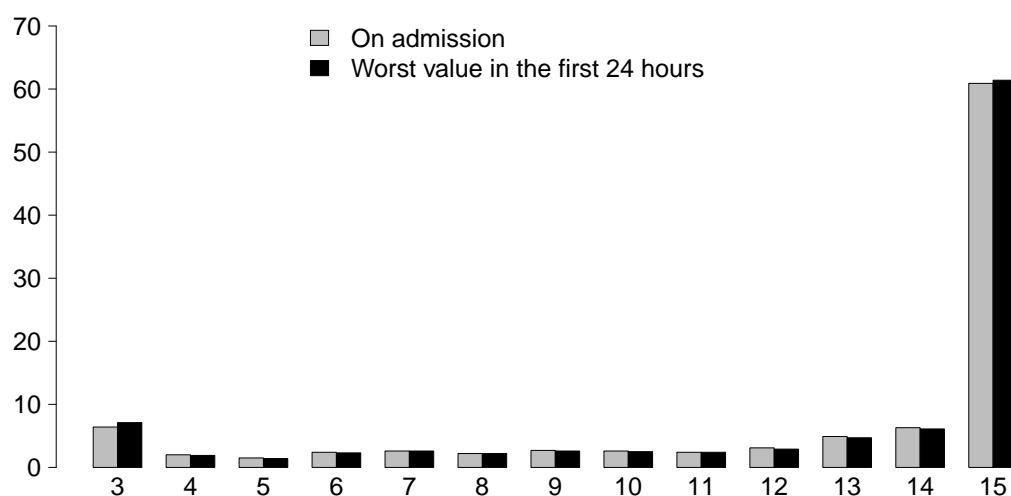
Patients infected (N=11194)



## National report for general ICUs - Year 2016

## Severity scores - Adult patients evaluated in the GiViTI model

## Glasgow Coma Scale (%)



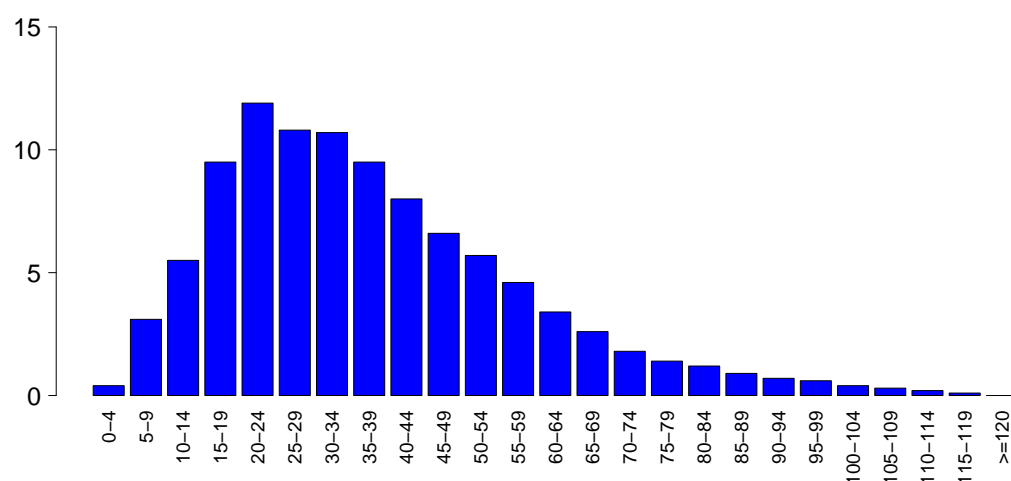
## GCS (admission)

Median	15
Q1–Q3	12–15
Not evaluable	8457
Missing	0

## GCS (first 24 hours)

Median	15
Q1–Q3	12–15
Not evaluable	7137
Missing	0

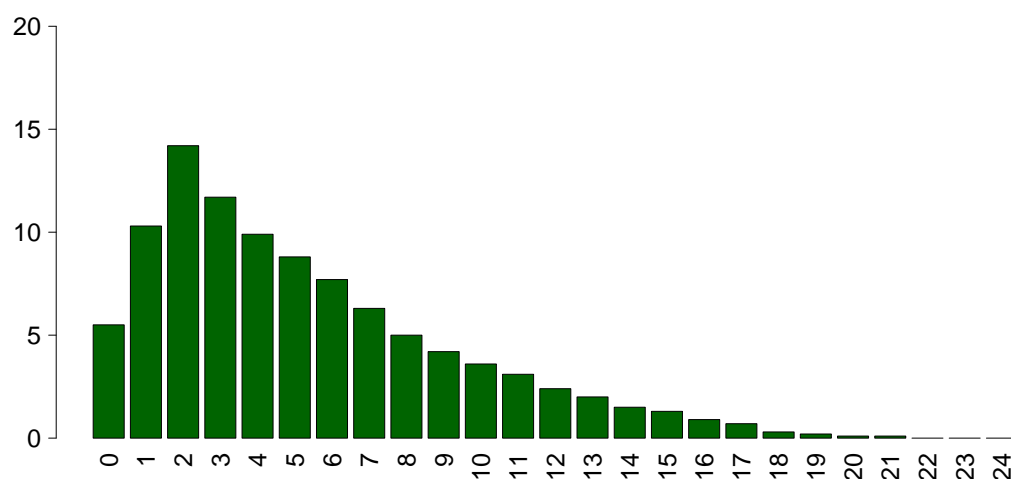
## SAPS II (%)



## SAPSII

Mean	37.3
SD	20.3
Median	33
Q1–Q3	22–49
Not evaluable	7137
Missing	0

## SOFA (%)



## SOFA

Mean	5.3
SD	4.1
Median	4
Q1–Q3	2–8
Not evaluable	7137
Missing	0

## National report for general ICUs - Year 2016

## Characteristics during the stay - Adult patients evaluated in the GiViTI model

Complications during the stay	N	%
No	33415	71.1
Yes	13554	28.9
Missing	3	

Failures during the stay	N	%
No	41226	87.8
Yes	5746	12.2
A: Respiratory failure	2194	4.7
B: Cardiovascular failure	2825	6.0
C: Neurological failure	472	1.0
D: Hepatic failure	202	0.4
E: Renal failure (AKIN)	1716	3.7
F: Acute skin failure	13	0.0
G: Metabolic failure	467	1.0
H: Coagulation failure	276	0.6
Missing	0	

Failures during the stay (top 10)	N	%
B	1558	3.3
A	1215	2.6
E	733	1.6
AB	382	0.8
BE	332	0.7
G	265	0.6
ABE	151	0.3
C	146	0.3
AE	126	0.3
AC	94	0.2
Missing	0	

Respiratory failure occurred	N	%
None	44775	95.3
Intubation for airway maint.	615	1.3
Hypoxic failure	1527	3.3
Hypercapnic failure	404	0.9
Missing	3	

Cardiovascular failure occurred	N	%
None	44144	94.0
Cardiogenic shock	868	1.8
Hypovolemic shock	218	0.5
Haemorrhagic/hypovolemic shock	246	0.5
Septic shock	1270	2.7
Anaphylactic shock	3	0.0
Neurogenic shock	185	0.4
Other shock	186	0.4
Missing	3	

Neurological failure occurred	N	%
None	46497	99.0
Cerebral coma	267	0.6
Metabolic coma	128	0.3
Postanoxic coma	85	0.2
Missing	3	

Renal failure occurred (AKIN)	N	%
None	45253	96.3
Mild	231	0.5
Moderate	260	0.6
Severe	1225	2.6
Missing	3	

Complications during the stay	N	%
Respiratory	2479	5.3
Pleural effusion	896	1.9
Atelectasis	612	1.3
Severe ARDS	377	0.8
Pneumothorax/Pneumomediastinum	258	0.5
Moderate ARDS	163	0.3
Cardiovascular	3784	8.1
Acute severe arrhythmia: tachycardias	1396	3.0
Cardiac arrest	1238	2.6
Left heart failure w/o pulm. edema	320	0.7
Acute severe arrhythmia: bradycardias	274	0.6
Pulmonary edema	264	0.6
Neurological	2623	5.6
Drowsiness/agitation/delirium	1115	2.4
Intracranial hypertension	478	1.0
Seizures	472	1.0
Brain edema	388	0.8
New ischaemic stroke	195	0.4
Gastrointestinal and hepatic	1314	2.8
Gastrointestinal bleeding: upper tract	216	0.5
Bowel ischaemia	187	0.4
Liver Dysfunction Syndrome	169	0.4
Paralytic Ileus	166	0.4
Gastrointestinal bleeding: lower tract	145	0.3
Other	1125	2.4
Metabolic disorder	467	1.0
Nephrourologic disease	315	0.7
Other disease	227	0.5
Other skin and/or soft tissue pathology	57	0.1
Category/Stage II: Partial Thickness Skin Loss	48	0.1
Extremity compartment syndrome (severe)	28	0.1
Category/Stage III: Full Thickness Skin Loss	27	0.1
Infections	3920	8.3
Pneumonia	1449	3.1
L.R.T.I. other than pneumonia	884	1.9
NON-surgical urinary tract infection	547	1.2
Catheter-related bacteremia (CR-BSI)	365	0.8
Primary bacteraemia of unknown origin	341	0.7
Post-surgical peritonitis	154	0.3
Clinical sepsis	149	0.3
F.U.O. fever of unknown origin	124	0.3
Upper respiratory tract infection	124	0.3
Post-surgical skin/soft tissue infection	104	0.2
Missing	3	

## National report for general ICUs - Year 2016

## Characteristics during the stay - Adult patients evaluated in the GiViTI model

Infections			Maximum severity of infection		
	N	%		N	%
None	32872	70.0	None	32872	70.3
Only on admission	10177	21.7	Infection with or without SIRS	4366	9.3
On admission and during ICU stay	1099	2.3	SEVERE SEPSIS	4536	9.7
Only during ICU stay	2821	6.0	Septic shock	4998	10.7
Missing	3		Missing	200	

## Severity evolution

Severity evolution		During the stay				
		N (R %)	None	Infection with or without SIRS	SEVERE SEPSIS	Septic shock
Admission	None	32872 (92.4%)	1112 (3.1%)	1126 (3.2%)	467 (1.3%)	35577
	Infection with or without SIRS	-	3253 (86.8%)	365 (9.7%)	130 (3.5%)	3748
	SEVERE SEPSIS	-	-	3044 (89.1%)	373 (10.9%)	3417
	Septic shock	-	-	-	4026 (100.0%)	4026
	TOT	32872	4365	4535	4996	46768

Ventil. Associat. Pneumonia (VAP)	N	%
No	45712	97.3
Yes	1257	2.7
Missing	3	

## Incidence of VAP

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

Estimate	8.8
CI (95%)	8.3–9.3

## Incidence of VAP

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

Estimate	7.0%
CI (95%)	6.6–7.4

Catheter Bacteraemia (CR-BSI)	N	%
No	46604	99.2
Yes	365	0.8
Missing	3	

## Incidence of CR-BSI

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

Estimate	1.6
CI (95%)	1.4–1.8

## Incidence of CR-BSI

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

Estimate	1.9%
CI (95%)	1.7–2.1

**National report for general ICUs - Year 2016**  
**Process indicators - Adult patients evaluated in the GiViTI model**

Procedures and/or treatments (Missing=0)		Use		On admission		On discharge		Length (days)			Days from admission		
		N	%	N	%	N	%	Median	Q1-Q3	Missing	Median	Q1-Q3	Missing
Procedures (antibiotics excluded)		44101	93.9										
Procedures (antibiotics excluded)	Invasive ventilation	31305	66.6	23140	49.3	6462	13.8	1	0-6	3	0	0-0	1
	Non invasive ventilation	7222	15.4	1593	3.4	1378	2.9	1	1-3	1	0	0-2	1
	Tracheostomy	5036	10.7	1259	2.7	4273	9.1	10	5-19	1	8	4-12	0
	iNO (inhaled nitric oxide)	94	0.2	5	0	22	0	2	1-6	0	1	0-3	0
	Central Venous Catheter	30388	64.7	14373	30.6	24459	52.1	4	2-9	4	0	0-0	1
	PICC	804	1.7	279	0.6	675	1.4	4	2-9	0	5	1-17	0
	Arterial Catheter	36221	77.1	17524	37.3	9619	20.5	3	1-7	2	0	0-0	0
	Vasoactive drugs	15702	33.4	6857	14.6	3801	8.1	2	1-4	1	0	0-0	0
	Antiarrhythmics	3508	7.5	1036	2.2	1861	4	3	1-7	0	1	0-2	0
	IABP	337	0.7	239	0.5	120	0.3	2	1-3	0	0	0-0	0
	Invasive monitoring of C.O.	1489	3.2	232	0.5	345	0.7	4	2-8	0	0	0-1	0
	Continuous monitoring of ScVO2	95	0.2	27	0.1	26	0.1	3	1-5	0	0	0-1	0
	Temporary pacing	171	0.4	99	0.2	82	0.2	2	1-4	0	0	0-1	0
	Ventricular assistance	2	0.0	1	0	0	0	6	6-6	0	0	0-0	0
	DC-shock	924	2.0								0	0-1	0
	CPR	1390	3.0								0	0-0	0
	Massive blood transfusion	728	1.5								0	0-0	0
	ICP monitoring without liquor-drainage	335	0.7	143	0.3	64	0.1	7	4-11	0	0	0-1	0
	ICP monitoring with liquor-drainage	344	0.7	167	0.4	178	0.4	9	4-16	0	0	0-1	0
	External ventricular drainage without ICP	188	0.4	111	0.2	96	0.2	9	3-16	0	0	0-1	0
Haemofiltration	1816	3.9	176	0.4	505	1.1	3	2-7	0	1	0-2	0	
Haemodialysis	1025	2.2	175	0.4	395	0.8	3	1-8	0	1	0-3	0	
ECMO	147	0.3	52	0.1	64	0.1	4	1-12	0	0	0-3	0	
Hepatic clearance techniques	10	0.0											
Clearance techniques during sepsis	334	0.7	13	0	64	0.1	2	1-4	0	1	0-1	0	
IAP (intra-abdominal pressure)	572	1.2											
Hypothermia	480	1.0											
Enteral nutrition	14579	31.0	2169	4.6	9599	20.4	7	3-14	3	1	1-2	1	
Parenteral nutrition	9026	19.2	1229	2.6	5388	11.5	4	2-8	1	1	0-2	1	
SDD (Topical, Topical and systemic)	254	0.5											
Patient restraint	1281	2.7											
Peridural catheter	1546	3.3	1369	2.9	1241	2.6	1	1-2	0	0	0-2	0	
Electrical cardioversion	271	0.6								1	0-3	0	
Vacuum therapy	220	0.5											
Antibiotics	31316	66.7											
Antibiotics for surgical prophylaxis	13571	28.9	11189	23.8	8585	18.3	1	1-2	0	0	0-0	0	
Antibiotics for medical prophylaxis	7229	15.4	2688	5.7	4225	9	4	2-7	0	0	0-0	0	
Empirical antibiotic therapy	9191	19.6	4014	8.5	4307	9.2	3	2-6	1	0	0-1	1	
Targeted antibiotic therapy	6119	13.0	1152	2.5	3851	8.2	7	4-12	2	4	2-8	1	

**National report for general ICUs - Year 2016****Process indicators - Adult patients evaluated in the GiViTI model**

Process indicators - Adult patients evaluated in the GiViTI model			Length (days)					
Invasive ventilation (N=31305)	N	%	Mean	SD	Median	Q1-Q3	Missing	
Due to pulmonary failure	10498	30.9	7.5	11.2	3	1–9	1	
For airway maintenance	13172	38.8	5.6	8.8	2	1–7	1	
In weaning	6765	19.9	0.3	0.5	0	0–1	0	
Not evaluable	3510	10.3	5.1	8.4	2	1–6	2675	
Reintubation within 48 hours	540	1.6	8.0	9.8	5	2–10	0	
Non invasive ventilation (N=7222)	N	%	Number of surgical interventions					
Non invasive ventilation only	3823	52.9				0	45023	95.9
Non invasive ventilation failed	1223	16.9				1	1531	3.3
For weaning	1914	26.5				2	259	0.6
Other	262	3.6				3	85	0.2
Missing	0					>3	74	0.2
						Missing	0	
Tracheostomy not present on admission (N=3777)	N	%	Surgical interventions					
			Days from admission					
Surgical	750	19.9				Mean		9.4
Percutwist	415	11.0				SD		10.7
Ciaglia	557	14.7				Median		6
Monodil. Ciaglia	1218	32.2				Q1–Q3		3–12
Fantoni	203	5.4				Missing		15
Griggs	440	11.6						
Other Kind	167	4.4						
Unknown	27	0.7						
Missing	0							
Tracheostomy - Days after the beginning of inv. vent. Not present on admission (N=3731)			Surgical interventions (top 10)					
Mean	9.0					N		%
SD	6.6		Gastrointestinal surgery			899		1.9
Median	8		Orthopaedic surgery			525		1.1
Q1–Q3	4–12		Neurosurgery			313		0.7
Missing	3		ENT surgery			199		0.4
			Other surgery			98		0.2
			Thoracic surgery			88		0.2
			Maxillo-Facial surgery			80		0.2
			Plastic surgery			78		0.2
			Nephro/Urological surgery			75		0.2
			Peripheral vascular surgery			61		0.1
			Missing			0		
Invasive monitoring of C.O. (N=1489)	N	%	Non surgical interventions					
Swan Ganz	292	19.6				N		%
PICCO	947	63.6				No	46091	98.1
LIDCO	4	0.3				Yes	881	1.9
Vigileo-PRAM	198	13.3				Missing	0	
Other	48	3.2						
Missing	0							
SDD (N=254)	N	%	Non surgical interventions					
Topical	204	80.3				Days from admission		
Topical and systemic	50	19.7				Mean		11.9
Missing	0					SD		12.2
						Median		8
						Q1–Q3		4–15
						Missing		36
Antibiotic therapy			Non surgical interventions					
Pt. infected in ICU only (N=2821)	N	%						
Only empirical	585	25.1				N		%
Only targeted	968	41.5	Interventional endoscopy			572		1.2
Targeted after empirical	671	28.7	Interventional radiology			217		0.5
Other	110	4.7	Interventional cardiology			159		0.3
Missing	487		Interventional neuroradiology			83		0.2
			Missing			0		
Surgical interventions	N	%						
No	45023	95.9						
Yes	1949	4.1						
Missing	0							

**National report for general ICUs - Year 2016****Outcome indicators - Adult patients evaluated in the GiViTI model**

ICU outcome	N	%
Dead	8194	17.4
Transferred to same hospital	34311	73.1
Transferred to other hospital	3897	8.3
Discharged home	416	0.9
Disch. terminally ill	151	0.3
Missing	3	

Transferred to (N=38208)	N	%
Ward	31108	81.4
Other ICU	2698	7.1
High dependency care unit	3159	8.3
Rehabilitation	925	2.4
Day hospital or Long-term care	318	0.8
Missing	0	

Reason of transfer to Other ICU (N=2768)	N	%
Specialist expertise	1181	42.7
Step-up care	225	8.1
Logistical/organizational reasons	1263	45.6
Step-down care	99	3.6
Missing	0	

Transferred to Same hospital (N=34311)	N	%
Ward	29903	87.2
Other ICU	1113	3.2
High dependency care unit	2997	8.7
Rehabilitation	195	0.6
Day hospital or Long-term care	103	0.3
Missing	0	

Transferred to Other hospital (N=3897)	N	%
Ward	1205	30.9
Other ICU	1585	40.7
High dependency care unit	162	4.2
Rehabilitation	730	18.7
Day hospital or Long-term care	215	5.5
Missing	0	

ICU mortality	N	%
Alive	38624	82.2
Dead	8345	17.8
Missing	3	

Timing of ICU mortality (N=8345)	N	%
Daytime (08:00AM - 07:59PM)	5597	67.1
Nighttime (08:00PM - 07:59AM)	2748	32.9
Weekdays (Monday - Friday)	6205	74.4
Weekend (Saturday - Sunday)	2140	25.6
Missing	0	

C.A.M. activation (N=8345)	N	%
Yes, with organ donation	431	5.3
Yes, without organ donation	494	6.0
No, with organ donation	19	0.2
No, without organ donation	7249	88.5
Missing	152	

Tissue removal (N=8345)	N	%
Yes, with C.A.M. activation	327	3.9
Yes, without C.A.M. activation	409	4.9
No	7608	91.2
Missing	1	

Hospital mortality	N	%
Dead	11062	23.6
Transf. to other acute-care hospital	4273	9.1
Transf. to other type of hosp. stay	6952	14.8
Nursing home	946	2.0
Voluntary discharge	328	0.7
Discharged home	23411	49.8
Missing	0	

To other type of H stay (N=6952)	N	%
Rehabilitation in the same institute	1141	16.4
Rehabilitation in other institute	3664	52.7
DH/long-term care, same inst.	649	9.3
DH/long-term care, other inst.	1498	21.5
Missing	0	

Disch. terminally ill (N=35910)	N	%
Yes	522	1.5
No	35388	98.5
Missing	0	

Hospital mortality	N	%
Alive	35388	75.3
Dead	11584	24.7
Missing	0	

Timing of hosp. mortality (N=11584)	N	%
In ICU	8343	72.0
Within 24 hours after ICU	241	2.1
24-47 hours after ICU	201	1.7
48-71 hours after ICU	190	1.6
72-95 hours after ICU	169	1.5
After 95 hours after ICU	2437	21.0
Missing	3	

Timing of hosp. mortality (days from ICU disch.) Discharged alive from ICU (N=3241)		
Mean		17.0
SD		21.6
Median		11
Q1-Q3		4-22
Missing		2



**National report for general ICUs - Year 2016****Outcome indicators** - Adult patients evaluated in the GiViTI model

<b>Last hospital mortality</b>	<b>N</b>	<b>%</b>
Alive	35140	74.8
Dead	11832	25.2
Missing	0	

<b>ICU stay (days)</b>		
	Mean	6.0
	SD	9.7
	Median	2
	Q1–Q3	1–7
	Missing	3

<b>ICU stay (days)</b>		
<b>Alive (N=38624)</b>		
	Mean	5.7
	SD	9.2
	Median	2
	Q1–Q3	1–6
	Missing	1

<b>ICU stay (days)</b>		
<b>Dead (N=8345)</b>		
	Mean	7.7
	SD	11.5
	Median	3
	Q1–Q3	1–10
	Missing	0

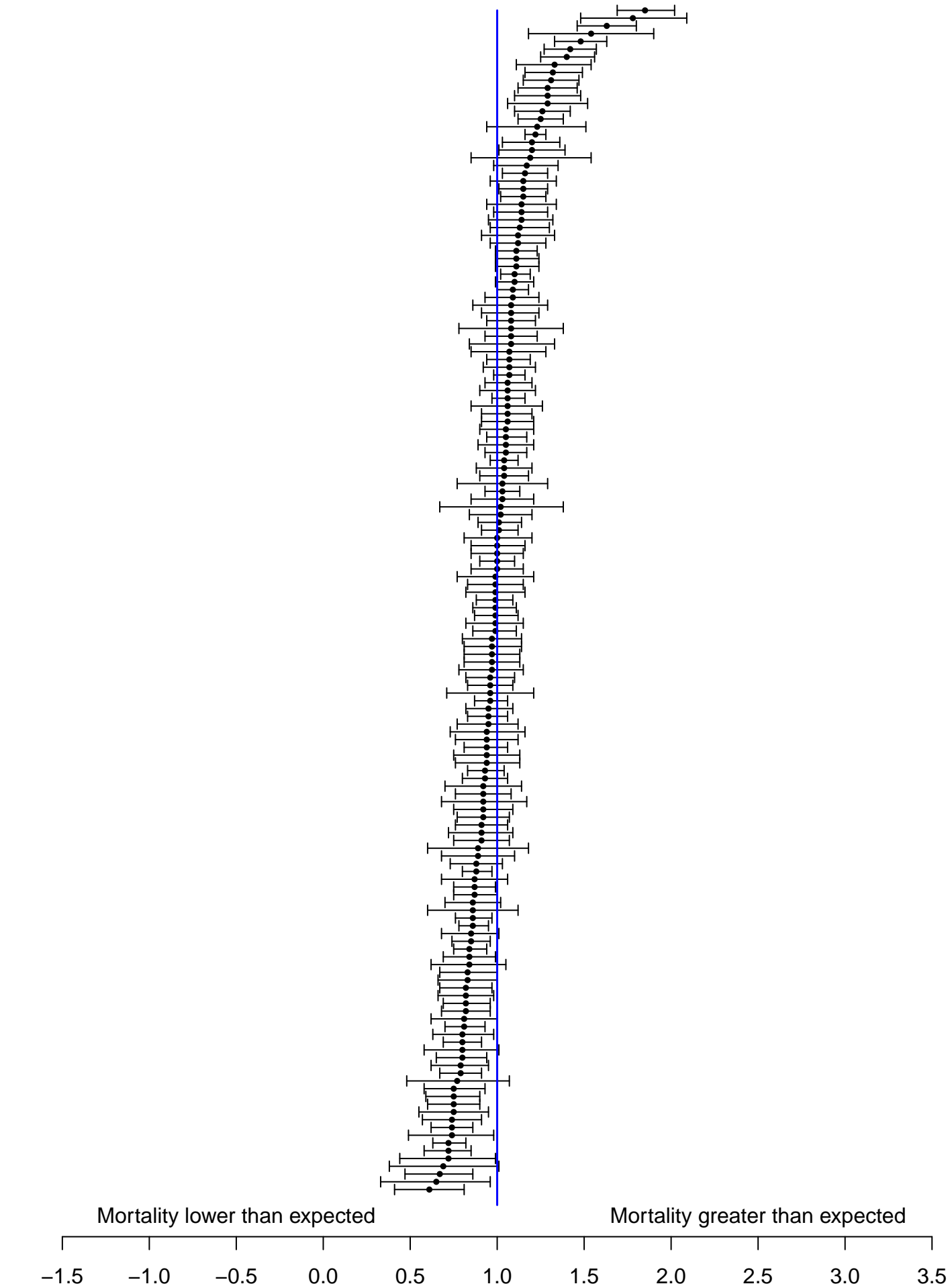
<b>Stay after ICU (days)</b>		
<b>Alive (N=38624)</b>		
	Mean	13.4
	SD	17.5
	Median	9
	Q1–Q3	4–16
	Missing	17

<b>Hospital stay (days)</b>		
	Mean	20.3
	SD	22.0
	Median	14
	Q1–Q3	7–26
	Missing	8

<b>Hospital stay (days)</b>		
<b>Alive (N=35388)</b>		
	Mean	21.4
	SD	22.0
	Median	15
	Q1–Q3	8–27
	Missing	6

<b>Hospital stay (days)</b>		
<b>Dead (N=11584)</b>		
	Mean	16.7
	SD	21.4
	Median	10
	Q1–Q3	3–23
	Missing	2

National report for general ICUs - Year 2016  
Analysis of hospital mortality - Adult patients evaluated in the GiViTI model  
Predictive model: GiViTI 2016



## National report for general ICUs - Year 2016

## Characteristics on admission - Adult non surgical patients evaluated in the GiViTI model

Patients (N): 23914

Sex	N	%
Male	14362	60.1
Female	9549	39.9
Missing	3	

Age (years)	N	%
17-45	2951	12.3
46-65	6326	26.5
66-75	6019	25.2
>75	8618	36.0
Missing	0	
Mean	66.4	
SD	16.6	
Median	70	
Q1–Q3	57–79	
Min–Max	17–100	

Body mass Index (BMI)	N	%
Underweight	1385	5.8
Normal	10616	44.4
Overweight	7508	31.4
Obese	4402	18.4
Missing	3	

Pregnancy status	N	%
Females (N=9549)		
Not fertile	5193	54.4
Not pregnant/Unknown	4252	44.5
Currently pregnant	43	0.5
Post partum	61	0.6
Missing	0	

Comorbidities	N	%
No	3454	14.4
Yes	20460	85.6
Missing	0	

Comorbidities (top 10)	N	%
Hypertension	12139	50.8
Arrhythmia	4346	18.2
Moderate COPD	3612	15.1
Diabetes Type II without insulin tr.	3311	13.8
Myocardial infarction	3161	13.2
NYHA class II-III	3056	12.8
Cerebrovascular disease	3037	12.7
Moderate or severe renal disease	2502	10.5
Severe COPD	2200	9.2
Peripheral vascular disease	2088	8.7
Missing	0	

Stay before ICU (days)	Mean	SD	Median	Q1–Q3	Missing
	3.9	10.9	0	0–2	0

Source of admission	N	%
Same hospital	19494	81.5
Other hospital	4420	18.5
Long-term chronic care hospital	0	0.0
Directly from the community	0	0.0
Missing	0	

Ward of admission	N	%
Hospital (N=23914)		
Medical ward	5690	23.8
Surgical ward	1459	6.1
Emergency room	13540	56.6
Other ICU	2282	9.5
High dependency care unit	943	3.9
Missing	0	

Reason for transfer from	N	%
Other ICU (N=2282)		
Specialist expertise	520	22.8
Step-up care	423	18.5
Logistical/organizational reasons	1293	56.7
Step-down care	46	2.0
Missing	0	

Ward of admission	N	%
Same hospital (N=19494)		
Medical ward	5056	25.9
Surgical ward	1348	6.9
Emergency room	11593	59.5
Other ICU	650	3.3
High dependency care unit	847	4.3
Missing	0	

Ward of admission	N	%
Other hospital (N=4420)		
Medical ward	634	14.3
Surgical ward	111	2.5
Emergency room	1947	44.0
Other ICU	1632	36.9
High dependency care unit	96	2.2
Missing	0	

Scheduled admission	N	%
No	23798	99.5
Yes	116	0.5
Missing	0	

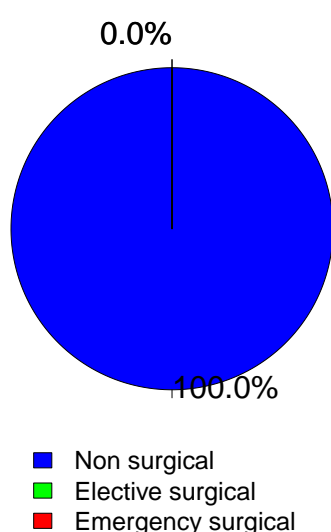
## National report for general ICUs - Year 2016

## Characteristics on admission - Adult non surgical patients evaluated in the GiViTI model

Trauma	N	%
No	20996	87.8
Yes	2918	12.2
Multiple trauma	1342	5.6
Missing	0	

Surgical status	N	%
Non surgical	23914	100.0
Elective surgical	0	0.0
Emergency surgical	0	0.0
Missing	0	

Surgical status



Source of admission	N	%
Surgical pt. (N=0)		
Operating theatre of surgical ward	0	0.0
Operating theatre of emergency room	0	0.0
Surgical ward	0	0.0
Other	0	0.0
Missing	0	

Surgical interventions (top 10)	N	%
Elective surgical (N=0)		
-	0	0.0
-	0	0.0
-	0	0.0
-	0	0.0
-	0	0.0
-	0	0.0
-	0	0.0
-	0	0.0
-	0	0.0
Missing	0	

Timing	N	%
Elective surgical (N=0)		
From -7 to -3 days	0	0.0
From -2 to -1 days	0	0.0
On ICU admission day	0	0.0
The day after ICU admission	0	0.0
Missing	0	

Surgical interventions (top 10)	N	%
Emergency surgical (N=0)		
-	0	0.0
-	0	0.0
-	0	0.0
-	0	0.0
-	0	0.0
-	0	0.0
-	0	0.0
-	0	0.0
-	0	0.0
Missing	0	

Timing	N	%
Emergency surgical (N=0)		
From -7 to -3 days	0	0.0
From -2 to -1 days	0	0.0
On ICU admission day	0	0.0
The day after ICU admission	0	0.0
Missing	0	

Non surgical interventions	N	%
None	20882	87.3
Elective	348	1.5
Emergency	2684	11.2
Missing	0	

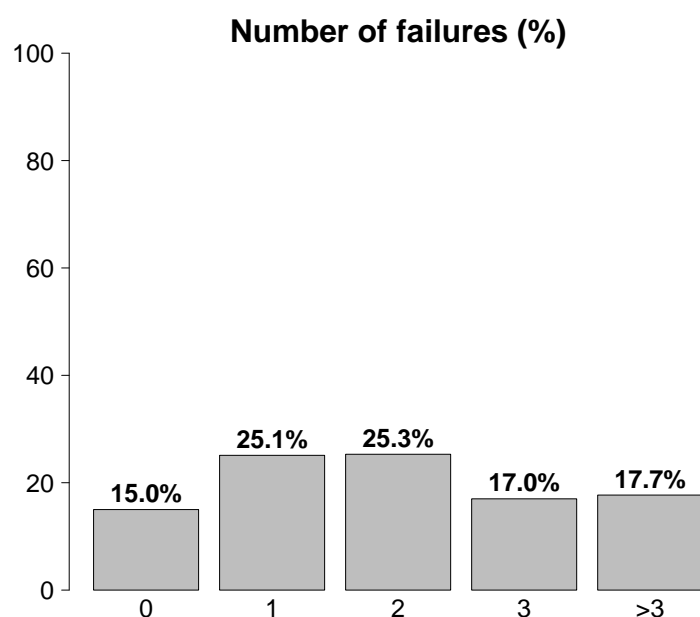
Non surgical interventions	N	%
Elective (N=348)		
Interventional endoscopy	120	34.5
Interventional cardiology	92	26.4
Interventional radiology	86	24.7
Interventional neuroradiology	49	14.1
Missing	1	

Non surgical interventions	N	%
Emergency (N=2684)		
Interventional cardiology	1321	49.2
Interventional endoscopy	597	22.2
Interventional radiology	476	17.7
Interventional neuroradiology	311	11.6
Missing	0	

## National report for general ICUs - Year 2016

## Characteristics on admission - Adult non surgical patients evaluated in the GiViTI model

Reason for admission	N	%
Monitoring/Weaning	5333	22.3
Post surgical weaning	0	0.0
Surgical monitoring	0	0.0
Post interventional weaning	142	0.6
Interventional monitoring	676	2.8
Non surgical monitoring	4356	18.3
Missing	159	
Admission for procedures/treatments	0	0.0
Intensive Treatment	18581	77.7
Only ventilatory support	10633	44.5
Only cardiovascular support	1129	4.7
Ventilatory and cardiovascular support	6819	28.5
Missing	0	
Palliative Sedation	0	0.0
Diagnosis of death/Organ donation	0	0.0
Missing	0	



Failures on admission	N	%
No	3581	15.0
Yes	20333	85.0
A: Respiratory failure	17452	73.0
B: Cardiovascular failure	7948	33.2
C: Neurological failure	5370	22.5
D: Hepatic failure	298	1.2
E: Renal failure	9811	41.0
F: Acute skin failure	27	0.1
G: Metabolic failure	7271	30.4
H: Coagulation failure	472	2.0
Missing	0	

Failures on admission (top 10)	N	%
A	4620	19.3
ABEG	1861	7.8
AC	1837	7.7
AE	1548	6.5
AB	1191	5.0
ABCEG	1036	4.3
AEG	905	3.8
ABE	890	3.7
E	742	3.1
ABC	575	2.4
Missing	0	

Respiratory failure	N	%
None	6462	27.0
Only hypoxic failure	5867	24.5
Only hypercapnic failure	1259	5.3
Hypoxic-hypercapnic failure	2956	12.4
Intubation for airway maint.	7370	30.8
Missing	0	

Cardiovascular failure	N	%
None	15966	66.8
Without shock	1400	5.9
Cardiogenic shock	2521	10.5
Septic shock	2039	8.5
Haemorrhagic/hypovolemic shock	487	2.0
Hypovolemic shock	446	1.9
Anaphylactic shock	32	0.1
Neurogenic shock	234	1.0
Other shock	344	1.4
Mixed shock	445	1.9
Missing	0	

Neurologic failure	N	%
None	14915	73.5
Cerebral coma	2482	12.2
Metabolic coma	1005	5.0
Postanoxic coma	1585	7.8
Toxic coma	298	1.5
Missing or not evaluable	3629	

Renal failure (AKIN)	N	%
None	14103	59.0
Mild	4350	18.2
Moderate	2358	9.9
Severe	3103	13.0
Missing	0	

Metabolic failure	N	%
None	16643	69.6
pH $\leq$ 7.3, PaCO <sub>2</sub> $<$ 45 mmHg	2149	9.0
Base deficit $\geq$ 5 mmol/L, lactate $>$ 1.5x	5122	21.4
Missing	0	

**National report for general ICUs - Year 2016****Characteristics on admission - Adult non surgical patients evaluated in the GiViTI model**

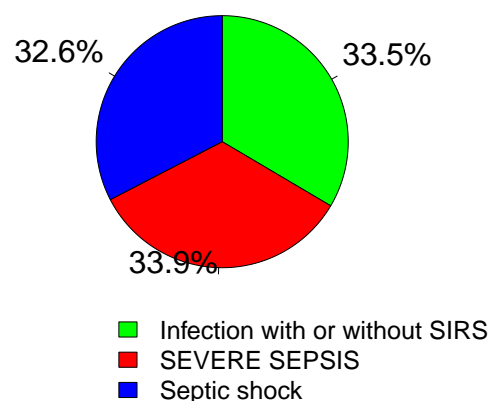
<b>Clinical conditions on admission</b>	<b>N</b>	<b>%</b>
Respiratory	6612	27.6
Acute exacerbation of COPD	2246	9.4
Pleural effusion	1324	5.5
Aspiration pneumonia	782	3.3
Atelectasis	720	3.0
Moderate ARDS	444	1.9
Cardiovascular	6737	28.2
Cardiac arrest	2124	8.9
Left heart failure with pulmonary edema	1762	7.4
Left heart failure without pulm. edema	1157	4.8
Acute severe arrhythmia: tachycardias	754	3.2
Acute myocardial infarction	682	2.9
Neurological	4614	19.3
Cerebral artery stroke	1088	4.5
Spontaneous Intraparenchymal bleeding	1023	4.3
Seizures	908	3.8
Metabolic/postanoxic encephalopathy	751	3.1
Spontaneous Subarachnoid haemorrhage	444	1.9
Gastrointestinal and hepatic	1883	7.9
Gastrointestinal bleeding: upper tract	497	2.1
Acute pancreatitis	302	1.3
Liver Dysfunction Syndrome	203	0.8
Ascites	186	0.8
Acute bile-duct disease	176	0.7
Trauma (anatomical districts)	2918	12.2
Head	1519	6.4
Chest	1410	5.9
Pelvis/bone/joint & muscle	805	3.4
Spine	755	3.2
Abdomen	402	1.7
Major vessels injury	83	0.3
Miscellaneous	65	0.3
Other	4676	19.6
Metabolic disorder	1807	7.6
Acute intoxication	1043	4.4
Other disease	896	3.7
Nephrourologic disease	671	2.8
Coagulation disorder	472	2.0
Post transplantation	85	0.4
Renal transplantation	30	0.1
Bone marrow transplantation	21	0.1
Infections	7470	31.2
Pneumonia	3750	15.7
L.R.T.I. other than pneumonia	762	3.2
NON-surgical urinary tract infection	757	3.2
Primary bacteraemia of unknown origin	437	1.8
Clinical sepsis	425	1.8
NON-surgical CNS infection	320	1.3
NON-surgical skin/soft tissue infection	267	1.1
Cholecystitis/choolangitis	226	0.9
Gastroenteritis	189	0.8
Upper respiratory tract infection	151	0.6
Missing	0	

<b>Trauma (anatomical districts)</b>	<b>N</b>	<b>%</b>
Head	1519	6.4
Traumatic subarachnoid haemorrhage	568	2.4
Maxillofacial fracture	501	2.1
Cerebral contusion/laceration	387	1.6
Skull fracture	387	1.6
Traumatic Subdural haematoma	347	1.5
Spine	755	3.2
Vertebral fracture, without deficit	661	2.8
Tetraplegia	39	0.2
Cervical injury, incomplete deficit	31	0.1
Chest	1410	5.9
Other injuries of the chest	750	3.1
Traum. haemothorax/pneumothorax	568	2.4
Severe lung contusion/laceration	413	1.7
Abdomen	402	1.7
Minor injuries of the abdomen	132	0.6
Spleen: Moderate-Severe laceration	121	0.5
Liver: Moderate-Severe laceration	115	0.5
Pelvis/bone/joint & muscle	805	3.4
Long bone fracture	516	2.2
Multiple fracture of the pelvis	362	1.5
Very severe or open fracture of the pelvis	38	0.2
Major vessels injury	83	0.3
Neck vessels: dissection/transection	32	0.1
Aorta: rupture/dissection	25	0.1
Proximal limbs vessels: transection	11	0.0
Miscellaneous	65	0.3
Burns (>30% BSA)	40	0.2
Inhalation injury	30	0.1
Missing	0	

<b>Infection severity on admission</b>	<b>N</b>	<b>%</b>
None	16444	69.0
Infection with or without SIRS	2476	10.4
SEVERE SEPSIS	2512	10.5
Septic shock	2413	10.1
Missing	69	

**Infection severity on admission**

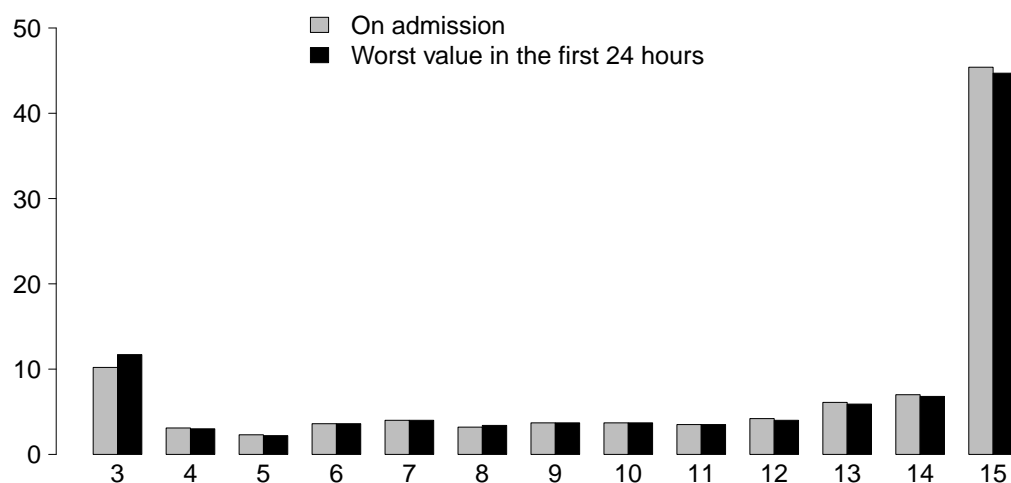
Patients infected (N=7401)



## National report for general ICUs - Year 2016

## Severity scores - Adult non surgical patients evaluated in the GiViTI model

## Glasgow Coma Scale (%)



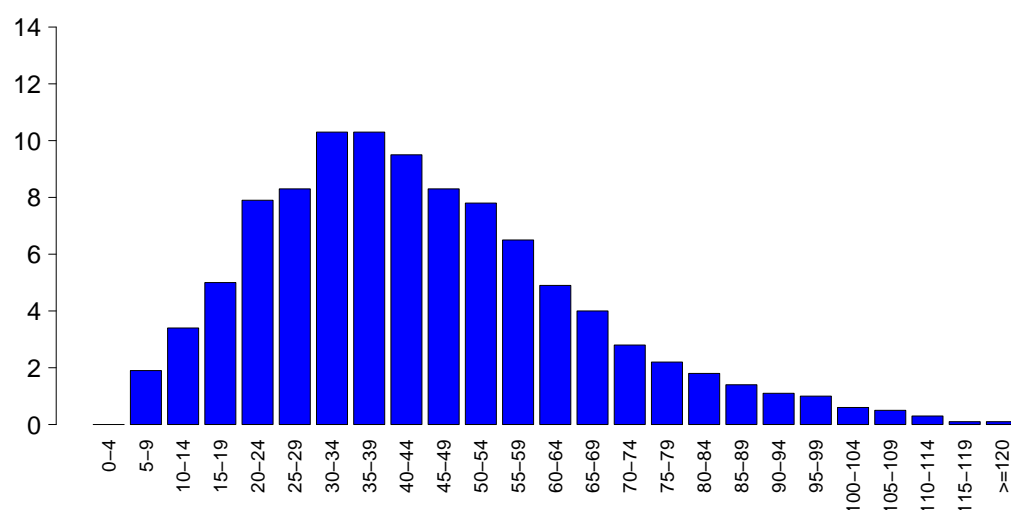
## GCS (admission)

Median	14
Q1–Q3	8–15
Not evaluable	3629
Missing	0

## GCS (first 24 hours)

Median	14
Q1–Q3	8–15
Not evaluable	3779
Missing	0

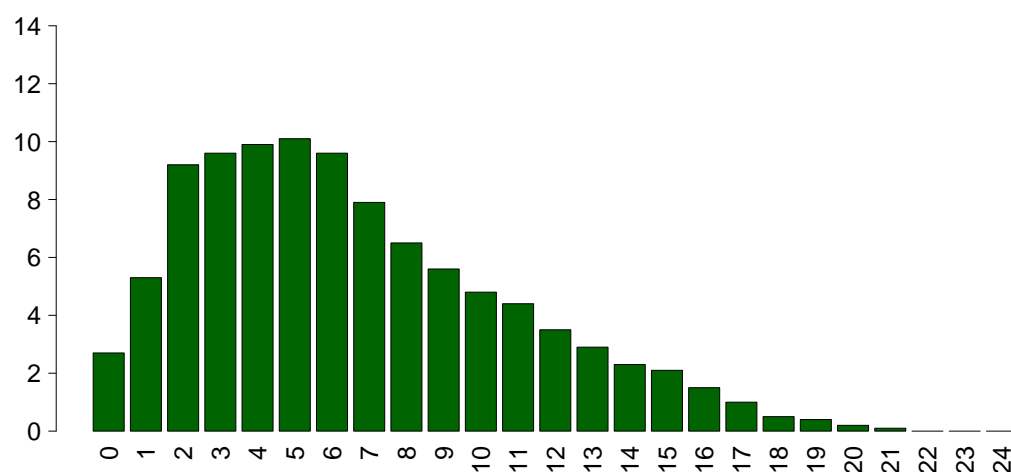
## SAPS II (%)



## SAPSII

Mean	44.0
SD	21.1
Median	41
Q1–Q3	29–56
Not evaluable	3779
Missing	0

## SOFA (%)



## SOFA

Mean	6.6
SD	4.3
Median	6
Q1–Q3	3–9
Not evaluable	3779
Missing	0

**National report for general ICUs - Year 2016****Characteristics during the stay** - Adult non surgical patients evaluated in the GiViTI model

<b>Complications during the stay</b>	<b>N</b>	<b>%</b>
No	15159	63.4
Yes	8754	36.6
Missing	1	

<b>Failures during the stay</b>	<b>N</b>	<b>%</b>
No	20192	84.4
Yes	3722	15.6
A: Respiratory failure	1408	5.9
B: Cardiovascular failure	1879	7.9
C: Neurological failure	329	1.4
D: Hepatic failure	126	0.5
E: Renal failure (AKIN)	1068	4.5
F: Acute skin failure	10	0.0
G: Metabolic failure	285	1.2
H: Coagulation failure	160	0.7
Missing	0	

<b>Failures during the stay (top 10)</b>	<b>N</b>	<b>%</b>
B	1059	4.4
A	779	3.3
E	429	1.8
AB	242	1.0
BE	236	1.0
G	168	0.7
C	110	0.5
AE	89	0.4
ABE	87	0.4
AC	63	0.3
Missing	0	

<b>Respiratory failure occurred</b>	<b>N</b>	<b>%</b>
None	22505	94.1
Intubation for airway maint.	370	1.5
Hypoxic failure	994	4.2
Hypercapnic failure	296	1.2
Missing	1	

<b>Cardiovascular failure occurred</b>	<b>N</b>	<b>%</b>
None	22034	92.1
Cardiogenic shock	674	2.8
Hypovolemic shock	119	0.5
Haemorrhagic/hypovolemic shock	89	0.4
Septic shock	839	3.5
Anaphylactic shock	0	0.0
Neurogenic shock	138	0.6
Other shock	116	0.5
Missing	1	

<b>Neurological failure occurred</b>	<b>N</b>	<b>%</b>
None	23584	98.6
Cerebral coma	175	0.7
Metabolic coma	91	0.4
Postanoxic coma	69	0.3
Missing	1	

<b>Renal failure occurred (AKIN)</b>	<b>N</b>	<b>%</b>
None	22845	95.5
Mild	123	0.5
Moderate	139	0.6
Severe	806	3.4
Missing	1	

<b>Complications during the stay</b>	<b>N</b>	<b>%</b>
Respiratory	1540	6.4
Pleural effusion	507	2.1
Atelectasis	326	1.4
Severe ARDS	295	1.2
Pneumothorax/Pneumomediastinum	145	0.6
Acute asthma/bronchospasm	109	0.5
Cardiovascular	2576	10.8
Cardiac arrest	971	4.1
Acute severe arrhythmia: tachycardias	835	3.5
Left heart failure w/o pulm. edema	227	0.9
Pulmonary edema	213	0.9
Acute severe arrhythmia: bradycardias	200	0.8
Neurological	1675	7.0
Drowsiness/agitation/delirium	696	2.9
Seizures	344	1.4
Brain edema	276	1.2
Intracranial hypertension	271	1.1
Non-surgical intracranial bleeding	120	0.5
Gastrointestinal and hepatic	606	2.5
Gastrointestinal bleeding: upper tract	145	0.6
Liver Dysfunction Syndrome	110	0.5
Gastrointestinal bleeding: lower tract	84	0.4
Paralytic Ileus	84	0.4
Bowel ischaemia	69	0.3
Other	653	2.7
Metabolic disorder	285	1.2
Nephrourologic disease	191	0.8
Other disease	118	0.5
Category/Stage II: Partial Thickness Skin Loss	40	0.2
Category/Stage III: Full Thickness Skin Loss	22	0.1
Other skin and/or soft tissue pathology	22	0.1
Category/Stage IV: Full Thickness Tissue Loss	19	0.1
Infections	2482	10.4
Pneumonia	949	4.0
L.R.T.I. other than pneumonia	616	2.6
NON-surgical urinary tract infection	402	1.7
Catheter-related bacteremia (CR-BSI)	250	1.0
Primary bacteraemia of unknown origin	231	1.0
Clinical sepsis	81	0.3
Upper respiratory tract infection	71	0.3
F.U.O. fever of unknown origin	70	0.3
Gastroenteritis	45	0.2
NON-surgical skin/soft tissue infection	44	0.2
Missing	1	



## National report for general ICUs - Year 2016

## Characteristics during the stay - Adult non surgical patients evaluated in the GiViTI model

Infections	N	%
None	14710	61.5
Only on admission	6721	28.1
On admission and during ICU stay	748	3.1
Only during ICU stay	1734	7.3
Missing	1	

Maximum severity of infection	N	%
None	14710	61.9
Infection with or without SIRS	2820	11.9
SEVERE SEPSIS	3182	13.4
Septic shock	3070	12.9
Missing	132	

## Severity evolution

Severity evolution		During the stay				
		N (R %)	None	Infection with or without SIRS	SEVERE SEPSIS	Septic shock
Admission	None	14710 (89.8%)	708 (4.3%)	687 (4.2%)	275 (1.7%)	16380
	Infection with or without SIRS	-	2111 (85.3%)	268 (10.8%)	97 (3.9%)	2476
	SEVERE SEPSIS	-	-	2226 (88.6%)	285 (11.4%)	2511
	Septic shock	-	-	-	2412 (100.0%)	2412
	TOT	14710	2819	3181	3069	23779

Ventil. Associat. Pneumonia (VAP)	N	%
No	23092	96.6
Yes	821	3.4
Missing	1	

## Incidence of VAP

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

Estimate	8.1
CI (95%)	7.6–8.7

## Incidence of VAP

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

Estimate	6.5%
CI (95%)	6.1–7.0

Catheter Bacteraemia (CR-BSI)	N	%
No	23663	99.0
Yes	250	1.0
Missing	1	

## Incidence of CR-BSI

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

Estimate	1.7
CI (95%)	1.5–1.9

## Incidence of CR-BSI

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

Estimate	2.0%
CI (95%)	1.8–2.3

**National report for general ICUs - Year 2016**  
**Process indicators - Adult non surgical patients evaluated in the GiViTI model**

Procedures and/or treatments (Missing=0) <b>Procedures (antibiotics excluded)</b>	Use		On admission		On discharge		Length (days)			Days from admission		
	N	%	N	%	N	%	Median	Q1-Q3	Missing	Median	Q1-Q3	Missing
	22740	95.1										
Invasive ventilation	15800	66.1	9369	39.2	4750	19.9	3	1-9	2	0	0-0	1
Non invasive ventilation	5414	22.6	1307	5.5	1034	4.3	2	1-3	1	0	0-1	1
Tracheostomy	3412	14.3	823	3.4	2849	11.9	11	6-21	1	8	4-12	0
iNO (inhaled nitric oxide)	79	0.3	4	0	22	0.1	2	1-5	0	1	0-3	0
Central Venous Catheter	16955	70.9	5427	22.7	12717	53.2	5	2-12	3	0	0-0	1
PICC	499	2.1	132	0.6	410	1.7	5	2-12	0	6	1-18	0
Arterial Catheter	18786	78.6	5200	21.7	6158	25.8	4	2-10	1	0	0-0	0
Vasoactive drugs	9600	40.1	3369	14.1	2699	11.3	2	1-5	0	0	0-0	0
Antiarrhythmics	2345	9.8	693	2.9	1239	5.2	3	1-8	0	1	0-2	0
IABP	326	1.4	235	1	115	0.5	2	1-3	0	0	0-0	0
Invasive monitoring of C.O.	933	3.9	87	0.4	272	1.1	5	2-8	0	0	0-1	0
Continuous monitoring of ScVO2	50	0.2	5	0	20	0.1	4	2-7	0	0	0-1	0
Temporary pacing	148	0.6	93	0.4	69	0.3	2	1-4	0	0	0-1	0
Ventricular assistance	2	0.0	1	0	0	0	6	6-6	0	0	0-0	0
DC-shock	788	3.3								0	0-0	0
CPR	1125	4.7								0	0-0	0
Massive blood transfusion	204	0.9								0	0-1	0
ICP monitoring without liquor-drainage	115	0.5	32	0.1	20	0.1	7	4-12	0	0	0-1	0
ICP monitoring with liquor-drainage	65	0.3	22	0.1	26	0.1	9	4-15	0	0	0-2	0
External ventricular drainage without ICP	33	0.1	12	0.1	12	0.1	8	4-14	0	2	0-4	0
Haemofiltration	1328	5.6	138	0.6	371	1.6	3	2-7	0	0	0-2	0
Haemodialysis	721	3.0	121	0.5	270	1.1	3	1-7	0	1	0-3	0
ECMO	133	0.6	47	0.2	59	0.2	5	1-13	0	0	0-3	0
Hepatic clearance techniques	7	0.0										
Clearance techniques during sepsis	201	0.8	10	0	41	0.2	2	1-5	0	1	0-1	0
IAP (intra-abdominal pressure)	211	0.9										
Hypothermia	461	1.9										
Enteral nutrition	10431	43.6	1729	7.2	6578	27.5	7	3-14	3	1	0-2	1
Parenteral nutrition	4374	18.3	578	2.4	2092	8.7	5	2-10	1	1	0-2	1
SDD (Topical, Topical and systemic)	154	0.6										
Patient restraint	723	3.0										
Peridural catheter	85	0.4	14	0.1	53	0.2	4	2-7	0	1	0-2	0
Electrical cardioversion	178	0.7								1	0-3	0
Vacuum therapy	28	0.1										
<b>Antibiotics</b>	13988	58.5										
Antibiotics for surgical prophylaxis	273	1.1	102	0.4	128	0.5	2	1-5	0	3	0-5	0
Antibiotics for medical prophylaxis	6419	26.8	2331	9.7	3739	15.6	4	2-7	0	0	0-0	0
Empirical antibiotic therapy	5931	24.8	2284	9.6	2500	10.5	3	2-6	1	0	0-0	1
Targeted antibiotic therapy	4301	18.0	855	3.6	2627	11	7	4-12	2	4	2-7	1

**National report for general ICUs - Year 2016****Process indicators - Adult non surgical patients evaluated in the GiViTI model**

			Length (days)					
Invasive ventilation (N=15800)	N	%	Mean	SD	Median	Q1-Q3	Missing	
Due to pulmonary failure	7928	46.1	7.9	11.2	4	1–10	1	
For airway maintenance	7218	42.0	6.0	9.0	3	1–7	0	
In weaning	293	1.7	0.4	0.5	0	0–1	0	
Not evaluable	1758	10.2	7.6	9.7	4	1–10	1414	
Reintubation within 48 hours	311	1.8	8.5	10.7	5	2–10	0	
Non invasive ventilation (N=5414)	N	%	Number of surgical interventions					
Non invasive ventilation only	3087	57.0				0	22946	96.0
Non invasive ventilation failed	1072	19.8				1	836	3.5
For weaning	1087	20.1				2	93	0.4
Other	168	3.1				3	19	0.1
Missing	0					>3	20	0.1
						Missing	0	
Tracheostomy not present on admission (N=2589)	N	%	Surgical interventions					
			Days from admission					
Surgical	472	18.2				Mean		9.4
Percutwist	288	11.1				SD		10.3
Ciaglia	395	15.3				Median		6
Monodil. Ciaglia	860	33.2				Q1–Q3		3–12
Fantoni	151	5.8				Missing		14
Griggs	285	11.0						
Other Kind	118	4.6						
Unknown	20	0.8						
Missing	0							
Tracheostomy - Days after the beginning of inv. vent. Not present on admission (N=2558)								
Mean	8.7							
SD	6.4							
Median	7							
Q1–Q3	4–12							
Missing	3							
Invasive monitoring of C.O. (N=933)	N	%						
Swan Ganz	188	20.2						
PICCO	603	64.6						
LIDCO	3	0.3						
Vigileo-PRAM	109	11.7						
Other	30	3.2						
Missing	0							
SDD (N=154)	N	%						
Topical	114	74.0						
Topical and systemic	40	26.0						
Missing	0							
Antibiotic therapy								
Pt. infected in ICU only (N=1734)	N	%						
Only empirical	327	22.7						
Only targeted	610	42.4						
Targeted after empirical	428	29.7						
Other	75	5.2						
Missing	294							
Surgical interventions	N	%						
No	22946	96.0						
Yes	968	4.0						
Missing	0							
			Surgical interventions					
			Days from admission					
						Mean		11.8
						SD		12.4
						Median		7
						Q1–Q3		3–15
						Missing		22
			Non surgical interventions					
			Days from admission					
						Mean		11.8
						SD		12.4
						Median		7
						Q1–Q3		3–15
						Missing		22
			Non surgical interventions					
			Days from admission					
						Mean		11.8
						SD		12.4
						Median		7
						Q1–Q3		3–15
						Missing		22
			Non surgical interventions					
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			Non surgical interventions					
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						Q1–Q3		3–15
						Missing		22
			Non surgical interventions					
			Days from admission					
						Mean		11.8
						SD		12.4
						Median		7
						Q1–Q3		3–15
						Missing		22
			Non surgical interventions					
			Days from admission					
						Mean		11.8
						SD		12.4
						Median		7
						Q1–Q3		3–15
						Missing		22
			Non surgical interventions					
			Days from admission					
						Mean		11.8
						SD		12.4
						Median		7
						Q1–Q3		3–15
						Missing		22
			Non surgical interventions					
			Days from admission					
						Mean		11.8
						SD		12.4
						Median		7
						Q1–Q3		3–15
						Missing		22
			Non surgical interventions					
			Days from admission					
						Mean		11.8
						SD		12.4
						Median		7
						Q1–Q3		3–15
						Missing</		

**National report for general ICUs - Year 2016****Outcome indicators** - Adult non surgical patients evaluated in the GiViTI model

ICU outcome	N	%
Dead	6183	25.9
Transferred to same hospital	14247	59.6
Transferred to other hospital	3002	12.6
Discharged home	346	1.4
Disch. terminally ill	135	0.6
Missing	1	

Transferred to (N=17249)	N	%
Ward	11963	69.4
Other ICU	2073	12.0
High dependency care unit	2221	12.9
Rehabilitation	712	4.1
Day hospital or Long-term care	280	1.6
Missing	0	

Reason of transfer to Other ICU (N=2134)	N	%
Specialist expertise	995	46.6
Step-up care	194	9.1
Logistical/organizational reasons	897	42.0
Step-down care	48	2.2
Missing	0	

Transferred to Same hospital (N=14247)	N	%
Ward	11048	77.5
Other ICU	883	6.2
High dependency care unit	2079	14.6
Rehabilitation	152	1.1
Day hospital or Long-term care	85	0.6
Missing	0	

Transferred to Other hospital (N=3002)	N	%
Ward	915	30.5
Other ICU	1190	39.6
High dependency care unit	142	4.7
Rehabilitation	560	18.7
Day hospital or Long-term care	195	6.5
Missing	0	

ICU mortality	N	%
Alive	17595	73.6
Dead	6318	26.4
Missing	1	

Timing of ICU mortality (N=6318)	N	%
Daytime (08:00AM - 07:59PM)	4271	67.6
Nighttime (08:00PM - 07:59AM)	2047	32.4
Weekdays (Monday - Friday)	4723	74.8
Weekend (Saturday - Sunday)	1595	25.2
Missing	0	

C.A.M. activation (N=6318)	N	%
Yes, with organ donation	334	5.4
Yes, without organ donation	381	6.2
No, with organ donation	12	0.2
No, without organ donation	5455	88.2
Missing	136	

Tissue removal (N=6318)	N	%
Yes, with C.A.M. activation	244	3.9
Yes, without C.A.M. activation	312	4.9
No	5761	91.2
Missing	1	

Hospital mortality	N	%
Dead	7769	32.5
Transf. to other acute-care hospital	3029	12.7
Transf. to other type of hosp. stay	3954	16.5
Nursing home	450	1.9
Voluntary discharge	248	1.0
Discharged home	8464	35.4
Missing	0	

To other type of H stay (N=3954)	N	%
Rehabilitation in the same institute	580	14.7
Rehabilitation in other institute	2069	52.3
DH/long-term care, same inst.	411	10.4
DH/long-term care, other inst.	894	22.6
Missing	0	

Disch. terminally ill (N=16145)	N	%
Yes	327	2.0
No	15818	98.0
Missing	0	

Hospital mortality	N	%
Alive	15818	66.1
Dead	8096	33.9
Missing	0	

Timing of hosp. mortality (N=8096)	N	%
In ICU	6316	78.0
Within 24 hours after ICU	151	1.9
24-47 hours after ICU	125	1.5
48-71 hours after ICU	123	1.5
72-95 hours after ICU	111	1.4
After 95 hours after ICU	1268	15.7
Missing	2	

Timing of hosp. mortality (days from ICU disch.) Discharged alive from ICU (N=1780)		
Mean	15.1	
SD	20.1	
Median	9	
Q1-Q3	3-20	
Missing	1	

**National report for general ICUs - Year 2016****Outcome indicators** - Adult non surgical patients evaluated in the GiViTI model

<b>Last hospital mortality</b>			<b>ICU stay (days)</b>		
	N	%			
Alive	15619	65.3		Mean	7.8
Dead	8295	34.7		SD	10.8
Missing	0			Median	4
				Q1–Q3	2–9
				Missing	1
			<b>ICU stay (days)</b>		
			<b>Alive (N=17595)</b>		
				Mean	7.9
				SD	10.6
				Median	4
				Q1–Q3	2–9
				Missing	1
			<b>ICU stay (days)</b>		
			<b>Dead (N=6318)</b>		
				Mean	7.6
				SD	11.3
				Median	3
				Q1–Q3	1–10
				Missing	0
			<b>Stay after ICU (days)</b>		
			<b>Alive (N=17595)</b>		
				Mean	12.5
				SD	17.5
				Median	8
				Q1–Q3	2–16
				Missing	8
			<b>Hospital stay (days)</b>		
				Mean	19.5
				SD	21.9
				Median	14
				Q1–Q3	6–25
				Missing	4
			<b>Hospital stay (days)</b>		
			<b>Alive (N=15818)</b>		
				Mean	21.8
				SD	22.7
				Median	16
				Q1–Q3	8–28
				Missing	3
			<b>Hospital stay (days)</b>		
			<b>Dead (N=8096)</b>		
				Mean	14.9
				SD	19.5
				Median	8
				Q1–Q3	2–20
				Missing	1



## National report for general ICUs - Year 2016

## Characteristics on admission - Adult elective surgical patients evaluated in the GiViTI model

Patients (N): 12001

Sex		N	%
	Male	7107	59.2
	Female	4890	40.8
	Missing	4	

Age (years)		N	%
	17-45	973	8.1
	46-65	3250	27.1
	66-75	3633	30.3
	>75	4145	34.5
	Missing	0	
	Mean	68.0	
	SD	14.1	
	Median	71	
	Q1–Q3	60–78	
	Min–Max	17–102	

Body mass Index (BMI)		N	%
	Underweight	643	5.4
	Normal	5063	42.2
	Overweight	3604	30.0
	Obese	2687	22.4
	Missing	4	

Pregnancy status		N	%
	Females (N=4890)		
	Not fertile	2446	50.0
	Not pregnant/Unknown	2385	48.8
	Currently pregnant	7	0.1
	Post partum	52	1.1
	Missing	0	

Comorbidities		N	%
	No	1311	10.9
	Yes	10690	89.1
	Missing	0	

Comorbidities (top 10)		N	%
	Hypertension	6948	57.9
	Any tumour without metastasis	2647	22.1
	Moderate COPD	2003	16.7
	Arrhythmia	1864	15.5
	Myocardial infarction	1743	14.5
	Diabetes Type II without insulin tr.	1631	13.6
	Peripheral vascular disease	1355	11.3
	Metastatic cancer	1119	9.3
	NYHA class II-III	1075	9.0
	Cerebrovascular disease	1001	8.3
	Missing	0	

Stay before ICU (days)			
	Mean	4.5	
	SD	9.1	
	Median	1	
	Q1–Q3	1–4	
	Missing	0	

Source of admission		N	%
	Same hospital	11821	98.5
	Other hospital	180	1.5
	Long-term chronic care hospital	0	0.0
	Directly from the community	0	0.0
	Missing	0	

Ward of admission		N	%
	Hospital (N=12001)		
	Medical ward	257	2.1
	Surgical ward	11512	95.9
	Emergency room	69	0.6
	Other ICU	113	0.9
	High dependency care unit	50	0.4
	Missing	0	

Reason for transfer from		N	%
	Other ICU (N=113)		
	Specialist expertise	32	28.3
	Step-up care	27	23.9
	Logistical/organizational reasons	53	46.9
	Step-down care	1	0.9
	Missing	0	

Ward of admission		N	%
	Same hospital (N=11821)		
	Medical ward	250	2.1
	Surgical ward	11410	96.5
	Emergency room	58	0.5
	Other ICU	58	0.5
	High dependency care unit	45	0.4
	Missing	0	

Ward of admission		N	%
	Other hospital (N=180)		
	Medical ward	7	3.9
	Surgical ward	102	56.7
	Emergency room	11	6.1
	Other ICU	55	30.6
	High dependency care unit	5	2.8
	Missing	0	

Scheduled admission		N	%
	No	2649	22.1
	Yes	9352	77.9
	Missing	0	

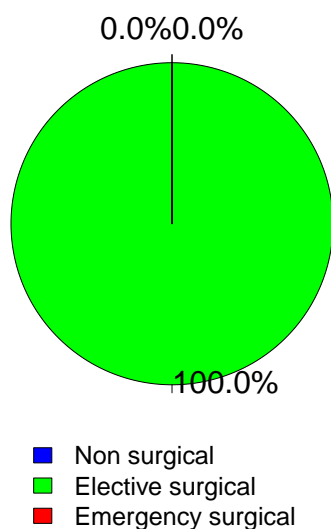
## National report for general ICUs - Year 2016

## Characteristics on admission - Adult elective surgical patients evaluated in the GiViTI model

Trauma	N	%
No	11335	94.5
Yes	666	5.5
Multiple trauma	73	0.6
Missing	0	

Surgical status	N	%
Non surgical	0	0.0
Elective surgical	12001	100.0
Emergency surgical	0	0.0
Missing	0	

Surgical status



Timing	N	%
Elective surgical (N=12001)		
From -7 to -3 days	214	1.8
From -2 to -1 days	322	2.7
On ICU admission day	12070	100.6
The day after ICU admission	116	1.0
Missing	13	

Surgical interventions (top 10)	N	%
Emergency surgical (N=0)		
-	0	0.0
-	0	0.0
-	0	0.0
-	0	0.0
-	0	0.0
-	0	0.0
-	0	0.0
-	0	0.0
-	0	0.0
Missing	0	

Timing	N	%
Emergency surgical (N=0)		
From -7 to -3 days	0	0.0
From -2 to -1 days	0	0.0
On ICU admission day	0	0.0
The day after ICU admission	0	0.0
Missing	0	

Source of admission	N	%
Surgical pt. (N=12001)		
Operating theatre of surgical ward	10976	91.5
Operating theatre of emergency room	23	0.2
Surgical ward	536	4.5
Other	466	3.9
Missing	0	

Non surgical interventions	N	%
None	11763	98.0
Elective	162	1.3
Emergency	76	0.6
Missing	0	

Surgical interventions (top 10)	N	%
Elective surgical (N=12001)		
Gastrointestinal surgery	3330	27.7
Orthopaedic surgery	1710	14.2
Nephro/Urological surgery	1535	12.8
Neurosurgery	899	7.5
ENT surgery	787	6.6
Thoracic surgery	653	5.4
Gynaecological surgery	637	5.3
Abdominal vascular surgery	557	4.6
Hepatic surgery	529	4.4
Pancreatic surgery	432	3.6
Missing	932	

Non surgical interventions	N	%
Elective (N=162)		
Interventional endoscopy	48	29.6
Interventional radiology	36	22.2
Interventional neuroradiology	4	2.5
Interventional cardiology	3	1.9
Missing	71	

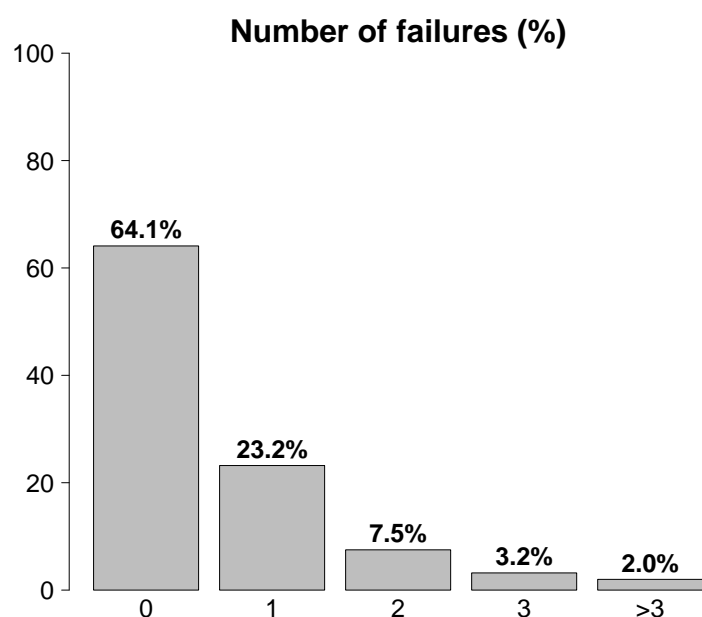
Non surgical interventions	N	%
Emergency (N=76)		
Interventional radiology	38	50.0
Interventional cardiology	19	25.0
Interventional endoscopy	9	11.8
Interventional neuroradiology	5	6.6
Missing	5	



## National report for general ICUs - Year 2016

## Characteristics on admission - Adult elective surgical patients evaluated in the GiViTI model

Reason for admission	N	%
Monitoring/Weaning	9665	80.5
Post surgical weaning	4661	38.9
Surgical monitoring	4990	41.6
Post interventional weaning	5	0.0
Interventional monitoring	5	0.0
Non surgical monitoring	0	0.0
Missing	4	
Admission for procedures/treatments	0	0.0
Intensive Treatment	2336	19.5
Only ventilatory support	1417	11.8
Only cardiovascular support	278	2.3
Ventilatory and cardiovascular support	641	5.3
Missing	0	
Palliative Sedation	0	0.0
Diagnosis of death/Organ donation	0	0.0
Missing	0	



Failures on admission	N	%
No	7697	64.1
Yes	4304	35.9
A: Respiratory failure	2058	17.1
B: Cardiovascular failure	919	7.7
C: Neurological failure	157	1.3
D: Hepatic failure	29	0.2
E: Renal failure	2410	20.1
F: Acute skin failure	0	0.0
G: Metabolic failure	1098	9.1
H: Coagulation failure	71	0.6
Missing	0	

Failures on admission (top 10)	N	%
E	1337	11.1
A	987	8.2
G	292	2.4
EG	272	2.3
AB	229	1.9
AE	200	1.7
ABEG	153	1.3
ABE	130	1.1
B	123	1.0
AEG	98	0.8
Missing	0	

Respiratory failure	N	%
None	9943	82.9
Only hypoxic failure	526	4.4
Only hypercapnic failure	53	0.4
Hypoxic-hypercapnic failure	80	0.7
Intubation for airway maint.	1399	11.7
Missing	0	

Cardiovascular failure	N	%
None	11082	92.3
Without shock	246	2.0
Cardiogenic shock	96	0.8
Septic shock	114	0.9
Haemorrhagic/hypovolemic shock	260	2.2
Hypovolemic shock	133	1.1
Anaphylactic shock	6	0.0
Neurogenic shock	7	0.1
Other shock	28	0.2
Mixed shock	29	0.2
Missing	0	

Neurologic failure	N	%
None	9827	98.4
Cerebral coma	72	0.7
Metabolic coma	36	0.4
Postanoxic coma	42	0.4
Toxic coma	7	0.1
Missing or not evaluable	2017	

Renal failure (AKIN)	N	%
None	9591	79.9
Mild	1641	13.7
Moderate	432	3.6
Severe	337	2.8
Missing	0	

Metabolic failure	N	%
None	10903	90.9
pH ≤ 7.3, PaCO <sub>2</sub> < 45 mmHg	351	2.9
Base deficit ≥ 5 mmol/L, lactate > 1.5x	747	6.2
Missing	0	

**National report for general ICUs - Year 2016****Characteristics on admission** - Adult elective surgical patients evaluated in the GiViTI model

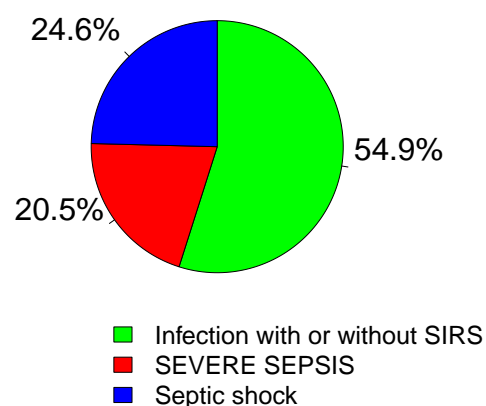
<b>Clinical conditions on admission</b>	<b>N</b>	<b>%</b>
Respiratory	1267	10.6
Lung cancer	496	4.1
Upper respiratory tract disease	195	1.6
Pleural effusion	175	1.5
Atelectasis	174	1.4
Acute asthma/bronchospasm	70	0.6
Cardiovascular	1362	11.3
Non-ruptured aneurysm	468	3.9
Peripheral vascular disease	313	2.6
Acute severe arrhythmia: tachycardias	157	1.3
Left heart failure without pulm. edema	90	0.7
Cardiac arrest	71	0.6
Neurological	884	7.4
Brain tumour	599	5.0
Neuropathy/myopathy	62	0.5
Seizures	49	0.4
Cerebral artery stroke	46	0.4
Cerebral Aneurysm	38	0.3
Gastrointestinal and hepatic	3590	29.9
Digestive tract malignancy	2142	17.8
Hepatic malignancy	446	3.7
Pancreatic malignancy	409	3.4
Acute bile-duct disease	248	2.1
Intestinal occlusion	142	1.2
Trauma (anatomical districts)	666	5.5
Pelvis/bone/joint & muscle	615	5.1
Chest	54	0.4
Spine	48	0.4
Head	33	0.3
Abdomen	10	0.1
Major vessels injury	2	0.0
-	0	0.0
Other	5262	43.8
Nephrourologic disease	1367	11.4
Other disease	1363	11.4
Orthopaedic disease	928	7.7
ENT/maxillofacial disease	772	6.4
Gynaecological disease	564	4.7
Post transplantation	43	0.4
Renal transplantation	23	0.2
Liver transplantation	13	0.1
Infections	546	4.5
Pneumonia	98	0.8
Post-surgical peritonitis	57	0.5
Cholecystitis/cholangitis	39	0.3
NON-surgical secondary peritonitis	38	0.3
NON-surgical urinary tract infection	35	0.3
Pleurisy/Pleural empyema	34	0.3
Orthopaedic prosthesis infection	32	0.3
NON-surgical skin/soft tissue infection	32	0.3
Post-surgical skin/soft tissue infection	24	0.2
L.R.T.I. other than pneumonia	23	0.2
Missing	0	

<b>Trauma (anatomical districts)</b>	<b>N</b>	<b>%</b>
Head	33	0.3
Maxillofacial fracture	17	0.1
Traumatic subarachnoid haemorrhage	7	0.1
Traumatic Subdural haematoma	6	0.0
Cerebral contusion/laceration	4	0.0
Skull fracture	3	0.0
Spine	48	0.4
Vertebral fracture, without deficit	38	0.3
Cervical injury, incomplete deficit	5	0.0
Dorsal injury, incomplete deficit	2	0.0
Chest	54	0.4
Other injuries of the chest	28	0.2
Traum. haemothorax/pneumothorax	23	0.2
Severe lung contusion/laceration	11	0.1
Abdomen	10	0.1
Minor injuries of the abdomen	6	0.0
Bowel transection/perforation	2	0.0
Spleen: Moderate-Severe laceration	2	0.0
Pelvis/bone/joint & muscle	615	5.1
Long bone fracture	579	4.8
Multiple fracture of the pelvis	49	0.4
Very severe or open fracture of the pelvis	5	0.0
Major vessels injury	2	0.0
Major abdominal vessels: transection	1	0.0
Proximal limbs vessels: transection	1	0.0
-	0	0.0
Miscellaneous	0	0.0
-	0	0.0
-	0	0.0
Missing	0	

<b>Infection severity on admission</b>	<b>N</b>	<b>%</b>
None	11455	95.5
Infection with or without SIRS	297	2.5
SEVERE SEPSIS	111	0.9
Septic shock	133	1.1
Missing	5	

**Infection severity on admission**

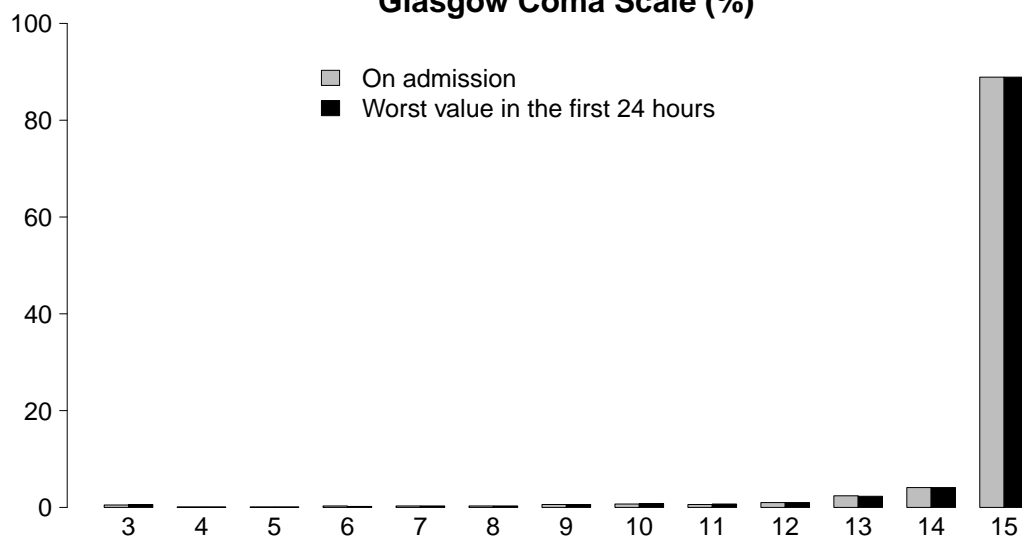
Patients infected (N=541)



## National report for general ICUs - Year 2016

## Severity scores - Adult elective surgical patients evaluated in the GiViTI model

## Glasgow Coma Scale (%)



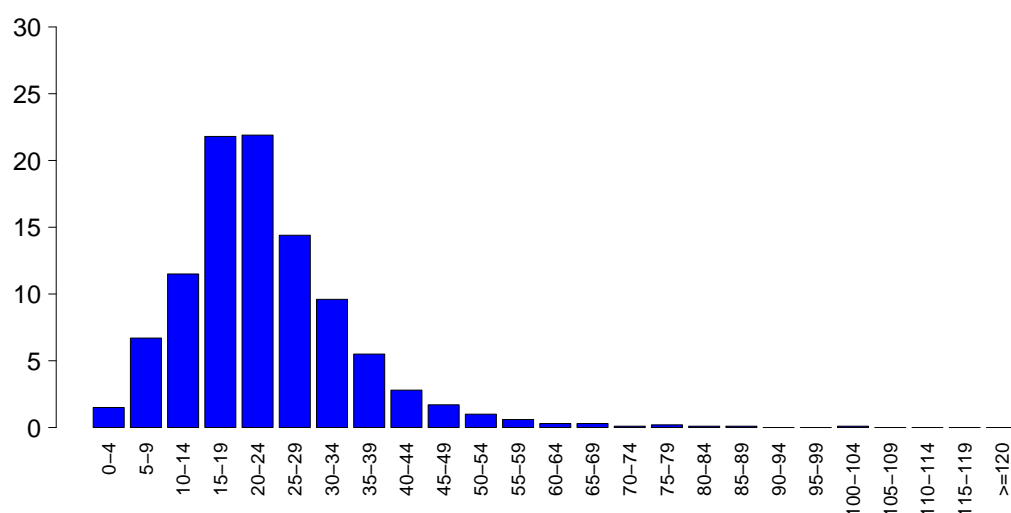
## GCS (admission)

Median	15
Q1–Q3	15–15
Not evaluable	2017
Missing	0

## GCS (first 24 hours)

Median	15
Q1–Q3	15–15
Not evaluable	1077
Missing	0

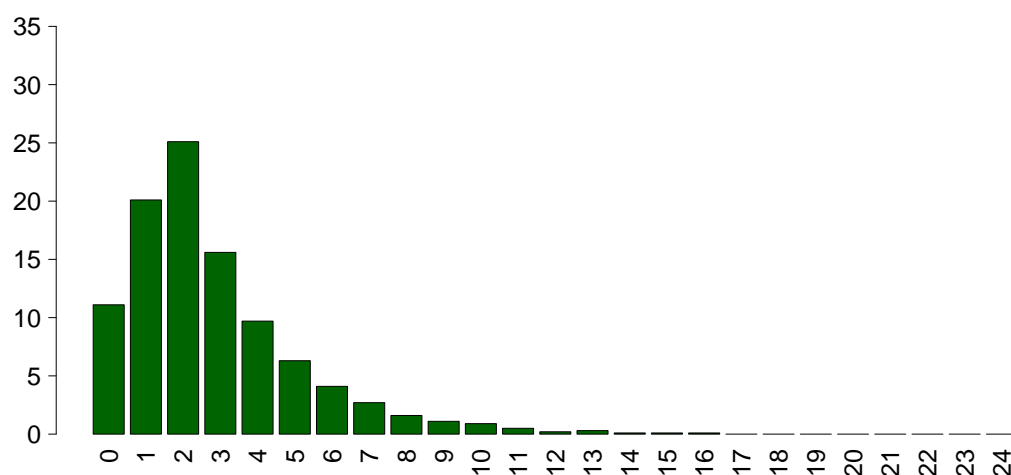
## SAPS II (%)



## SAPSII

Mean	23.1
SD	11.6
Median	22
Q1–Q3	16–28
Not evaluable	1077
Missing	0

## SOFA (%)



## SOFA

Mean	2.8
SD	2.5
Median	2
Q1–Q3	1–4
Not evaluable	1077
Missing	0

**National report for general ICUs - Year 2016****Characteristics during the stay** - Adult elective surgical patients evaluated in the GiViTI model

<b>Complications during the stay</b>	<b>N</b>	<b>%</b>
No	10812	90.1
Yes	1189	9.9
Missing	0	

<b>Failures during the stay</b>	<b>N</b>	<b>%</b>
No	11497	95.8
Yes	504	4.2
A: Respiratory failure	254	2.1
B: Cardiovascular failure	195	1.6
C: Neurological failure	26	0.2
D: Hepatic failure	18	0.1
E: Renal failure (AKIN)	157	1.3
F: Acute skin failure	0	0.0
G: Metabolic failure	45	0.4
H: Coagulation failure	22	0.2
Missing	0	

<b>Failures during the stay (top 10)</b>	<b>N</b>	<b>%</b>
A	149	1.2
B	84	0.7
E	84	0.7
AB	46	0.4
G	25	0.2
ABE	17	0.1
BE	16	0.1
AE	11	0.1
D	10	0.1
AC	8	0.1
Missing	0	

<b>Respiratory failure occurred</b>	<b>N</b>	<b>%</b>
None	11747	97.9
Intubation for airway maint.	88	0.7
Hypoxic failure	165	1.4
Hypercapnic failure	29	0.2
Missing	0	

<b>Cardiovascular failure occurred</b>	<b>N</b>	<b>%</b>
None	11806	98.4
Cardiogenic shock	47	0.4
Hypovolemic shock	33	0.3
Haemorrhagic/hypovolemic shock	36	0.3
Septic shock	72	0.6
Anaphylactic shock	1	0.0
Neurogenic shock	3	0.0
Other shock	17	0.1
Missing	0	

<b>Neurological failure occurred</b>	<b>N</b>	<b>%</b>
None	11975	99.8
Cerebral coma	16	0.1
Metabolic coma	6	0.0
Postanoxic coma	4	0.0
Missing	0	

<b>Renal failure occurred (AKIN)</b>	<b>N</b>	<b>%</b>
None	11844	98.7
Mild	41	0.3
Moderate	36	0.3
Severe	80	0.7
Missing	0	

<b>Complications during the stay</b>	<b>N</b>	<b>%</b>
Respiratory	234	1.9
Atelectasis	74	0.6
Pleural effusion	65	0.5
Pneumothorax/Pneumomediastinum	24	0.2
Upper resp. tract disease	22	0.2
Acute asthma/bronchospasm	20	0.2
Cardiovascular	344	2.9
Acute severe arrhythmia: tachycardias	173	1.4
Cardiac arrest	59	0.5
Left heart failure w/o pulm. edema	28	0.2
Acute ischaemia	25	0.2
Peripheral vascular disease	24	0.2
Neurological	199	1.7
Drowsiness/agitation/delirium	124	1.0
Seizures	25	0.2
Post-surgical intracranial bleeding	22	0.2
New ischaemic stroke	16	0.1
Hydrocephalus	10	0.1
Gastrointestinal and hepatic	176	1.5
Anastomotic dehiscence	34	0.3
Intrabdominal bleeding	30	0.2
Bowel ischaemia	23	0.2
Paralytic Ileus	19	0.2
Gastrointestinal bleeding: lower tract	16	0.1
Other	152	1.3
Other disease	48	0.4
Metabolic disorder	45	0.4
Nephrourologic disease	44	0.4
Other skin and/or soft tissue pathology	9	0.1
Iatrogenic major vessels injury	7	0.1
Category/Stage II: Partial Thickness Skin Loss	5	0.0
Extremity compartment syndrome (severe)	4	0.0
Infections	238	2.0
Pneumonia	61	0.5
L.R.T.I. other than pneumonia	48	0.4
Post-surgical peritonitis	48	0.4
Primary bacteraemia of unknown origin	20	0.2
Catheter-related bacteremia (CR-BSI)	20	0.2
NON-surgical urinary tract infection	20	0.2
Clinical sepsis	16	0.1
F.U.O. fever of unknown origin	15	0.1
Post-surgical skin/soft tissue infection	13	0.1
Post-surgical urinary tract infection	9	0.1
Missing	0	

## National report for general ICUs - Year 2016

## Characteristics during the stay - Adult elective surgical patients evaluated in the GiViTI model

Infections	N	%
None	11259	93.8
Only on admission	504	4.2
On admission and during ICU stay	42	0.3
Only during ICU stay	196	1.6
Missing	0	

Maximum severity of infection	N	%
None	11259	94.0
Infection with or without SIRS	346	2.9
SEVERE SEPSIS	181	1.5
Septic shock	195	1.6
Missing	20	

## Severity evolution

Severity evolution		During the stay				
		N (R %)	None	Infection with or without SIRS	SEVERE SEPSIS	Septic shock
Admission	None	11259 (98.4%)	71 (0.6%)	63 (0.6%)	47 (0.4%)	11440
	Infection with or without SIRS	-	275 (92.6%)	17 (5.7%)	5 (1.7%)	297
	SEVERE SEPSIS	-	-	101 (91.0%)	10 (9.0%)	111
	Septic shock	-	-	-	133 (100.0%)	133
	TOT	11259	346	181	195	11981

Ventil. Associat. Pneumonia (VAP)	N	%
No	11959	99.7
Yes	42	0.3
Missing	0	

## Incidence of VAP

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

Estimate	7.2
CI (95%)	5.2–9.8

## Incidence of VAP

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

Estimate	5.8%
CI (95%)	4.2–7.8

Catheter Bacteraemia (CR-BSI)	N	%
No	11981	99.8
Yes	20	0.2
Missing	0	

## Incidence of CR-BSI

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

Estimate	1.2
CI (95%)	0.7–1.8

## Incidence of CR-BSI

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

Estimate	1.4%
CI (95%)	0.9–2.2

**National report for general ICUs - Year 2016**  
**Process indicators - Adult elective surgical patients evaluated in the GiViTI model**

Procedures and/or treatments (Missing=0)	Use		On admission		On discharge		Length (days)		Days from admission			
	N	%	N	%	N	%	Median	Q1-Q3	Missing	Median	Q1-Q3	Missing
<b>Procedures (antibiotics excluded)</b>	10740	89.5										
Invasive ventilation	6775	56.5	6359	53	274	2.3	0	0-1	0	0	0-0	0
Non invasive ventilation	802	6.7	169	1.4	166	1.4	1	1-2	0	0	0-1	0
Tracheostomy	417	3.5	285	2.4	391	3.3	2	1-6	0	10	4-14	0
iNO (inhaled nitric oxide)	2	0.0	0	0	0	0	3	2-4	0	0	0-0	0
Central Venous Catheter	5585	46.5	4441	37	5196	43.3	1	1-3	0	0	0-0	0
PICC	135	1.1	93	0.8	125	1	1	1-3	0	1	0-3	0
Arterial Catheter	8473	70.6	6860	57.2	1138	9.5	1	1-2	0	0	0-0	0
Vasoactive drugs	1428	11.9	850	7.1	164	1.4	1	1-2	0	0	0-1	0
Antiarrhythmics	380	3.2	150	1.2	234	1.9	1	1-3	0	1	0-2	0
IABP	4	0.0	1	0	3	0	2	2-3	0	1	1-2	0
Invasive monitoring of C.O.	125	1.0	52	0.4	13	0.1	2	1-4	0	0	0-1	0
Continuous monitoring of ScVO2	15	0.1	5	0	1	0	2	1-4	0	0	0-0	0
Temporary pacing	6	0.0	2	0	4	0	1	0-1	0	0	0-0	0
Ventricular assistance	0	0.0										
DC-shock	37	0.3								0	0-2	0
CPR	72	0.6								0	0-1	0
Massive blood transfusion	96	0.8								0	0-0	0
ICP monitoring without liquor-drainage	11	0.1	5	0	2	0	2	1-6	0	1	0-2	0
ICP monitoring with liquor-drainage	31	0.3	23	0.2	26	0.2	2	1-3	0	1	0-1	0
External ventricular drainage without ICP	20	0.2	14	0.1	13	0.1	2	1-4	0	1	0-2	0
Haemofiltration	94	0.8	9	0.1	21	0.2	3	1-6	0	1	0-2	0
Haemodialysis	83	0.7	18	0.1	33	0.3	1	0-3	0	1	1-2	0
ECMO	3	0.0	1	0	1	0	4	3-7	0	0	0-1	0
Hepatic clearance techniques	1	0.0										
Clearance techniques during sepsis	4	0.0	0	0	2	0	2	2-2	0	2	2-4	0
IAP (intra-abdominal pressure)	77	0.6										
Hypothermia	11	0.1										
Enteral nutrition	923	7.7	156	1.3	724	6	3	1-7	0	1	1-2	0
Parenteral nutrition	1515	12.6	230	1.9	1240	10.3	2	1-4	0	1	0-1	0
SDD (Topical, Topical and systemic)	25	0.2										
Patient restraint	228	1.9										
Peridural catheter	1293	10.8	1226	10.2	1068	8.9	1	1-2	0	0	0-0	0
Electrical cardioversion	24	0.2								1	0-3	0
Vacuum therapy	11	0.1										
<b>Antibiotics</b>	8521	71.0										
Antibiotics for surgical prophylaxis	7820	65.2	6913	57.6	5140	42.8	1	1-1	0	0	0-0	0
Antibiotics for medical prophylaxis	216	1.8	113	0.9	158	1.3	2	1-4	0	0	0-1	0
Empirical antibiotic therapy	435	3.6	211	1.8	270	2.2	3	1-5	0	0	0-3	0
Targeted antibiotic therapy	306	2.5	111	0.9	243	2	5	2-10	0	5	2-8	0

**National report for general ICUs - Year 2016****Process indicators** - Adult elective surgical patients evaluated in the GiViTI model

Process indicators - Adult elective surgical patients evaluated in the GIVITI model											
				Length (days)							
Invasive ventilation (N=6775)				N	%	Mean	SD	Median	Q1-Q3	Missing	
Due to pulmonary failure				605	7.9	4.3	7.6	1	1–4	0	
For airway maintenance				1406	18.4	2.7	6.9	1	0–2	0	
In weaning				4605	60.3	0.2	0.4	0	0–0	0	
Not evaluable				1015	13.3	2.9	6.0	1	0–3	860	
Reintubation within 48 hours				67	0.9	6.7	9.3	3	1–7	0	
Non invasive ventilation (N=802)				N	%	Number of surgical interventions					
Non invasive ventilation only				442	55.1				0	11876	99.0
Non invasive ventilation failed				60	7.5				1	100	0.8
For weaning				265	33.0				2	15	0.1
Other				35	4.4				3	4	0.0
Missing				0					>3	6	0.0
									Missing	0	
Tracheostomy not present on admission (N=132)				N	%	Surgical interventions					
Surgical				47	35.6	Days from admission					
Percutwist				10	7.6				Mean		9.3
Ciaglia				15	11.4				SD		10.6
Monodil. Ciaglia				32	24.2				Median		5
Fantoni				7	5.3				Q1–Q3		2–11.5
Griggs				12	9.1				Missing		0
Other Kind				7	5.3						
Unknown				2	1.5						
Missing				0							
Tracheostomy - Days after the beginning of inv. vent. Not present on admission (N=128)						Surgical interventions (top 10)					
Mean				9.9					N		%
SD				7.1							
Median				9							
Q1–Q3				4–14							
Missing				0							
Invasive monitoring of C.O. (N=125)				N	%	Non surgical interventions					
Swan Ganz				24	19.2				N		%
PICCO				52	41.6						
LIDCO				1	0.8				No	11957	99.6
Vigileo-PRAM				44	35.2				Yes	44	0.4
Other				4	3.2				Missing	0	
Missing				0							
SDD (N=25)				N	%	Non surgical interventions					
Topical				20	80.0	Days from admission					
Topical and systemic				5	20.0				Mean		9.2
Missing				0					SD		7.3
									Median		6
									Q1–Q3		4–12.2
									Missing		3
Antibiotic therapy						Non surgical interventions					
Pt. infected in ICU only (N=196)				N	%				N		%
Only empirical				71	44.9						
Only targeted				40	25.3				Interventional radiology	26	0.2
Targeted after empirical				39	24.7				Interventional endoscopy	22	0.2
Other				8	5.1				Interventional cardiology	7	0.1
Missing				38					Interventional neuroradiology	0	0.0
Surgical interventions				N	%				Missing	0	
No				11876	99.0						
Yes				125	1.0						
Missing				0							

**National report for general ICUs - Year 2016****Outcome indicators** - Adult elective surgical patients evaluated in the GiViTI model

ICU outcome	N	%
Dead	286	2.4
Transferred to same hospital	11488	95.7
Transferred to other hospital	200	1.7
Discharged home	26	0.2
Disch. terminally ill	1	0.0
Missing	0	

Transferred to (N=11688)	N	%
Ward	11251	96.3
Other ICU	101	0.9
High dependency care unit	284	2.4
Rehabilitation	41	0.4
Day hospital or Long-term care	11	0.1
Missing	0	

Reason of transfer to Other ICU (N=101)	N	%
Specialist expertise	45	44.6
Step-up care	2	2.0
Logistical/organizational reasons	51	50.5
Step-down care	3	3.0
Missing	0	

Transferred to Same hospital (N=11488)	N	%
Ward	11131	96.9
Other ICU	62	0.5
High dependency care unit	277	2.4
Rehabilitation	12	0.1
Day hospital or Long-term care	6	0.1
Missing	0	

Transferred to Other hospital (N=200)	N	%
Ward	120	60.0
Other ICU	39	19.5
High dependency care unit	7	3.5
Rehabilitation	29	14.5
Day hospital or Long-term care	5	2.5
Missing	0	

ICU mortality	N	%
Alive	11714	97.6
Dead	287	2.4
Missing	0	

Timing of ICU mortality (N=287)	N	%
Daytime (08:00AM - 07:59PM)	193	67.2
Nighttime (08:00PM - 07:59AM)	94	32.8
Weekdays (Monday - Friday)	219	76.3
Weekend (Saturday - Sunday)	68	23.7
Missing	0	

C.A.M. activation (N=287)	N	%
Yes, with organ donation	1	0.3
Yes, without organ donation	18	6.3
No, with organ donation	0	0.0
No, without organ donation	267	93.4
Missing	1	

Tissue removal (N=287)	N	%
Yes, with C.A.M. activation	7	2.4
Yes, without C.A.M. activation	11	3.8
No	269	93.7
Missing	0	

Hospital mortality	N	%
Dead	757	6.3
Transf. to other acute-care hospital	343	2.9
Transf. to other type of hosp. stay	1221	10.2
Nursing home	276	2.3
Voluntary discharge	30	0.2
Discharged home	9374	78.1
Missing	0	

To other type of H stay (N=1221)	N	%
Rehabilitation in the same institute	258	21.1
Rehabilitation in other institute	646	52.9
DH/long-term care, same inst.	92	7.5
DH/long-term care, other inst.	225	18.4
Missing	0	

Disch. terminally ill (N=11244)	N	%
Yes	90	0.8
No	11154	99.2
Missing	0	

Hospital mortality	N	%
Alive	11154	92.9
Dead	847	7.1
Missing	0	

Timing of hosp. mortality (N=847)	N	%
In ICU	287	33.9
Within 24 hours after ICU	41	4.8
24-47 hours after ICU	28	3.3
48-71 hours after ICU	21	2.5
72-95 hours after ICU	14	1.7
After 95 hours after ICU	456	53.8
Missing	0	

Timing of hosp. mortality (days from ICU disch.) Discharged alive from ICU (N=560)		
Mean	20.4	
SD	25.9	
Median	13	
Q1-Q3	5-26	
Missing	0	



**National report for general ICUs - Year 2016****Outcome indicators** - Adult elective surgical patients evaluated in the GiViTI model

<b>Last hospital mortality</b>	<b>N</b>	<b>%</b>
Alive	11153	92.9
Dead	848	7.1
Missing	0	

<b>ICU stay (days)</b>		
	Mean	2.1
	SD	4.4
	Median	1
	Q1–Q3	1–2
	Missing	0

<b>ICU stay (days)</b>		
<b>Alive (N=11714)</b>		
	Mean	2.0
	SD	3.7
	Median	1
	Q1–Q3	1–1
	Missing	0

<b>ICU stay (days)</b>		
<b>Dead (N=287)</b>		
	Mean	8.9
	SD	13.4
	Median	3
	Q1–Q3	1–11
	Missing	0

<b>Stay after ICU (days)</b>		
<b>Alive (N=11714)</b>		
	Mean	12.6
	SD	16.4
	Median	8
	Q1–Q3	5–14
	Missing	6

<b>Hospital stay (days)</b>		
	Mean	18.9
	SD	20.4
	Median	13
	Q1–Q3	8–23
	Missing	1

<b>Hospital stay (days)</b>		
<b>Alive (N=11154)</b>		
	Mean	18.2
	SD	19.4
	Median	12
	Q1–Q3	8–22
	Missing	1

<b>Hospital stay (days)</b>		
<b>Dead (N=847)</b>		
	Mean	28.3
	SD	29.9
	Median	20
	Q1–Q3	9–36
	Missing	0



## National report for general ICUs - Year 2016

## Characteristics on admission - Adult emergency surgical patients evaluated in the GiViTI model

Patients (N): 11057

Sex		N	%
	Male	6295	56.9
	Female	4760	43.1
	Missing	2	

Age (years)		N	%
	17-45	1750	15.8
	46-65	2644	23.9
	66-75	2381	21.5
	>75	4282	38.7
	Missing	0	
	Mean	66.1	
	SD	18.2	
	Median	71	
	Q1–Q3	55–80	
	Min–Max	17–102	

Body mass Index (BMI)		N	%
	Underweight	636	5.8
	Normal	5285	47.8
	Overweight	3452	31.2
	Obese	1682	15.2
	Missing	2	

Pregnancy status		N	%
	Females (N=4760)		
	Not fertile	2587	54.3
	Not pregnant/Unknown	1802	37.9
	Currently pregnant	31	0.7
	Post partum	340	7.1
	Missing	0	

Comorbidities		N	%
	No	2324	21.0
	Yes	8733	79.0
	Missing	0	

Comorbidities (top 10)		N	%
	Hypertension	5446	49.3
	Arrhythmia	1779	16.1
	Moderate COPD	1300	11.8
	Any tumour without metastasis	1193	10.8
	Diabetes Type II without insulin tr.	1179	10.7
	Myocardial infarction	1171	10.6
	Cerebrovascular disease	1122	10.1
	Peripheral vascular disease	1081	9.8
	Moderate or severe renal disease	921	8.3
	NYHA class II-III	891	8.1
	Missing	0	

Stay before ICU (days)			
	Mean	3.8	
	SD	9.6	
	Median	1	
	Q1–Q3	0–3	
	Missing	0	

Source of admission		N	%
	Same hospital	10032	90.7
	Other hospital	1025	9.3
	Long-term chronic care hospital	0	0.0
	Directly from the community	0	0.0
	Missing	0	

Ward of admission		N	%
	Hospital (N=11057)		
	Medical ward	802	7.3
	Surgical ward	6658	60.2
	Emergency room	3098	28.0
	Other ICU	338	3.1
	High dependency care unit	161	1.5
	Missing	0	

Reason for transfer from		N	%
	Other ICU (N=338)		
	Specialist expertise	113	33.4
	Step-up care	98	29.0
	Logistical/organizational reasons	123	36.4
	Step-down care	4	1.2
	Missing	0	

Ward of admission		N	%
	Same hospital (N=10032)		
	Medical ward	714	7.1
	Surgical ward	6488	64.7
	Emergency room	2533	25.2
	Other ICU	147	1.5
	High dependency care unit	150	1.5
	Missing	0	

Ward of admission		N	%
	Other hospital (N=1025)		
	Medical ward	88	8.6
	Surgical ward	170	16.6
	Emergency room	565	55.1
	Other ICU	191	18.6
	High dependency care unit	11	1.1
	Missing	0	

Scheduled admission		N	%
	No	11040	99.8
	Yes	17	0.2
	Missing	0	

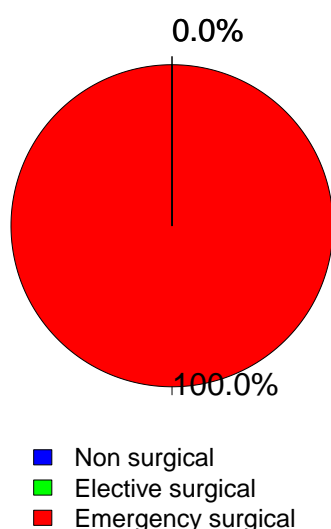
## National report for general ICUs - Year 2016

## Characteristics on admission - Adult emergency surgical patients evaluated in the GiViTI model

Trauma	N	%
No	8624	78.0
Yes	2433	22.0
Multiple trauma	1053	9.5
Missing	0	

Surgical status	N	%
Non surgical	0	0.0
Elective surgical	0	0.0
Emergency surgical	11057	100.0
Missing	0	

Surgical status



Source of admission	N	%
<b>Surgical pt. (N=11057)</b>		
Operating theatre of surgical ward	6067	54.9
Operating theatre of emergency room	1995	18.0
Surgical ward	591	5.3
Other	2404	21.7
Missing	0	

Surgical interventions (top 10)	N	%
<b>Elective surgical (N=0)</b>		
-	0	0.0
-	0	0.0
-	0	0.0
-	0	0.0
-	0	0.0
-	0	0.0
-	0	0.0
-	0	0.0
-	0	0.0
Missing	0	

Timing	N	%
<b>Elective surgical (N=0)</b>		
From -7 to -3 days	0	0.0
From -2 to -1 days	0	0.0
On ICU admission day	0	0.0
The day after ICU admission	0	0.0
Missing	0	

Surgical interventions (top 10)	N	%
<b>Emergency surgical (N=11057)</b>		
Gastrointestinal surgery	4768	43.1
Neurosurgery	1607	14.5
Orthopaedic surgery	1299	11.7
Nephro/Urological surgery	554	5.0
Abdominal vascular surgery	488	4.4
Biliary tract surgery	471	4.3
Peripheral vascular surgery	445	4.0
Obstetric surgery	338	3.1
ENT surgery	285	2.6
Splenectomy	276	2.5
Missing	526	

Timing	N	%
<b>Emergency surgical (N=11057)</b>		
From -7 to -3 days	294	2.7
From -2 to -1 days	1173	10.6
On ICU admission day	9744	88.1
The day after ICU admission	481	4.4
Missing	41	

Non surgical interventions	N	%
None	10383	93.9
Elective	61	0.6
Emergency	613	5.5
Missing	0	

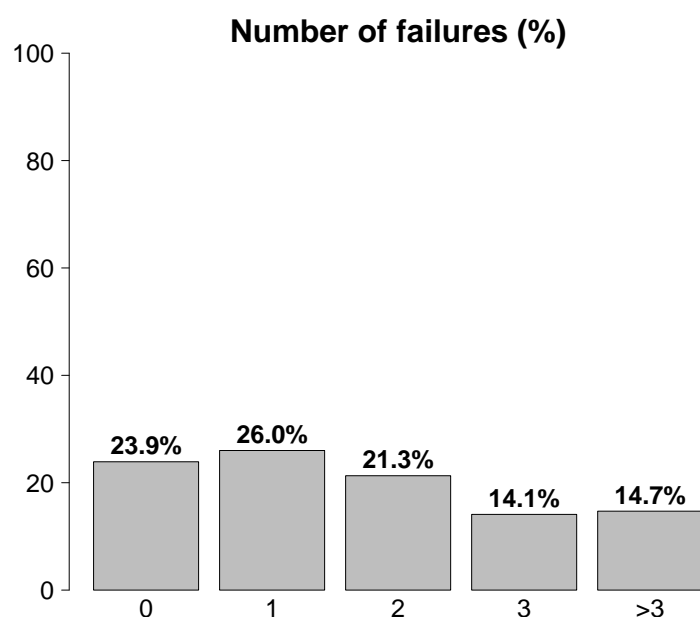
Non surgical interventions	N	%
<b>Elective (N=61)</b>		
Interventional endoscopy	20	32.8
Interventional radiology	10	16.4
Interventional neuroradiology	10	16.4
Interventional cardiology	7	11.5
Missing	14	

Non surgical interventions	N	%
<b>Emergency (N=613)</b>		
Interventional radiology	251	40.9
Interventional neuroradiology	152	24.8
Interventional endoscopy	130	21.2
Interventional cardiology	31	5.1
Missing	49	

## National report for general ICUs - Year 2016

## Characteristics on admission - Adult emergency surgical patients evaluated in the GiViTI model

Reason for admission	N	%
Monitoring/Weaning	3971	35.9
Post surgical weaning	1899	17.2
Surgical monitoring	2046	18.5
Post interventional weaning	5	0.0
Interventional monitoring	15	0.1
Non surgical monitoring	0	0.0
Missing	6	
Admission for procedures/treatments	0	0.0
Intensive Treatment	7086	64.1
Only ventilatory support	3130	28.3
Only cardiovascular support	514	4.6
Ventilatory and cardiovascular support	3442	31.1
Missing	0	
Palliative Sedation	0	0.0
Diagnosis of death/Organ donation	0	0.0
Missing	0	



Failures on admission	N	%
No	2638	23.9
Yes	8419	76.1
A: Respiratory failure	6571	59.4
B: Cardiovascular failure	3956	35.8
C: Neurological failure	1061	9.6
D: Hepatic failure	47	0.4
E: Renal failure	4241	38.4
F: Acute skin failure	4	0.0
G: Metabolic failure	3005	27.2
H: Coagulation failure	191	1.7
Missing	0	

Failures on admission (top 10)	N	%
A	1696	15.3
ABEG	1163	10.5
AB	844	7.6
E	770	7.0
ABE	554	5.0
AE	465	4.2
AC	399	3.6
EG	276	2.5
ABG	275	2.5
AEG	237	2.1
Missing	0	

Respiratory failure	N	%
None	4485	40.6
Only hypoxic failure	1655	15.0
Only hypercapnic failure	80	0.7
Hypoxic-hypercapnic failure	247	2.2
Intubation for airway maint.	4589	41.5
Missing	1	

Cardiovascular failure	N	%
None	7101	64.2
Without shock	644	5.8
Cardiogenic shock	170	1.5
Septic shock	1259	11.4
Haemorrhagic/hypovolemic shock	945	8.5
Hypovolemic shock	391	3.5
Anaphylactic shock	4	0.0
Neurogenic shock	165	1.5
Other shock	116	1.0
Mixed shock	262	2.4
Missing	0	

Neurologic failure	N	%
None	7185	87.1
Cerebral coma	785	9.5
Metabolic coma	190	2.3
Postanoxic coma	78	0.9
Toxic coma	8	0.1
Missing or not evaluable	2811	

Renal failure (AKIN)	N	%
None	6816	61.6
Mild	2166	19.6
Moderate	1020	9.2
Severe	1055	9.5
Missing	0	

Metabolic failure	N	%
None	8052	72.8
pH $\leq$ 7.3, PaCO <sub>2</sub> $<$ 45 mmHg	804	7.3
Base deficit $\geq$ 5 mmol/L, lactate $>$ 1.5x	2201	19.9
Missing	0	

## National report for general ICUs - Year 2016

## Characteristics on admission - Adult emergency surgical patients evaluated in the GiViTI model

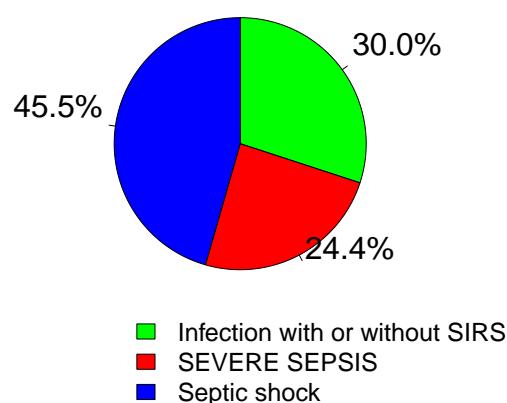
Clinical conditions on admission	N	%
Respiratory	947	8.6
Pleural effusion	280	2.5
Atelectasis	156	1.4
Aspiration pneumonia	135	1.2
Upper respiratory tract disease	119	1.1
Acute exacerbation of COPD	71	0.6
Cardiovascular	1206	10.9
Ruptured or fissured aneurysm	359	3.2
Peripheral vascular disease	268	2.4
Acute severe arrhythmia: tachycardias	146	1.3
Cardiac arrest	132	1.2
Left heart failure without pulm. edema	90	0.8
Neurological	1159	10.5
Spontaneous Intraparenchymal bleeding	438	4.0
Spontaneous Subarachnoid haemorrhage	287	2.6
Cerebral Aneurysm	193	1.7
Chronic Subdural haematoma	127	1.1
Cerebral artery stroke	101	0.9
Gastrointestinal and hepatic	4392	39.7
Gastrointestinal perforation	1374	12.4
Intestinal occlusion	1267	11.5
Bowel ischaemia	540	4.9
Digestive tract malignancy	406	3.7
Acute bile-duct disease	344	3.1
Trauma (anatomical districts)	2433	22.0
Pelvis/bone/joint & muscle	1324	12.0
Head	896	8.1
Chest	780	7.1
Abdomen	612	5.5
Spine	544	4.9
Major vessels injury	135	1.2
Miscellaneous	18	0.2
Other	1926	17.4
Nephrourologic disease	413	3.7
Metabolic disorder	388	3.5
Other disease	304	2.7
Coagulation disorder	191	1.7
Orthopaedic disease	173	1.6
Post transplantation	152	1.4
Renal transplantation	75	0.7
Liver transplantation	51	0.5
Infections	3263	29.5
NON-surgical secondary peritonitis	1077	9.7
Post-surgical peritonitis	521	4.7
Primary peritonitis	310	2.8
Pneumonia	272	2.5
Cholecystitis/choolangitis	270	2.4
NON-surgical skin/soft tissue infection	233	2.1
NON-surgical urinary tract infection	199	1.8
Clinical sepsis	90	0.8
L.R.T.I. other than pneumonia	63	0.6
Primary bacteraemia of unknown origin	55	0.5
Missing	0	

Trauma (anatomical districts)	N	%
Head	896	8.1
Traumatic Subdural haematoma	328	3.0
Maxillofacial fracture	303	2.7
Traumatic subarachnoid haemorrhage	234	2.1
Skull fracture	219	2.0
Cerebral contusion/laceration	146	1.3
Spine	544	4.9
Vertebral fracture, without deficit	429	3.9
Cervical injury, incomplete deficit	32	0.3
Tetraplegia	31	0.3
Chest	780	7.1
Other injuries of the chest	361	3.3
Traum. haemothorax/pneumothorax	345	3.1
Severe lung contusion/laceration	233	2.1
Abdomen	612	5.5
Spleen: Massive rupture	172	1.6
Spleen: Moderate-Severe laceration	150	1.4
Minor injuries of the abdomen	142	1.3
Pelvis/bone/joint & muscle	1324	12.0
Long bone fracture	1109	10.0
Multiple fracture of the pelvis	287	2.6
Very severe or open fracture of the pelvis	91	0.8
Major vessels injury	135	1.2
Proximal limbs vessels: transection	57	0.5
Major abdominal vessels: transection	35	0.3
Neck vessels: dissection/transection	30	0.3
Miscellaneous	18	0.2
Burns (>30% BSA)	14	0.1
Inhalation injury	5	0.0
Missing	0	

Infection severity on admission	N	%
None	7794	70.6
Infection with or without SIRS	976	8.8
SEVERE SEPSIS	795	7.2
Septic shock	1481	13.4
Missing	11	

## Infection severity on admission

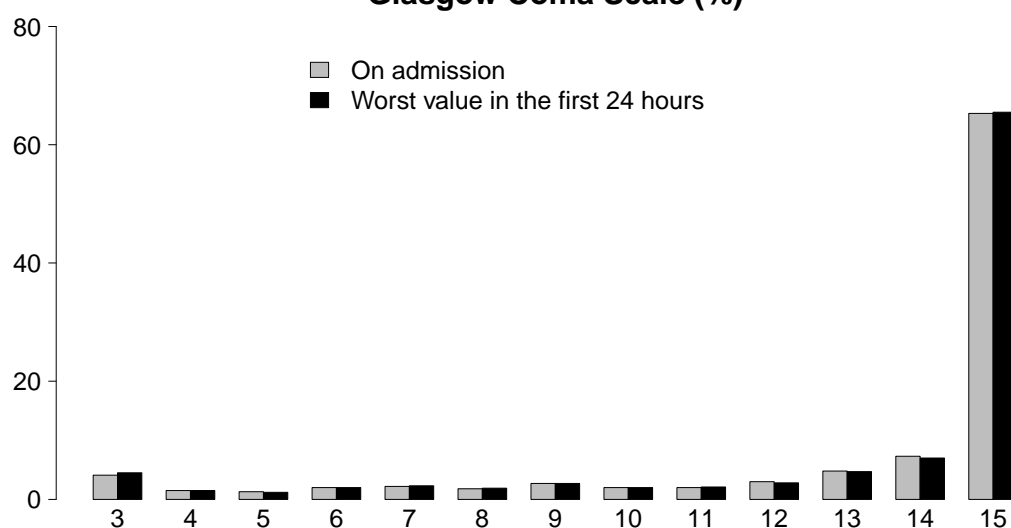
Patients infected (N=3252)



## National report for general ICUs - Year 2016

## Severity scores - Adult emergency surgical patients evaluated in the GiViTI model

## Glasgow Coma Scale (%)



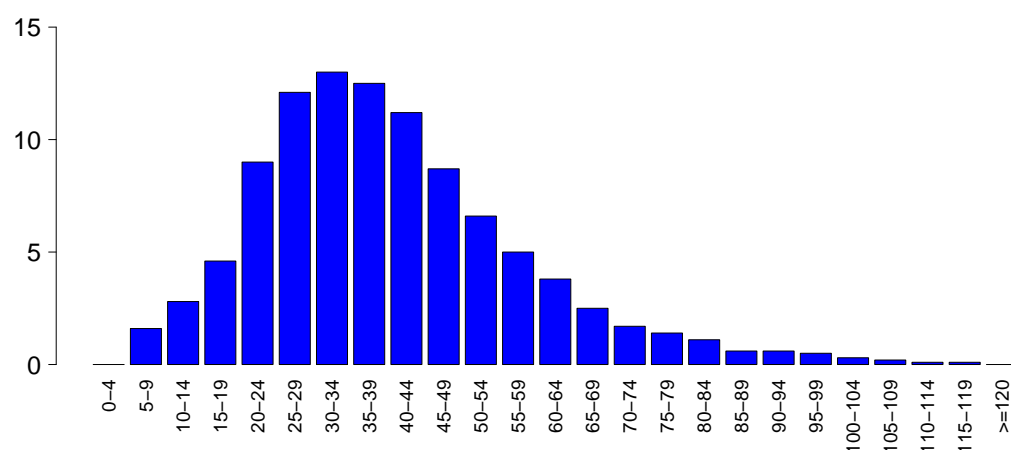
## GCS (admission)

Median	15
Q1–Q3	13–15
Not evaluable	2811
Missing	0

## GCS (first 24 hours)

Median	15
Q1–Q3	13–15
Not evaluable	2281
Missing	0

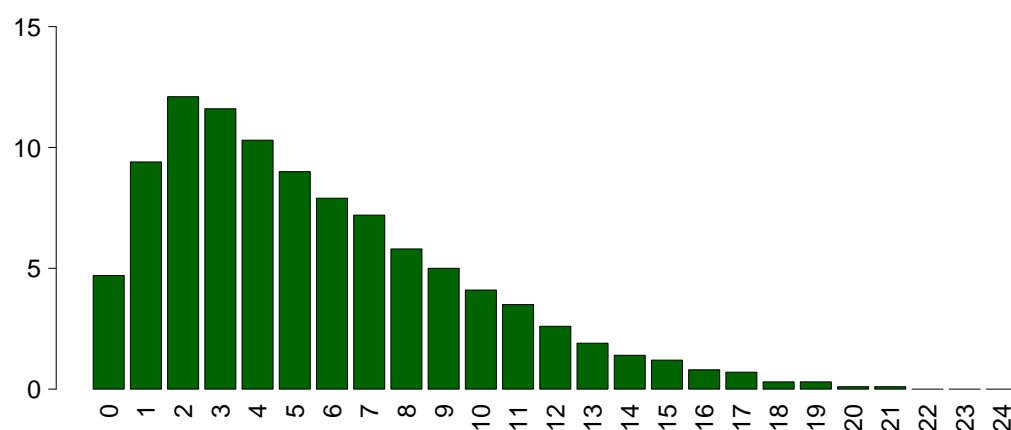
## SAPS II (%)



## SAPSII

Mean	39.9
SD	18.0
Median	37
Q1–Q3	27–49
Not evaluable	2281
Missing	0

## SOFA (%)



## SOFA

Mean	5.5
SD	4.0
Median	5
Q1–Q3	2–8
Not evaluable	2281
Missing	0

## National report for general ICUs - Year 2016

## Characteristics during the stay - Adult emergency surgical patients evaluated in the GiViTI model

Complications during the stay	N	%
No	7444	67.3
Yes	3611	32.7
Missing	2	

Failures during the stay	N	%
No	9537	86.3
Yes	1520	13.7
A: Respiratory failure	532	4.8
B: Cardiovascular failure	751	6.8
C: Neurological failure	117	1.1
D: Hepatic failure	58	0.5
E: Renal failure (AKIN)	491	4.4
F: Acute skin failure	3	0.0
G: Metabolic failure	137	1.2
H: Coagulation failure	94	0.9
Missing	0	

Failures during the stay (top 10)	N	%
B	415	3.8
A	287	2.6
E	220	2.0
AB	94	0.9
BE	80	0.7
G	72	0.7
ABE	47	0.4
C	33	0.3
AE	26	0.2
AC	23	0.2
Missing	0	

Respiratory failure occurred	N	%
None	10523	95.2
Intubation for airway maint.	157	1.4
Hypoxic failure	368	3.3
Hypercapnic failure	79	0.7
Missing	2	

Cardiovascular failure occurred	N	%
None	10304	93.2
Cardiogenic shock	147	1.3
Hypovolemic shock	66	0.6
Haemorrhagic/hypovolemic shock	121	1.1
Septic shock	359	3.2
Anaphylactic shock	2	0.0
Neurogenic shock	44	0.4
Other shock	53	0.5
Missing	2	

Neurological failure occurred	N	%
None	10938	98.9
Cerebral coma	76	0.7
Metabolic coma	31	0.3
Postanoxic coma	12	0.1
Missing	2	

Renal failure occurred (AKIN)	N	%
None	10564	95.6
Mild	67	0.6
Moderate	85	0.8
Severe	339	3.1
Missing	2	

Complications during the stay	N	%
Respiratory	705	6.4
Pleural effusion	324	2.9
Atelectasis	212	1.9
Pneumothorax/Pneumomediastinum	89	0.8
Severe ARDS	67	0.6
Moderate ARDS	49	0.4
Cardiovascular	864	7.8
Acute severe arrhythmia: tachycardias	388	3.5
Cardiac arrest	208	1.9
Deep venous thrombosis	93	0.8
Left heart failure w/o pulm. edema	65	0.6
Acute severe arrhythmia: bradycardias	52	0.5
Neurological	749	6.8
Drowsiness/agitation/delirium	295	2.7
Intracranial hypertension	198	1.8
Brain edema	105	0.9
Seizures	103	0.9
New ischaemic stroke	71	0.6
Gastrointestinal and hepatic	532	4.8
Bowel ischaemia	95	0.9
Anastomotic dehiscence	92	0.8
Gastrointestinal perforation	80	0.7
Paralytic Ileus	63	0.6
Gastrointestinal bleeding: upper tract	55	0.5
Other	320	2.9
Metabolic disorder	137	1.2
Nephrourologic disease	80	0.7
Other disease	61	0.6
Other skin and/or soft tissue pathology	26	0.2
Extremity compartment syndrome (severe)	19	0.2
Category/Stage I: Nonblanchable Erythema	6	0.1
Category/Stage IV: Full Thickness Tissue Loss	6	0.1
Infections	1200	10.9
Pneumonia	439	4.0
L.R.T.I. other than pneumonia	220	2.0
NON-surgical urinary tract infection	125	1.1
Catheter-related bacteremia (CR-BSI)	95	0.9
Post-surgical peritonitis	93	0.8
Primary bacteraemia of unknown origin	90	0.8
Post-surgical skin/soft tissue infection	62	0.6
Clinical sepsis	52	0.5
Upper respiratory tract infection	48	0.4
F.U.O. fever of unknown origin	39	0.4
Missing	2	



## National report for general ICUs - Year 2016

## Characteristics during the stay - Adult emergency surgical patients evaluated in the GiViTI model

Infections			Maximum severity of infection		
	N	%		N	%
None	6903	62.4	None	6903	62.7
Only on admission	2952	26.7	Infection with or without SIRS	1200	10.9
On admission and during ICU stay	309	2.8	SEVERE SEPSIS	1173	10.7
Only during ICU stay	891	8.1	Septic shock	1733	15.7
Missing	2		Missing	48	

## Severity evolution

Severity evolution		During the stay				
		N (R %)	None	Infection with or without SIRS	SEVERE SEPSIS	Septic shock
Admission	None	6903 (89.0%)	333 (4.3%)	376 (4.8%)	145 (1.9%)	7757
	Infection with or without SIRS	-	867 (88.9%)	80 (8.2%)	28 (2.9%)	975
	SEVERE SEPSIS	-	-	717 (90.2%)	78 (9.8%)	795
	Septic shock	-	-	-	1481 (100.0%)	1481
	TOT	6903	1200	1173	1732	11008

Ventil. Associat. Pneumonia (VAP)	N	%
No	10661	96.4
Yes	394	3.6
Missing	2	

## Incidence of VAP

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

Estimate	10.8
CI (95%)	9.8–11.9

## Incidence of VAP

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

Estimate	8.6%
CI (95%)	7.8–9.6

Catheter Bacteraemia (CR-BSI)	N	%
No	10960	99.1
Yes	95	0.9
Missing	2	

## Incidence of CR-BSI

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

Estimate	1.6
CI (95%)	1.3–2.0

## Incidence of CR-BSI

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

Estimate	1.9%
CI (95%)	1.6–2.4

**National report for general ICUs - Year 2016**  
**Process indicators - Adult emergency surgical patients evaluated in the GiViTI model**

Procedures and/or treatments (Missing=0) <b>Procedures (antibiotics excluded)</b>	Use		On admission		On discharge		Length (days)			Days from admission		
	N	%	N	%	N	%	Median	Q1-Q3	Missing	Median	Q1-Q3	Missing
	10621	96.1										
Invasive ventilation	8730	79.0	7412	67	1438	13	1	1-5	1	0	0-0	0
Non invasive ventilation	1006	9.1	117	1.1	178	1.6	2	1-3	0	1	0-3	0
Tracheostomy	1207	10.9	151	1.4	1033	9.3	10	5-19	0	8	5-12	0
iNO (inhaled nitric oxide)	13	0.1	1	0	0	0	6	3-8	0	2	1-4	0
Central Venous Catheter	7848	71.0	4505	40.7	6546	59.2	4	2-10	1	0	0-0	0
PICC	170	1.5	54	0.5	140	1.3	4	2-9	0	7	1-17	0
Arterial Catheter	8962	81.1	5464	49.4	2323	21	3	1-8	1	0	0-0	0
Vasoactive drugs	4674	42.3	2638	23.9	938	8.5	2	1-4	1	0	0-0	0
Antiarrhythmics	783	7.1	193	1.7	388	3.5	3	1-7	0	1	0-2	0
IABP	7	0.1	3	0	2	0	1	1-4	0	0	0-0	0
Invasive monitoring of C.O.	431	3.9	93	0.8	60	0.5	5	2-8	0	0	0-1	0
Continuous monitoring of ScVO2	30	0.3	17	0.2	5	0	2	1-4	0	0	0-1	0
Temporary pacing	17	0.2	4	0	9	0.1	2	1-6	0	3	2-7	0
Ventricular assistance	0	0.0										
DC-shock	99	0.9								1	0-4	0
CPR	193	1.7								0	0-1	0
Massive blood transfusion	428	3.9								0	0-0	0
ICP monitoring without liquor-drainage	209	1.9	106	1	42	0.4	7	4-10	0	0	0-1	0
ICP monitoring with liquor-drainage	248	2.2	122	1.1	126	1.1	10	5-17	0	0	0-0	0
External ventricular drainage without ICP	135	1.2	85	0.8	71	0.6	10	4-16	0	0	0-0	0
Haemofiltration	394	3.6	29	0.3	113	1	4	2-9	0	1	0-3	0
Haemodialysis	221	2.0	36	0.3	92	0.8	3	1-9	0	1	1-6	0
ECMO	11	0.1	4	0	4	0	2	1-9	0	1	0-4	0
Hepatic clearance techniques	2	0.0										
Clearance techniques during sepsis	129	1.2	3	0	21	0.2	2	1-4	0	1	0-1	0
IAP (intra-abdominal pressure)	284	2.6										
Hypothermia	8	0.1										
Enteral nutrition	3225	29.2	284	2.6	2297	20.8	7	3-15	0	2	1-3	0
Parenteral nutrition	3137	28.4	421	3.8	2056	18.6	4	2-8	0	1	0-2	0
SDD (Topical, Topical and systemic)	75	0.7										
Patient restraint	330	3.0										
Peridural catheter	168	1.5	129	1.2	120	1.1	2	1-4	0	1	0-4	0
Electrical cardioversion	69	0.6								2	1-3	0
Vacuum therapy	181	1.6										
<b>Antibiotics</b>	8807	79.7										
Antibiotics for surgical prophylaxis	5478	49.5	4174	37.7	3317	30	2	1-3	0	0	0-0	0
Antibiotics for medical prophylaxis	594	5.4	244	2.2	328	3	4	2-8	0	0	0-1	0
Empirical antibiotic therapy	2825	25.5	1519	13.7	1537	13.9	3	2-6	0	0	0-2	0
Targeted antibiotic therapy	1512	13.7	186	1.7	981	8.9	7	4-13	0	5	3-9	0

**National report for general ICUs - Year 2016****Process indicators - Adult emergency surgical patients evaluated in the GiViTI model**

Process indicators - Adult emergency surgical patients evaluated in the GIVILI model					Length (days)					
Invasive ventilation (N=8730)				N	%	Mean	SD	Median	Q1-Q3	Missing
Due to pulmonary failure				1965	21.6	6.7	11.7	3	1–8	0
For airway maintenance				4548	49.9	5.8	8.6	2	1–8	1
In weaning				1867	20.5	0.4	0.5	0	0–1	0
Not evaluable				737	8.1	3.5	7.1	1	1–3	401
Reintubation within 48 hours				162	1.8	7.6	7.9	5	2–10.75	0
Non invasive ventilation (N=1006)				N	%	Number of surgical interventions				
Non invasive ventilation only				294	29.2	0 10201 92.3				
Non invasive ventilation failed				91	9.0	1 595 5.4				
For weaning				562	55.9	2 151 1.4				
Other				59	5.9	3 62 0.6				
Missing				0		>3 48 0.4				
						Missing 0				
Tracheostomy not present on admission (N=1056)				N	%	Surgical interventions				
Surgical				231	21.9	Days from admission				
Percutwist				117	11.1	Mean 9.4				
Ciaglia				147	13.9	SD 11.0				
Monodil. Ciaglia				326	30.9	Median 6				
Fantoni				45	4.3	Q1–Q3 3–11				
Griggs				143	13.5	Missing 1				
Other Kind				42	4.0	Surgical interventions (top 10)				
Unknown				5	0.5	N %				
Missing				0		Gastrointestinal surgery 576 5.2				
						Orthopaedic surgery 245 2.2				
						Neurosurgery 143 1.3				
						Other surgery 56 0.5				
						ENT surgery 52 0.5				
						Plastic surgery 49 0.4				
						Pancreatic surgery 27 0.2				
						Maxillo-Facial surgery 26 0.2				
						Nephro/Urological surgery 24 0.2				
						Peripheral vascular surgery 23 0.2				
						Missing 0				
Tracheostomy - Days after the beginning of inv. vent.						Non surgical interventions				
Not present on admission (N=1045)						N %				
Mean					9.6	No 10848 98.1				
SD					7.0	Yes 209 1.9				
Median					8	Missing 0				
Q1–Q3					5–12	Non surgical interventions				
Missing					0	Days from admission				
						Mean 12.5				
						SD 12.3				
						Median 9				
						Q1–Q3 4–16				
						Missing 11				
Invasive monitoring of C.O. (N=431)				N	%	Non surgical interventions				
Swan Ganz				80	18.6	N %				
PICCO				292	67.7	Interventional endoscopy 109 1.0				
LIDCO				0	0.0	Interventional radiology 79 0.7				
Vigileo-PRAM				45	10.4	Interventional neuroradiology 58 0.5				
Other				14	3.2	Interventional cardiology 18 0.2				
Missing				0		Missing 0				
SDD (N=75)				N	%					
Topical				70	93.3					
Topical and systemic				5	6.7					
Missing				0						
Antibiotic therapy										
Pt. infected in ICU only (N=891)				N	%					
Only empirical				187	25.4					
Only targeted				318	43.2					
Targeted after empirical				204	27.7					
Other				27	3.7					
Missing				155						
Surgical interventions				N	%					
No				10201	92.3					
Yes				856	7.7					
Missing				0						

**National report for general ICUs - Year 2016****Outcome indicators** - Adult emergency surgical patients evaluated in the GiViTI model

ICU outcome	N	%
Dead	1725	15.6
Transferred to same hospital	8576	77.6
Transferred to other hospital	695	6.3
Discharged home	44	0.4
Disch. terminally ill	15	0.1
Missing	2	

Transferred to (N=9271)	N	%
Ward	7894	85.1
Other ICU	524	5.7
High dependency care unit	654	7.1
Rehabilitation	172	1.9
Day hospital or Long-term care	27	0.3
Missing	0	

Reason of transfer to Other ICU (N=533)	N	%
Specialist expertise	141	26.5
Step-up care	29	5.4
Logistical/organizational reasons	315	59.1
Step-down care	48	9.0
Missing	0	

Transferred to Same hospital (N=8576)	N	%
Ward	7724	90.1
Other ICU	168	2.0
High dependency care unit	641	7.5
Rehabilitation	31	0.4
Day hospital or Long-term care	12	0.1
Missing	0	

Transferred to Other hospital (N=695)	N	%
Ward	170	24.5
Other ICU	356	51.2
High dependency care unit	13	1.9
Rehabilitation	141	20.3
Day hospital or Long-term care	15	2.2
Missing	0	

ICU mortality	N	%
Alive	9315	84.3
Dead	1740	15.7
Missing	2	

Timing of ICU mortality (N=1740)	N	%
Daytime (08:00AM - 07:59PM)	1133	65.1
Nighttime (08:00PM - 07:59AM)	607	34.9
Weekdays (Monday - Friday)	1263	72.6
Weekend (Saturday - Sunday)	477	27.4
Missing	0	

C.A.M. activation (N=1740)	N	%
Yes, with organ donation	96	5.6
Yes, without organ donation	95	5.5
No, with organ donation	7	0.4
No, without organ donation	1527	88.5
Missing	15	

Tissue removal (N=1740)	N	%
Yes, with C.A.M. activation	76	4.4
Yes, without C.A.M. activation	86	4.9
No	1578	90.7
Missing	0	

Hospital mortality	N	%
Dead	2536	22.9
Transf. to other acute-care hospital	901	8.1
Transf. to other type of hosp. stay	1777	16.1
Nursing home	220	2.0
Voluntary discharge	50	0.5
Discharged home	5573	50.4
Missing	0	

To other type of H stay (N=1777)	N	%
Rehabilitation in the same institute	303	17.1
Rehabilitation in other institute	949	53.4
DH/long-term care, same inst.	146	8.2
DH/long-term care, other inst.	379	21.3
Missing	0	

Disch. terminally ill (N=8521)	N	%
Yes	105	1.2
No	8416	98.8
Missing	0	

Hospital mortality	N	%
Alive	8416	76.1
Dead	2641	23.9
Missing	0	

Timing of hosp. mortality (N=2641)	N	%
In ICU	1740	65.9
Within 24 hours after ICU	49	1.9
24-47 hours after ICU	48	1.8
48-71 hours after ICU	46	1.7
72-95 hours after ICU	44	1.7
After 95 hours after ICU	713	27.0
Missing	1	

Timing of hosp. mortality (days from ICU disch.) Discharged alive from ICU (N=901)		
Mean		18.6
SD		21.2
Median		12
Q1-Q3		5-24
Missing		1

**National report for general ICUs - Year 2016****Outcome indicators** - Adult emergency surgical patients evaluated in the GiViTI model

<b>Last hospital mortality</b>	<b>N</b>	<b>%</b>
Alive	8368	75.7
Dead	2689	24.3
Missing	0	

<b>ICU stay (days)</b>		
	Mean	6.5
	SD	10.1
	Median	3
	Q1–Q3	1–7
	Missing	2

<b>ICU stay (days)</b>		
<b>Alive (N=9315)</b>		
	Mean	6.2
	SD	9.8
	Median	3
	Q1–Q3	1–7
	Missing	0

<b>ICU stay (days)</b>		
<b>Dead (N=1740)</b>		
	Mean	7.8
	SD	11.7
	Median	3
	Q1–Q3	1–10
	Missing	0

<b>Stay after ICU (days)</b>		
<b>Alive (N=9315)</b>		
	Mean	16.0
	SD	18.7
	Median	11
	Q1–Q3	5–20
	Missing	3

<b>Hospital stay (days)</b>		
	Mean	23.4
	SD	23.4
	Median	16
	Q1–Q3	9–30
	Missing	3

<b>Hospital stay (days)</b>		
<b>Alive (N=8416)</b>		
	Mean	25.0
	SD	23.5
	Median	18
	Q1–Q3	10–32
	Missing	2

<b>Hospital stay (days)</b>		
<b>Dead (N=2641)</b>		
	Mean	18.3
	SD	22.5
	Median	11
	Q1–Q3	3.8–25
	Missing	1



## National report for general ICUs - Year 2016

## Characteristics on admission - Pediatric patients evaluated with PIM 3

Patients (N): 593

Sex	N	%
Male	340	57.3
Female	253	42.7
Missing	0	

Age	N	%
Newborn (0-4 weeks)	2	0.3
1-6 months	4	0.7
6-12 months	21	3.5
12-24 months	44	7.4
2-4 years	100	16.9
5-8 years	85	14.3
9-16 years	337	56.8
Missing	0	
Mean	9.2	
SD	5.5	
Median	10	
Q1–Q3	4–15	
Min–Max	0–16	

Weight (kg) Newborns (N=2)	N	%
Mean	21.0	
SD	15.6	
Median	21	
Q1–Q3	15.5–26.5	
Missing	0	

Gestational age Newborns (N=2)	N	%
At term	2	100.0
Not at term	0	0.0
Missing	0	

Comorbidities	N	%
No	378	63.7
Yes	215	36.3
Missing	0	

Comorbidities (top 10)	N	%
Encephalopathy	50	8.4
Genetic diseases	29	4.9
Asthma	23	3.9
Brain and skull malformations	23	3.9
Hemiplegia or paraplegia or quadriplegia	23	3.9
Malignant haematological disease	19	3.2
Skeletal malformations/disorders	18	3.0
Any tumour without metastasis	14	2.4
Neurodegenerative/Neuromuscular disease	13	2.2
Chromosomal anomalies	10	1.7
Missing	0	

Previous ICU admissions	N	%
None	400	67.5
≤2	58	9.8
>2	28	4.7
Unknown	107	18.0
Missing	0	

Previous ICU admissions (N=86)	N	%
Paediatric	37	43.0
Neonatal	27	31.4
General - adult	31	36.0
Other/Unknown	5	5.8
Missing	0	

Stay before ICU (days)	Mean	SD
Mean	2.7	
SD	12.2	
Median	0	
Q1–Q3	0–1	
Missing	1	

Source of admission	N	%
Same hospital	496	83.6
Other hospital	69	11.6
Long-term chronic care hospital	2	0.3
Directly from the community	26	4.4
Missing	0	

Ward of admission Hospital (N=565)	N	%
Medical ward	108	19.1
Surgical ward	145	25.7
Emergency room	293	51.9
Other ICU	15	2.7
High dependency care unit	4	0.7
Neonatology	0	0.0
Missing	0	

Reason for transfer from Other ICU (N=15)	N	%
Specialist expertise	10	66.7
Step-up care	2	13.3
Logistical/organizational reasons	2	13.3
Step-down care	1	6.7
Missing	0	

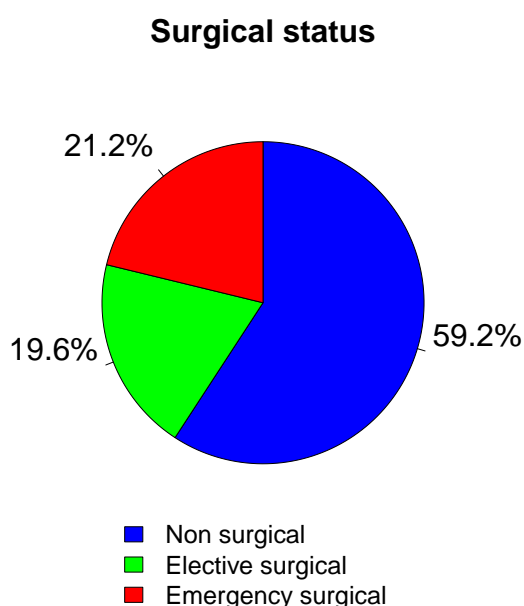
Scheduled admission	N	%
No	492	83.0
Yes	101	17.0
Missing	0	

## National report for general ICUs - Year 2016

## Characteristics on admission - Pediatric patients evaluated with PIM 3

Trauma	N	%
No	414	69.8
Yes	179	30.2
Multiple trauma	73	12.3
Missing	0	

Surgical status	N	%
Non surgical	351	59.2
Elective surgical	116	19.6
Emergency surgical	126	21.2
Missing	0	



Source of admission	N	%
<b>Surgical pt. (N=242)</b>		
Operating theatre of surgical ward	131	54.8
Operating theatre of emergency room	40	16.7
Surgical ward	8	3.3
Other	60	25.1
Missing	3	

Surgical interventions (top 10)	N	%
<b>Elective surgical (N=116)</b>		
Orthopaedic surgery	26	22.4
Gastrointestinal surgery	23	19.8
ENT surgery	22	19.0
Neurosurgery	15	12.9
Nephro/Urological surgery	9	7.8
Maxillo-Facial surgery	8	6.9
Thoracic surgery	5	4.3
Other surgery	4	3.4
Splenectomy	2	1.7
Gynaecological surgery	1	0.9
Missing	1	

Timing	N	%
<b>Elective surgical (N=116)</b>		
From -7 to -3 days	1	0.9
From -2 to -1 days	2	1.7
On ICU admission day	109	94.0
The day after ICU admission	6	5.2
Missing	0	

Surgical interventions (top 10)	N	%
<b>Emergency surgical (N=126)</b>		
Orthopaedic surgery	34	27.0
Neurosurgery	31	24.6
Gastrointestinal surgery	25	19.8
Splenectomy	12	9.5
ENT surgery	9	7.1
Peripheral vascular surgery	6	4.8
Maxillo-Facial surgery	5	4.0
Hepatic surgery	3	2.4
Thoracic surgery	3	2.4
Other surgery	3	2.4
Missing	0	

Timing	N	%
<b>Emergency surgical (N=126)</b>		
From -7 to -3 days	1	0.8
From -2 to -1 days	12	9.5
On ICU admission day	118	93.7
The day after ICU admission	4	3.2
Missing	0	

Non surgical interventions	N	%
None	562	94.8
Elective	7	1.2
Emergency	24	4.0
Missing	0	

Non surgical interventions	N	%
<b>Elective (N=7)</b>		
Diagnostic bronchoscopy on admission	4	57.1
Interventional neuroradiology	1	14.3
Therapeutic endoscopy (bronchoscopy excluded)	1	14.3
Interventional radiology	0	0.0
Interventional cardiology	0	0.0
Interventional endoscopy	0	0.0
Missing	1	

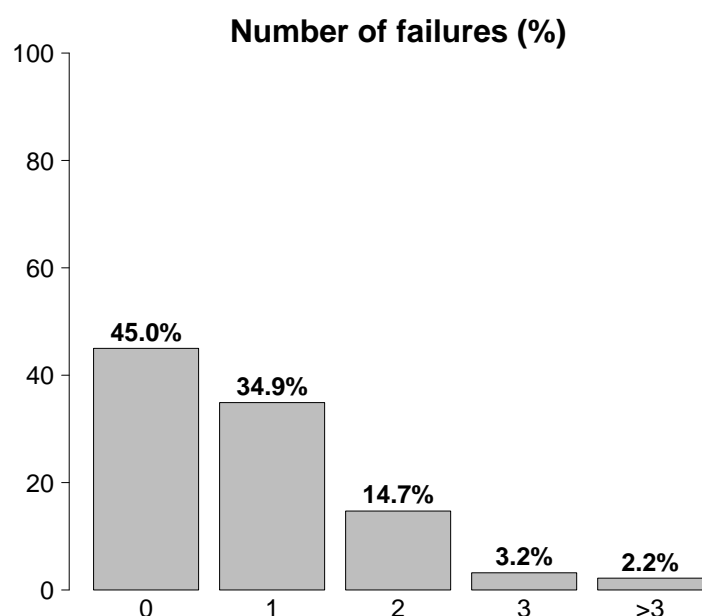
Non surgical interventions	N	%
<b>Emergency (N=24)</b>		
Therapeutic endoscopy (bronchoscopy excluded)	6	25.0
Interventional radiology	5	20.8
Therapeutic bronchoscopy	4	16.7
Interventional neuroradiology	3	12.5
Interventional cardiology	1	4.2
Interventional endoscopy	0	0.0
Missing	5	



## National report for general ICUs - Year 2016

## Characteristics on admission - Pediatric patients evaluated with PIM 3

Reason for admission	N	%
Monitoring/Weaning	320	58.3
Post surgical weaning	85	15.7
Surgical monitoring	71	13.1
Post interventional weaning	2	0.4
Interventional monitoring	6	1.1
Non surgical monitoring	149	27.5
Missing	7	
Admission for procedures/treatments	0	0.0
Intensive Treatment	228	41.5
Ventilatory support	214	36.1
Cardiovascular support	24	4.0
Metabolic support	17	2.9
Missing	0	
Palliative Sedation	0	0.0
Diagnosis of death/Organ donation	1	0.2
Missing	44	



Failures on admission	N	%
No	267	45.0
Yes	326	55.0
A: Respiratory failure	210	35.4
B: Cardiovascular failure	86	14.5
C: Neurological failure	53	8.9
D: Hepatic failure	41	6.9
E: Renal failure	74	12.5
F: Acute skin failure	2	0.3
G: Metabolic failure	27	4.6
H: Coagulation failure	2	0.3
Missing	0	

Failures on admission (top 10)	N	%
A	115	19.4
E	30	5.1
AB	26	4.4
B	21	3.5
AE	17	2.9
AC	15	2.5
C	15	2.5
D	14	2.4
G	12	2.0
AD	6	1.0
Missing	0	

Respiratory failure	N	%
None	379	63.9
Only hypoxic failure	50	8.4
Only hypercapnic failure	12	2.0
Hypoxic-hypercapnic failure	13	2.2
Intubation for airway maint.	139	23.4
Missing	0	

Cardiovascular failure	N	%
None	569	96.0
Without shock	8	1.3
Cardiogenic shock	1	0.2
Septic shock	3	0.5
Haemorrhagic/hypovolemic shock	8	1.3
Hypovolemic shock	1	0.2
Anaphylactic shock	0	0.0
Neurogenic shock	3	0.5
Other shock	0	0.0
Mixed shock	0	0.0
Missing	0	

Neurologic failure	N	%
None	424	83.3
Cerebral coma	66	13.0
Metabolic coma	9	1.8
Postanoxic coma	7	1.4
Toxic coma	3	0.6
Missing or not evaluable	84	

Renal failure (RIFLE)	N	%
None	519	87.5
Risk	53	8.9
Injury	7	1.2
Failure	12	2.0
Loss	1	0.2
End-stage renal disease	1	0.2
Missing	0	

## National report for general ICUs - Year 2016

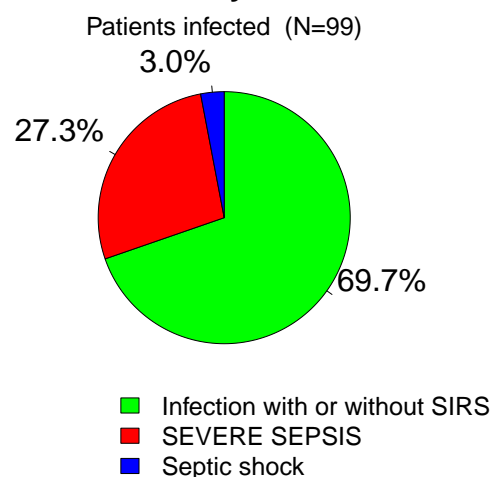
## Characteristics on admission - Pediatric patients evaluated with PIM 3

Clinical conditions on admission	N	%
Respiratory	108	18.2
Upper respiratory tract disease	27	4.6
Acute asthma/bronchospasm	23	3.9
Aspiration pneumonia	23	3.9
Pleural effusion	13	2.2
Atelectasis	12	2.0
Cardiovascular	20	3.4
Cardiac arrest	10	1.7
Acute severe arrhythmia: tachycardias	3	0.5
Pericardial effusion (non traumatic)	3	0.5
Systemic hypertensive crisis	1	0.2
Left heart failure without pulm. edema	1	0.2
Neurological	126	21.2
Seizures	86	14.5
Brain tumour	15	2.5
Spontaneous Hydrocephalus	6	1.0
Neuropathy/myopathy	5	0.8
Brain and skull malformations	5	0.8
Gastrointestinal and hepatic	39	6.6
Oesophago-gastro-intestinal malf.	15	2.5
Intestinal occlusion	8	1.3
Intrabdominal bleeding (non traumatic)	3	0.5
Gastrointestinal bleeding: upper tract	2	0.3
Gastrointestinal perforation	2	0.3
Trauma (anatomical districts)	179	30.2
Head	96	16.2
Pelvis/bone/joint & muscle	61	10.3
Chest	57	9.6
Abdomen	50	8.4
Spine	21	3.5
Major vessels injury	6	1.0
Miscellaneous	3	0.5
Other	170	28.7
Other disease	39	6.6
ENT/maxillofacial disease	31	5.2
Metabolic disorder	27	4.6
Acute intoxication	23	3.9
Orthopaedic disease	23	3.9
Post transplantation	2	0.3
Bone marrow transplantation	1	0.2
Renal transplantation	1	0.2
Infections	102	17.2
Pneumonia	39	6.6
NON-surgical CNS infection	16	2.7
L.R.T.I. other than pneumonia	11	1.9
Upper respiratory tract infection	11	1.9
Clinical sepsis	3	0.5
F.U.O. fever of unknown origin	3	0.5
Pleurisy/Pleural empyema	3	0.5
NON-surgical urinary tract infection	3	0.5
Post-surgical CNS infection	2	0.3
Gastroenteritis	2	0.3
Missing	0	

Trauma (anatomical districts)	N	%
Head	96	16.2
Skull fracture	34	5.7
Cerebral contusion/laceration	28	4.7
Maxillofacial fracture	28	4.7
Traumatic Subdural haematoma	20	3.4
Extradural/epidural haematoma	16	2.7
Spine	21	3.5
Vertebral fracture, without deficit	15	2.5
Tetraplegia	2	0.3
Cervical injury, incomplete deficit	1	0.2
Chest	57	9.6
Other injuries of the chest	31	5.2
Traum. haemothorax/pneumothorax	19	3.2
Severe lung contusion/laceration	14	2.4
Abdomen	50	8.4
Spleen: Moderate-Severe laceration	25	4.2
Liver: Moderate-Severe laceration	12	2.0
Minor injuries of the abdomen	7	1.2
Pelvis/bone/joint & muscle	61	10.3
Long bone fracture	46	7.8
Multiple fracture of the pelvis	18	3.0
Massive crush/amputation	2	0.3
Major vessels injury	6	1.0
Proximal limbs vessels: transection	3	0.5
Neck vessels: dissection/transection	2	0.3
Major abdominal vessels: transection	1	0.2
Miscellaneous	3	0.5
Burns (>30% BSA)	3	0.5
-	0	0.0
Missing	0	

Infection severity on admission	N	%
None	491	83.2
Infection with or without SIRS	69	11.7
SEVERE SEPSIS	27	4.6
Septic shock	3	0.5
Missing	3	

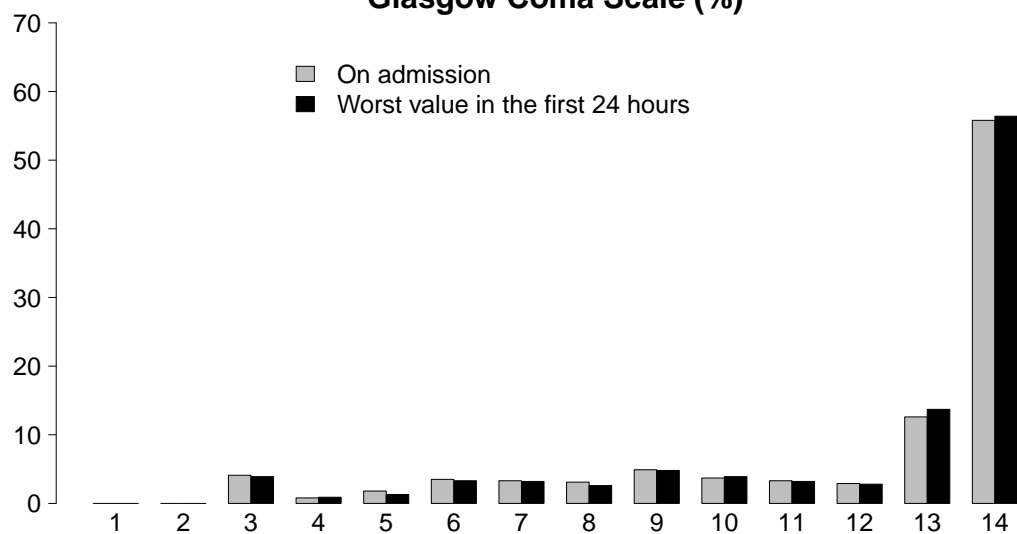
## Infection severity on admission



## National report for general ICUs - Year 2016

## Severity scores - Pediatric patients evaluated with PIM 3

## Glasgow Coma Scale (%)



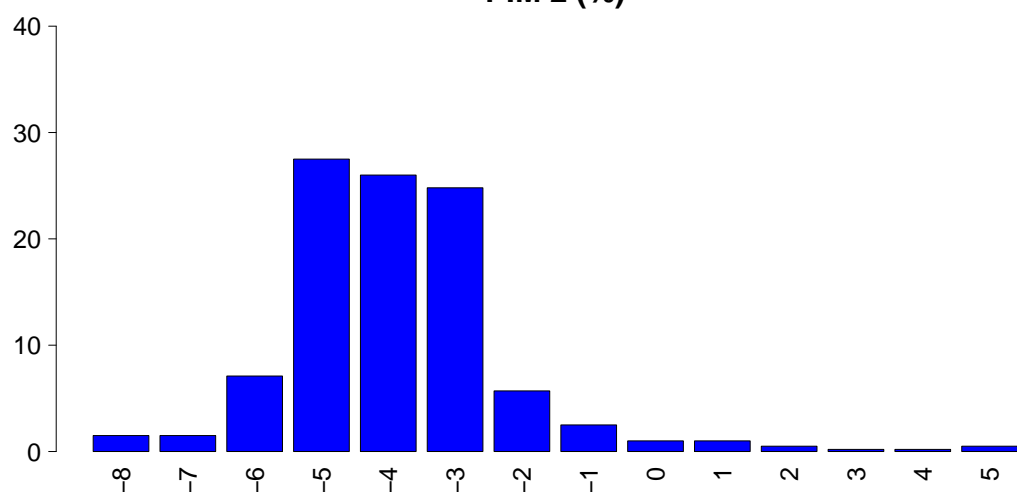
## GCS (admission)

Median	14
Q1–Q3	10–14
Not evaluable	84
Missing	0

## GCS (first 24 hours)

Median	14
Q1–Q3	11–14
Not evaluable	54
Missing	0

## PIM 2 (%)



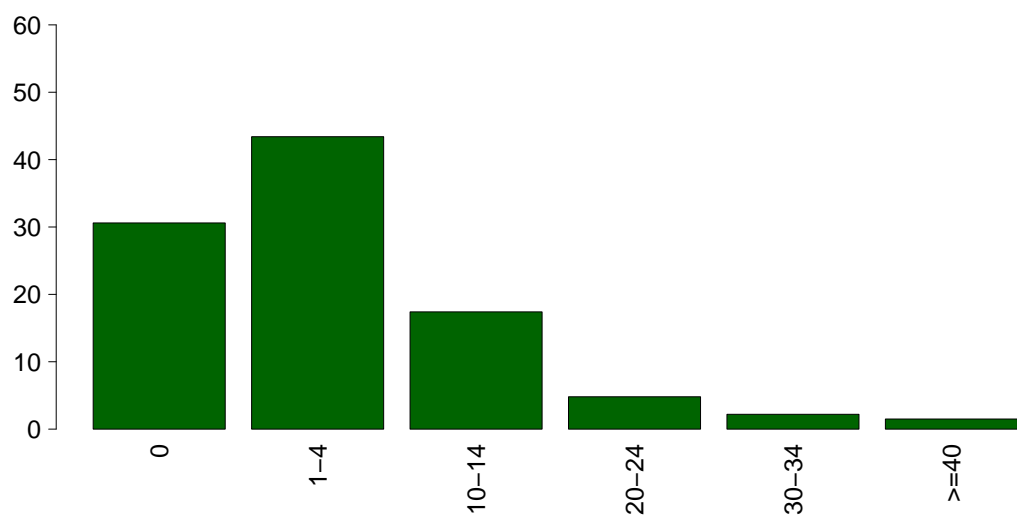
## PIM 2

Median	-4.2
Q1–Q3	-4.8–-3.1
Not evaluable	0
Missing	0

## PIM 3

Median	-4.4
Q1–Q3	-5.4–-3.3
Not evaluable	0
Missing	0

## PELOD (%)



## PELOD

Mean	4.9
SD	8.8
Median	1
Q1–Q3	0–10
Not evaluable	54
Missing	0

## National report for general ICUs - Year 2016

## Characteristics during the stay - Pediatric patients evaluated with PIM 3

Complications during the stay	N	%
No	514	86.7
Yes	79	13.3
Missing	0	

Failures during the stay	N	%
No	573	96.6
Yes	20	3.4
A: Respiratory failure	11	1.9
B: Cardiovascular failure	5	0.8
C: Neurological failure	1	0.2
D: Hepatic failure	0	0.0
E: Renal failure (AKIN)	4	0.7
F: Acute skin failure	0	0.0
G: Metabolic failure	3	0.5
H: Coagulation failure	1	0.2
Missing	0	

Failures during the stay (top 10)	N	%
A	10	1.7
B	3	0.5
E	3	0.5
G	2	0.3
ABCGH	1	0.2
BE	1	0.2
-	0	0.0
-	0	0.0
-	0	0.0
-	0	0.0
Missing	0	

Respiratory failure occurred	N	%
None	582	98.1
Intubation for airway maint.	3	0.5
Hypoxic failure	8	1.3
Hypercapnic failure	2	0.3
Missing	0	

Cardiovascular failure occurred	N	%
None	588	99.2
Cardiogenic shock	2	0.3
Hypovolemic shock	0	0.0
Haemorrhagic/hypovolemic shock	0	0.0
Septic shock	1	0.2
Anaphylactic shock	0	0.0
Neurogenic shock	1	0.2
Other shock	2	0.3
Missing	0	

Neurological failure occurred	N	%
None	592	99.8
Cerebral coma	1	0.2
Metabolic coma	0	0.0
Postanoxic coma	0	0.0
Missing	0	

Renal failure occurred (AKIN)	N	%
None	589	99.3
Mild	1	0.2
Moderate	0	0.0
Severe	3	0.5
Missing	0	

Complications during the stay	N	%
Respiratory	25	4.2
Acute asthma/bronchospasm	7	1.2
Pleural effusion	5	0.8
Upper resp. tract disease	4	0.7
Mild ARDS	2	0.3
Aspiration pneumonia	2	0.3
Cardiovascular	3	0.5
Cardiac arrest	3	0.5
Acute severe arrhythmia: tachycardias	1	0.2
-	0	0.0
-	0	0.0
-	0	0.0
Neurological	23	3.9
Intracranial hypertension	8	1.3
Brain edema	7	1.2
Drowsiness/agitation/delirium	7	1.2
Seizures	7	1.2
Non-surgical intracranial bleeding	2	0.3
Gastrointestinal and hepatic	2	0.3
Gastrointestinal bleeding: upper tract	2	0.3
-	0	0.0
-	0	0.0
-	0	0.0
-	0	0.0
-	0	0.0
-	0	0.0
Other	5	0.8
Metabolic disorder	3	0.5
Other disease	2	0.3
-	0	0.0
-	0	0.0
-	0	0.0
-	0	0.0
-	0	0.0
-	0	0.0
Infections	23	3.9
L.R.T.I. other than pneumonia	7	1.2
Pneumonia	6	1.0
NON-surgical urinary tract infection	3	0.5
Primary bacteraemia of unknown origin	2	0.3
Upper respiratory tract infection	2	0.3
Catheter-related bacteremia (CR-BSI)	1	0.2
Clinical sepsis	1	0.2
NON-surgical CNS infection	1	0.2
Post-surgical skin/soft tissue infection	1	0.2
Post-surgical urinary tract infection	1	0.2
Missing	0	

## National report for general ICUs - Year 2016

## Characteristics during the stay - Pediatric patients evaluated with PIM 3

Infections	N	%
None	471	79.4
Only on admission	99	16.7
On admission and during ICU stay	3	0.5
Only during ICU stay	20	3.4
Missing	0	

Maximum severity of infection	N	%
None	471	79.8
Infection with or without SIRS	82	13.9
SEVERE SEPSIS	34	5.8
Septic shock	3	0.5
Missing	3	

## Severity evolution

Severity evolution		During the stay				
		N (R %)	None	Infection with or without SIRS	SEVERE SEPSIS	Septic shock
Admission	None	471 (95.9%)	15 (3.1%)	5 (1.0%)	0 (0.0%)	491
	Infection with or without SIRS	-	66 (95.7%)	3 (4.3%)	0 (0.0%)	69
	SEVERE SEPSIS	-	-	26 (96.3%)	0 (0.0%)	27
	Septic shock	-	-	-	3 (100.0%)	3
	TOT	471	82	34	3	590

Ventil. Associat. Pneumonia (VAP)	N	%
No	587	99.0
Yes	6	1.0
Missing	0	

## Incidence of VAP

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

Estimate	9.3
CI (95%)	3.4–20.3

## Incidence of VAP

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

Estimate	7.4%
CI (95%)	2.7–16.2

Catheter Bacteraemia (CR-BSI)	N	%
No	592	99.8
Yes	1	0.2
Missing	0	

## Incidence of CR-BSI

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

Estimate	1.0
CI (95%)	0.0–5.6

## Incidence of CR-BSI

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

Estimate	1.2%
CI (95%)	0.0–6.7

# **National report for general ICUs - Year 2016** **Process indicators - Pediatric patients evaluated with PIM 3**

Procedures and/or treatments (Missing=0)	Use		On admission		On discharge		Length (days)		Days from admission	
	N	%	N	%	N	%	Median	Q1-Q3	Median	Missing
<b>Procedures (antibiotics excluded)</b>	476	80.3								
Invasive ventilation	305	51.4	243	41	38	6.4	1	0-2	0	0-0
Non invasive ventilation	39	6.6	2	0.3	4	0.7	1	1-2	0	0-0
Tracheostomy	22	3.7	9	1.5	20	3.4	10	6-20	7	5-12
iNO (inhaled nitric oxide)	0	0.0								0
Central Venous Catheter	204	34.4	96	16.2	172	29	2	1-6	0	0-0
PICC	6	1.0	1	0.2	5	0.8	6	4-10	0	0-10
Arterial Catheter	290	48.9	143	24.1	43	7.3	2	1-4	0	0-0
Vasoactive drugs	31	5.2	13	2.2	8	1.3	2	0-3	0	0-2
Antiarrhythmics	1	0.2	1	0.2	1	0.2	1	1-1	0	0
IABP	1	0.2	0	0	1	0.2	2	2-2	0	0-0
Invasive monitoring of C.O.	1	0.2	0	0	1	0.2	2	2-2	0	0-0
Continuous monitoring of ScVO2	1	0.2	0	0	0	0	7	7-7	0	0-0
Temporary pacing	0	0.0								
Ventricular assistance	0	0.0								
DC-shock	1	0.2							0	0-0
CPR	8	1.3							0	0-0
Massive transfusion	4	0.7							0	0-0
ICP monitoring without liquor-drainage	10	1.7	6	1	3	0.5	5	2-11	0	0-0
ICP monitoring with liquor-drainage	3	0.5	2	0.3	2	0.3	6	4-10	1	1-1
External ventricular drainage without ICP	3	0.5	1	0.2	3	0.5	4	3-4	2	1-3
Haemofiltration	2	0.3	0	0	1	0.2	2	2-2	0	0-1
Haemodialysis	2	0.3	0	0	1	0.2	2	2-2	0	0-0
ECMO	0	0.0								
Hepatic clearance techniques	0	0.0								
Clearance techniques during sepsis	0	0.0								
IAP (intra-abdominal pressure)	1	0.2								
Hypothermia	4	0.7								
Enteral nutrition	110	18.5	28	4.7	71	12	4	2-8	1	0-2
Parenteral nutrition	51	8.6	7	1.2	25	4.2	3	2-6	1	0-2
SDD (Topical, Topical and systemic)	4	0.7								
Patient restraint	7	1.2								
Diagnostic fibrobronchoscopy	20	3.4							0	0-2
Surfactant treatment	0	0.0								
Vacuum therapy	0	0.0								
Oxygen therapy	98	16.5	57	9.6	59	9.9	1	1-4	0	0-1
Blood transfusion	0	0.0								
Peritoneal dialysis	0	0.0								
Plasmapheresis	4	0.7								
Thoracic drainage	4	0.7	3	0.5	2	0.3	4	2-8	0	0-0
Peridural catheter	8	1.3	6	1	7	1.2	1	1-1	2	2-2
Urinary catheter	68	11.5	41	6.9	47	7.9	2	1-4	0	0-0
Near-infrared spectroscopy	0	0.0								
Phototherapy	0	0.0								
Electrical cardioversion	0	0.0								
<b>Antibiotics</b>	314	53.0								
Antibiotics for surgical prophylaxis	144	24.3	117	19.7	93	15.7	1	1-2	0	0-0
Antibiotics for medical prophylaxis	88	14.8	38	6.4	60	10.1	2	1-4	0	0-0
Empirical antibiotic therapy	79	13.3	39	6.6	50	8.4	2	1-4	0	0-1
Targeted antibiotic therapy	32	5.4	4	0.7	26	4.4	5	2-7	3	1-8

## National report for general ICUs - Year 2016

## Process indicators - Pediatric patients evaluated with PIM 3

			Length (days)				
Invasive ventilation (N=305)	N	%	Mean	SD	Median	Q1-Q3	Missing
Due to pulmonary failure	54	15.6	4.4	7.0	2	1–5	0
For airway maintenance	140	40.5	3.0	4.4	1	1–3	0
In weaning	86	24.9	0.4	0.5	0	0–1	0
Not evaluable	66	19.1	1.8	3.2	1	0–2	41
Reintubation within 48 hours	7	2.0	8.0	11.8	4	2–7	0
Non invasive ventilation (N=39)	N	%	Number of surgical interventions				
Non invasive ventilation only	29	74.4				0	583
Non invasive ventilation failed	3	7.7				1	10
For weaning	5	12.8				2	0
Other	2	5.1				3	0
Missing	0					>3	0
						Missing	0
Tracheostomy not present on admission (N=13)	N	%	Surgical interventions				
Surgical	6	46.2	Days from admission				
Percutwist	0	0.0				Mean	9.5
Ciaglia	2	15.4				SD	4.1
Monodil. Ciaglia	2	15.4				Median	8
Fantoni	1	7.7				Q1–Q3	6.5–12
Griggs	2	15.4				Missing	0
Other Kind	0	0.0					
Unknown	0	0.0					
Missing	0						
Tracheostomy - Days after the beginning of inv. vent. Not present on admission (N=13)			Surgical interventions (top 10)				
Mean	8.0					N	%
SD	5.0		ENT surgery	4	0.7		
Median	7		Orthopaedic surgery	3	0.5		
Q1–Q3	5–12		Maxillo-Facial surgery	1	0.2		
Missing	0		Neurosurgery	1	0.2		
			Other surgery	1	0.2		
			-	0	0.0		
			-	0	0.0		
			-	0	0.0		
			-	0	0.0		
			-	0	0.0		
			-	0	0.0		
			Missing	0			
Invasive monitoring of C.O. (N=1)	N	%	Non surgical interventions				
Swan Ganz	0	0.0				N	%
PICCO	1	100.0	No	589	99.3		
LIDCO	0	0.0	Yes	4	0.7		
Vigileo-PRAM	0	0.0	Missing	0			
Other	0	0.0					
Missing	0						
SDD (N=4)	N	%	Non surgical interventions				
Topical	2	50.0	Days from admission				
Topical and systemic	2	50.0				Mean	26.1
Missing	0					SD	22.8
						Median	27
						Q1–Q3	6–36
						Missing	0
Antibiotic therapy			Non surgical interventions				
Pt. infected in ICU only (N=20)	N	%					
Only empirical	1	7.1				N	%
Only targeted	4	28.6	Therapeutic endoscopy (bronchoscopy excluded)	4	0.7		
Targeted after empirical	9	64.3	Therapeutic bronchoscopy	2	0.3		
Other	0	0.0	Interventional neuroradiology	1	0.2		
Missing	6		Interventional radiology	0	0.0		
			Interventional cardiology	0	0.0		
			Interventional endoscopy	0	0.0		
			Missing	0			
Surgical interventions	N	%					
No	583	98.3					
Yes	10	1.7					
Missing	0						

**National report for general ICUs - Year 2016****Outcome indicators** - Pediatric patients evaluated with PIM 3

ICU outcome	N	%
Dead	17	2.9
Transferred to same hospital	516	87.0
Transferred to other hospital	42	7.1
Discharged home	17	2.9
Disch. terminally ill	1	0.2
Missing	0	

Transferred to (N=558)	N	%
Ward	514	92.1
Other ICU	0	0.0
High dependency care unit	26	4.7
Rehabilitation	17	3.0
Day hospital or Long-term care	1	0.2
Missing	0	

Reason of transfer to Other ICU (N=0)	N	%
Specialist expertise	0	0.0
Step-up care	0	0.0
Logistical/organizational reasons	0	0.0
Step-down care	0	0.0
Missing	0	

Transferred to Same hospital (N=516)	N	%
Ward	488	94.6
Other ICU	0	0.0
High dependency care unit	21	4.1
Rehabilitation	7	1.4
Day hospital or Long-term care	0	0.0
Missing	0	

Transferred to Other hospital (N=42)	N	%
Ward	26	61.9
Other ICU	0	0.0
High dependency care unit	5	11.9
Rehabilitation	10	23.8
Day hospital or Long-term care	1	2.4
Missing	0	

ICU mortality	N	%
Alive	575	97.0
Dead	18	3.0
Missing	0	

Timing of ICU mortality (N=18)	N	%
Daytime (08:00AM - 07:59PM)	11	61.1
Nighttime (08:00PM - 07:59AM)	7	38.9
Weekdays (Monday - Friday)	13	72.2
Weekend (Saturday - Sunday)	5	27.8
Missing	0	

C.A.M. activation (N=18)	N	%
Yes, with organ donation	5	29.4
Yes, without organ donation	3	17.6
No, with organ donation	0	0.0
No, without organ donation	9	52.9
Missing	1	

Tissue removal (N=18)	N	%
Yes, with C.A.M. activation	1	5.6
Yes, without C.A.M. activation	0	0.0
No	17	94.4
Missing	0	

Hospital mortality	N	%
Dead	24	4.1
Transf. to other acute-care hospital	47	7.9
Transf. to other type of hosp. stay	37	6.2
Nursing home	7	1.2
Voluntary discharge	5	0.8
Discharged home	472	79.7
Missing	1	

To other type of H stay (N=37)	N	%
Rehabilitation in the same institute	9	24.3
Rehabilitation in other institute	22	59.5
DH/long-term care, same inst.	1	2.7
DH/long-term care, other inst.	5	13.5
Missing	0	

Disch. terminally ill (N=568)	N	%
Yes	2	0.4
No	566	99.6
Missing	0	

Hospital mortality	N	%
Alive	566	95.6
Dead	26	4.4
Missing	1	

Timing of hosp. mortality (N=26)	N	%
In ICU	18	69.2
Within 24 hours after ICU	1	3.8
24-47 hours after ICU	1	3.8
48-71 hours after ICU	1	3.8
72-95 hours after ICU	0	0.0
After 95 hours after ICU	5	19.2
Missing	0	

Timing of hosp. mortality (days from ICU disch.) Discharged alive from ICU (N=8)		
Mean		24.1
SD		31.5
Median		10
Q1–Q3		1.8–35
Missing		0



**National report for general ICUs - Year 2016****Outcome indicators** - Pediatric patients evaluated with PIM 3

<b>Last hospital mortality</b>	N	%
Alive	566	95.6
Dead	26	4.4
Missing	1	

<b>Expected outcome</b> (N=575)	N	%
Recovery/resolution of acute episode	549	95.6
Palliative care grade 1	7	1.2
Palliative care grade 2	3	0.5
Palliative care grade 3	7	1.2
Palliative care grade 4	8	1.4
Missing	1	

<b>Outcome treatments</b> (N=26)	N	%
NON invasive ventilation	2	7.7
Invasive ventilation	6	23.1
Oxygen therapy	6	23.1
Tracheostomy	6	23.1
Diuretics grugs	2	7.7
Inotropic agents drugs	0	0.0
Antiepileptics drugs	11	42.3
Dialytic therapy	0	0.0
Limb replacement	0	0.0
Nasogastric tube	2	7.7
Ostomies	6	23.1
Home based parenteral nutrition	3	11.5
Motor physiotherapy	14	53.8
Respiratory physiotherapy	7	26.9
Posture	10	38.5
Psychological counselling	7	26.9
Missing	0	

<b>ICU stay (days)</b>		
Mean	3.4	
SD	5.9	
Median	1	
Q1–Q3	1–3	
Missing	0	

<b>ICU stay (days)</b> <b>Alive</b> (N=575)		
Mean	3.3	
SD	5.7	
Median	1	
Q1–Q3	1–3	
Missing	0	

<b>ICU stay (days)</b> <b>Dead</b> (N=18)		
Mean	4.9	
SD	11.2	
Median	1.5	
Q1–Q3	1–3.8	
Missing	0	

<b>Stay after ICU (days)</b> <b>Alive</b> (N=575)		
Mean	8.4	
SD	18.5	
Median	6	
Q1–Q3	2–9	
Missing	1	

<b>Hospital stay (days)</b>		
Mean	13.9	
SD	23.6	
Median	9	
Q1–Q3	4–15	
Missing	1	

<b>Hospital stay (days)</b> <b>Alive</b> (N=566)		
Mean	13.5	
SD	22.6	
Median	9	
Q1–Q3	4–15	
Missing	0	

<b>Hospital stay (days)</b> <b>Dead</b> (N=26)		
Mean	23.3	
SD	39.2	
Median	4	
Q1–Q3	2–14.8	
Missing	0	



## **Appendix**



# National report for general ICUs - Year 2016

## Prognostic models - Adult patients with LOS>=to 24 hours

**Model:** Logistic regression.  
**Dependent variable:** Hospital mortality°.  
**Sample used for model development:** Adults patients from general Italian ICUs.  
**Sample size (TRAINING set):** 38271 patients.

Independent variables	Coefficients (95% CI)	Odds Ratio (95% CI)	p
Intercept	-6.8 (-7.08;-6.52)	/	/
<b>Miscellanea</b>			
Age in decades	0.37 (0.35;0.4)	1.45 (1.41;1.49)	<0.001
Min((BMI - 25), 0)	-0.08 (-0.09;-0.06)	0.93 (0.91;0.94)	<0.001
Surgical status (Non surgical vs. Elective surgical)	0.75 (0.59;0.92)	/	×
Surgical status (Emergency surgical vs. Elective surgical)	0.37 (0.24;0.49)	/	
Stay before ICU (days) (logarithm)	0.32 (0.28;0.37)	1.38 (1.32;1.44)	<0.001
Admitted in hospital the same day of ICU admission (Yes vs. No)	0.11 (0.01;0.21)	1.11 (1.01;1.23)	0.029
Reason for admission: Monitoring/Weaning vs. Intensive Treatment	-0.43 (-0.55;-0.31)	/	×
Ward of admission: Emergency room/High dependency care unit/Medical ward vs. Surgical ward/Other ICU/ Long-term chronic care hospital	0.15 (0.06;0.24)	1.16 (1.06;1.28)	0.002
Source of admission: Other hospital vs. Same hospital/ Long-term chronic care hospital/Directly from the community	-0.14 (-0.24;-0.04)	0.87 (0.79;0.96)	0.005
Reason for transfer from Other ICU: Logistical/organizational reasons vs. Specialist expertise/Step-up care/Step-down care/No other ICU	-0.33 (-0.53;-0.13)	0.72 (0.59;0.88)	0.001
From Operating theatre (Yes vs. No)	-0.31 (-0.44;-0.18)	0.73 (0.64;0.84)	<0.001
<b>Physiopatological components</b>			
Bilirubin (mg/100ml) (1.2-1.9 vs. <1.2)	0.15 (0.06;0.24)	1.16 (1.06;1.27)	
Bilirubin (mg/100ml) (2-5.9 vs. <1.2)	0.4 (0.27;0.52)	1.49 (1.32;1.69)	<0.001
Bilirubin (mg/100ml) (>=6 vs. <1.2)	0.75 (0.48;1.01)	2.11 (1.62;2.74)	
WBC (10 <sup>9</sup> /L) (>=20 vs. <20)	0.08 (-0.01;0.17)	/	×
Sodium (mEq/L) (<125 vs. 125-144)	0.42 (0.15;0.69)	1.52 (1.16;1.99)	<0.001
Sodium (mEq/L) (>=145 vs. 125-144)	0.19 (0.09;0.29)	1.21 (1.1;1.34)	
Heart rate (bpm) (<70 vs. >=70)	-0.47 (-0.64;-0.29)	/	×
Serum urea (mg/100 ml) (>=60 vs. <60)	0.17 (0.08;0.25)	/	×
Potassium (mEq/L) (>=5 vs. <5)	0.15 (0.05;0.25)	1.16 (1.05;1.29)	0.004
HCO <sub>3</sub> (mEq/L) (<15 vs. >=20)	0.34 (0.21;0.46)	1.4 (1.24;1.59)	
HCO <sub>3</sub> (mEq/L) (15-19 vs. >=20)	0.15 (0.07;0.24)	1.17 (1.08;1.27)	<0.001
Platelets (10 <sup>3</sup> /mm3) (20-99 vs. >=100)	0.42 (0.32;0.52)	/	×
Platelets (10 <sup>3</sup> /mm3) (<20 vs. >=100)	1.13 (0.79;1.48)	/	
Systolic Blood Pressure (mmHg) (<70 vs. >=100)	0.59 (0.43;0.74)	/	×
Systolic Blood Pressure (mmHg) (70-99 vs. >=100)	0.19 (0.12;0.27)	/	
Urine Output (L/24h) (<0.2 vs. >=1)	0.83 (0.67;0.99)	/	×
Urine Output (L/24h) (0.2-0.99 vs. >=1)	0.31 (0.22;0.4)	/	
PaO <sub>2</sub> /FiO <sub>2</sub> (100*mmHg/%) (100-299 vs. >=300)	0.22 (0.13;0.31)	/	×
PaO <sub>2</sub> /FiO <sub>2</sub> (100*mmHg/%) (<100 vs. >=300)	0.93 (0.74;1.13)	/	
<b>Clinical conditions on admission</b>			
Acute intoxication (Yes vs. No)	-1.12 (-1.44;-0.81)	0.32 (0.24;0.45)	<0.001
Spontaneous Intraparenchymal bleeding (Yes vs. No)	0.85 (0.68;1.01)	2.33 (1.97;2.76)	<0.001
ARDS (Yes vs. No)	0.5 (0.31;0.69)	1.64 (1.36;1.99)	<0.001
Lung cancer (Yes vs. No)	0.25 (-0.53;1.03)	/	×
Acute pancreatitis (Yes vs. No)	0.75 (0.47;1.04)	2.13 (1.6;2.82)	<0.001
Seizures (Yes vs. No)	-0.46 (-0.67;-0.25)	0.63 (0.51;0.78)	<0.001
Bowel ischaemia (Yes vs. No)	0.53 (0.29;0.76)	1.69 (1.33;2.14)	<0.001
Spontaneous Subarachnoid haemorrhage (Yes vs. No)	0.51 (0.28;0.75)	1.67 (1.33;2.11)	<0.001
Cardiac arrest (Yes vs. No)	0.41 (0.24;0.59)	/	×
Cerebral artery stroke (Yes vs. No)	0.48 (0.3;0.65)	1.61 (1.35;1.92)	<0.001
Left heart failure with pulmonary edema (Yes vs. No)	0.25 (0.09;0.41)	1.28 (1.09;1.5)	0.003
Brain tumour (Yes vs. No)	0.55 (0.24;0.86)	1.73 (1.27;2.36)	0.001
Systemic hypertensive crisis (Yes vs. No)	-0.62 (-1.03;-0.2)	0.54 (0.36;0.82)	0.002
Haematological disease (Yes vs. No)	0.63 (0.3;0.97)	1.88 (1.35;2.63)	<0.001
Pneumothorax/Pneumomediastinum (Yes vs. No)	0.65 (0.28;1.02)	1.92 (1.32;2.78)	0.001
Pancreatic malignancy (Yes vs. No)	0.66 (0.3;1.02)	1.94 (1.35;2.77)	0.001
Spontaneous Hydrocephalus (Yes vs. No)	0.84 (0.27;1.42)	2.33 (1.32;4.12)	0.004
Airways bleeding (Yes vs. No)	0.67 (0.21;1.13)	1.95 (1.23;3.09)	0.005
Peripheral vascular disease (Yes vs. No)	0.44 (0.16;0.73)	1.56 (1.17;2.07)	0.003
Pneumonia (Yes vs. No)	0.58 (0.43;0.72)	/	×
Endocarditis (Yes vs. No)	0.72 (0.28;1.16)	2.05 (1.32;3.19)	0.002
Peritonites (Yes vs. No)	0.43 (0.26;0.59)	1.53 (1.29;1.81)	<0.001
Skin or soft tissue infection (Yes vs. No)	0.8 (0.46;1.14)	/	×
Infection with or without SIRS or SEVERE SEPSIS (Yes vs. No)	-0.26 (-0.37;-0.14)	/	×
Septic shock (Yes vs. No)	0.01 (-0.15;0.16)	/	
Traumatic diffuse injury with oedema (Yes vs. No)	1.37 (0.73;2.01)	3.93 (2.07;7.45)	<0.001
Maxillofacial fracture (Yes vs. No)	-0.79 (-1.1;-0.48)	0.45 (0.33;0.62)	<0.001
Traumatic Subdural haematoma (Yes vs. No)	0.66 (0.42;0.91)	1.94 (1.52;2.48)	<0.001

(to be continued)

°For patients transferred to other ICU or to rehabilitation/high dependency care unit in other hospital, it is considered the outcome at the last hospital discharge.  
 × See interaction significance.

Comorbidities			
Severe COPD (Yes vs. No)	0.27 (0.16;0.36)	1.31 (1.17;1.47)	<0.001
Dementia (Yes vs. No)	0.3 (0.16;0.44)	1.35 (1.18;1.56)	<0.001
Malignant haematological disease (Yes vs. No)	0.44 (0.24;0.65)	1.56 (1.28;1.91)	<0.001
Restrictive lung disease (Yes vs. No)	0.69 (0.51;0.86)	1.99 (1.67;2.37)	<0.001
Immunosuppression (Yes vs. No)	0.4 (0.18;0.63)	1.5 (1.19;1.88)	0.001
Any tumour without metastasis (Yes vs. No tumor)	0.16 (0.06;0.26)	1.17 (1.06;1.3)	<0.001
Metastatic cancer (Yes vs. No tumor)	1.06 (0.92;1.21)	2.89 (2.5;3.35)	<0.001
NYHA class IV (Yes vs. No)	0.65 (0.46;0.85)	1.93 (1.59;2.33)	<0.001
Moderate or severe liver disease (Yes vs. No)	0.45 (0.25;0.64)	1.56 (1.29;1.9)	<0.001
Peripheral vascular disease (Yes vs. No)	0.24 (0.14;0.34)	1.27 (1.15;1.41)	<0.001
Diabetes: Type II diabetes without insuline treatment vs. No diabetes or type I diabetes	-0.14 (-0.23;-0.05)	0.87 (0.79;0.95)	<0.001
Diabetes: Type II diabetes with insuline treatment vs. No diabetes or type I diabetes	0.21 (0.1;0.33)	1.24 (1.1;1.39)	<0.001
Arrhythmia (Yes vs. No)	0.18 (0.1;0.26)	1.2 (1.11;1.3)	<0.001
Antiplatelet therapy (Yes vs. No)	-0.21 (-0.32;-0.1)	0.81 (0.72;0.9)	<0.001
Asthma (Yes vs. No)	-0.42 (-0.66;-0.17)	0.66 (0.52;0.84)	0.001
Neurodegenerative/Neuromuscular disease (Yes vs. No)	0.26 (0.09;0.43)	1.29 (1.09;1.53)	0.004
Myocardial infarction (Yes vs. No)	0.12 (0.03;0.21)	1.13 (1.03;1.24)	0.008
Pressure ulcer: Stadium II, III, IV vs. Other	0.83 (0.53;1.13)	2.29 (1.7;3.09)	<0.001
Organ failures			
GCS (3,4,5,6 vs. 15)	1.84 (1.64;2.04)	/	
GCS (7,8,9 vs. 15)	0.96 (0.82;1.1)	/	
GCS (10,11,12,13,14 vs. 15)	0.42 (0.33;0.51)	/	x
GCS (Not evaluable in the first 24 hours in neurological patient* vs. 15)	0.72 (0.29;1.14)	/	
GCS (Not evaluable in the first 24 hours in NON-neurological patient* vs. 15)	-0.3 (-0.69;0.08)	/	
Pupils in the first 24 hrs.: Unilaterally dilated and non-reactive vs. Bilaterally reactive and/or miotic	1.23 (0.97;1.48)	3.41 (2.65;4.39)	
Pupils in the first 24 hrs.: Bilaterally dilated and non-reactive vs. Bilaterally reactive and/or miotic	3.07 (2.7;3.44)	21.49 (14.84;31.1)	<0.001
Pupils in the first 24 hrs.: Unavailable/Unassessable vs. Bilaterally reactive and/or miotic	1.15 (0.77;1.52)	3.14 (2.17;4.56)	
Renal failure (AKIN): Moderate or Severe (Yes vs. No)	0.46 (0.29;0.64)	/	x
Neurologic failure Toxic coma or Metabolic coma (Yes vs. No)	-0.59 (-0.78;-0.41)	/	x
Neurologic failure Postanoxic coma (Yes vs. No)	0.18 (-0.11;0.47)	/	
Cardiovascular failure: Without shock (Yes vs. No)	-0.01 (-0.14;0.13)	/	x
Neurogenic shock (Yes vs. No)	0.78 (0.47;1.1)	2.19 (1.6;3)	<0.001
Hepatic failure (Yes vs. No)	0.72 (0.39;1.05)	2.05 (1.47;2.85)	<0.001
Number of failures	0.16 (0.12;0.21)	1.18 (1.12;1.23)	<0.001
Surgical and non surgical procedures			
Gastrointestinal surgery (Yes vs. No)	0.49 (0.36;0.61)	1.63 (1.44;1.84)	<0.001
Abdominal vascular surgery (Yes vs. No)	0.45 (0.21;0.68)	1.56 (1.24;1.98)	<0.001
Splenectomy (Yes vs. No)	0.64 (0.27;1.01)	1.9 (1.31;2.75)	0.001
Interactions among independent variables			
Heart rate (bpm) (<70) × Urine Output (L/24h) (<1)	0.33 (0.15;0.51)	/	<0.001
Heart rate (bpm) (<70) × PaO2/FiO2 (100*mmHg/%) (100-299)	0.23 (0.04;0.43)	/	0.002
Heart rate (bpm) (<70) × PaO2/FiO2 (100*mmHg/%) (<100)	0.55 (0.23;0.86)	/	
GCS (3,4,5,6,Not evaluable in the first 24 hours in neurological patient*) × PaO2/FiO2 (100*mmHg/%) (100-299)	-0.32 (-0.5;-0.14)	/	<0.001
GCS (3,4,5,6,Not evaluable in the first 24 hours in neurological patient*) × PaO2/FiO2 (100*mmHg/%) (<100)	0.74 (-1.08;-0.39)	/	
Platelets (10 <sup>3</sup> /mm3) (<20) × WBC (10 <sup>9</sup> /L) (>=20)	-1.04 (-1.74;-0.35)	/	0.004
Serum urea (mg/100 ml) (>=60) × PaO2/FiO2 (100*mmHg/%) (<100)	-0.37 (-0.59;-0.15)	/	0.001
Pneumonia × GCS (3-9,Not evaluable in the first 24 hours in neurological patient*,Not evaluable in the first 24 hours in NON-neurological patient*)	-0.4 (-0.59;-0.21)	/	<0.001
Systolic Blood Pressure (mmHg) (<70) × Urine Output (L/24h) (<0.2)	0.9 (0.63;1.17)	/	<0.001
Systolic Blood Pressure (mmHg) (<70) × Urine Output (L/24h) (0.2-0.99)	0.34 (0.13;0.55)	/	
Serum urea (mg/100 ml) (>=60) × Renal failure (AKIN) (Moderate or Severe)	-0.25 (-0.44;-0.07)	/	0.008
Lung cancer × PaO2/FiO2 (100*mmHg/%) (<300)	1.21 (0.38;2.04)	/	0.002
Monitoring/Weaning × Infection with or without SIRS/SEVERE SEPSIS	0.46 (0.25;0.66)	/	<0.001
Skin or soft tissue infection × Surgical status - Non surgical	-0.58 (-1.03;-0.13)	/	0.012
Systolic Blood Pressure (mmHg) (<70) × Septic shock	-0.61 (-0.83;-0.39)	/	<0.001
Systolic Blood Pressure (mmHg) (<70) × Cardiovascular failure - Without shock	-0.56 (-0.92;-0.2)	/	0.002
Neurologic failure - Postanoxic coma × GCS (Not evaluable in the first 24 hours in NON-neurological patient*)	1.3 (0.47;2.13)	/	<0.001
Neurologic failure - Postanoxic coma × GCS (7,8,9)	-0.61 (-1.04;-0.17)	/	
Neurologic failure - Postanoxic coma × Cardiac arrest	-0.39 (-0.74;-0.04)	/	0.029

Dependent variable explained

Likelihood Ratio Test: 16708  
Degree of freedom: 113  
p-value: <0.0001

Goodness-of-fit

Area under the ROC curve: 0.891  
GiVITI Calibration Test: 0.67  
p-value: 0.412  
Polynomial Degree: 2

\* A neurological patient is a one with an altered consciousness, probably due to a direct brain injury. It is defined by the presence of at least one of these clinical conditions on admission: Cerebral artery stroke, Vertebral basilar ischemic stroke, Intracranial hypertension, Spontaneous Hydrocephalus, Non traumatic cerebral oedema, Metabolic/postanoxic encephalopathy, Seizures, Brain tumour, Cerebral Aneurysm, AVM (ArterioVenous Malformation), Chronic Subdural haematoma, Spontaneous Subarachnoid haemorrhage, Spontaneous Intraparenchymal bleeding, CNS degenerative disease, Brain and skull malformations, Cerebral contusion/laceration, Traumatic diffuse injury without oedema, Traumatic diffuse injury with oedema, Extradural/epidural haematoma, Traumatic Subdural haematoma, Traumatic intraparenchymal bleeding, Traumatic subarachnoid haemorrhage, Skull fracture, NON-surgical CNS infection, Post-surgical CNS infection, Ventriculostomy-related CNS infection.

× See interaction significance.

**National report for general ICUs - Year 2016****Validity of the models - Calibration belts**

The calibration belt is designed to compare actually observed mortality with expected mortality according to a given prediction model. Expected mortality is plotted on the x axis while observed mortality is plotted on the y-axis. Two overlapping belts are presented in each graph: the first, in light grey, with a confidence level of 80%, and the second, in dark grey, with a confidence level of 95%. The belt lying above the bisector indicates that observed mortality is higher than expected mortality; vice versa, the belt lying below the bisector indicates that observed mortality is lower than expected mortality. The belt is plotted in the range of expected mortality values actually present in the sample under study. The higher the polynomial, the more complex the relationship between expected and observed mortality. A significant test ( $p < 0.05$ ) indicates poor calibration.

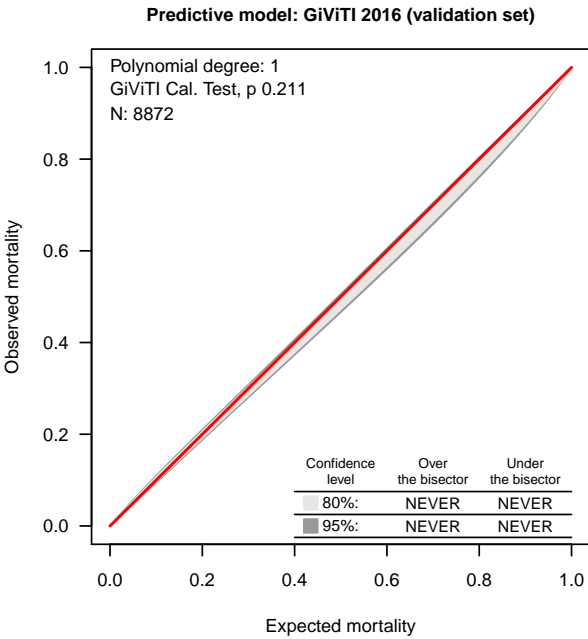
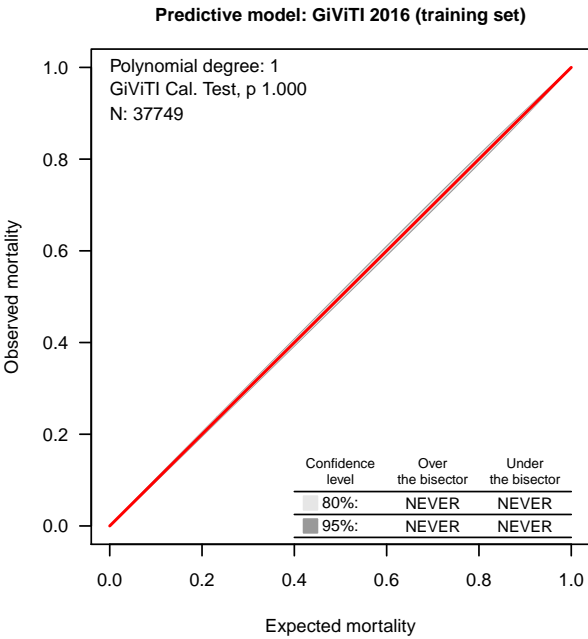
These pages show the calibration belts built on 2016 data using PIM 2, PIM 3, PELOD, SAPSII, and GiViTI 2016 prognostic models. The latter are reported for both the overall population and the subgroups presented in the report. Patients with valid data for the model were splitted in two subgroups in order to build the model on the first one (training set) and to validate it on the second one (validation set).

These belts serve as a representation of the validity of the models used to evaluate the performance of each ICU. A model is well calibrated, and thus a useful tool for evaluating individual departments, when the bisector is fully included in the belt. Only when this occurs can a deviation from the bisector be attributed to local factors and not to poor calibration of the model. Poor calibration is clearly visible for SAPSII and PELOD and, accordingly, these should be used with caution to assess the performance of individual ICUs.

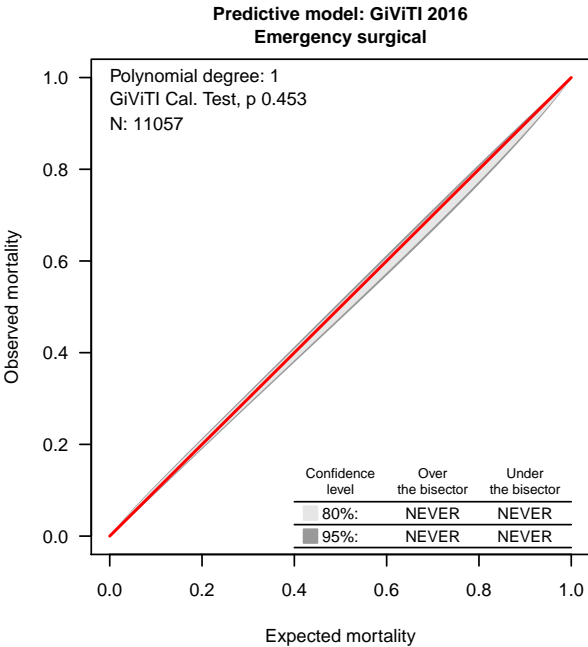
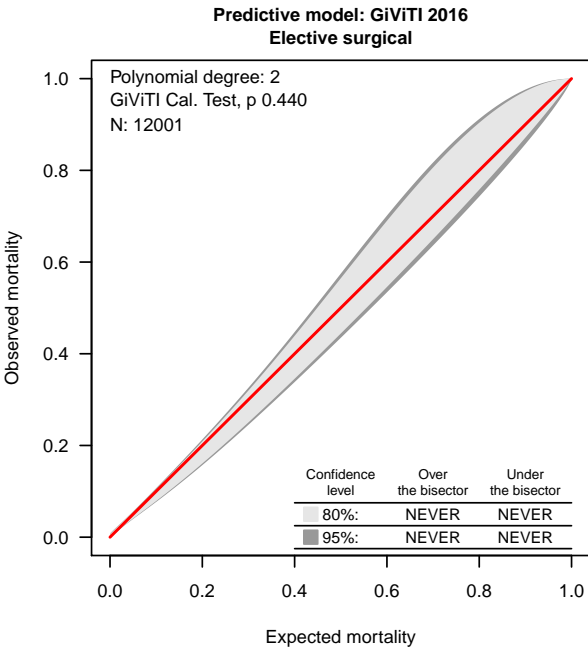
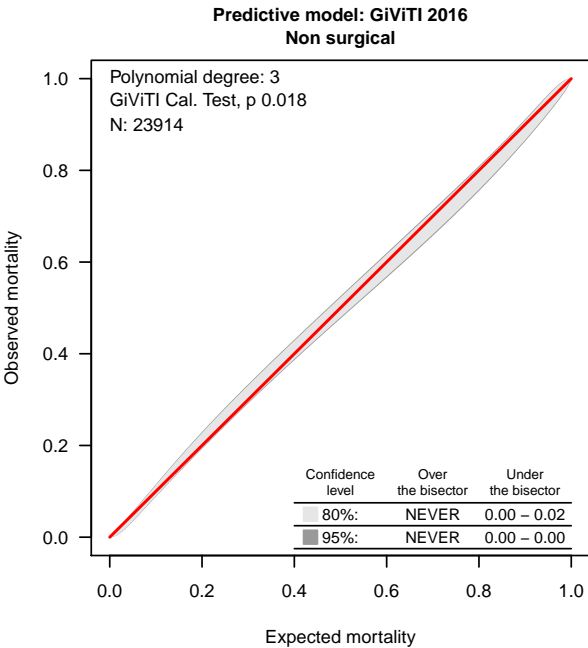
Moreover, the calibration belt built on 2016 data using the GiViTI 2015 model is reported. The aim of this belt is to investigate 2015 to 2016 difference in terms of performance of the GiViTI general ICUs.

For further informations please look at [PLoS ONE 6(2): e16110].

National report for general ICUs - Year 2016  
Validity of the models - Calibration belts



UNIFORMITY OF FIT

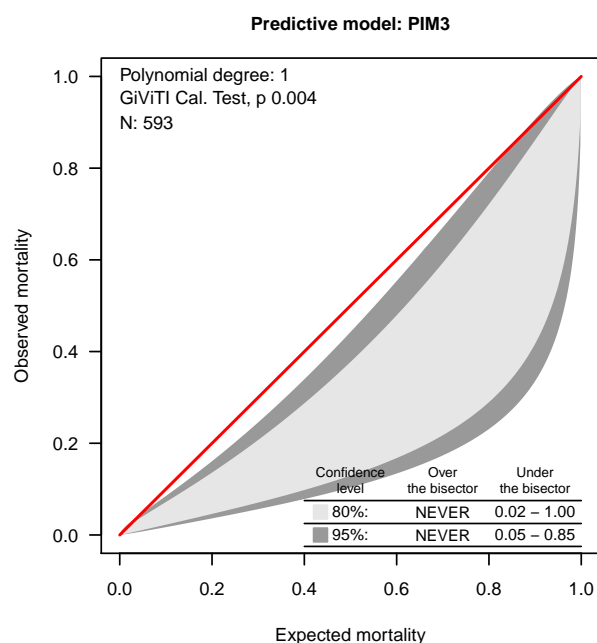
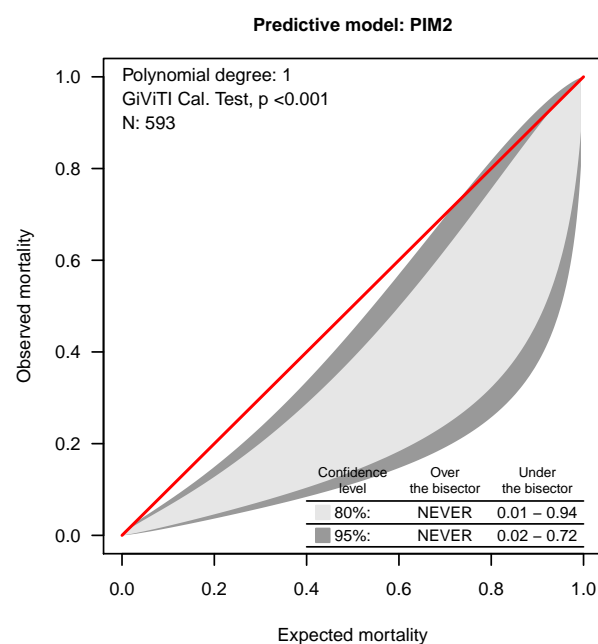
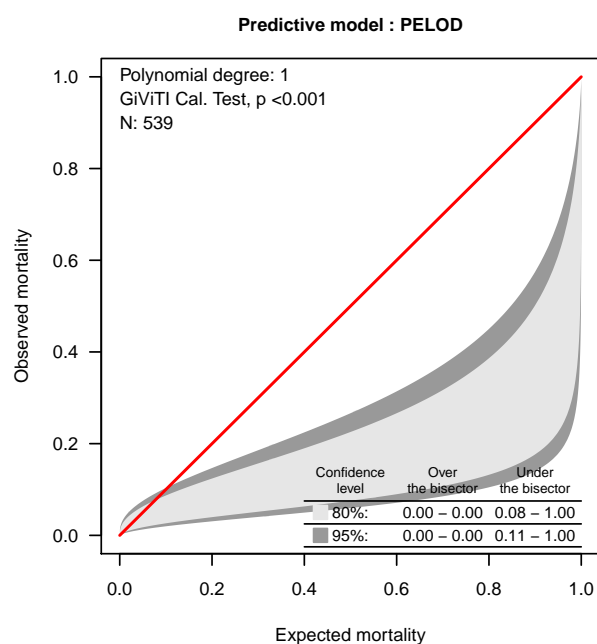
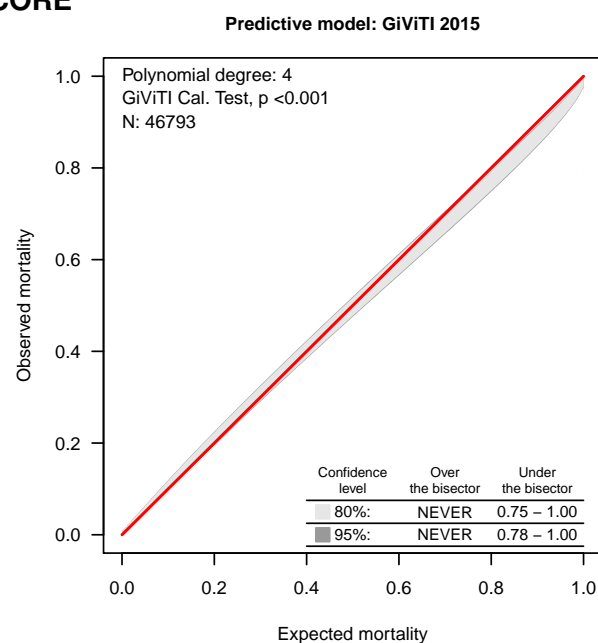
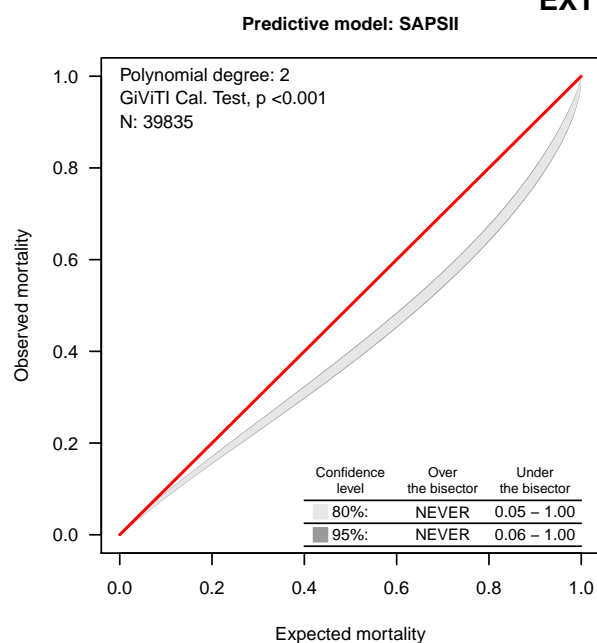




## National report for general ICUs - Year 2016

## Validity of the models - Calibration belts

## EXTERNAL SCORE





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