

GiViTi

Gruppo Italiano per la Valutazione degli Interventi In Terapia Intensiva

**Report
PROSAFE project**

Year 2016

National report (7 ICUs)

SLOVENIA

PROSAFE project - National report (7 ICUs)

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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).
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). 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

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.

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 21, 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 23 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 ± 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

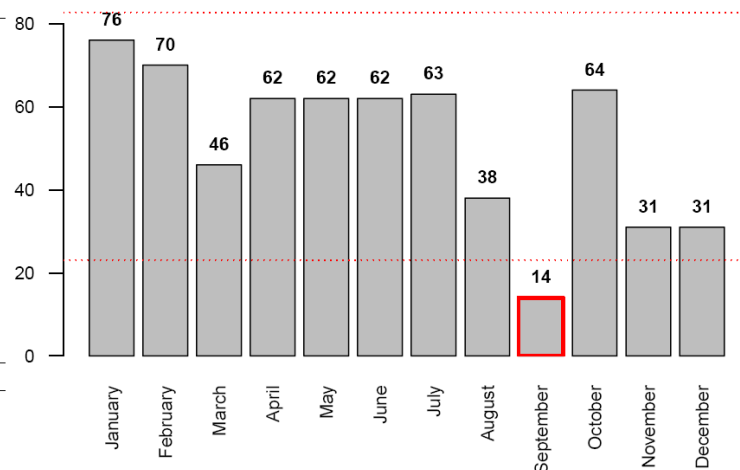
Patients admitted: 619

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.

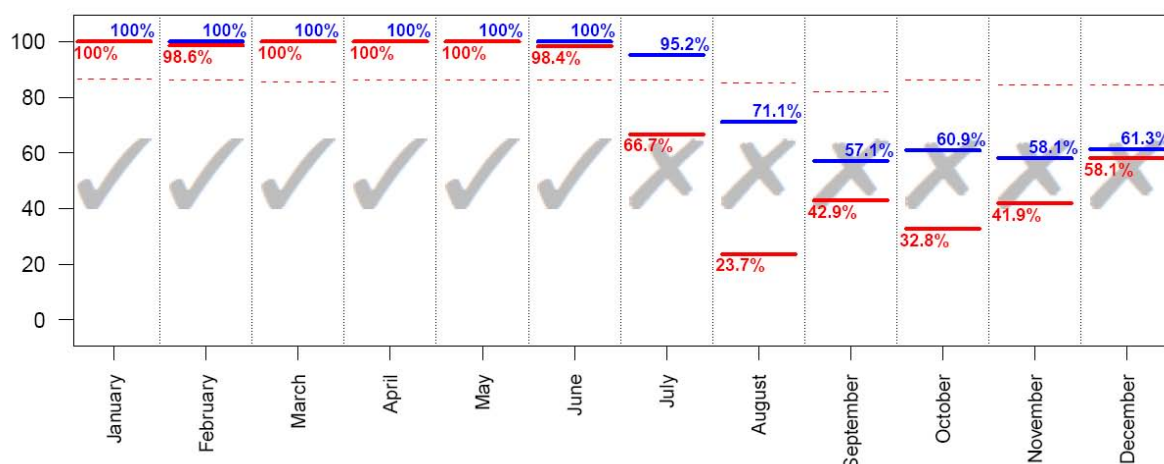
The second table divides the recruited patients by admission month and form completion status. Overall, the ICU in

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:

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

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<=BMI<=25 (males) or 19<=BMI<=24 (females); overweight if 25<BMI<=30 (males) or 24<BMI<=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 onsetting 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

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 ICU 152 patients			6 ICUs 1248 patients
 Hungary	1 ICU 523 patients			1 ICU 355 patients				2 ICUs 878 patients
 Israel					3 ICUs 1315 patients			3 ICUs 1315 patients
 Italy	166 ICUs 56797 patients	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 ICU 171 patients				1 ICU 100 patients			2 ICUs 271 patients
 Slovenia			5 ICUs 1818 patients				2 ICUs 775 patients	7 ICUs 2593 patients
Total	175 ICUs 59703 patients	21 ICUs 12855 patients	18 ICUs 8660 patients	12 ICUs 4867 patients	9 ICUs 3005 patients	7 ICUs 2859 patients	9 ICUs 3562 patients	251 ICUs 95511 patients

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

Description of hospitals (N=7) - Year 2016

Number of beds in hospital	N	%
< 300 beds	2	28.6
300 - 800 beds	4	57.1
> 800 beds	1	14.3
Missing	0	

Type of ICUs present in hospital	N	%
General	1	14.3
Medical	6	85.7
Surgical	6	85.7
Neurological/neurosurgical	1	14.3
Cardiosurgical	1	14.3
Burns	1	14.3
Post-transplantations	0	0.0
Other	1	14.3

Type of subICUs present in hospital	N	%
General	0	0.0
Surgical	5	71.4
Cardiological	3	42.9
Respiratory	0	0.0
Neurological (stroke unit)	2	28.6
Other	2	28.6

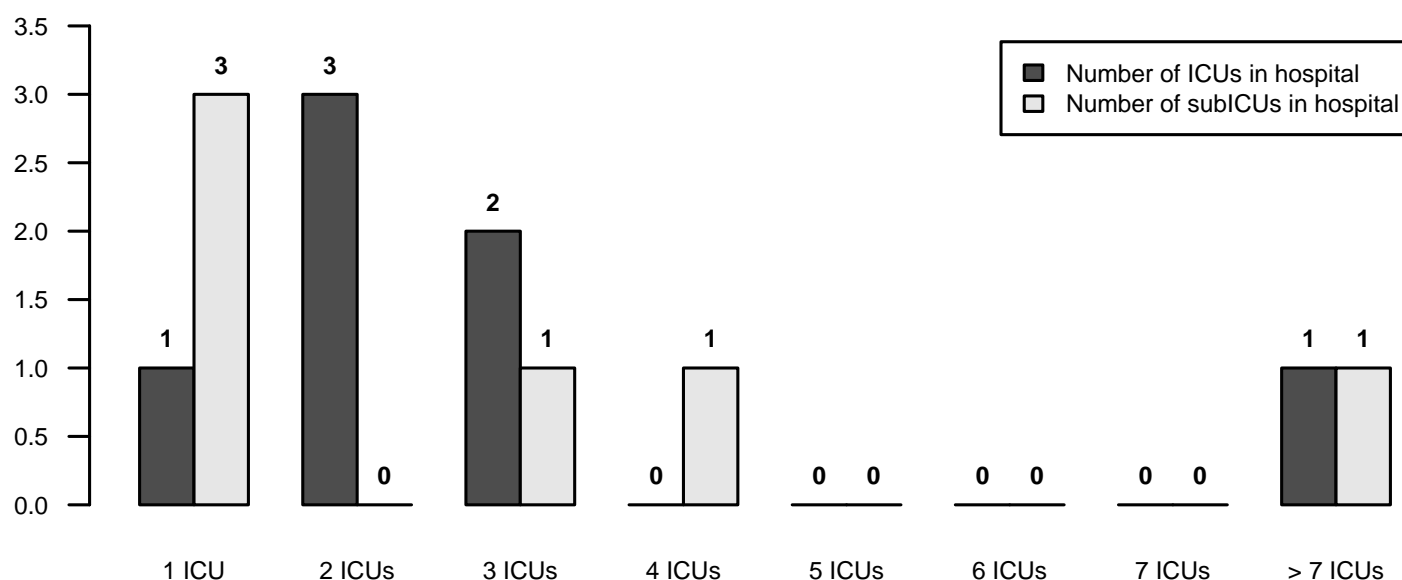
Non surgical specialties	N	%
Cardiology	6	85.7
Pulmonology	4	57.1
Nephrology	6	85.7
Infection disease	4	57.1
Pediatric	6	85.7
Neonatology	2	28.6
Neurology	5	71.4
Haematology	4	57.1
Emergency room	6	85.7
Traumatology	6	85.7
Emergency medical	6	85.7

Surgical specialties (independent ward)	N	%
Neurosurgery	1	14.3
Cardiosurgery	1	14.3
Major vascular surgery	5	71.4
Thoracic surgery	1	14.3
Pediatric surgery	3	42.9
Transplantation activities	1	14.3

Surgical specialties (procedures only)	N	%
Neurosurgery	5	71.4
Cardiosurgery	1	14.3
Major vascular surgery	0	0.0
Thoracic surgery	1	14.3
Pediatric surgery	4	57.1
Transplantation activities	2	28.6

Services/activities available in H (h24)	N	%
Neuroradiology	4	57.1
Interventional neuroradiology	2	28.6
Interventional vascular radiology	2	28.6
CT scan	5	71.4
MRI	4	57.1
Interventional hemodynamic	4	57.1
Endoscopy	5	71.4
Bronchoscopy	5	71.4
Hyperbaric chamber	0	0.0

Services/activities available in H (rep.)	N	%
Neuroradiology	0	0.0
Interventional neuroradiology	0	0.0
Interventional vascular radiology	1	14.3
CT scan	0	0.0
MRI	1	14.3
Interventional hemodynamic	0	0.0
Endoscopy	0	0.0
Bronchoscopy	0	0.0
Hyperbaric chamber	2	28.6



Description of ICUs (N=7) - Year 2016

Number of activable beds		
Mean (SD)	12.0 (4.6)	
Median (Q1–Q3)	11 (10–11)	
Missing	2	
Number of beds declared to hospital		
Mean (SD)	256.8 (263.7)	
Median (Q1–Q3)	263 (20–340)	
Missing	2	
University affiliation		
	N	%
Yes	4	57.1
No	3	42.9
Missing	0	
Square meter per bed		
Mean (SD)	21.3 (20.8)	
Median (Q1–Q3)	12 (10.5–27)	
Missing	0	
Clinical psychologist		
	N	%
No	5	71.4
For relatives	1	14.3
For patients	2	28.6
For personnel	0	0.0
ICU Structure		
	N	%
NON OPEN-SPACE	5	71.4
OPEN-SPACE (or alike)	2	28.6
Missing	0	
Physicians		
	N	%
Dedicated to ICU only	1	20.0
Dedicated to ICU on a rotation basis	1	20.0
Dedicated to ICU only and on a rotation basis	3	60.0
Missing	2	
Declared beds per physician (average)		
Mean (SD)	133.8 (122.4)	
Median (Q1–Q3)	177 (5–212.2)	
Missing	2	
Nurses		
	N	%
Dedicated to ICU only	2	40.0
Dedicated to ICU on a rotation basis	0	0.0
Dedicated to ICU only and on a rotation basis	3	60.0
Missing	2	
Declared beds per nurse (average)		
Mean (SD)	53.2 (54.3)	
Median (Q1–Q3)	54.5 (2.4–77.2)	
Missing	2	

Number of hours conceded for relatives' visits	N	%	
1	6	85.7	
2	1	14.3	
3-4	0	0.0	
5-12	0	0.0	
13-20	0	0.0	
>20	0	0.0	
Missing	0		
Maximum number of visitors per patient	N	%	
One	1	14.3	
Two	4	57.1	
Three or more	2	28.6	
Missing	0		
Biomedical devices per declared bed	Median	Q1-Q3	<5 Years (mean %)
Basic ICU monitors (ECG, NIPB, SaO2)	0.0	0.0–1.0	0.0
Advanced ICU monitors	0.0	0.0–1.0	20.0
Invasive monitoring of cardiac output (Swan-Ganz)	0.0	0.0–0.0	0.0
Invasive monitoring of cardiac output (PiCCO)	0.0	0.0–0.0	37.5
Invasive monitoring of cardiac output (Vigileo)	0.0	0.0–0.0	25.0
Non-invasive monitoring of cardiac output (impedentiometry)	0.0	0.0–0.0	75.0
Defibrillators	0.0	0.0–0.1	0.0
Both invasive and non invasive ventilators	0.0	0.0–0.6	30.9
Invasive ventilators	0.0	0.0–0.6	26.4
Non invasive ventilators	0.0	0.0–0.1	46.7
Syringe pumps	0.2	0.1–3.2	41.7
Peristaltic pumps	0.0	0.0–0.0	5.6
Biomedical equipment in ICU	N	%	
Transoesophageal echo	3	42.9	
Basic ultrasounds	6	85.7	
Advanced ultrasounds	4	57.1	
Blood-gas analyzer	4	57.1	
Haemodialysis - Haemofiltration	5	71.4	
Transport ventilator	7	100.0	
Fiberscope	7	100.0	
Extracorporeal circulation system	0	0.0	
Routine microbiological surveillance cultures	N	%	
Yes	6	85.7	
No	1	14.3	
Missing	0		

Description of ICUs (N=7) - Year 2016

Patients admitted

Mean (SD)	382.0 (187.3)
Median	423.3
Q1–Q3	313–492.4
Missing	3

Occupancy rate (%)

Mean (SD)	78.1 (5.4)
Median	78.1
Q1–Q3	76.2–80
Missing	5

Rotation index (patients/bed)

Mean (SD)	35.3 (10.6)
Median	35.3
Q1–Q3	31.6–39
Missing	5

Turnover (hours)

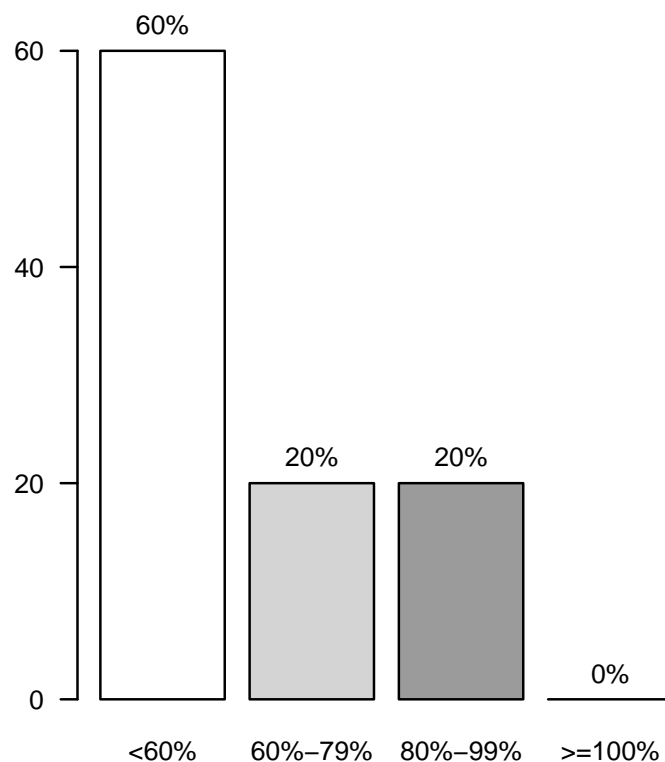
Mean (SD)	53.7 (2.7)
Median	53.7
Q1–Q3	52.7–54.7
Missing	5

Occupied beds per physician (average)

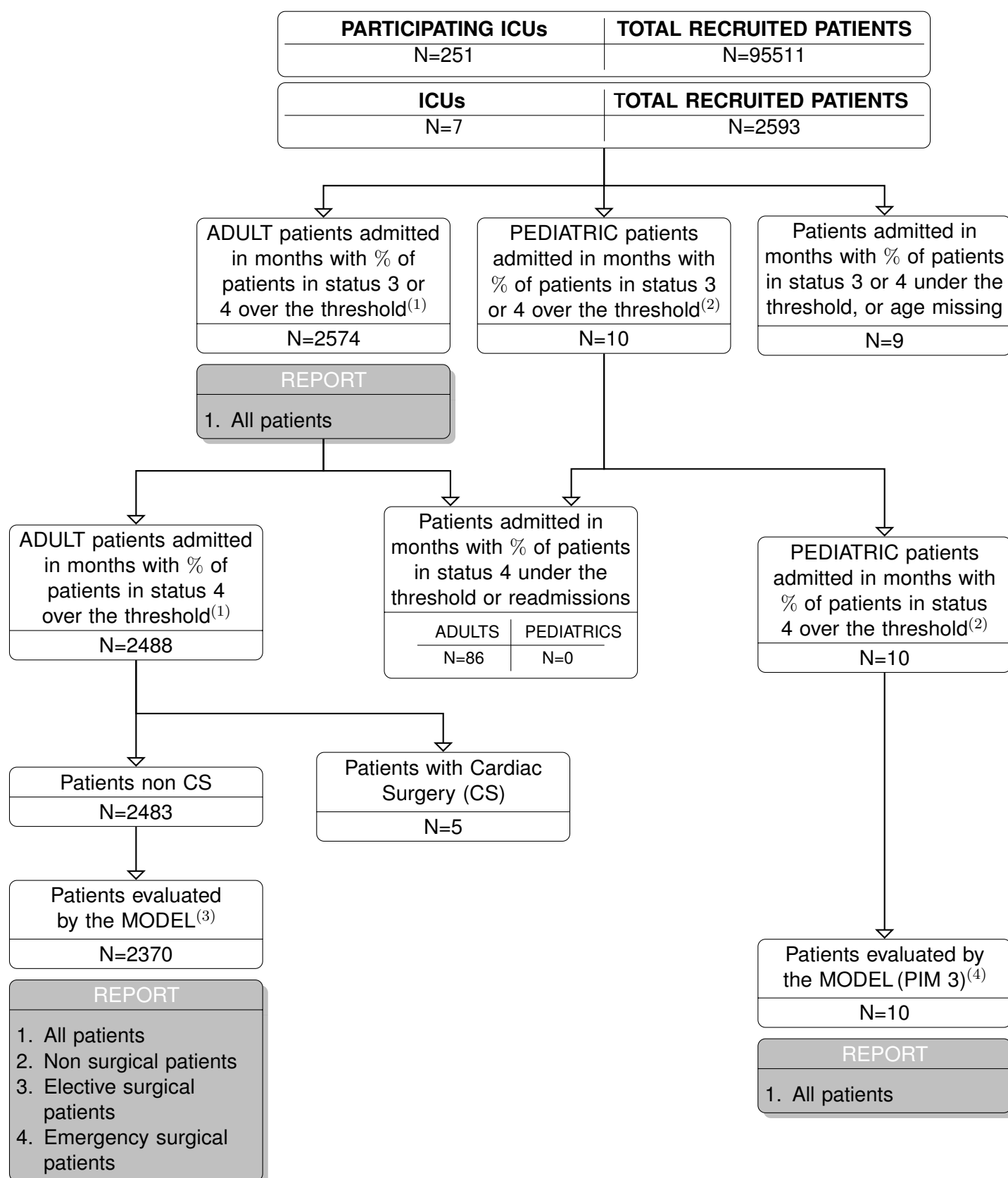
Mean (SD)	3.8 (0.9)
Median	3.7
Q1–Q3	3.7–4.4
Missing	2

Occupied beds per nurse (average)

Mean (SD)	1.5 (0.3)
Median	1.4
Q1–Q3	1.2–1.8
Missing	2

Occupancy rate (%)

National report (7 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 - Year 2016

Characteristics on admission - Adult patients

Patients (N): 2574

Sex	N	%
Male	1592	61.8
Female	982	38.2
Missing	0	

Age (years)	N	%
17-45	270	10.5
46-65	812	31.5
66-75	630	24.5
>75	862	33.5
Missing	0	
Mean	66.5	
SD	15.9	
Median	69	
Q1–Q3	58–79	
Min–Max	17–99	

Body mass Index (BMI)	N	%
Underweight	109	4.3
Normal	1115	43.9
Overweight	879	34.6
Obese	437	17.2
Missing	34	

Pregnancy status	N	%
Females (N=982)		
Not fertile	545	55.5
Not pregnant/Unknown	432	44.0
Currently pregnant	2	0.2
Post partum	3	0.3
Missing	0	

Comorbidities	N	%
No	333	13.0
Yes	2238	87.0
Missing	3	

Comorbidities (top 10)	N	%
Hypertension	1413	55.0
Arrhythmia	512	19.9
NYHA class II-III	452	17.6
Any tumour without metastasis	421	16.4
Diabetes Type II without insulin tr.	327	12.7
Moderate or severe renal disease	300	11.7
Peripheral vascular disease	224	8.7
Metastatic cancer	213	8.3
Drug-induced coagulopathy	199	7.7
Cerebrovascular disease	194	7.5
Missing	3	

Stay before ICU (days)	Mean	SD	Median	Q1–Q3	Missing
	4.2	10.2	1	0–3	5

Source of admission	N	%
Same hospital	2342	91.1
Other hospital	157	6.1
Long-term chronic care hospital	72	2.8
Directly from the community	0	0.0
Missing	3	

Ward of admission	N	%
Hospital (N=2499)		
Medical ward	351	14.0
Surgical ward	1288	51.5
Emergency room	633	25.3
Other ICU	126	5.0
High dependency care unit	101	4.0
Missing	0	

Reason for transfer from	N	%
Other ICU (N=126)		
Specialist expertise	29	23.0
Step-up care	26	20.6
Logistical/organizational reasons	71	56.3
Step-down care	0	0.0
Missing	0	

Ward of admission	N	%
Same hospital (N=2342)		
Medical ward	334	14.3
Surgical ward	1277	54.5
Emergency room	602	25.7
Other ICU	44	1.9
High dependency care unit	85	3.6
Missing	0	

Ward of admission	N	%
Other hospital (N=157)		
Medical ward	17	10.8
Surgical ward	11	7.0
Emergency room	31	19.7
Other ICU	82	52.2
High dependency care unit	16	10.2
Missing	0	

Scheduled admission	N	%
No	1964	76.4
Yes	607	23.6
Missing	3	

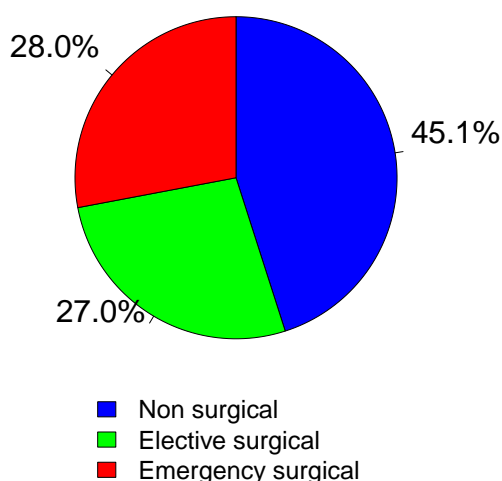
National report - Year 2016

Characteristics on admission - Adult patients

Trauma	N	%
No	2186	85.0
Yes	385	15.0
Multiple trauma	114	4.4
Missing	3	

Surgical status	N	%
Non surgical	1159	45.1
Elective surgical	693	27.0
Emergency surgical	719	28.0
Missing	3	

Surgical status



Source of admission	N	%
Surgical pt. (N=1412)		
Operating theatre of surgical ward	1055	74.9
Operating theatre of emergency room	99	7.0
Surgical ward	87	6.2
Other	167	11.9
Missing	4	

Surgical interventions (top 10)	N	%
Elective surgical (N=693)		
Gastrointestinal surgery	364	52.5
Nephro/Urological surgery	108	15.6
Peripheral vascular surgery	52	7.5
Hepatic surgery	38	5.5
Other surgery	36	5.2
Gynaecological surgery	29	4.2
Abdominal vascular surgery	28	4.0
Orthopaedic surgery	23	3.3
Pancreatic surgery	15	2.2
Neurosurgery	13	1.9
Missing	0	

Timing	N	%
Elective surgical (N=693)		
From -7 to -3 days	16	2.3
From -2 to -1 days	19	2.7
On ICU admission day	701	101.2
The day after ICU admission	7	1.0
Missing	1	

Surgical interventions (top 10)	N	%
Emergency surgical (N=719)		
Gastrointestinal surgery	349	48.5
Neurosurgery	114	15.9
Orthopaedic surgery	59	8.2
Other surgery	48	6.7
Biliary tract surgery	30	4.2
Peripheral vascular surgery	25	3.5
Nephro/Urological surgery	22	3.1
Abdominal vascular surgery	18	2.5
Hepatic surgery	16	2.2
Organ/s transplantation	15	2.1
Missing	23	

Timing	N	%
Emergency surgical (N=719)		
From -7 to -3 days	38	5.3
From -2 to -1 days	80	11.1
On ICU admission day	606	84.3
The day after ICU admission	34	4.7
Missing	3	

Non surgical interventions	N	%
None	2418	94.0
Elective	12	0.5
Emergency	141	5.5
Missing	3	

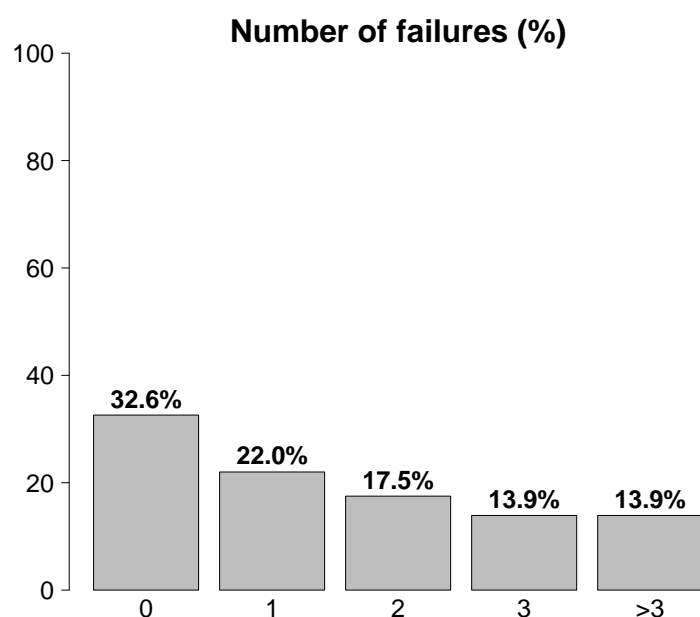
Non surgical interventions	N	%
Elective (N=12)		
Interventional radiology	4	33.3
Interventional endoscopy	3	25.0
Interventional cardiology	0	0.0
Interventional neuroradiology	0	0.0
Missing	5	

Non surgical interventions	N	%
Emergency (N=141)		
Interventional endoscopy	57	40.4
Interventional cardiology	53	37.6
Interventional radiology	21	14.9
Interventional neuroradiology	2	1.4
Missing	8	

National report - Year 2016

Characteristics on admission - Adult patients

Reason for admission	N	%
Monitoring/Weaning	1096	42.7
Post surgical weaning	32	1.2
Surgical monitoring	609	23.8
Post interventional weaning	0	0.0
Interventional monitoring	62	2.4
Non surgical monitoring	387	15.1
Missing	6	
Admission for procedures/treatments	0	0.0
Intensive Treatment	1467	57.1
Only ventilatory support	492	19.2
Only cardiovascular support	276	10.7
Ventilatory and cardiovascular support	699	27.2
Missing	0	
Palliative Sedation	3	0.1
Diagnosis of death/Organ donation	3	0.1
Missing	5	



Failures on admission	N	%
No	840	32.6
Yes	1734	67.4
A: Respiratory failure	1191	46.3
B: Cardiovascular failure	975	37.9
C: Neurological failure	224	8.7
D: Hepatic failure	36	1.4
E: Renal failure	858	33.3
F: Acute skin failure	4	0.2
G: Metabolic failure	717	27.9
H: Coagulation failure	88	3.4
Missing	0	

Failures on admission (top 10)	N	%
A	285	11.1
AB	183	7.1
ABEG	182	7.1
E	137	5.3
BEG	98	3.8
ABE	85	3.3
B	85	3.3
ABG	71	2.8
EG	61	2.4
ABCEG	55	2.1
Missing	0	

Respiratory failure	N	%
None	1383	53.7
Only hypoxic failure	626	24.3
Only hypercapnic failure	83	3.2
Hypoxic-hypercapnic failure	68	2.6
Intubation for airway maint.	414	16.1
Missing	0	

Cardiovascular failure	N	%
None	1599	62.1
Without shock	364	14.1
Cardiogenic shock	81	3.1
Septic shock	297	11.5
Haemorrhagic/hypovolemic shock	94	3.7
Hypovolemic shock	36	1.4
Anaphylactic shock	1	0.0
Neurogenic shock	20	0.8
Other shock	32	1.2
Mixed shock	50	1.9
Missing	0	

Neurologic failure	N	%
None	1922	89.6
Cerebral coma	114	5.3
Metabolic coma	67	3.1
Postanoxic coma	36	1.7
Toxic coma	7	0.3
Missing or not evaluable	428	

Renal failure (AKIN)	N	%
None	1708	66.6
Mild	473	18.4
Moderate	194	7.6
Severe	191	7.4
Missing	8	

Metabolic failure	N	%
None	1849	72.1
pH \leq 7.3, PaCO ₂ $<$ 45 mmHg	333	13.0
Base deficit \geq 5 mmol/L, lactate $>$ 1.5x	384	15.0
Missing	8	

National report - Year 2016

Characteristics on admission - Adult patients

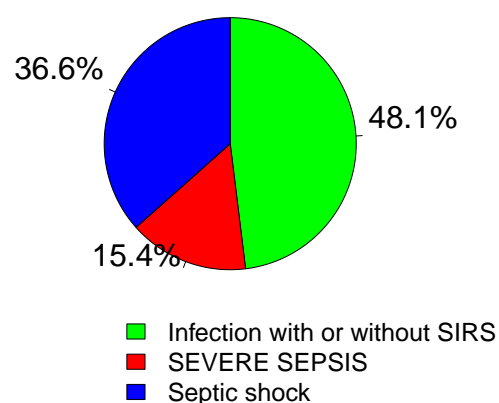
Clinical conditions on admission	N	%
Respiratory	343	13.4
Pleural effusion	107	4.2
Aspiration pneumonia	84	3.3
Atelectasis	45	1.8
Pulmonary embolism	37	1.4
Pneumothorax/Pneumomediastinum	31	1.2
Cardiovascular	596	23.2
Left heart failure without pulm. edema	97	3.8
Acute severe arrhythmia: tachycardias	96	3.7
Cardiac arrest	85	3.3
Peripheral vascular disease	80	3.1
Acute myocardial infarction	75	2.9
Neurological	167	6.5
Cerebral artery stroke	39	1.5
Seizures	36	1.4
Non traumatic cerebral oedema	20	0.8
Brain tumour	20	0.8
Intracranial hypertension	14	0.5
Gastrointestinal and hepatic	803	31.3
Digestive tract malignancy	372	14.5
Paralytic Ileus	100	3.9
Intestinal occlusion	98	3.8
Gastrointestinal perforation	69	2.7
Gastrointestinal bleeding: upper tract	54	2.1
Trauma (anatomical districts)	383	14.9
Head	233	9.1
Chest	109	4.2
Pelvis/bone/joint & muscle	99	3.9
Spine	71	2.8
Abdomen	43	1.7
Major vessels injury	11	0.4
Miscellaneous	5	0.2
Other	804	31.3
Other disease	385	15.0
Metabolic disorder	200	7.8
Nephrourologic disease	180	7.0
Coagulation disorder	88	3.4
Acute intoxication	29	1.1
Post transplantation	44	1.7
Liver transplantation	30	1.2
Renal transplantation	11	0.4
Infections	964	37.5
Pneumonia	393	15.3
NON-surgical urinary tract infection	99	3.9
NON-surgical secondary peritonitis	84	3.3
Post-surgical peritonitis	69	2.7
Clinical sepsis	67	2.6
L.R.T.I. other than pneumonia	48	1.9
Cholecystitis/choolangitis	41	1.6
NON-surgical skin/soft tissue infection	39	1.5
Upper respiratory tract infection	31	1.2
Post-surgical skin/soft tissue infection	28	1.1
Missing	6	

Trauma (anatomical districts)	N	%
Head	233	9.1
Traumatic subarachnoid haemorrhage	111	4.3
Traumatic Subdural haematoma	91	3.5
Skull fracture	81	3.2
Cerebral contusion/laceration	50	1.9
Maxillofacial fracture	49	1.9
Spine	71	2.8
Vertebral fracture, without deficit	41	1.6
Tetraplegia	12	0.5
Cervical injury, incomplete deficit	9	0.4
Chest	109	4.2
Other injuries of the chest	69	2.7
Traum. haemothorax/pneumothorax	56	2.2
Severe lung contusion/laceration	30	1.2
Abdomen	43	1.7
Spleen: Moderate-Severe laceration	13	0.5
Liver: Moderate-Severe laceration	10	0.4
Minor injuries of the abdomen	8	0.3
Pelvis/bone/joint & muscle	99	3.9
Long bone fracture	79	3.1
Multiple fracture of the pelvis	26	1.0
Massive crush/amputation	4	0.2
Major vessels injury	11	0.4
Proximal limbs vessels: transection	6	0.2
Aorta: rupture/dissection	4	0.2
Neck vessels: dissection/transection	1	0.0
Miscellaneous	5	0.2
Burns (>30% BSA)	4	0.2
Inhalation injury	1	0.0
Missing	6	

Infection severity on admission	N	%
None	1604	62.8
Infection with or without SIRS	457	17.9
SEVERE SEPSIS	146	5.7
Septic shock	348	13.6
Missing	19	

Infection severity on admission

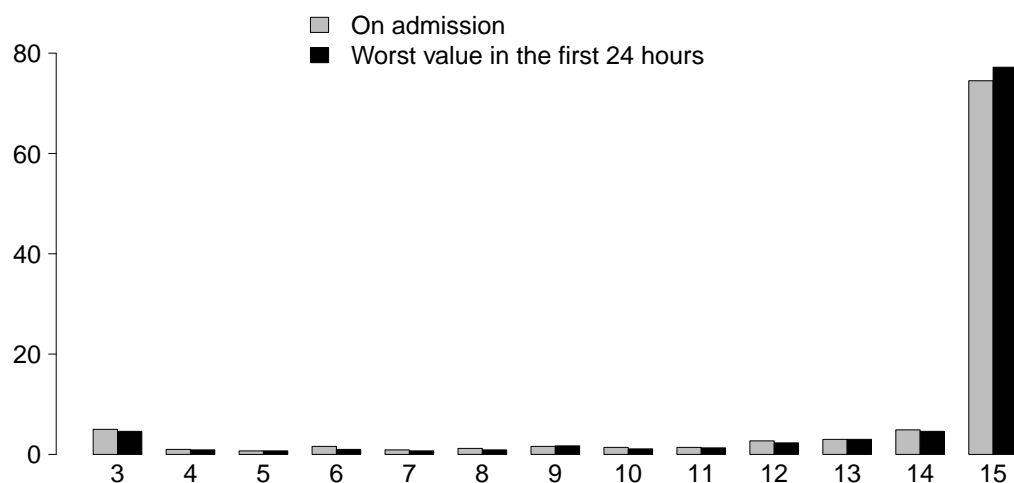
Patients infected (N=951)



National report - Year 2016

Severity scores - Adult patients

Glasgow Coma Scale (%)



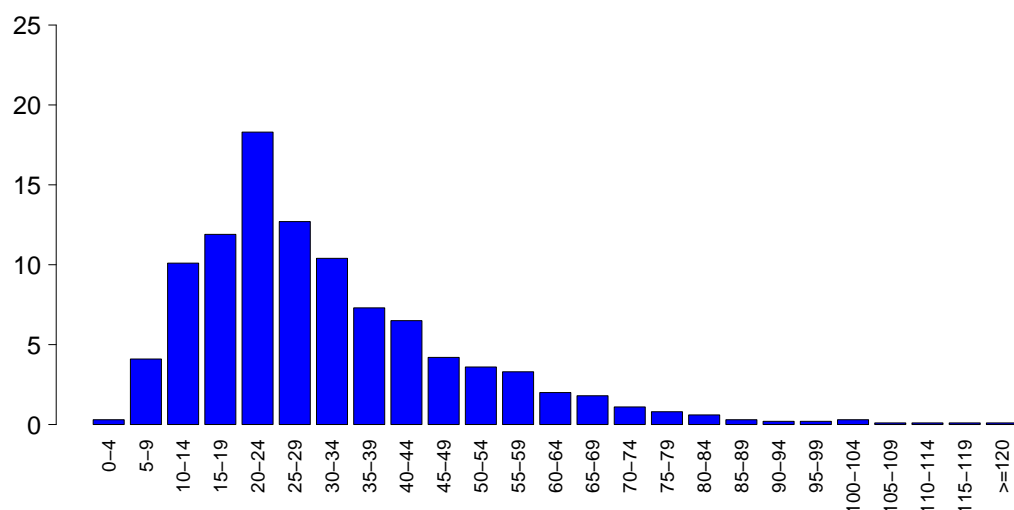
GCS (admission)

Median	15
Q1–Q3	14–15
Not evaluable	420
Missing	8

GCS (first 24 hours)

Median	15
Q1–Q3	15–15
Not evaluable	605
Missing	8

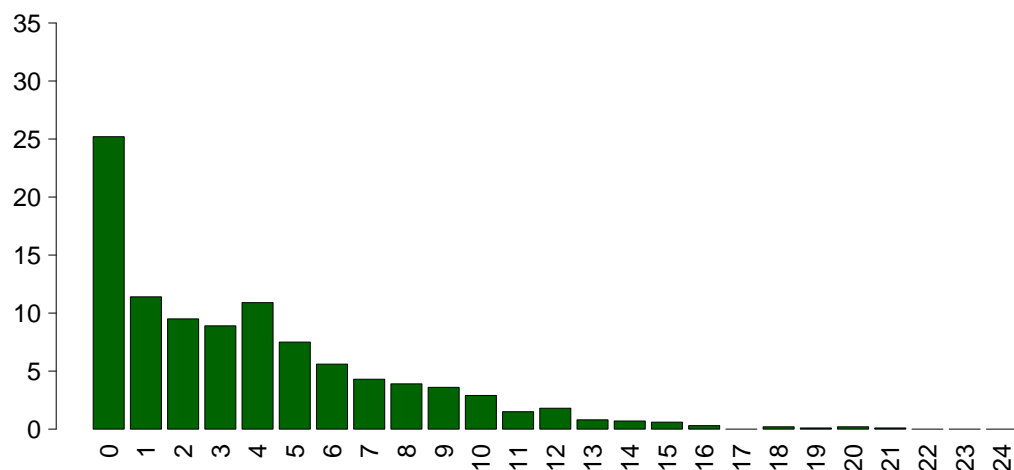
SAPS II (%)



SAPSII

Mean	31.0
SD	17.6
Median	26
Q1–Q3	19–39.5
Not evaluable	605
Missing	10

SOFA (%)



SOFA

Mean	3.8
SD	3.8
Median	3
Q1–Q3	0–6
Not evaluable	605
Missing	10

National report - Year 2016

Characteristics during the stay - Adult patients

Complications during the stay	N	%
No	1399	54.5
Yes	1167	45.5
Missing	8	

Failures during the stay	N	%
No	2232	86.7
Yes	342	13.3
A: Respiratory failure	147	5.7
B: Cardiovascular failure	144	5.6
C: Neurological failure	22	0.9
D: Hepatic failure	33	1.3
E: Renal failure (AKIN)	153	5.9
F: Acute skin failure	0	0.0
G: Metabolic failure	50	1.9
H: Coagulation failure	18	0.7
Missing	0	

Failures during the stay (top 10)	N	%
E	62	2.4
A	59	2.3
B	46	1.8
AB	22	0.9
ABE	20	0.8
BE	16	0.6
G	16	0.6
D	15	0.6
AE	13	0.5
AG	6	0.2
Missing	0	

Respiratory failure occurred	N	%
None	2419	94.3
Intubation for airway maint.	28	1.1
Hypoxic failure	105	4.1
Hypercapnic failure	40	1.6
Missing	8	

Cardiovascular failure occurred	N	%
None	2422	94.4
Cardiogenic shock	29	1.1
Hypovolemic shock	8	0.3
Haemorrhagic/hypovolemic shock	12	0.5
Septic shock	92	3.6
Anaphylactic shock	0	0.0
Neurogenic shock	1	0.0
Other shock	9	0.4
Missing	8	

Neurological failure occurred	N	%
None	2544	99.1
Cerebral coma	11	0.4
Metabolic coma	9	0.4
Postanoxic coma	2	0.1
Missing	8	

Renal failure occurred (AKIN)	N	%
None	2413	94.0
Mild	29	1.1
Moderate	39	1.5
Severe	85	3.3
Missing	8	

Complications during the stay	N	%
Respiratory	238	9.3
Pleural effusion	101	3.9
Atelectasis	55	2.1
Aspiration pneumonia	49	1.9
Pneumothorax/Pneumomediastinum	25	1.0
Severe ARDS	22	0.9
Cardiovascular	299	11.7
Acute severe arrhythmia: tachycardias	133	5.2
Hypertensive crisis	65	2.5
Cardiac arrest	45	1.8
Left heart failure w/o pulm. edema	29	1.1
Pulmonary edema	19	0.7
Neurological	338	13.2
Drowsiness/agitation/delirium	219	8.5
Intracranial hypertension	70	2.7
Seizures	25	1.0
Brain edema	24	0.9
CrIMyNe	14	0.5
Gastrointestinal and hepatic	225	8.8
Paralytic Ileus	120	4.7
Liver Dysfunction Syndrome	28	1.1
Anastomotic dehiscence	25	1.0
Gastrointestinal bleeding: lower tract	24	0.9
Gastrointestinal bleeding: upper tract	19	0.7
Other	185	7.2
Other disease	98	3.8
Metabolic disorder	50	1.9
Nephrourologic disease	33	1.3
Iatrogenic major vessels injury	8	0.3
Other skin and/or soft tissue pathology	8	0.3
Category/Stage III: Full Thickness Skin Loss	7	0.3
Category/Stage II: Partial Thickness Skin Loss	6	0.2
Infections	482	18.8
Pneumonia	182	7.1
Post-surgical peritonitis	68	2.7
L.R.T.I. other than pneumonia	62	2.4
NON-surgical urinary tract infection	40	1.6
Post-surgical skin/soft tissue infection	38	1.5
Clinical sepsis	27	1.1
Other fungal infections	19	0.7
F.U.O. fever of unknown origin	15	0.6
Upper respiratory tract infection	14	0.5
NON-surgical secondary peritonitis	13	0.5
Missing	8	

National report - Year 2016

Characteristics during the stay - Adult patients

Infections	N	%
None	1275	49.7
Only on admission	809	31.5
On admission and during ICU stay	153	6.0
Only during ICU stay	329	12.8
Missing	8	

Maximum severity of infection	N	%
None	1275	50.2
Infection with or without SIRS	671	26.4
SEVERE SEPSIS	191	7.5
Septic shock	404	15.9
Missing	33	

Severity evolution

Severity evolution		During the stay				
		N (R %)	None	Infection with or without SIRS	SEVERE SEPSIS	Septic shock
Admission	None	1275 (80.2%)	241 (15.2%)	41 (2.6%)	33 (2.1%)	1590
	Infection with or without SIRS	-	429 (94.1%)	17 (3.7%)	10 (2.2%)	456
	SEVERE SEPSIS	-	-	133 (91.1%)	13 (8.9%)	146
	Septic shock	-	-	-	347 (100.0%)	347
	TOT	1275	670	191	403	2539

Ventil. Associat. Pneumonia (VAP)	N	%
No	2427	94.3
Yes	146	5.7
Missing	1	

Incidence of VAP

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

Estimate	22.5
CI (95%)	19.0–26.4

Incidence of VAP

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

Estimate	18.0%
CI (95%)	15.2–21.1

Catheter Bacteraemia (CR-BSI)	N	%
No	2563	99.9
Yes	3	0.1
Missing	8	

Incidence of CR-BSI

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

Estimate	0.2
CI (95%)	0.0–0.6

Incidence of CR-BSI

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

Estimate	0.2%
CI (95%)	0.0–0.7

National report - Year 2016
Process indicators - Adult patients

Procedures and/or treatments (Missing=7) Procedures (antibiotics excluded)	Use		On admission		On discharge		Length (days)			Days from admission		
	N	%	N	%	N	%	Median	Q1-Q3	Missing	Median	Q1-Q3	Missing
	2302	89.7										
Invasive ventilation	1080	42.1	668	26	185	7.2	3	1-9	0	0	0-0	0
Non invasive ventilation	592	23.1	94	3.7	142	5.5	2	1-4	0	0	0-2	0
Tracheostomy	154	6.0	27	1.1	112	4.4	7	1-14	0	15	10-22	0
iNO (inhaled nitric oxide)	28	1.1	6	0.2	3	0.1	4	2-5	0	2	1-7	0
Central Venous Catheter	1752	68.3	1023	39.9	1344	52.4	5	3-9	1	0	0-0	0
PICC	130	5.1	40	1.6	94	3.7	3	2-5	0	0	0-1	0
Arterial Catheter	1767	68.8	1047	40.8	567	22.1	4	2-9	1	0	0-0	0
Vasoactive drugs	1369	53.3	563	21.9	155	6	2	1-5	0	0	0-0	0
Antiarrhythmics	282	11.0	41	1.6	59	2.3	2	1-5	0	1	0-3	0
IABP	6	0.2	1	0	3	0.1	3	1-4	0	0	0-0	0
Invasive monitoring of C.O.	164	6.4	24	0.9	25	1	5	2-8	0	0	0-1	0
Continuous monitoring of ScVO2	5	0.2	0	0	0	0	7	7-9	0	0	0-0	0
Temporary pacing	18	0.7	4	0.2	8	0.3	3	2-6	0	0	0-0	0
Ventricular assistance	1	0.0	0	0	0	0	3	3-3	0	1	1-1	0
DC-shock	49	1.9								1	0-3	0
CPR	55	2.1								0	0-2	0
Massive blood transfusion	52	2.0								0	0-0	0
ICP monitoring without liquor-drainage	104	4.1	80	3.1	20	0.8	6	2-12	0	0	0-1	0
ICP monitoring with liquor-drainage	30	1.2	20	0.8	8	0.3	7	3-21	0	0	0-1	0
External ventricular drainage without ICP	11	0.4	7	0.3	5	0.2	10	3-16	0	6	6-11	0
Haemofiltration	5	0.2	0	0	0	0	10	5-11	0	1	1-2	0
Haemodialysis	172	6.7	30	1.2	51	2	5	1-12	0	2	0-5	0
ECMO	3	0.1	1	0	1	0	1	1-2	0	4	3-6	0
Hepatic clearance techniques	0	0.0										
Clearance techniques during sepsis	1	0.0	0	0	0	0	5	5-5	0	1	1-1	0
IAP (intra-abdominal pressure)	110	4.3										
Hypothermia	42	1.6										
Enteral nutrition	972	37.9	124	4.8	599	23.3	5	2-11	1	1	1-2	0
Parenteral nutrition	1404	54.7	332	12.9	858	33.4	4	2-7	1	1	0-1	0
SDD (Topical, Topical and systemic)	29	1.1										
Patient restraint	59	2.3										
Peridural catheter	305	11.9	289	11.3	259	10.1	3	2-5	0	0	0-0	0
Electrical cardioversion	19	0.7								3	0-4	0
Vacuum therapy	26	1.0										
Antibiotics	2047	79.7										
Antibiotics for surgical prophylaxis	870	33.9	704	27.4	368	14.3	2	1-3	1	0	0-0	0
Antibiotics for medical prophylaxis	218	8.5	92	3.6	115	4.5	3	2-5	0	0	0-1	0
Empirical antibiotic therapy	916	35.7	386	15	344	13.4	3	2-5	0	0	0-1	0
Targeted antibiotic therapy	677	26.4	148	5.8	470	18.3	6	3-12	0	3	2-5	0

National report - Year 2016

Process indicators - Adult patients

			Length (days)				
Invasive ventilation (N=1080)			Mean	SD	Median	Q1-Q3	Missing
Due to pulmonary failure			7.7	11.3	4	1–9	0
For airway maintenance			7.9	9.8	3	1–11	0
In weaning			0.5	0.5	0	0–1	0
Not evaluable			4.3	6.7	1	1–4.8	15
Reintubation within 48 hours			8.7	8.0	7	2.5–14.5	0
Non invasive ventilation (N=592)			Number of surgical interventions				
Non invasive ventilation only			0	2399	93.5		
Non invasive ventilation failed			1	122	4.8		
For weaning			2	28	1.1		
Other			3	10	0.4		
Missing			>3	7	0.3		
			Missing	8			
Tracheostomy not present on admission (N=127)			Surgical interventions				
			Days from admission				
Surgical			Mean	8.8			
Percutwist			SD	8.0			
Ciaglia			Median	6			
Monodil. Ciaglia			Q1–Q3	3–12			
Fantoni			Missing	0			
Griggs							
Other Kind							
Unknown							
Missing							
Tracheostomy - Days after the beginning of inv. vent. Not present on admission (N=127)			Surgical interventions (top 10)				
Mean			16.0				
SD			11.1				
Median			15				
Q1–Q3			9–21				
Missing			0				
Invasive monitoring of C.O. (N=164)			Non surgical interventions				
Swan Ganz			No	2486	96.9		
PICCO			Yes	79	3.1		
LIDCO			Missing	9			
Vigileo-PRAM							
Other							
Missing							
SDD (N=29)			Non surgical interventions				
Topical			Days from admission				
Topical and systemic			Mean	10.4			
Missing			SD	9.9			
			Median	7			
			Q1–Q3	4–12.5			
			Missing	2			
Antibiotic therapy			Non surgical interventions				
Pt. infected in ICU only (N=329)							
Only empirical			N		%		
Only targeted			33	1.3			
Targeted after empirical			33	1.3			
Other			14	0.5			
Missing			12	0.5			
Surgical interventions			9				
No							
Yes							
Missing							

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Outcome indicators - Adult patients

ICU outcome	N	%
Dead	324	12.7
Transferred to same hospital	2036	79.6
Transferred to other hospital	186	7.3
Discharged home	12	0.5
Disch. terminally ill	0	0.0
Missing	16	

Transferred to (N=2222)	N	%
Ward	1625	73.1
Other ICU	146	6.6
High dependency care unit	451	20.3
Rehabilitation	0	0.0
Day hospital or Long-term care	0	0.0
Missing	0	

Reason of transfer to Other ICU (N=146)	N	%
Specialist expertise	23	15.8
Step-up care	40	27.4
Logistical/organizational reasons	71	48.6
Step-down care	12	8.2
Missing	0	

Transferred to Same hospital (N=2036)	N	%
Ward	1541	75.7
Other ICU	58	2.8
High dependency care unit	437	21.5
Rehabilitation	0	0.0
Day hospital or Long-term care	0	0.0
Missing	0	

Transferred to Other hospital (N=186)	N	%
Ward	84	45.2
Other ICU	88	47.3
High dependency care unit	14	7.5
Rehabilitation	0	0.0
Day hospital or Long-term care	0	0.0
Missing	0	

ICU mortality	N	%
Alive	2234	87.3
Dead	324	12.7
Missing	16	

Timing of ICU mortality (N=324)	N	%
Daytime (08:00AM - 07:59PM)	194	59.9
Nighttime (08:00PM - 07:59AM)	130	40.1
Weekdays (Monday - Friday)	254	78.4
Weekend (Saturday - Sunday)	70	21.6
Missing	0	

Hospital mortality *	N	%
Alive	1951	78.7
Dead	528	21.3
Missing	9	

Timing of hosp. mortality * (N=528)	N	%
In ICU	306	58.0
Within 24 hours after ICU	11	2.1
24-47 hours after ICU	20	3.8
48-71 hours after ICU	12	2.3
72-95 hours after ICU	15	2.8
After 95 hours after ICU	164	31.1
Missing	0	

Timing of hosp. mortality (days from ICU disch.) * Discharged alive from ICU (N=222)	
Mean	19.2
SD	25.0
Median	10.5
Q1–Q3	3–25
Missing	0

* Statistics computed on patients admitted in months with % of patients in status 4 over the threshold (readmissions excluded) (N=2488).

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Outcome indicators - Adult patients

Last hospital mortality *	N	%
Alive	1931	78.1
Dead	543	21.9
Missing	14	

Readmission from ward	N	%
No	2526	98.1
Yes	48	1.9
Missing	0	

Number of readmissions (N=48)	N	%
1	44	91.7
2	4	8.3
>2	0	0.0
Missing	0	

Timing of readmission (N=48)	N	%
Within 48 hours	12	26.7
48-71 hours	1	2.2
72-95 hours	4	8.9
After 95 hours	28	62.2
Missing	3	

Timing readmission (days)	N	
Mean	48	
SD	5.3	
Median	8.5	
Q1–Q3	4.6	
	1.4–8	

ICU stay (days)		
Mean	6.7	
SD	9.8	
Median	3	
Q1–Q3	1–7	
Missing	6	

ICU stay (days) Alive (N=2234)		
Mean	6.2	
SD	8.9	
Median	3	
Q1–Q3	1–7	
Missing	0	

ICU stay (days) Dead (N=324)		
Mean	9.3	
SD	13.2	
Median	4	
Q1–Q3	2–12	
Missing	0	

Stay after ICU (days) *		
Alive (N=2168)		
Mean	13.8	
SD	19.8	
Median	7	
Q1–Q3	3–17	
Missing	5	

Hospital stay (days) *		
Mean	22.1	
SD	25.9	
Median	13	
Q1–Q3	7–28	
Missing	10	

Hospital stay (days) *		
Alive (N=1951)		
Mean	21.3	
SD	24.6	
Median	13	
Q1–Q3	8–26	
Missing	0	

Hospital stay (days) *		
Dead (N=528)		
Mean	25.2	
SD	30.2	
Median	14	
Q1–Q3	5–34	
Missing	1	

* Statistics computed on patients admitted in months with % of patients in status 4 over the threshold (readmissions excluded) (N=2488).

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Characteristics on admission - Adult patients evaluated in the GiViTI model

Patients (N): 2370

Sex	N	%
Male	1456	61.4
Female	914	38.6
Missing	0	

Age (years)	N	%
17-45	251	10.6
46-65	751	31.7
66-75	582	24.6
>75	786	33.2
Missing	0	
Mean	66.4	
SD	15.9	
Median	69	
Q1–Q3	58–79	
Min–Max	17–99	

Body mass Index (BMI)	N	%
Underweight	100	4.2
Normal	1035	43.7
Overweight	826	34.9
Obese	409	17.3
Missing	0	

Pregnancy status	N	%
Females (N=914)		
Not fertile	506	55.4
Not pregnant/Unknown	403	44.1
Currently pregnant	2	0.2
Post partum	3	0.3
Missing	0	

Comorbidities	N	%
No	315	13.3
Yes	2055	86.7
Missing	0	

Comorbidities (top 10)	N	%
Hypertension	1291	54.5
Arrhythmia	463	19.5
NYHA class II-III	402	17.0
Any tumour without metastasis	397	16.8
Diabetes Type II without insulin tr.	310	13.1
Moderate or severe renal disease	268	11.3
Metastatic cancer	207	8.7
Cerebrovascular disease	184	7.8
Peripheral vascular disease	182	7.7
Drug-induced coagulopathy	178	7.5
Missing	0	

Stay before ICU (days)		
Mean	4.0	
SD	10.0	
Median	1	
Q1–Q3	0–3	
Missing	0	

Source of admission	N	%
Same hospital	2221	93.7
Other hospital	149	6.3
Long-term chronic care hospital	0	0.0
Directly from the community	0	0.0
Missing	0	

Ward of admission	N	%
Hospital (N=2370)		
Medical ward	322	13.6
Surgical ward	1225	51.7
Emergency room	605	25.5
Other ICU	119	5.0
High dependency care unit	99	4.2
Missing	0	

Reason for transfer from	N	%
Other ICU (N=119)		
Specialist expertise	28	23.5
Step-up care	24	20.2
Logistical/organizational reasons	67	56.3
Step-down care	0	0.0
Missing	0	

Ward of admission	N	%
Same hospital (N=2221)		
Medical ward	307	13.8
Surgical ward	1214	54.7
Emergency room	574	25.8
Other ICU	43	1.9
High dependency care unit	83	3.7
Missing	0	

Ward of admission	N	%
Other hospital (N=149)		
Medical ward	15	10.1
Surgical ward	11	7.4
Emergency room	31	20.8
Other ICU	76	51.0
High dependency care unit	16	10.7
Missing	0	

Scheduled admission	N	%
No	1775	74.9
Yes	595	25.1
Missing	0	

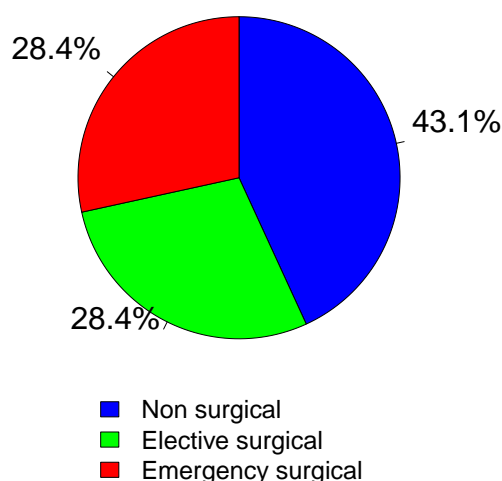
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Characteristics on admission - Adult patients evaluated in the GiViTI model

Trauma	N	%
No	2007	84.7
Yes	363	15.3
Multiple trauma	106	4.5
Missing	0	

Surgical status	N	%
Non surgical	1022	43.1
Elective surgical	674	28.4
Emergency surgical	674	28.4
Missing	0	

Surgical status



Source of admission	N	%
Surgical pt. (N=1348)		
Operating theatre of surgical ward	1022	75.8
Operating theatre of emergency room	95	7.0
Surgical ward	74	5.5
Other	157	11.6
Missing	0	

Surgical interventions (top 10)	N	%
Elective surgical (N=674)		
Gastrointestinal surgery	360	53.4
Nephro/Urological surgery	103	15.3
Peripheral vascular surgery	52	7.7
Hepatic surgery	38	5.6
Other surgery	33	4.9
Gynaecological surgery	29	4.3
Abdominal vascular surgery	26	3.9
Orthopaedic surgery	21	3.1
Pancreatic surgery	15	2.2
Neurosurgery	13	1.9
Missing	0	

Timing	N	%
Elective surgical (N=674)		
From -7 to -3 days	13	1.9
From -2 to -1 days	18	2.7
On ICU admission day	688	102.1
The day after ICU admission	6	0.9
Missing	0	

Surgical interventions (top 10)	N	%
Emergency surgical (N=674)		
Gastrointestinal surgery	329	48.8
Neurosurgery	111	16.5
Orthopaedic surgery	55	8.2
Other surgery	41	6.1
Biliary tract surgery	28	4.2
Peripheral vascular surgery	23	3.4
Nephro/Urological surgery	22	3.3
Abdominal vascular surgery	18	2.7
Hepatic surgery	15	2.2
Organ/s transplantation	15	2.2
Missing	17	

Timing	N	%
Emergency surgical (N=674)		
From -7 to -3 days	35	5.2
From -2 to -1 days	80	11.9
On ICU admission day	569	84.4
The day after ICU admission	32	4.7
Missing	0	

Non surgical interventions	N	%
None	2235	94.3
Elective	12	0.5
Emergency	123	5.2
Missing	0	

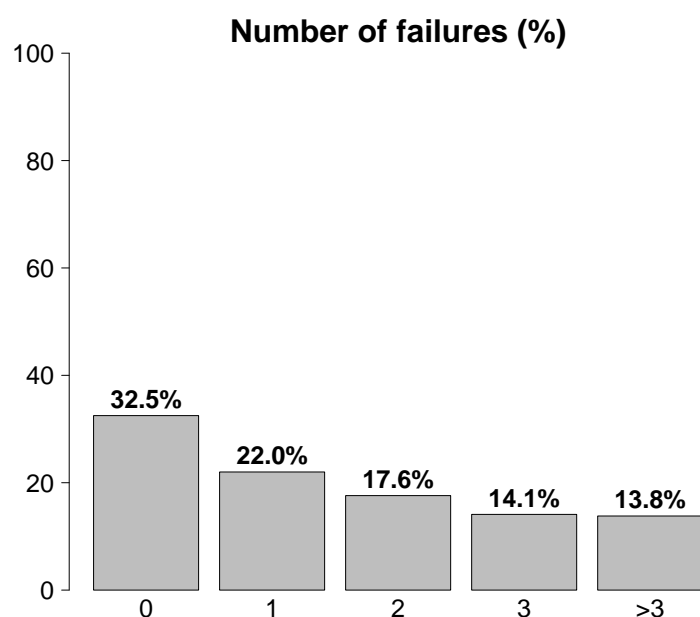
Non surgical interventions	N	%
Elective (N=12)		
Interventional radiology	4	33.3
Interventional endoscopy	3	25.0
Interventional cardiology	0	0.0
Interventional neuroradiology	0	0.0
Missing	5	

Non surgical interventions	N	%
Emergency (N=123)		
Interventional endoscopy	47	38.2
Interventional cardiology	45	36.6
Interventional radiology	21	17.1
Interventional neuroradiology	2	1.6
Missing	8	

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Characteristics on admission - Adult patients evaluated in the GiViTI model

Reason for admission	N	%
Monitoring/Weaning	998	42.1
Post surgical weaning	29	1.2
Surgical monitoring	585	24.7
Post interventional weaning	0	0.0
Interventional monitoring	53	2.2
Non surgical monitoring	327	13.8
Missing	4	
Admission for procedures/treatments	0	0.0
Intensive Treatment	1372	57.9
Only ventilatory support	465	19.6
Only cardiovascular support	251	10.6
Ventilatory and cardiovascular support	656	27.7
Missing	0	
Palliative Sedation	0	0.0
Diagnosis of death/Organ donation	0	0.0
Missing	0	



Failures on admission	N	%
No	770	32.5
Yes	1600	67.5
A: Respiratory failure	1121	47.3
B: Cardiovascular failure	907	38.3
C: Neurological failure	195	8.2
D: Hepatic failure	34	1.4
E: Renal failure	779	32.9
F: Acute skin failure	4	0.2
G: Metabolic failure	649	27.4
H: Coagulation failure	83	3.5
Missing	0	

Failures on admission (top 10)	N	%
A	276	11.6
AB	176	7.4
ABEG	166	7.0
E	122	5.1
BEG	88	3.7
ABE	83	3.5
B	75	3.2
ABG	70	3.0
EG	49	2.1
AE	47	2.0
Missing	0	

Respiratory failure	N	%
None	1249	52.7
Only hypoxic failure	586	24.7
Only hypercapnic failure	77	3.2
Hypoxic-hypercapnic failure	64	2.7
Intubation for airway maint.	394	16.6
Missing	0	

Cardiovascular failure	N	%
None	1463	61.7
Without shock	349	14.7
Cardiogenic shock	73	3.1
Septic shock	273	11.5
Haemorrhagic/hypovolemic shock	84	3.5
Hypovolemic shock	35	1.5
Anaphylactic shock	1	0.0
Neurogenic shock	19	0.8
Other shock	31	1.3
Mixed shock	42	1.8
Missing	0	

Neurologic failure	N	%
None	1772	90.1
Cerebral coma	103	5.2
Metabolic coma	56	2.8
Postanoxic coma	31	1.6
Toxic coma	5	0.3
Missing or not evaluable	403	

Renal failure (AKIN)	N	%
None	1591	67.1
Mild	433	18.3
Moderate	174	7.3
Severe	172	7.3
Missing	0	

Metabolic failure	N	%
None	1721	72.6
pH \leq 7.3, PaCO ₂ $<$ 45 mmHg	308	13.0
Base deficit \geq 5 mmol/L, lactate $>$ 1.5x	341	14.4
Missing	0	

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

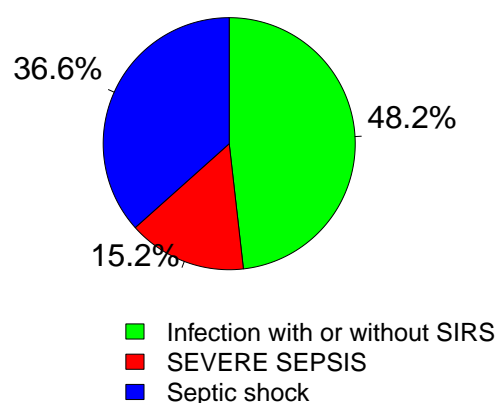
Clinical conditions on admission	N	%
Respiratory	310	13.1
Pleural effusion	93	3.9
Aspiration pneumonia	79	3.3
Atelectasis	41	1.7
Pulmonary embolism	32	1.4
Pneumothorax/Pneumomediastinum	28	1.2
Cardiovascular	525	22.2
Left heart failure without pulm. edema	86	3.6
Acute severe arrhythmia: tachycardias	82	3.5
Peripheral vascular disease	76	3.2
Cardiac arrest	73	3.1
Acute myocardial infarction	66	2.8
Neurological	157	6.6
Seizures	36	1.5
Cerebral artery stroke	34	1.4
Non traumatic cerebral oedema	20	0.8
Brain tumour	20	0.8
Intracranial hypertension	14	0.6
Gastrointestinal and hepatic	763	32.2
Digestive tract malignancy	371	15.7
Intestinal occlusion	95	4.0
Paralytic Ileus	89	3.8
Gastrointestinal perforation	68	2.9
Bowel ischaemia	48	2.0
Trauma (anatomical districts)	363	15.3
Head	224	9.5
Chest	102	4.3
Pelvis/bone/joint & muscle	89	3.8
Spine	68	2.9
Abdomen	41	1.7
Major vessels injury	9	0.4
Miscellaneous	5	0.2
Other	755	31.9
Other disease	369	15.6
Metabolic disorder	182	7.7
Nephrourologic disease	173	7.3
Coagulation disorder	83	3.5
Acute intoxication	28	1.2
Post transplantation	40	1.7
Liver transplantation	27	1.1
Renal transplantation	11	0.5
Infections	867	36.6
Pneumonia	360	15.2
NON-surgical urinary tract infection	89	3.8
NON-surgical secondary peritonitis	79	3.3
Clinical sepsis	60	2.5
Post-surgical peritonitis	60	2.5
L.R.T.I. other than pneumonia	41	1.7
NON-surgical skin/soft tissue infection	37	1.6
Cholecystitis/choolangitis	36	1.5
Primary peritonitis	27	1.1
Upper respiratory tract infection	27	1.1
Missing	0	

Trauma (anatomical districts)	N	%
Head	224	9.5
Traumatic subarachnoid haemorrhage	106	4.5
Traumatic Subdural haematoma	87	3.7
Skull fracture	80	3.4
Cerebral contusion/laceration	49	2.1
Maxillofacial fracture	48	2.0
Spine	68	2.9
Vertebral fracture, without deficit	39	1.6
Tetraplegia	11	0.5
Cervical injury, incomplete deficit	9	0.4
Chest	102	4.3
Other injuries of the chest	64	2.7
Traum. haemothorax/pneumothorax	54	2.3
Severe lung contusion/laceration	29	1.2
Abdomen	41	1.7
Spleen: Moderate-Severe laceration	11	0.5
Liver: Moderate-Severe laceration	10	0.4
Minor injuries of the abdomen	8	0.3
Pelvis/bone/joint & muscle	89	3.8
Long bone fracture	70	3.0
Multiple fracture of the pelvis	24	1.0
Very severe or open fracture of the pelvis	3	0.1
Major vessels injury	9	0.4
Aorta: rupture/dissection	4	0.2
Proximal limbs vessels: transection	4	0.2
Neck vessels: dissection/transection	1	0.0
Miscellaneous	5	0.2
Burns (>30% BSA)	4	0.2
Inhalation injury	1	0.0
Missing	0	

Infection severity on admission	N	%
None	1503	63.7
Infection with or without SIRS	413	17.5
SEVERE SEPSIS	130	5.5
Septic shock	314	13.3
Missing	10	

Infection severity on admission

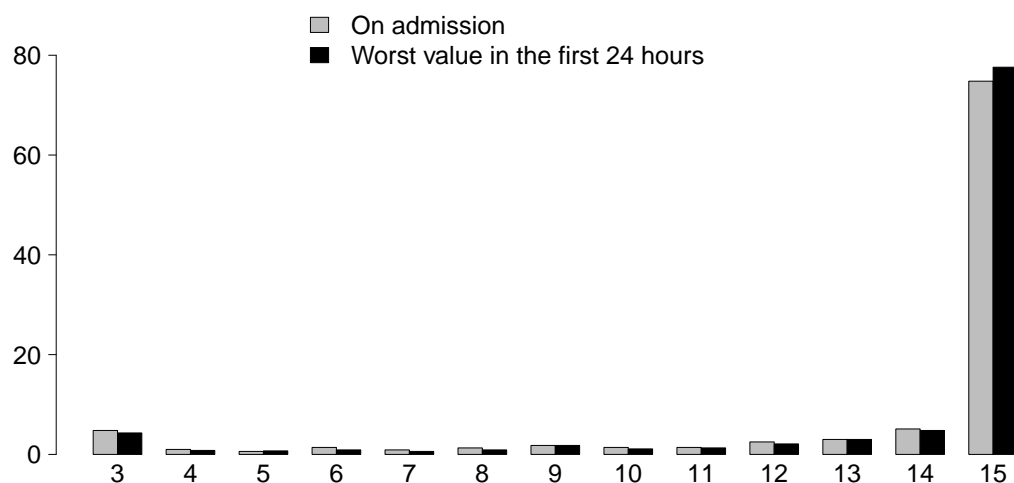
Patients infected (N=857)



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Severity scores - Adult patients evaluated in the GiViTI model

Glasgow Coma Scale (%)



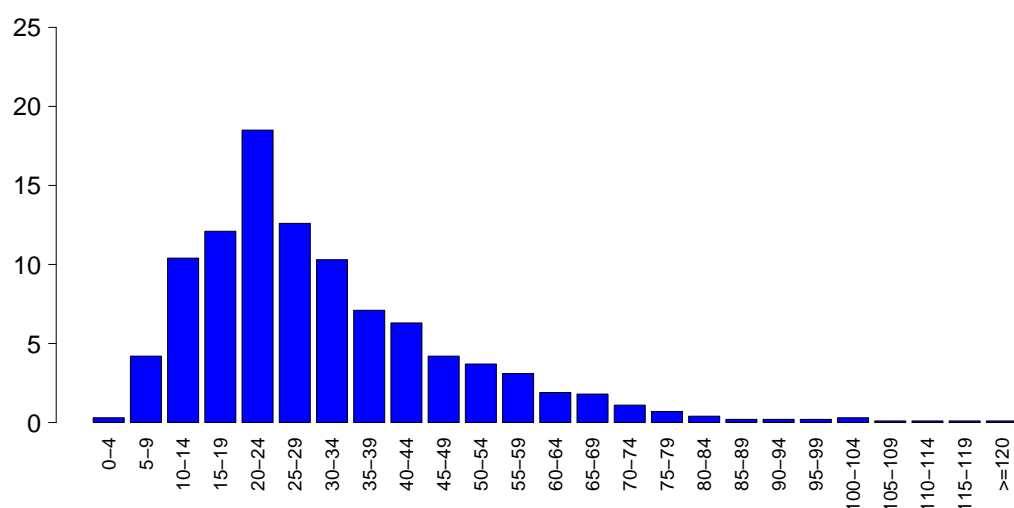
GCS (admission)

Median	15
Q1–Q3	14–15
Not evaluable	403
Missing	0

GCS (first 24 hours)

Median	15
Q1–Q3	15–15
Not evaluable	574
Missing	0

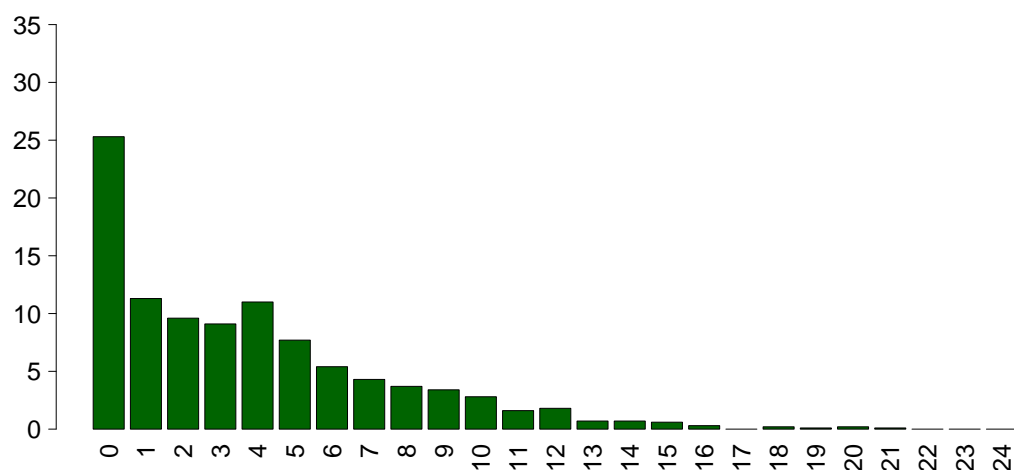
SAPS II (%)



SAPSII

Mean	30.7
SD	17.5
Median	26
Q1–Q3	18–39
Not evaluable	574
Missing	0

SOFA (%)



SOFA

Mean	3.8
SD	3.8
Median	3
Q1–Q3	0–6
Not evaluable	574
Missing	0

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

Complications during the stay	N	%
No	1276	53.8
Yes	1094	46.2
Missing	0	

Failures during the stay	N	%
No	2062	87.0
Yes	308	13.0
A: Respiratory failure	128	5.4
B: Cardiovascular failure	126	5.3
C: Neurological failure	21	0.9
D: Hepatic failure	33	1.4
E: Renal failure (AKIN)	139	5.9
F: Acute skin failure	0	0.0
G: Metabolic failure	46	1.9
H: Coagulation failure	18	0.8
Missing	0	

Failures during the stay (top 10)	N	%
E	57	2.4
A	51	2.2
B	40	1.7
AB	19	0.8
BE	15	0.6
D	15	0.6
G	15	0.6
ABE	14	0.6
AE	13	0.5
AG	5	0.2
Missing	0	

Respiratory failure occurred	N	%
None	2242	94.6
Intubation for airway maint.	25	1.1
Hypoxic failure	91	3.8
Hypercapnic failure	36	1.5
Missing	0	

Cardiovascular failure occurred	N	%
None	2244	94.7
Cardiogenic shock	25	1.1
Hypovolemic shock	8	0.3
Haemorrhagic/hypovolemic shock	12	0.5
Septic shock	78	3.3
Anaphylactic shock	0	0.0
Neurogenic shock	1	0.0
Other shock	8	0.3
Missing	0	

Neurological failure occurred	N	%
None	2349	99.1
Cerebral coma	11	0.5
Metabolic coma	9	0.4
Postanoxic coma	1	0.0
Missing	0	

Renal failure occurred (AKIN)	N	%
None	2231	94.1
Mild	28	1.2
Moderate	38	1.6
Severe	73	3.1
Missing	0	

Complications during the stay	N	%
Respiratory	224	9.5
Pleural effusion	95	4.0
Atelectasis	51	2.2
Aspiration pneumonia	46	1.9
Pneumothorax/Pneumomediastinum	22	0.9
Severe ARDS	19	0.8
Cardiovascular	275	11.6
Acute severe arrhythmia: tachycardias	123	5.2
Hypertensive crisis	63	2.7
Cardiac arrest	41	1.7
Left heart failure w/o pulm. edema	26	1.1
Pulmonary edema	18	0.8
Neurological	315	13.3
Drowsiness/agitation/delirium	200	8.4
Intracranial hypertension	70	3.0
Seizures	23	1.0
Brain edema	22	0.9
CrIMyNe	14	0.6
Gastrointestinal and hepatic	210	8.9
Paralytic Ileus	111	4.7
Liver Dysfunction Syndrome	28	1.2
Anastomotic dehiscence	25	1.1
Gastrointestinal bleeding: lower tract	22	0.9
Gastrointestinal bleeding: upper tract	18	0.8
Other	180	7.6
Other disease	98	4.1
Metabolic disorder	46	1.9
Nephrourologic disease	33	1.4
Iatrogenic major vessels injury	8	0.3
Other skin and/or soft tissue pathology	8	0.3
Category/Stage II: Partial Thickness Skin Loss	6	0.3
Category/Stage III: Full Thickness Skin Loss	6	0.3
Infections	455	19.2
Pneumonia	174	7.3
Post-surgical peritonitis	64	2.7
L.R.T.I. other than pneumonia	61	2.6
NON-surgical urinary tract infection	37	1.6
Post-surgical skin/soft tissue infection	35	1.5
Clinical sepsis	25	1.1
Other fungal infections	17	0.7
Upper respiratory tract infection	14	0.6
F.U.O. fever of unknown origin	13	0.5
NON-surgical secondary peritonitis	12	0.5
Missing	0	

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

Infections	N	%
None	1187	50.1
Only on admission	728	30.7
On admission and during ICU stay	139	5.9
Only during ICU stay	316	13.3
Missing	0	

Maximum severity of infection	N	%
None	1187	50.5
Infection with or without SIRS	625	26.6
SEVERE SEPSIS	175	7.4
Septic shock	363	15.4
Missing	20	

Severity evolution

Severity evolution		During the stay				
		N (R %)	None	Infection with or without SIRS	SEVERE SEPSIS	Septic shock
Admission	None	1187 (79.6%)	235 (15.8%)	39 (2.6%)	30 (2.0%)	1491
	Infection with or without SIRS	-	389 (94.2%)	16 (3.9%)	8 (1.9%)	413
	SEVERE SEPSIS	-	-	120 (92.3%)	10 (7.7%)	130
	Septic shock	-	-	-	314 (100.0%)	314
	TOT	1187	624	175	362	2348

Ventil. Associat. Pneumonia (VAP)	N	%
No	2229	94.1
Yes	141	5.9
Missing	0	

Incidence of VAP

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

Estimate	23.4
CI (95%)	19.7–27.6

Incidence of VAP

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

Estimate	18.7%
CI (95%)	15.8–22.1

Catheter Bacteraemia (CR-BSI)	N	%
No	2367	99.9
Yes	3	0.1
Missing	0	

Incidence of CR-BSI

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

Estimate	0.2
CI (95%)	0.0–0.7

Incidence of CR-BSI

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

Estimate	0.3%
CI (95%)	0.1–0.8

National report - 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	Median	Q1-Q3
Procedures (antibiotics excluded)	2148	90.6								
Invasive ventilation	1003	42.3	639	27	167	7	3	1-9	0	0-0
Non invasive ventilation	561	23.7	90	3.8	137	5.8	2	1-4	0	0-2
Tracheostomy	144	6.1	27	1.1	104	4.4	7	1-14	0	10-22
iNO (inhaled nitric oxide)	27	1.1	6	0.3	3	0.1	3	2-5	0	1-4
Central Venous Catheter	1636	69.0	985	41.6	1271	53.6	5	3-9	0	0-0
PICC	120	5.1	38	1.6	88	3.7	3	2-5	0	0-1
Arterial Catheter	1646	69.5	1013	42.7	536	22.6	4	2-9	0	0-0
Vasoactive drugs	1273	53.7	545	23	139	5.9	2	1-5	0	0-0
Antiarrhythmics	257	10.8	36	1.5	56	2.4	2	1-5	0	0-3
IABP	5	0.2	1	0	2	0.1	4	2-4	0	0-2
Invasive monitoring of C.O.	151	6.4	24	1	23	1	5	3-8	0	0-1
Continuous monitoring of ScVO2	3	0.1	0	0	0	0	7	6-8	0	0-0
Temporary pacing	18	0.8	4	0.2	8	0.3	3	2-6	0	0-0
Ventricular assistance	1	0.0	0	0	0	0	3	3-3	0	1-1
DC-shock	46	1.9							1	0-3
CPR	49	2.1							0	0-2
Massive blood transfusion	47	2.0							0	0-0
ICP monitoring without liquor-drainage	100	4.2	78	3.3	19	0.8	6	2-12	0	0-1
ICP monitoring with liquor-drainage	30	1.3	20	0.8	8	0.3	7	3-21	0	0-1
External ventricular drainage without ICP	11	0.5	7	0.3	5	0.2	10	3-16	0	6-11
Haemofiltration	3	0.1	0	0	0	0	5	2-8	0	0-2
Haemodialysis	154	6.5	28	1.2	47	2	5	1-12	0	0-5
ECMO	2	0.1	1	0	1	0	1	1-1	0	7-7
Hepatic clearance techniques	0	0.0								
Clearance techniques during sepsis	1	0.0	0	0	0	0	5	5-5	0	1-1
IAP (intra-abdominal pressure)	108	4.6								
Hypothermia	37	1.6								
Enteral nutrition	902	38.1	111	4.7	566	23.9	5	2-11	0	1-2
Parenteral nutrition	1333	56.2	308	13	827	34.9	3	2-7	0	0-1
SDD (Topical, Topical and systemic)	28	1.2								
Patient restraint	51	2.2								
Peridural catheter	301	12.7	287	12.1	257	10.8	3	2-5	0	0-0
Electrical cardioversion	17	0.7							4	1-4
Vacuum therapy	23	1.0								
Antibiotics	1917	80.9								
Antibiotics for surgical prophylaxis	847	35.7	688	29	356	15	2	1-3	0	0-0
Antibiotics for medical prophylaxis	204	8.6	84	3.5	106	4.5	3	2-5	0	0-1
Empirical antibiotic therapy	834	35.2	348	14.7	319	13.5	3	2-5	0	0-2
Targeted antibiotic therapy	620	26.2	136	5.7	434	18.3	6	3-12	0	2-5

National report - 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=1003)	N	%	Mean	SD	Median	Q1-Q3	Missing	
Due to pulmonary failure	526	51.7	7.8	11.4	4	1–9	0	
For airway maintenance	392	38.5	7.8	9.7	3	1–11	0	
In weaning	36	3.5	0.5	0.5	0	0–1	0	
Not evaluable	63	6.2	4.6	7.0	1.5	1–5	15	
Reintubation within 48 hours	14	1.4	9.3	8.0	7	3–14.75	0	
Non invasive ventilation (N=561)	N	%	Number of surgical interventions					
Non invasive ventilation only	320	57.0				0	2224	93.8
Non invasive ventilation failed	42	7.5				1	106	4.5
For weaning	176	31.4				2	25	1.1
Other	23	4.1				3	9	0.4
Missing	0					>3	6	0.3
						Missing	0	
Tracheostomy not present on admission (N=117)	N	%	Surgical interventions					
			Days from admission					
Surgical	25	21.4				Mean		8.9
Percutwist	43	36.8				SD		8.1
Ciaglia	0	0.0				Median		6
Monodil. Ciaglia	1	0.9				Q1–Q3		3–12
Fantoni	0	0.0				Missing		0
Griggs	10	8.5						
Other Kind	5	4.3						
Unknown	33	28.2						
Missing	0							
Tracheostomy - Days after the beginning of inv. vent. Not present on admission (N=117)			Surgical interventions (top 10)					
Mean	16.4					N		%
SD	11.4		Gastrointestinal surgery			96		4.1
Median	15		Other surgery			48		2.0
Q1–Q3	9–22		Neurosurgery			17		0.7
Missing	0		Orthopaedic surgery			16		0.7
			ENT surgery			9		0.4
			Nephro/Urological surgery			7		0.3
			Peripheral vascular surgery			5		0.2
			Plastic surgery			4		0.2
			Maxillo-Facial surgery			3		0.1
			Biliary tract surgery			3		0.1
			Missing			0		
Invasive monitoring of C.O. (N=151)	N	%	Non surgical interventions					
Swan Ganz	14	9.3				N		%
PICCO	84	55.6	No			2299		97.0
LIDCO	30	19.9	Yes			71		3.0
Vigileo-PRAM	4	2.6	Missing			0		
Other	19	12.6						
Missing	0							
SDD (N=28)	N	%	Non surgical interventions					
Topical	25	89.3	Days from admission					
Topical and systemic	3	10.7				Mean		10.8
Missing	0					SD		10.2
						Median		7
						Q1–Q3		4–13.5
						Missing		2
Antibiotic therapy			Non surgical interventions					
Pt. infected in ICU only (N=316)	N	%						
Only empirical	101	35.4				N		%
Only targeted	67	23.5	Interventional radiology			31		1.3
Targeted after empirical	108	37.9	Interventional endoscopy			29		1.2
Other	9	3.2	Interventional cardiology			14		0.6
Missing	31		Interventional neuroradiology			10		0.4
			Missing			0		
Surgical interventions	N	%						
No	2224	93.8						
Yes	146	6.2						
Missing	0							

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

ICU outcome	N	%
Dead	284	12.0
Transferred to same hospital	1914	81.1
Transferred to other hospital	151	6.4
Discharged home	11	0.5
Disch. terminally ill	0	0.0
Missing	10	

Transferred to (N=2065)	N	%
Ward	1502	72.7
Other ICU	126	6.1
High dependency care unit	437	21.2
Rehabilitation	0	0.0
Day hospital or Long-term care	0	0.0
Missing	0	

Reason of transfer to Other ICU (N=126)	N	%
Specialist expertise	20	15.9
Step-up care	28	22.2
Logistical/organizational reasons	67	53.2
Step-down care	11	8.7
Missing	0	

Transferred to Same hospital (N=1914)	N	%
Ward	1433	74.9
Other ICU	57	3.0
High dependency care unit	424	22.2
Rehabilitation	0	0.0
Day hospital or Long-term care	0	0.0
Missing	0	

Transferred to Other hospital (N=151)	N	%
Ward	69	45.7
Other ICU	69	45.7
High dependency care unit	13	8.6
Rehabilitation	0	0.0
Day hospital or Long-term care	0	0.0
Missing	0	

ICU mortality	N	%
Alive	2076	88.0
Dead	284	12.0
Missing	10	

Timing of ICU mortality (N=284)	N	%
Daytime (08:00AM - 07:59PM)	173	60.9
Nighttime (08:00PM - 07:59AM)	111	39.1
Weekdays (Monday - Friday)	225	79.2
Weekend (Saturday - Sunday)	59	20.8
Missing	0	

Hospital mortality	N	%
Alive	1867	78.8
Dead	503	21.2
Missing	0	

Timing of hosp. mortality (N=503)	N	%
In ICU	284	56.5
Within 24 hours after ICU	11	2.2
24-47 hours after ICU	20	4.0
48-71 hours after ICU	12	2.4
72-95 hours after ICU	15	3.0
After 95 hours after ICU	161	32.0
Missing	0	

Timing of hosp. mortality (days from ICU disch.) Discharged alive from ICU (N=219)	
Mean	19.3
SD	25.1
Median	10
Q1–Q3	3–25
Missing	0

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

Last hospital mortality	N	%
Alive	1855	78.3
Dead	515	21.7
Missing	0	

ICU stay (days)		
	Mean	6.7
	SD	9.9
	Median	3
	Q1–Q3	2–7
	Missing	0

ICU stay (days)		
Alive (N=2076)		
	Mean	6.3
	SD	9.0
	Median	3
	Q1–Q3	2–7
	Missing	0

ICU stay (days)		
Dead (N=284)		
	Mean	9.3
	SD	13.4
	Median	4
	Q1–Q3	2–12.2
	Missing	0

Stay after ICU (days)		
Alive (N=2076)		
	Mean	14.0
	SD	20.0
	Median	7
	Q1–Q3	3–17
	Missing	0

Hospital stay (days)		
	Mean	22.5
	SD	26.2
	Median	13
	Q1–Q3	8–28
	Missing	0

Hospital stay (days)		
Alive (N=1867)		
	Mean	21.6
	SD	24.8
	Median	13
	Q1–Q3	8–26
	Missing	0

Hospital stay (days)		
Dead (N=503)		
	Mean	25.8
	SD	30.6
	Median	15
	Q1–Q3	6–34
	Missing	0

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

Patients (N): 1022

Sex		N	%
	Male	637	62.3
	Female	385	37.7
	Missing	0	

Age (years)		N	%
	17-45	106	10.4
	46-65	293	28.7
	66-75	226	22.1
	>75	397	38.8
	Missing	0	
	Mean	67.3	
	SD	16.2	
	Median	70.5	
	Q1–Q3	59–79	
	Min–Max	17–94	

Body mass Index (BMI)		N	%
	Underweight	44	4.3
	Normal	431	42.2
	Overweight	334	32.7
	Obese	213	20.8
	Missing	0	

Pregnancy status		N	%
	Females (N=385)		
	Not fertile	247	64.2
	Not pregnant/Unknown	135	35.1
	Currently pregnant	1	0.3
	Post partum	2	0.5
	Missing	0	

Comorbidities		N	%
	No	128	12.5
	Yes	894	87.5
	Missing	0	

Comorbidities (top 10)		N	%
	Hypertension	563	55.1
	Arrhythmia	261	25.5
	NYHA class II-III	260	25.4
	Moderate or severe renal disease	142	13.9
	Diabetes Type II without insulin tr.	140	13.7
	Cerebrovascular disease	95	9.3
	Drug-induced coagulopathy	93	9.1
	Any tumour without metastasis	90	8.8
	Diabetes Type II with insulin treatment	86	8.4
	Moderate COPD	76	7.4
	Missing	0	

Stay before ICU (days)			
	Mean	4.4	
	SD	10.4	
	Median	0	
	Q1–Q3	0–3	
	Missing	0	

Source of admission		N	%
	Same hospital	922	90.2
	Other hospital	100	9.8
	Long-term chronic care hospital	0	0.0
	Directly from the community	0	0.0
	Missing	0	

Ward of admission		N	%
	Hospital (N=1022)		
	Medical ward	277	27.1
	Surgical ward	129	12.6
	Emergency room	480	47.0
	Other ICU	85	8.3
	High dependency care unit	51	5.0
	Missing	0	

Reason for transfer from		N	%
	Other ICU (N=85)		
	Specialist expertise	12	14.1
	Step-up care	13	15.3
	Logistical/organizational reasons	60	70.6
	Step-down care	0	0.0
	Missing	0	

Ward of admission		N	%
	Same hospital (N=922)		
	Medical ward	263	28.5
	Surgical ward	126	13.7
	Emergency room	471	51.1
	Other ICU	23	2.5
	High dependency care unit	39	4.2
	Missing	0	

Ward of admission		N	%
	Other hospital (N=100)		
	Medical ward	14	14.0
	Surgical ward	3	3.0
	Emergency room	9	9.0
	Other ICU	62	62.0
	High dependency care unit	12	12.0
	Missing	0	

Scheduled admission		N	%
	No	1021	99.9
	Yes	1	0.1
	Missing	0	

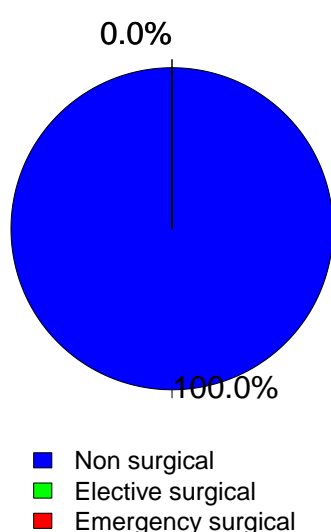
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Characteristics on admission - Adult non surgical patients evaluated in the GiViTI model

Trauma	N	%
No	858	84.0
Yes	164	16.0
Multiple trauma	44	4.3
Missing	0	

Surgical status	N	%
Non surgical	1022	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	926	90.6
Elective	5	0.5
Emergency	91	8.9
Missing	0	

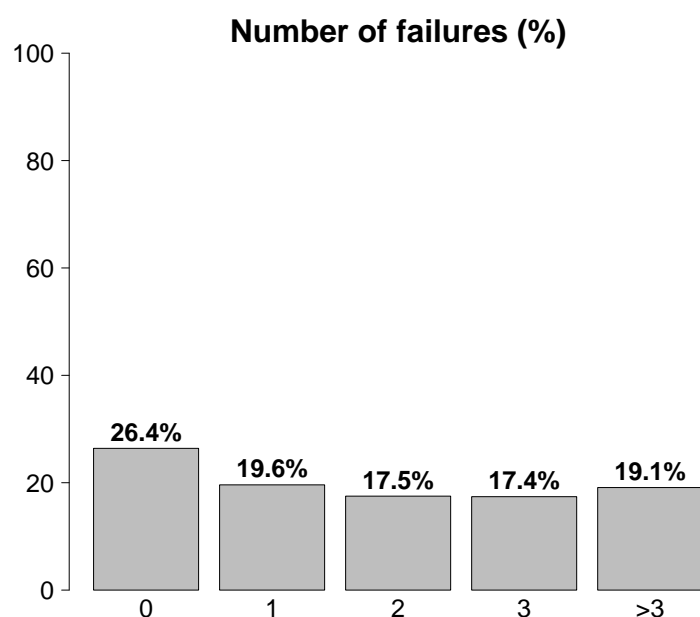
Non surgical interventions	N	%
Elective (N=5)		
Interventional radiology	3	60.0
Interventional endoscopy	2	40.0
Interventional cardiology	0	0.0
Interventional neuroradiology	0	0.0
Missing	0	

Non surgical interventions	N	%
Emergency (N=91)		
Interventional cardiology	43	47.3
Interventional endoscopy	37	40.7
Interventional radiology	9	9.9
Interventional neuroradiology	2	2.2
Missing	0	

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

Reason for admission	N	%
Monitoring/Weaning	384	37.6
Post surgical weaning	0	0.0
Surgical monitoring	0	0.0
Post interventional weaning	0	0.0
Interventional monitoring	53	5.2
Non surgical monitoring	327	32.1
Missing	4	
Admission for procedures/treatments	0	0.0
Intensive Treatment	638	62.4
Only ventilatory support	206	20.2
Only cardiovascular support	139	13.6
Ventilatory and cardiovascular support	293	28.7
Missing	0	
Palliative Sedation	0	0.0
Diagnosis of death/Organ donation	0	0.0
Missing	0	



Failures on admission	N	%
No	270	26.4
Yes	752	73.6
A: Respiratory failure	499	48.8
B: Cardiovascular failure	432	42.3
C: Neurological failure	146	14.3
D: Hepatic failure	15	1.5
E: Renal failure	430	42.1
F: Acute skin failure	2	0.2
G: Metabolic failure	371	36.3
H: Coagulation failure	39	3.8
Missing	0	

Failures on admission (top 10)	N	%
A	91	8.9
ABEG	87	8.5
BEG	61	6.0
E	59	5.8
AB	46	4.5
ABCEG	34	3.3
ABG	32	3.1
ABE	30	2.9
EG	27	2.6
AC	26	2.5
Missing	0	

Respiratory failure	N	%
None	523	51.2
Only hypoxic failure	299	29.3
Only hypercapnic failure	51	5.0
Hypoxic-hypercapnic failure	43	4.2
Intubation for airway maint.	106	10.4
Missing	0	

Cardiovascular failure	N	%
None	590	57.7
Without shock	144	14.1
Cardiogenic shock	62	6.1
Septic shock	156	15.3
Haemorrhagic/hypovolemic shock	19	1.9
Hypovolemic shock	4	0.4
Anaphylactic shock	0	0.0
Neurogenic shock	10	1.0
Other shock	9	0.9
Mixed shock	28	2.7
Missing	0	

Neurologic failure	N	%
None	708	82.9
Cerebral coma	67	7.8
Metabolic coma	51	6.0
Postanoxic coma	23	2.7
Toxic coma	5	0.6
Missing or not evaluable	168	

Renal failure (AKIN)	N	%
None	592	57.9
Mild	217	21.2
Moderate	98	9.6
Severe	115	11.3
Missing	0	

Metabolic failure	N	%
None	651	63.7
pH \leq 7.3, PaCO ₂ $<$ 45 mmHg	166	16.2
Base deficit \geq 5 mmol/L, lactate $>$ 1.5x	205	20.1
Missing	0	

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

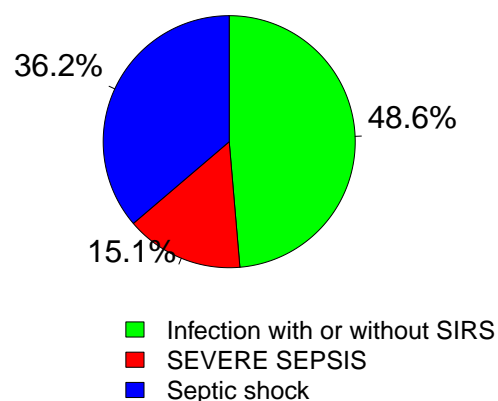
Clinical conditions on admission	N	%
Respiratory	216	21.1
Pleural effusion	64	6.3
Aspiration pneumonia	48	4.7
Pneumothorax/Pneumomediastinum	26	2.5
Atelectasis	23	2.3
Pulmonary embolism	20	2.0
Cardiovascular	329	32.2
Left heart failure without pulm. edema	62	6.1
Acute myocardial infarction	62	6.1
Acute severe arrhythmia: tachycardias	53	5.2
Cardiac arrest	47	4.6
Left heart failure with pulmonary edema	45	4.4
Neurological	108	10.6
Cerebral artery stroke	33	3.2
Seizures	30	2.9
Spontaneous Subarachnoid haemorrhage	9	0.9
Spontaneous Intraparenchymal bleeding	9	0.9
Metabolic/postanoxic encephalopathy	8	0.8
Gastrointestinal and hepatic	111	10.9
Gastrointestinal bleeding: upper tract	29	2.8
Paralytic Ileus	20	2.0
Ascites	16	1.6
Digestive tract malignancy	15	1.5
Acute pancreatitis	14	1.4
Trauma (anatomical districts)	164	16.0
Head	111	10.9
Chest	50	4.9
Spine	28	2.7
Pelvis/bone/joint & muscle	25	2.4
Abdomen	12	1.2
Miscellaneous	2	0.2
Major vessels injury	1	0.1
Other	271	26.5
Metabolic disorder	129	12.6
Other disease	81	7.9
Coagulation disorder	39	3.8
Nephrourologic disease	30	2.9
Acute intoxication	24	2.3
Post transplantation	4	0.4
Renal transplantation	2	0.2
Bone marrow transplantation	1	0.1
Infections	524	51.3
Pneumonia	286	28.0
NON-surgical urinary tract infection	75	7.3
Clinical sepsis	38	3.7
L.R.T.I. other than pneumonia	33	3.2
Upper respiratory tract infection	16	1.6
Pleurisy/Pleural empyema	15	1.5
Cholecystitis/choolangitis	11	1.1
Gastroenteritis	11	1.1
NON-surgical skin/soft tissue infection	11	1.1
Pandemic influenza A/H1N1	10	1.0
Missing	0	

Trauma (anatomical districts)	N	%
Head	111	10.9
Traumatic subarachnoid haemorrhage	54	5.3
Skull fracture	41	4.0
Cerebral contusion/laceration	30	2.9
Traumatic Subdural haematoma	29	2.8
Maxillofacial fracture	18	1.8
Spine	28	2.7
Vertebral fracture, without deficit	20	2.0
Cervical injury, incomplete deficit	4	0.4
Tetraplegia	2	0.2
Chest	50	4.9
Other injuries of the chest	30	2.9
Traum. haemothorax/pneumothorax	26	2.5
Flail chest	15	1.5
Abdomen	12	1.2
Minor injuries of the abdomen	5	0.5
Liver: Moderate-Severe laceration	3	0.3
Spleen: Moderate-Severe laceration	3	0.3
Pelvis/bone/joint & muscle	25	2.4
Long bone fracture	16	1.6
Multiple fracture of the pelvis	9	0.9
-	0	0.0
Major vessels injury	1	0.1
Aorta: rupture/dissection	1	0.1
-	0	0.0
-	0	0.0
Miscellaneous	2	0.2
Inhalation injury	1	0.1
Burns (>30% BSA)	1	0.1
Missing	0	

Infection severity on admission	N	%
None	498	49.1
Infection with or without SIRS	251	24.8
SEVERE SEPSIS	78	7.7
Septic shock	187	18.4
Missing	8	

Infection severity on admission

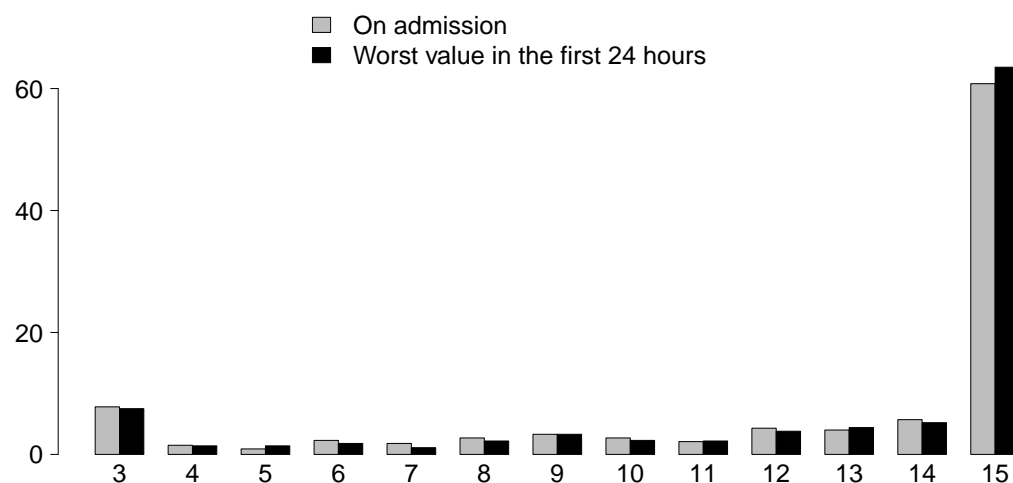
Patients infected (N=516)



National report - Year 2016

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

Glasgow Coma Scale (%)



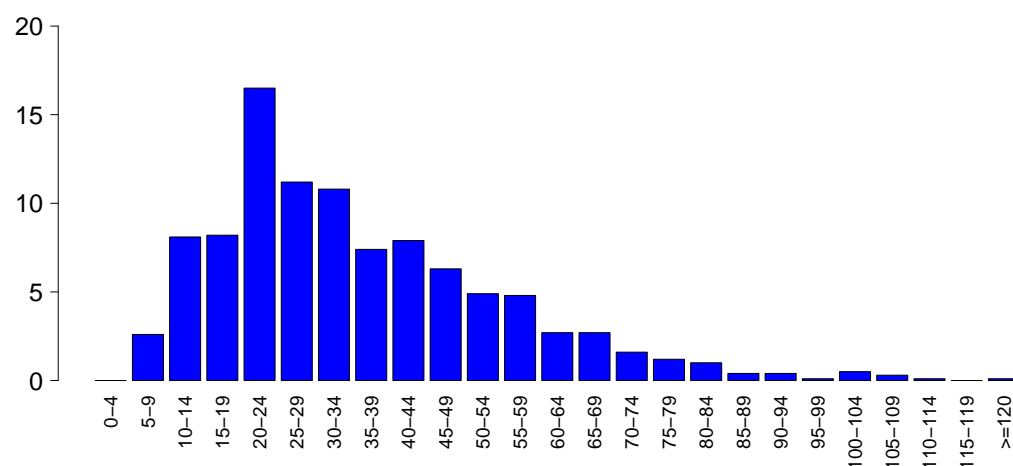
GCS (admission)

Median	15
Q1–Q3	11–15
Not evaluable	168
Missing	0

GCS (first 24 hours)

Median	15
Q1–Q3	12–15
Not evaluable	290
Missing	0

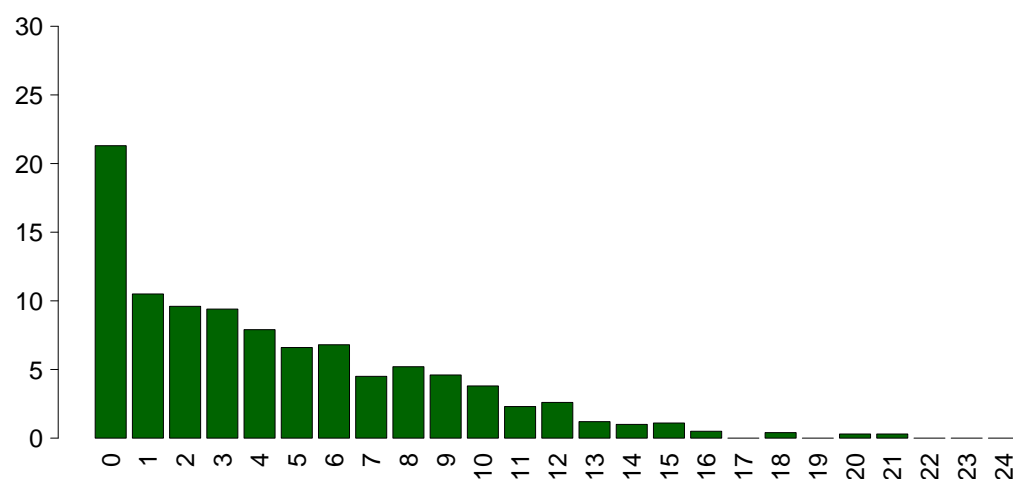
SAPS II (%)



SAPSII

Mean	35.5
SD	19.2
Median	31
Q1–Q3	22–46
Not evaluable	290
Missing	0

SOFA (%)



SOFA

Mean	4.5
SD	4.2
Median	3
Q1–Q3	1–7
Not evaluable	290
Missing	0

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

Complications during the stay	N	%
No	581	56.8
Yes	441	43.2
Missing	0	

Failures during the stay	N	%
No	857	83.9
Yes	165	16.1
A: Respiratory failure	79	7.7
B: Cardiovascular failure	64	6.3
C: Neurological failure	16	1.6
D: Hepatic failure	11	1.1
E: Renal failure (AKIN)	70	6.8
F: Acute skin failure	0	0.0
G: Metabolic failure	25	2.4
H: Coagulation failure	9	0.9
Missing	0	

Failures during the stay (top 10)	N	%
A	36	3.5
E	25	2.4
B	19	1.9
AB	11	1.1
AE	10	1.0
BE	8	0.8
G	7	0.7
D	6	0.6
ABE	5	0.5
AG	4	0.4
Missing	0	

Respiratory failure occurred	N	%
None	943	92.3
Intubation for airway maint.	8	0.8
Hypoxic failure	62	6.1
Hypercapnic failure	17	1.7
Missing	0	

Cardiovascular failure occurred	N	%
None	958	93.7
Cardiogenic shock	20	2.0
Hypovolemic shock	2	0.2
Haemorrhagic/hypovolemic shock	3	0.3
Septic shock	38	3.7
Anaphylactic shock	0	0.0
Neurogenic shock	1	0.1
Other shock	4	0.4
Missing	0	

Neurological failure occurred	N	%
None	1006	98.4
Cerebral coma	9	0.9
Metabolic coma	7	0.7
Postanoxic coma	0	0.0
Missing	0	

Renal failure occurred (AKIN)	N	%
None	952	93.2
Mild	7	0.7
Moderate	20	2.0
Severe	43	4.2
Missing	0	

Complications during the stay	N	%
Respiratory	100	9.8
Pleural effusion	36	3.5
Aspiration pneumonia	25	2.4
Atelectasis	18	1.8
Pneumothorax/Pneumomediastinum	14	1.4
Severe ARDS	8	0.8
Cardiovascular	117	11.4
Acute severe arrhythmia: tachycardias	66	6.5
Cardiac arrest	25	2.4
Hypertensive crisis	11	1.1
Pulmonary edema	10	1.0
Left heart failure w/o pulm. edema	8	0.8
Neurological	135	13.2
Drowsiness/agitation/delirium	89	8.7
Intracranial hypertension	22	2.2
Seizures	14	1.4
Brain edema	10	1.0
New ischaemic stroke	8	0.8
Gastrointestinal and hepatic	60	5.9
Paralytic Ileus	32	3.1
Gastrointestinal bleeding: lower tract	10	1.0
Liver Dysfunction Syndrome	10	1.0
Ascites	6	0.6
Gastrointestinal bleeding: upper tract	6	0.6
Other	49	4.8
Metabolic disorder	25	2.4
Other disease	17	1.7
Nephrourologic disease	11	1.1
Other skin and/or soft tissue pathology	4	0.4
Category/Stage II: Partial Thickness Skin Loss	3	0.3
Category/Stage III: Full Thickness Skin Loss	3	0.3
Category/Stage I: Nonblanchable Erythema	2	0.2
Infections	138	13.5
Pneumonia	57	5.6
L.R.T.I. other than pneumonia	24	2.3
NON-surgical urinary tract infection	21	2.1
Clinical sepsis	10	1.0
Upper respiratory tract infection	8	0.8
F.U.O. fever of unknown origin	6	0.6
Primary bacteraemia of unknown origin	3	0.3
Cholecystitis/cholangitis	3	0.3
Other fungal infections	3	0.3
Catheter-related bacteremia (CR-BSI)	2	0.2
Missing	0	

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

Infections	N	%
None	411	40.2
Only on admission	473	46.3
On admission and during ICU stay	51	5.0
Only during ICU stay	87	8.5
Missing	0	

Maximum severity of infection	N	%
None	411	40.7
Infection with or without SIRS	302	29.9
SEVERE SEPSIS	91	9.0
Septic shock	207	20.5
Missing	11	

Severity evolution

Severity evolution		During the stay				
		N (R %)	None	Infection with or without SIRS	SEVERE SEPSIS	Septic shock
Admission	None	411 (83.4%)	68 (13.8%)	5 (1.0%)	9 (1.8%)	493
	Infection with or without SIRS	-	233 (92.8%)	13 (5.2%)	5 (2.0%)	251
	SEVERE SEPSIS	-	-	73 (93.6%)	5 (6.4%)	78
	Septic shock	-	-	-	187 (100.0%)	187
	TOT	411	301	91	206	1009

Ventil. Associat. Pneumonia (VAP)	N	%
No	978	95.7
Yes	44	4.3
Missing	0	

Incidence of VAP

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

Estimate	14.0
CI (95%)	10.2–18.8

Incidence of VAP

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

Estimate	11.2%
CI (95%)	8.1–15.0

Catheter Bacteraemia (CR-BSI)	N	%
No	1020	99.8
Yes	2	0.2
Missing	0	

Incidence of CR-BSI

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

Estimate	0.3
CI (95%)	0.0–1.3

Incidence of CR-BSI

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

Estimate	0.4%
CI (95%)	0.0–1.5

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Process indicators - Adult non 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
Procedures (antibiotics excluded)		829	81.1										
Procedures (antibiotics excluded)	Invasive ventilation	467	45.7	219	21.4	68	6.7	4	1-8	0	0	0-0	0
	Non invasive ventilation	184	18.0	24	2.3	51	5	2	1-4	0	0	0-4	0
	Tracheostomy	59	5.8	17	1.7	42	4.1	8	2-14	0	14	9-20	0
	iNO (inhaled nitric oxide)	12	1.2	3	0.3	3	0.3	3	1-5	0	1	0-1	0
	Central Venous Catheter	626	61.3	219	21.4	395	38.6	5	3-11	0	0	0-0	0
	PICC	68	6.7	6	0.6	43	4.2	3	2-5	0	0	0-1	0
	Arterial Catheter	644	63.0	199	19.5	172	16.8	5	2-10	0	0	0-0	0
	Vasoactive drugs	518	50.7	133	13	73	7.1	3	1-6	0	0	0-0	0
	Antiarrhythmics	160	15.7	15	1.5	31	3	2	1-5	0	1	0-4	0
	IABP	1	0.1	0	0	0	0	4	4-4	0	9	9-9	0
	Invasive monitoring of C.O.	83	8.1	7	0.7	11	1.1	5	2-8	0	0	0-0	0
	Continuous monitoring of ScVO2	3	0.3	0	0	0	0	7	6-8	0	0	0-0	0
	Temporary pacing	15	1.5	2	0.2	8	0.8	3	2-6	0	0	0-0	0
	Ventricular assistance	1	0.1	0	0	0	0	3	3-3	0	1	1-1	0
	DC-shock	31	3.0								1	0-3	0
	CPR	37	3.6								0	0-1	0
	Massive blood transfusion	11	1.1								0	0-1	0
	ICP monitoring without liquor-drainage	26	2.5	16	1.6	5	0.5	6	2-12	0	0	0-1	0
	ICP monitoring with liquor-drainage	5	0.5	4	0.4	3	0.3	11	6-19	0	0	0-1	0
	External ventricular drainage without ICP	1	0.1	1	0.1	0	0	27	27-27	0		0-0	0
	Haemofiltration	0	0.0										
	Haemodialysis	106	10.4	19	1.9	29	2.8	5	1-10	0	1	0-4	0
	ECMO	0	0.0										
	Hepatic clearance techniques	0	0.0										
	Clearance techniques during sepsis	0	0.0										
	IAP (intra-abdominal pressure)	32	3.1										
Hypothermia	21	2.1											
Enteral nutrition	368	36.0	66	6.5	155	15.2	6	3-12	0	1	1-2	0	
Parenteral nutrition	293	28.7	70	6.8	129	12.6	4	2-9	0	1	0-2	0	
SDD (Topical, Topical and systemic)	11	1.1											
Patient restraint	32	3.1											
Peridural catheter	4	0.4	0	0	1	0.1	2	2-4	0	0	0-6	0	
Electrical cardioversion	13	1.3								4	1-4	0	
Vacuum therapy	3	0.3											
Antibiotics	675	66.0											
Antibiotics for surgical prophylaxis	15	1.5	9	0.9	7	0.7	1	0-6	0	0	0-0	0	
Antibiotics for medical prophylaxis	111	10.9	37	3.6	60	5.9	3	1-5	0	0	0-0	0	
Empirical antibiotic therapy	463	45.3	188	18.4	178	17.4	3	2-5	0	0	0-1	0	
Targeted antibiotic therapy	308	30.1	75	7.3	194	19	6	3-12	0	3	2-5	0	

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

Invasive ventilation (N=467)			N	%	Length (days)				
	Due to pulmonary failure	351	74.7	Mean	SD	Median	Q1-Q3	Missing	
	For airway maintenance	103	21.9	7.8	12.0	4	1–8	0	
	In weaning	4	0.9	7.7	9.8	4	2–10	0	
	Not evaluable	12	2.6	0.5	0.6	0.5	0–1	0	
	Reintubation within 48 hours	7	1.5	4.8	5.7	4	1–5	4	
					8.6	8.6	7	2–12.5	0
Non invasive ventilation (N=184)			N	%	Number of surgical interventions				
	Non invasive ventilation only	95	51.6				0	987	96.6
	Non invasive ventilation failed	25	13.6				1	30	2.9
	For weaning	55	29.9				2	5	0.5
	Other	9	4.9				3	0	0.0
	Missing	0					>3	0	0.0
							Missing	0	
Tracheostomy not present on admission (N=42)			N	%	Surgical interventions				
	Surgical	15	35.7	Days from admission					
	Percutwist	13	31.0				Mean	9.7	
	Ciaglia	0	0.0				SD	6.9	
	Monodil. Ciaglia	1	2.4				Median	7.5	
	Fantoni	0	0.0				Q1–Q3	3–14.2	
	Griggs	6	14.3				Missing	0	
	Other Kind	0	0.0	Surgical interventions (top 10)					
	Unknown	7	16.7					N	%
	Missing	0					Other surgery	13	1.3
							Gastrointestinal surgery	8	0.8
							ENT surgery	7	0.7
							Neurosurgery	5	0.5
							Orthopaedic surgery	4	0.4
							Plastic surgery	1	0.1
							Biliary tract surgery	1	0.1
							Organ donation	1	0.1
							-	0	0.0
							-	0	0.0
							Missing	0	
Tracheostomy - Days after the beginning of inv. vent. Not present on admission (N=42)					Non surgical interventions				
	Mean	16.0						N	%
	SD	9.5					No	978	95.7
	Median	14.5					Yes	44	4.3
	Q1–Q3	9.2–19.8					Missing	0	
	Missing	0		Non surgical interventions					
							Days from admission		
							Mean	10.5	
							SD	10.4	
							Median	6	
							Q1–Q3	4–13	
							Missing	2	
Invasive monitoring of C.O. (N=83)			N	%	Non surgical interventions				
	Swan Ganz	14	16.9					N	%
	PICCO	43	51.8				Interventional radiology	20	2.0
	LIDCO	4	4.8				Interventional endoscopy	14	1.4
	Vigileo-PRAM	3	3.6				Interventional cardiology	11	1.1
	Other	19	22.9				Interventional neuroradiology	10	1.0
	Missing	0					Missing	0	
SDD (N=11)			N	%					
	Topical	8	72.7						
	Topical and systemic	3	27.3						
	Missing	0							
Antibiotic therapy									
Pt. infected in ICU only (N=87)			N	%					
	Only empirical	30	37.5						
	Only targeted	15	18.8						
	Targeted after empirical	34	42.5						
	Other	1	1.2						
	Missing	7							
Surgical interventions			N	%					
	No	987	96.6						
	Yes	35	3.4						
	Missing	0							

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

ICU outcome	N	%
Dead	194	19.2
Transferred to same hospital	700	69.2
Transferred to other hospital	109	10.8
Discharged home	9	0.9
Disch. terminally ill	0	0.0
Missing	10	

Transferred to (N=809)	N	%
Ward	626	77.4
Other ICU	63	7.8
High dependency care unit	120	14.8
Rehabilitation	0	0.0
Day hospital or Long-term care	0	0.0
Missing	0	

Reason of transfer to Other ICU (N=63)	N	%
Specialist expertise	8	12.7
Step-up care	26	41.3
Logistical/organizational reasons	25	39.7
Step-down care	4	6.3
Missing	0	

Transferred to Same hospital (N=700)	N	%
Ward	562	80.3
Other ICU	25	3.6
High dependency care unit	113	16.1
Rehabilitation	0	0.0
Day hospital or Long-term care	0	0.0
Missing	0	

Transferred to Other hospital (N=109)	N	%
Ward	64	58.7
Other ICU	38	34.9
High dependency care unit	7	6.4
Rehabilitation	0	0.0
Day hospital or Long-term care	0	0.0
Missing	0	

ICU mortality	N	%
Alive	818	80.8
Dead	194	19.2
Missing	10	

Timing of ICU mortality (N=194)	N	%
Daytime (08:00AM - 07:59PM)	118	60.8
Nighttime (08:00PM - 07:59AM)	76	39.2
Weekdays (Monday - Friday)	154	79.4
Weekend (Saturday - Sunday)	40	20.6
Missing	0	

Hospital mortality	N	%
Alive	708	69.3
Dead	314	30.7
Missing	0	

Timing of hosp. mortality (N=314)	N	%
In ICU	194	61.8
Within 24 hours after ICU	6	1.9
24-47 hours after ICU	9	2.9
48-71 hours after ICU	4	1.3
72-95 hours after ICU	8	2.5
After 95 hours after ICU	93	29.6
Missing	0	

Timing of hosp. mortality (days from ICU disch.) Discharged alive from ICU (N=120)		
Mean		16.0
SD		17.1
Median		9
Q1–Q3		4–23
Missing		0

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

Last hospital mortality	N	%
Alive	702	68.7
Dead	320	31.3
Missing	0	

ICU stay (days)		
	Mean	7.1
	SD	10.8
	Median	4
	Q1–Q3	1–8
	Missing	0

ICU stay (days)		
Alive (N=818)		
	Mean	6.6
	SD	10.0
	Median	3
	Q1–Q3	1–7
	Missing	0

ICU stay (days)		
Dead (N=194)		
	Mean	8.9
	SD	11.9
	Median	5
	Q1–Q3	2–11
	Missing	0

Stay after ICU (days)		
Alive (N=818)		
	Mean	13.8
	SD	19.9
	Median	8
	Q1–Q3	3–18
	Missing	0

Hospital stay (days)		
	Mean	21.7
	SD	25.8
	Median	13
	Q1–Q3	6–28
	Missing	0

Hospital stay (days)		
Alive (N=708)		
	Mean	21.3
	SD	26.0
	Median	13
	Q1–Q3	7–26
	Missing	0

Hospital stay (days)		
Dead (N=314)		
	Mean	22.5
	SD	25.3
	Median	13.5
	Q1–Q3	5–30.8
	Missing	0

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

Patients (N): 674

Sex	N	%
Male	407	60.4
Female	267	39.6
Missing	0	

Age (years)	N	%
17-45	41	6.1
46-65	262	38.9
66-75	219	32.5
>75	152	22.6
Missing	0	
Mean	66.1	
SD	12.2	
Median	67	
Q1–Q3	59–75	
Min–Max	19–95	

Body mass Index (BMI)	N	%
Underweight	15	2.2
Normal	298	44.2
Overweight	260	38.6
Obese	101	15.0
Missing	0	

Pregnancy status	N	%
Females (N=267)		
Not fertile	115	43.1
Not pregnant/Unknown	152	56.9
Currently pregnant	0	0.0
Post partum	0	0.0
Missing	0	

Comorbidities	N	%
No	66	9.8
Yes	608	90.2
Missing	0	

Comorbidities (top 10)	N	%
Hypertension	384	57.0
Any tumour without metastasis	221	32.8
Metastatic cancer	122	18.1
Diabetes Type II without insulin tr.	94	13.9
Arrhythmia	84	12.5
NYHA class II-III	50	7.4
Peripheral vascular disease	47	7.0
Moderate or severe renal disease	46	6.8
Cerebrovascular disease	42	6.2
Moderate COPD	42	6.2
Missing	0	

Stay before ICU (days)	Mean	SD	Median	Q1–Q3	Missing
	2.9	6.7	1	1–2	0

Source of admission	N	%
Same hospital	669	99.3
Other hospital	5	0.7
Long-term chronic care hospital	0	0.0
Directly from the community	0	0.0
Missing	0	

Ward of admission	N	%
Hospital (N=674)		
Medical ward	3	0.4
Surgical ward	658	97.6
Emergency room	1	0.1
Other ICU	3	0.4
High dependency care unit	9	1.3
Missing	0	

Reason for transfer from	N	%
Other ICU (N=3)		
Specialist expertise	2	66.7
Step-up care	1	33.3
Logistical/organizational reasons	0	0.0
Step-down care	0	0.0
Missing	0	

Ward of admission	N	%
Same hospital (N=669)		
Medical ward	3	0.4
Surgical ward	656	98.1
Emergency room	1	0.1
Other ICU	1	0.1
High dependency care unit	8	1.2
Missing	0	

Ward of admission	N	%
Other hospital (N=5)		
Medical ward	0	0.0
Surgical ward	2	40.0
Emergency room	0	0.0
Other ICU	2	40.0
High dependency care unit	1	20.0
Missing	0	

Scheduled admission	N	%
No	81	12.0
Yes	593	88.0
Missing	0	

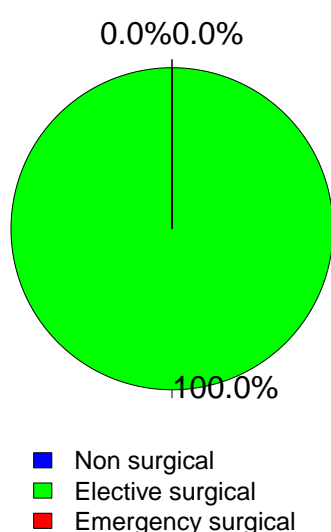
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Characteristics on admission - Adult elective surgical patients evaluated in the GiViTI model

Trauma	N	%
No	664	98.5
Yes	10	1.5
Multiple trauma	1	0.1
Missing	0	

Surgical status	N	%
Non surgical	0	0.0
Elective surgical	674	100.0
Emergency surgical	0	0.0
Missing	0	

Surgical status



Timing	N	%
Elective surgical (N=674)		
From -7 to -3 days	13	1.9
From -2 to -1 days	18	2.7
On ICU admission day	688	102.1
The day after ICU admission	6	0.9
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	

Source of admission	N	%
Surgical pt. (N=674)		
Operating theatre of surgical ward	635	94.2
Operating theatre of emergency room	1	0.1
Surgical ward	23	3.4
Other	15	2.2
Missing	0	

Surgical interventions (top 10)	N	%
Elective surgical (N=674)		
Gastrointestinal surgery	360	53.4
Nephro/Urological surgery	103	15.3
Peripheral vascular surgery	52	7.7
Hepatic surgery	38	5.6
Other surgery	33	4.9
Gynaecological surgery	29	4.3
Abdominal vascular surgery	26	3.9
Orthopaedic surgery	21	3.1
Pancreatic surgery	15	2.2
Neurosurgery	13	1.9
Missing	0	

Non surgical interventions	N	%
None	662	98.2
Elective	6	0.9
Emergency	6	0.9
Missing	0	

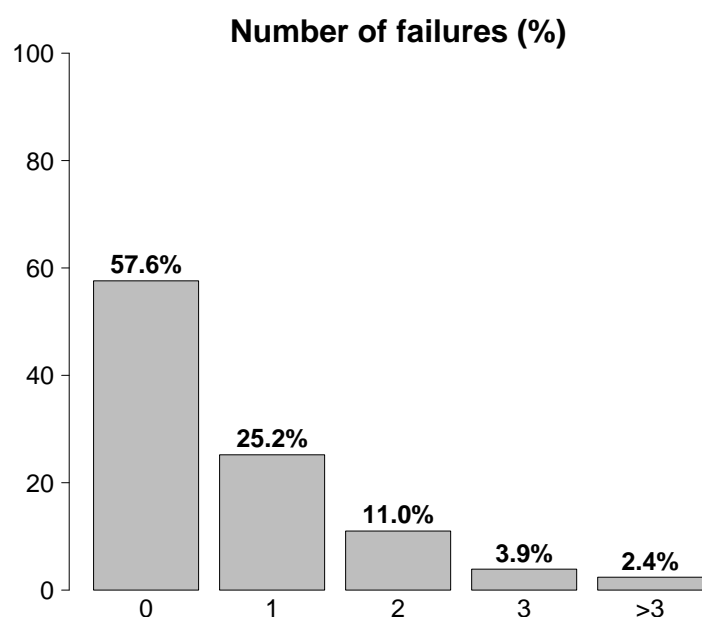
Non surgical interventions	N	%
Elective (N=6)		
Interventional radiology	1	16.7
Interventional cardiology	0	0.0
Interventional neuroradiology	0	0.0
Interventional endoscopy	0	0.0
Missing	5	

Non surgical interventions	N	%
Emergency (N=6)		
Interventional radiology	3	50.0
Interventional cardiology	0	0.0
Interventional neuroradiology	0	0.0
Interventional endoscopy	0	0.0
Missing	3	

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

Reason for admission	N	%
Monitoring/Weaning	460	68.2
Post surgical weaning	8	1.2
Surgical monitoring	452	67.1
Post interventional weaning	0	0.0
Interventional monitoring	0	0.0
Non surgical monitoring	0	0.0
Missing	0	
Admission for procedures/treatments	0	0.0
Intensive Treatment	214	31.8
Only ventilatory support	99	14.7
Only cardiovascular support	52	7.7
Ventilatory and cardiovascular support	63	9.3
Missing	0	
Palliative Sedation	0	0.0
Diagnosis of death/Organ donation	0	0.0
Missing	0	



Failures on admission	N	%
No	388	57.6
Yes	286	42.4
A: Respiratory failure	162	24.0
B: Cardiovascular failure	115	17.1
C: Neurological failure	3	0.4
D: Hepatic failure	3	0.4
E: Renal failure	108	16.0
F: Acute skin failure	0	0.0
G: Metabolic failure	66	9.8
H: Coagulation failure	13	1.9
Missing	0	

Failures on admission (top 10)	N	%
A	81	12.0
E	43	6.4
AB	31	4.6
B	31	4.6
G	14	2.1
EG	12	1.8
ABE	11	1.6
AE	11	1.6
ABEG	8	1.2
BE	6	0.9
Missing	0	

Respiratory failure	N	%
None	512	76.0
Only hypoxic failure	114	16.9
Only hypercapnic failure	7	1.0
Hypoxic-hypercapnic failure	4	0.6
Intubation for airway maint.	37	5.5
Missing	0	

Cardiovascular failure	N	%
None	559	82.9
Without shock	61	9.1
Cardiogenic shock	5	0.7
Septic shock	7	1.0
Haemorrhagic/hypovolemic shock	14	2.1
Hypovolemic shock	9	1.3
Anaphylactic shock	0	0.0
Neurogenic shock	1	0.1
Other shock	13	1.9
Mixed shock	5	0.7
Missing	0	

Neurologic failure	N	%
None	642	99.5
Cerebral coma	2	0.3
Metabolic coma	0	0.0
Postanoxic coma	1	0.2
Toxic coma	0	0.0
Missing or not evaluable	29	

Renal failure (AKIN)	N	%
None	566	84.0
Mild	80	11.9
Moderate	14	2.1
Severe	14	2.1
Missing	0	

Metabolic failure	N	%
None	608	90.2
pH \leq 7.3, PaCO ₂ $<$ 45 mmHg	27	4.0
Base deficit \geq 5 mmol/L, lactate $>$ 1.5x	39	5.8
Missing	0	

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

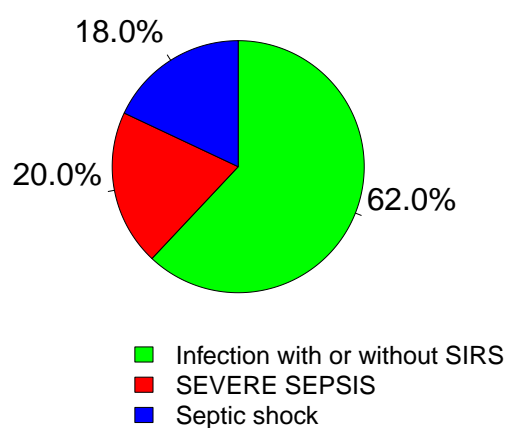
Clinical conditions on admission	N	%
Respiratory	26	3.9
Pleural effusion	7	1.0
Pulmonary embolism	6	0.9
Atelectasis	4	0.6
Aspiration pneumonia	4	0.6
Acute exacerbation of COPD	2	0.3
Cardiovascular	98	14.5
Peripheral vascular disease	47	7.0
Non-ruptured aneurysm	13	1.9
Cardiac arrest	10	1.5
Left heart failure without pulm. edema	7	1.0
Acute severe arrhythmia: tachycardias	6	0.9
Neurological	16	2.4
Brain tumour	7	1.0
Non traumatic cerebral oedema	5	0.7
Seizures	2	0.3
CNS degenerative disease	2	0.3
Metabolic/postanoxic encephalopathy	1	0.1
Gastrointestinal and hepatic	365	54.2
Digestive tract malignancy	299	44.4
Hepatic malignancy	33	4.9
Paralytic Ileus	26	3.9
Pancreatic malignancy	12	1.8
Intestinal occlusion	11	1.6
Trauma (anatomical districts)	10	1.5
Pelvis/bone/joint & muscle	9	1.3
Chest	2	0.3
-	0	0.0
-	0	0.0
-	0	0.0
-	0	0.0
-	0	0.0
-	0	0.0
Other	309	45.8
Other disease	186	27.6
Nephrourologic disease	102	15.1
Metabolic disorder	19	2.8
Gynaecological disease	15	2.2
Coagulation disorder	13	1.9
Post transplantation	15	2.2
Liver transplantation	10	1.5
Renal transplantation	5	0.7
Infections	50	7.4
Pneumonia	14	2.1
Post-surgical peritonitis	12	1.8
Post-surgical skin/soft tissue infection	4	0.6
NON-surgical urinary tract infection	4	0.6
Clinical sepsis	3	0.4
NON-surgical bone and joint infection	2	0.3
Pleurisy/Pleural empyema	2	0.3
NON-surgical secondary peritonitis	2	0.3
NON-surgical skin/soft tissue infection	2	0.3
Upper respiratory tract infection	2	0.3
Missing	0	

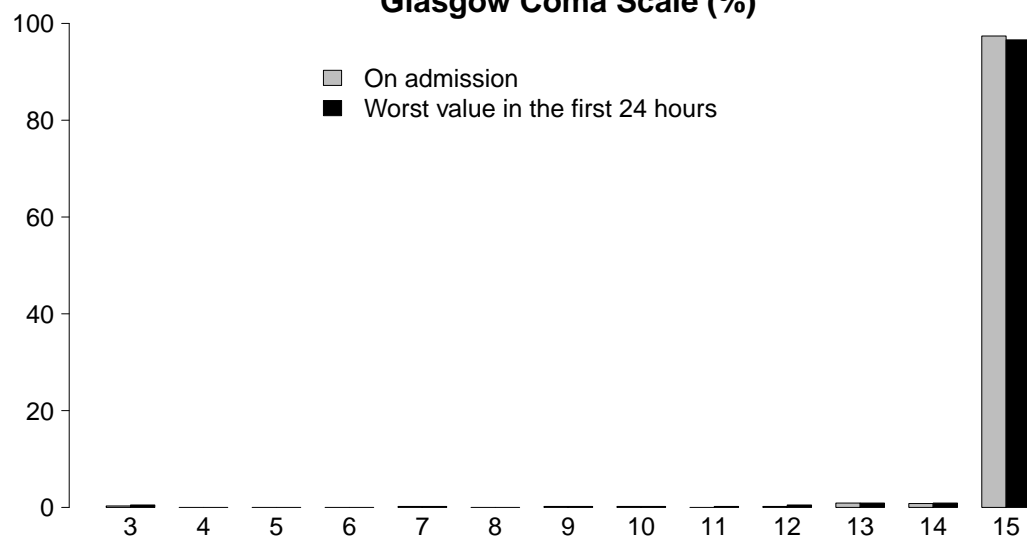
Trauma (anatomical districts)	N	%
Head	0	0.0
-	0	0.0
-	0	0.0
-	0	0.0
-	0	0.0
-	0	0.0
Spine	0	0.0
-	0	0.0
-	0	0.0
-	0	0.0
Chest	2	0.3
Traum. haemothorax/pneumothorax	1	0.1
Flail chest	1	0.1
-	0	0.0
Abdomen	0	0.0
-	0	0.0
-	0	0.0
-	0	0.0
Pelvis/bone/joint & muscle	9	1.3
Long bone fracture	8	1.2
Multiple fracture of the pelvis	1	0.1
-	0	0.0
Major vessels injury	0	0.0
-	0	0.0
-	0	0.0
-	0	0.0
Miscellaneous	0	0.0
-	0	0.0
-	0	0.0
Missing	0	

Infection severity on admission	N	%
None	624	92.6
Infection with or without SIRS	31	4.6
SEVERE SEPSIS	10	1.5
Septic shock	9	1.3
Missing	0	

Infection severity on admission

Patients infected (N=50)

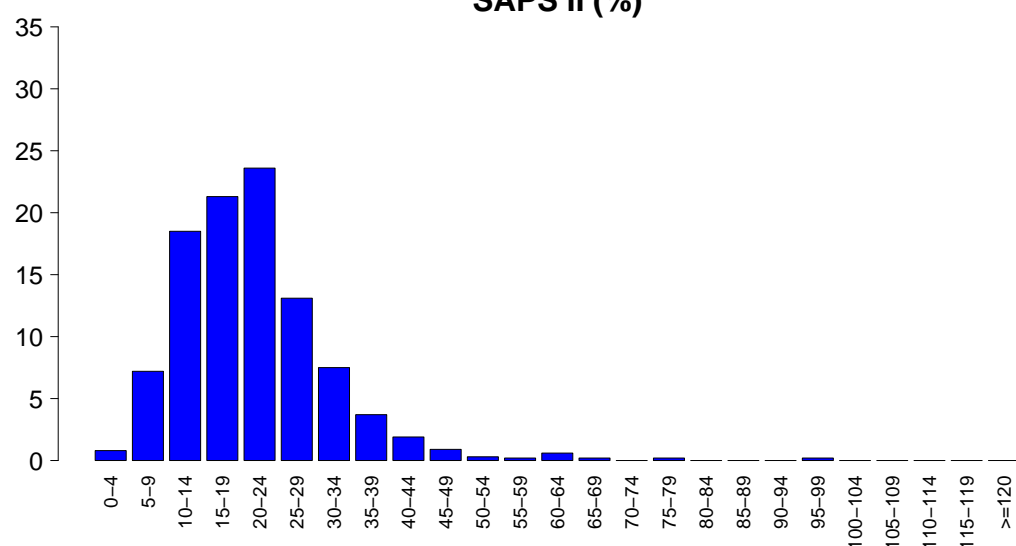


National report - Year 2016**Severity scores** - Adult elective surgical patients evaluated in the GiViTI model**Glasgow Coma Scale (%)****GCS (admission)**

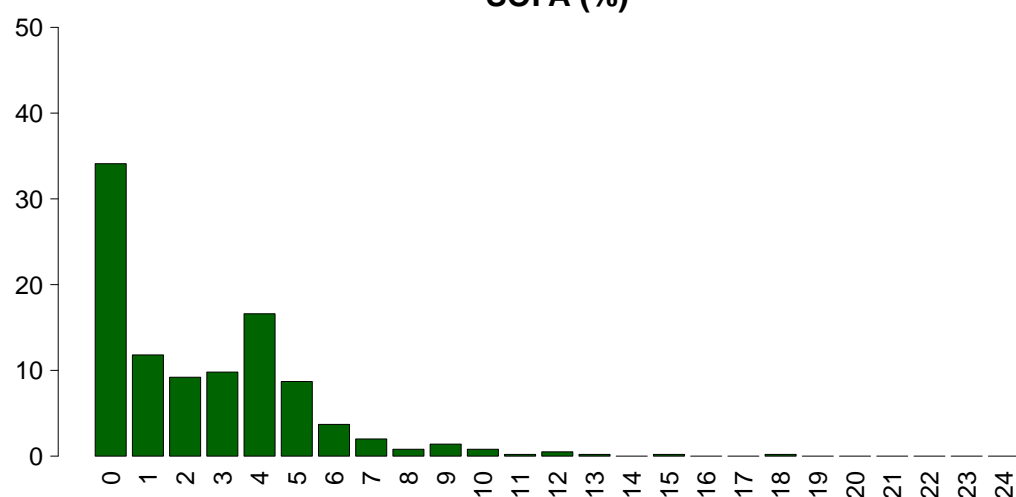
Median	15
Q1–Q3	15–15
Not evaluable	29
Missing	0

GCS (first 24 hours)

Median	15
Q1–Q3	15–15
Not evaluable	31
Missing	0

SAPS II (%)**SAPSII**

Mean	21.2
SD	10.2
Median	20
Q1–Q3	14–26
Not evaluable	31
Missing	0

SOFA (%)**SOFA**

Mean	2.5
SD	2.6
Median	2
Q1–Q3	0–4
Not evaluable	31
Missing	0

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

Complications during the stay	N	%
No	409	60.7
Yes	265	39.3
Missing	0	

Failures during the stay	N	%
No	632	93.8
Yes	42	6.2
A: Respiratory failure	18	2.7
B: Cardiovascular failure	23	3.4
C: Neurological failure	2	0.3
D: Hepatic failure	7	1.0
E: Renal failure (AKIN)	23	3.4
F: Acute skin failure	0	0.0
G: Metabolic failure	7	1.0
H: Coagulation failure	3	0.4
Missing	0	

Failures during the stay (top 10)	N	%
E	7	1.0
B	6	0.9
ABE	4	0.6
G	4	0.6
A	3	0.4
AB	3	0.4
ABDE	2	0.3
ABEG	2	0.3
EH	2	0.3
ABCDE	1	0.1
Missing	0	

Respiratory failure occurred	N	%
None	656	97.3
Intubation for airway maint.	6	0.9
Hypoxic failure	10	1.5
Hypercapnic failure	7	1.0
Missing	0	

Cardiovascular failure occurred	N	%
None	651	96.6
Cardiogenic shock	0	0.0
Hypovolemic shock	4	0.6
Haemorrhagic/hypovolemic shock	3	0.4
Septic shock	16	2.4
Anaphylactic shock	0	0.0
Neurogenic shock	0	0.0
Other shock	2	0.3
Missing	0	

Neurological failure occurred	N	%
None	672	99.7
Cerebral coma	1	0.1
Metabolic coma	0	0.0
Postanoxic coma	1	0.1
Missing	0	

Renal failure occurred (AKIN)	N	%
None	651	96.6
Mild	9	1.3
Moderate	6	0.9
Severe	8	1.2
Missing	0	

Complications during the stay	N	%
Respiratory	36	5.3
Pleural effusion	19	2.8
Atelectasis	15	2.2
Severe ARDS	3	0.4
Acute asthma/bronchospasm	3	0.4
Pneumothorax/Pneumomediastinum	3	0.4
Cardiovascular	73	10.8
Acute severe arrhythmia: tachycardias	27	4.0
Hypertensive crisis	24	3.6
Left heart failure w/o pulm. edema	9	1.3
Acute severe arrhythmia: bradycardias	5	0.7
Pulmonary edema	5	0.7
Neurological	58	8.6
Drowsiness/agitation/delirium	47	7.0
Brain edema	6	0.9
CriMyNe	6	0.9
Hydrocephalus	2	0.3
New ischaemic stroke	2	0.3
Gastrointestinal and hepatic	69	10.2
Paralytic Ileus	46	6.8
Anastomotic dehiscence	11	1.6
Intrabdominal bleeding	7	1.0
Liver Dysfunction Syndrome	7	1.0
Bowel ischaemia	5	0.7
Other	77	11.4
Other disease	62	9.2
Nephrourologic disease	10	1.5
Metabolic disorder	7	1.0
Category/Stage II: Partial Thickness Skin Loss	3	0.4
Extremity compartment syndrome (severe)	2	0.3
Iatrogenic major vessels injury	2	0.3
Acute rejection	1	0.1
Infections	108	16.0
Post-surgical peritonitis	43	6.4
Post-surgical skin/soft tissue infection	19	2.8
Pneumonia	18	2.7
Clinical sepsis	7	1.0
L.R.T.I. other than pneumonia	7	1.0
Other fungal infections	5	0.7
Post-surgical urinary tract infection	4	0.6
F.U.O. fever of unknown origin	3	0.4
Other viral infections	3	0.4
NON-surgical urinary tract infection	3	0.4
Missing	0	

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

Infections	N	%
None	532	78.9
Only on admission	34	5.0
On admission and during ICU stay	16	2.4
Only during ICU stay	92	13.6
Missing	0	

Maximum severity of infection	N	%
None	532	79.3
Infection with or without SIRS	83	12.4
SEVERE SEPSIS	33	4.9
Septic shock	23	3.4
Missing	3	

Severity evolution

Severity evolution		During the stay				
		N (R %)	None	Infection with or without SIRS	SEVERE SEPSIS	Septic shock
Admission	None	532 (85.7%)	53 (8.5%)	24 (3.9%)	12 (1.9%)	621
	Infection with or without SIRS	-	30 (96.8%)	1 (3.2%)	0 (0.0%)	31
	SEVERE SEPSIS	-	-	8 (80.0%)	2 (20.0%)	10
	Septic shock	-	-	-	9 (100.0%)	9
	TOT	532	83	33	23	671

Ventil. Associat. Pneumonia (VAP)	N	%
No	666	98.8
Yes	8	1.2
Missing	0	

Incidence of VAP

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

Estimate	14.0
CI (95%)	6.0–27.5

Incidence of VAP

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

Estimate	11.2%
CI (95%)	4.8–22.0

Catheter Bacteraemia (CR-BSI)	N	%
No	674	100.0
Yes	0	0.0
Missing	0	

Incidence of CR-BSI

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

Estimate	0.0
CI (95%)	0.0–1.4

Incidence of CR-BSI

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

Estimate	0.0%
CI (95%)	0.0–1.7

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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	Median	Q1-Q3
Procedures (antibiotics excluded)	658	97.6								
Invasive ventilation	85	12.6	58	8.6	15	2.2	2	0-8	0	0-4
Non invasive ventilation	171	25.4	41	6.1	20	3	1	1-3	0	0-0
Tracheostomy	16	2.4	2	0.3	15	2.2	6	2-12	0	16-27
iNO (inhaled nitric oxide)	5	0.7	0	0	0	0	5	2-5	0	1-3
Central Venous Catheter	461	68.4	379	56.2	423	62.8	4	3-5	0	0-0
PICC	20	3.0	15	2.2	19	2.8	2	2-4	0	0-7
Arterial Catheter	468	69.4	405	60.1	67	9.9	3	1-5	0	0-0
Vasoactive drugs	312	46.3	139	20.6	14	2.1	2	1-3	0	0-0
Antiarrhythmics	33	4.9	7	1	10	1.5	1	0-5	0	1-3
IABP	0	0.0								
Invasive monitoring of C.O.	20	3.0	2	0.3	2	0.3	7	3-23	0	0-4
Continuous monitoring of ScVO2	0	0.0								
Temporary pacing	1	0.1	0	0	0	0	12	12-12	0	23-23
Ventricular assistance	0	0.0								
DC-shock	1	0.1								
CPR	5	0.7								
Massive blood transfusion	12	1.8								
ICP monitoring without liquor-drainage	2	0.3	1	0.1	1	0.1	3	3-3	0	0-0
ICP monitoring with liquor-drainage	4	0.6	2	0.3	2	0.3	14	6-20	0	1-1
External ventricular drainage without ICP	0	0.0								
Haemofiltration	1	0.1	0	0	0	0	0	0-0	0	2-2
Haemodialysis	11	1.6	3	0.4	6	0.9	24	1-27	0	1-5
ECMO	2	0.3	1	0.1	1	0.1	1	1-1	0	7-7
Hepatic clearance techniques	0	0.0								
Clearance techniques during sepsis	0	0.0								
IAP (intra-abdominal pressure)	15	2.2								
Hypothermia	2	0.3								
Enteral nutrition	230	34.1	15	2.2	194	28.8	2	1-4	0	1-2
Parenteral nutrition	541	80.3	117	17.4	398	59.1	2	1-4	0	0-1
SDD (Topical, Topical and systemic)	3	0.4								
Patient restraint	2	0.3								
Peridural catheter	286	42.4	278	41.2	247	36.6	3	2-5	0	0-0
Electrical cardioversion	0	0.0								
Vacuum therapy	5	0.7								
Antibiotics	605	89.8								
Antibiotics for surgical prophylaxis	528	78.3	453	67.2	187	27.7	1	0-3	0	0-0
Antibiotics for medical prophylaxis	25	3.7	10	1.5	19	2.8	4	2-6	0	0-3
Empirical antibiotic therapy	103	15.3	16	2.4	41	6.1	3	1-4	0	1-2
Targeted antibiotic therapy	75	11.1	10	1.5	61	9.1	5	1-12	0	2-5

National report - 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=85)		N	%	Mean	SD	Median	Q1-Q3	Missing
Due to pulmonary failure		31	34.4	8.9	10.4	4	1–13	0
For airway maintenance		38	42.2	8.0	11.5	3.5	1–9.8	0
In weaning		9	10.0	0.3	0.5	0	0–1	0
Not evaluable		12	13.3	1.1	1.1	1	0.5–1.5	5
Reintubation within 48 hours		2	2.2	10.5	10.6	10.5	6.75–14.25	0
Non invasive ventilation (N=171)		N	%	Number of surgical interventions				
Non invasive ventilation only		140	81.9	0 649 96.3				
Non invasive ventilation failed		2	1.2	1 18 2.7				
For weaning		23	13.5	2 3 0.4				
Other		6	3.5	3 3 0.4				
Missing		0		>3 1 0.1				
				Missing 0				
Tracheostomy not present on admission (N=14)		N	%	Surgical interventions				
				Days from admission				
				Mean 6.8				
				SD 6.9				
				Median 4				
				Q1–Q3 3–7				
				Missing 0				
Tracheostomy - Days after the beginning of inv. vent. Not present on admission (N=14)				Surgical interventions (top 10)				
				N %				
				Gastrointestinal surgery 25 3.7				
				Other surgery 9 1.3				
				Nephro/Urological surgery 2 0.3				
				ENT surgery 1 0.1				
				- 0 0.0				
				- 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=20)		N	%	Non surgical interventions				
				N %				
				No 666 98.8				
				Yes 8 1.2				
				Missing 0				
SDD (N=3)		N	%	Non surgical interventions				
				Days from admission				
				Mean 13.3				
				SD 14.7				
				Median 8				
				Q1–Q3 6.2–13.2				
				Missing 0				
Antibiotic therapy				Non surgical interventions				
Pt. infected in ICU only (N=92)		N	%	N %				
				Interventional radiology 5 0.7				
				Interventional endoscopy 3 0.4				
				Interventional cardiology 2 0.3				
				Interventional neuroradiology 0 0.0				
				Missing 0				
Surgical interventions		N	%					

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

ICU outcome	N	%
Dead	14	2.1
Transferred to same hospital	653	96.9
Transferred to other hospital	7	1.0
Discharged home	0	0.0
Disch. terminally ill	0	0.0
Missing	0	

Transferred to (N=660)	N	%
Ward	601	91.1
Other ICU	9	1.4
High dependency care unit	50	7.6
Rehabilitation	0	0.0
Day hospital or Long-term care	0	0.0
Missing	0	

Reason of transfer to Other ICU (N=9)	N	%
Specialist expertise	1	11.1
Step-up care	0	0.0
Logistical/organizational reasons	6	66.7
Step-down care	2	22.2
Missing	0	

Transferred to Same hospital (N=653)	N	%
Ward	598	91.6
Other ICU	6	0.9
High dependency care unit	49	7.5
Rehabilitation	0	0.0
Day hospital or Long-term care	0	0.0
Missing	0	

Transferred to Other hospital (N=7)	N	%
Ward	3	42.9
Other ICU	3	42.9
High dependency care unit	1	14.3
Rehabilitation	0	0.0
Day hospital or Long-term care	0	0.0
Missing	0	

ICU mortality	N	%
Alive	660	97.9
Dead	14	2.1
Missing	0	

Timing of ICU mortality (N=14)	N	%
Daytime (08:00AM - 07:59PM)	9	64.3
Nighttime (08:00PM - 07:59AM)	5	35.7
Weekdays (Monday - Friday)	10	71.4
Weekend (Saturday - Sunday)	4	28.6
Missing	0	

Hospital mortality	N	%
Alive	647	96.0
Dead	27	4.0
Missing	0	

Timing of hosp. mortality (N=27)	N	%
In ICU	14	51.9
Within 24 hours after ICU	1	3.7
24-47 hours after ICU	3	11.1
48-71 hours after ICU	2	7.4
72-95 hours after ICU	1	3.7
After 95 hours after ICU	6	22.2
Missing	0	

Timing of hosp. mortality (days from ICU disch.) Discharged alive from ICU (N=13)		
Mean		32.8
SD		61.1
Median		3
Q1–Q3		1–29
Missing		0

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

Last hospital mortality	N	%
Alive	646	95.8
Dead	28	4.2
Missing	0	

ICU stay (days)		
	Mean	4.1
	SD	6.6
	Median	3
	Q1–Q3	1–4
	Missing	0

ICU stay (days)		
Alive (N=660)		
	Mean	3.9
	SD	6.2
	Median	3
	Q1–Q3	1–4
	Missing	0

ICU stay (days)		
Dead (N=14)		
	Mean	13.1
	SD	14.8
	Median	7.5
	Q1–Q3	3–18
	Missing	0

Stay after ICU (days)		
Alive (N=660)		
	Mean	9.4
	SD	16.1
	Median	5
	Q1–Q3	3–10
	Missing	0

Hospital stay (days)		
	Mean	16.4
	SD	20.9
	Median	11
	Q1–Q3	8–18
	Missing	0

Hospital stay (days)		
Alive (N=647)		
	Mean	15.4
	SD	17.1
	Median	11
	Q1–Q3	7–17.5
	Missing	0

Hospital stay (days)		
Dead (N=27)		
	Mean	41.4
	SD	58.4
	Median	31
	Q1–Q3	10–40.5
	Missing	0

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

Patients (N): 674

Sex	N	%
Male	412	61.1
Female	262	38.9
Missing	0	

Age (years)	N	%
17-45	104	15.4
46-65	196	29.1
66-75	137	20.3
>75	237	35.2
Missing	0	
Mean	65.3	
SD	18.5	
Median	68	
Q1–Q3	55–80	
Min–Max	17–99	

Body mass Index (BMI)	N	%
Underweight	41	6.1
Normal	306	45.4
Overweight	232	34.4
Obese	95	14.1
Missing	0	

Pregnancy status	N	%
Females (N=262)		
Not fertile	144	55.0
Not pregnant/Unknown	116	44.3
Currently pregnant	1	0.4
Post partum	1	0.4
Missing	0	

Comorbidities	N	%
No	121	18.0
Yes	553	82.0
Missing	0	

Comorbidities (top 10)	N	%
Hypertension	344	51.0
Arrhythmia	118	17.5
NYHA class II-III	92	13.6
Any tumour without metastasis	86	12.8
Moderate or severe renal disease	80	11.9
Diabetes Type II without insulin tr.	76	11.3
Peripheral vascular disease	67	9.9
Drug-induced coagulopathy	58	8.6
Myocardial infarction	51	7.6
Cerebrovascular disease	47	7.0
Missing	0	

Stay before ICU (days)	Mean	SD	Median	Q1–Q3	Missing
	4.5	11.8	1	0–4	0

Source of admission	N	%
Same hospital	630	93.5
Other hospital	44	6.5
Long-term chronic care hospital	0	0.0
Directly from the community	0	0.0
Missing	0	

Ward of admission	N	%
Hospital (N=674)		
Medical ward	42	6.2
Surgical ward	438	65.0
Emergency room	124	18.4
Other ICU	31	4.6
High dependency care unit	39	5.8
Missing	0	

Reason for transfer from	N	%
Other ICU (N=31)		
Specialist expertise	14	45.2
Step-up care	10	32.3
Logistical/organizational reasons	7	22.6
Step-down care	0	0.0
Missing	0	

Ward of admission	N	%
Same hospital (N=630)		
Medical ward	41	6.5
Surgical ward	432	68.6
Emergency room	102	16.2
Other ICU	19	3.0
High dependency care unit	36	5.7
Missing	0	

Ward of admission	N	%
Other hospital (N=44)		
Medical ward	1	2.3
Surgical ward	6	13.6
Emergency room	22	50.0
Other ICU	12	27.3
High dependency care unit	3	6.8
Missing	0	

Scheduled admission	N	%
No	673	99.9
Yes	1	0.1
Missing	0	

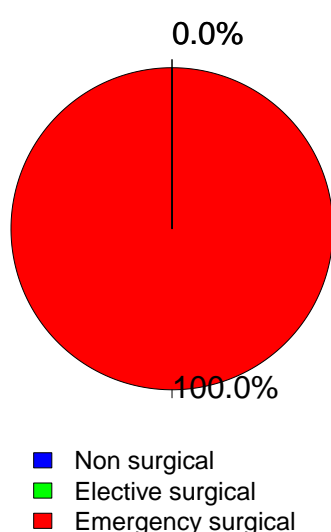
National report - Year 2016

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

Trauma	N	%
No	485	72.0
Yes	189	28.0
Multiple trauma	61	9.1
Missing	0	

Surgical status	N	%
Non surgical	0	0.0
Elective surgical	0	0.0
Emergency surgical	674	100.0
Missing	0	

Surgical status



Source of admission	N	%
Surgical pt. (N=674)		
Operating theatre of surgical ward	387	57.4
Operating theatre of emergency room	94	13.9
Surgical ward	51	7.6
Other	142	21.1
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=674)		
Gastrointestinal surgery	329	48.8
Neurosurgery	111	16.5
Orthopaedic surgery	55	8.2
Other surgery	41	6.1
Biliary tract surgery	28	4.2
Peripheral vascular surgery	23	3.4
Nephro/Urological surgery	22	3.3
Abdominal vascular surgery	18	2.7
Hepatic surgery	15	2.2
Organ/s transplantation	15	2.2
Missing	17	

Timing	N	%
Emergency surgical (N=674)		
From -7 to -3 days	35	5.2
From -2 to -1 days	80	11.9
On ICU admission day	569	84.4
The day after ICU admission	32	4.7
Missing	0	

Non surgical interventions	N	%
None	647	96.0
Elective	1	0.1
Emergency	26	3.9
Missing	0	

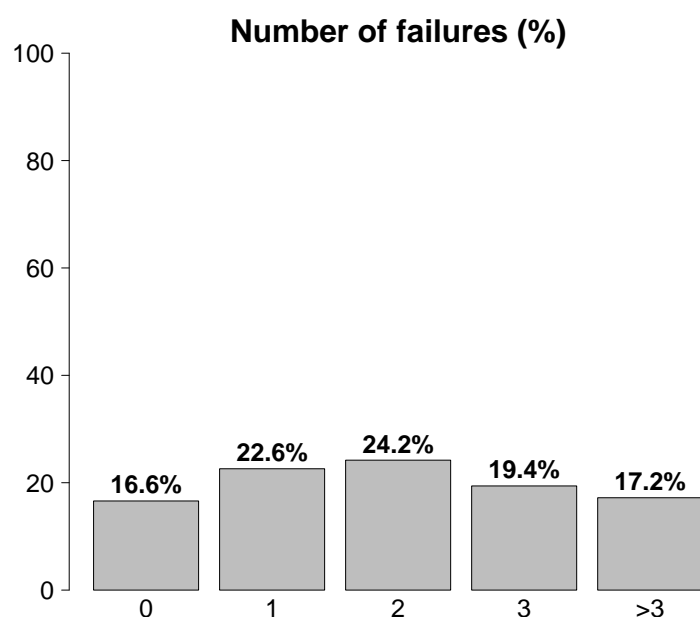
Non surgical interventions	N	%
Elective (N=1)		
Interventional endoscopy	1	100.0
Interventional radiology	0	0.0
Interventional cardiology	0	0.0
Interventional neuroradiology	0	0.0
Missing	0	

Non surgical interventions	N	%
Emergency (N=26)		
Interventional endoscopy	10	38.5
Interventional radiology	9	34.6
Interventional cardiology	2	7.7
Interventional neuroradiology	0	0.0
Missing	5	

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

Reason for admission	N	%
Monitoring/Weaning	154	22.8
Post surgical weaning	21	3.1
Surgical monitoring	133	19.7
Post interventional weaning	0	0.0
Interventional monitoring	0	0.0
Non surgical monitoring	0	0.0
Missing	0	
Admission for procedures/treatments	0	0.0
Intensive Treatment	520	77.2
Only ventilatory support	160	23.7
Only cardiovascular support	60	8.9
Ventilatory and cardiovascular support	300	44.5
Missing	0	
Palliative Sedation	0	0.0
Diagnosis of death/Organ donation	0	0.0
Missing	0	



Failures on admission	N	%
No	112	16.6
Yes	562	83.4
A: Respiratory failure	460	68.2
B: Cardiovascular failure	360	53.4
C: Neurological failure	46	6.8
D: Hepatic failure	16	2.4
E: Renal failure	241	35.8
F: Acute skin failure	2	0.3
G: Metabolic failure	212	31.5
H: Coagulation failure	31	4.6
Missing	0	

Failures on admission (top 10)	N	%
A	104	15.4
AB	99	14.7
ABEG	71	10.5
ABE	42	6.2
ABG	33	4.9
BEG	21	3.1
E	20	3.0
B	19	2.8
AE	17	2.5
ABC	14	2.1
Missing	0	

Respiratory failure	N	%
None	214	31.8
Only hypoxic failure	173	25.7
Only hypercapnic failure	19	2.8
Hypoxic-hypercapnic failure	17	2.5
Intubation for airway maint.	251	37.2
Missing	0	

Cardiovascular failure	N	%
None	314	46.6
Without shock	144	21.4
Cardiogenic shock	6	0.9
Septic shock	110	16.3
Haemorrhagic/hypovolemic shock	51	7.6
Hypovolemic shock	22	3.3
Anaphylactic shock	1	0.1
Neurogenic shock	8	1.2
Other shock	9	1.3
Mixed shock	9	1.3
Missing	0	

Neurologic failure	N	%
None	422	90.2
Cerebral coma	34	7.3
Metabolic coma	5	1.1
Postanoxic coma	7	1.5
Toxic coma	0	0.0
Missing or not evaluable	206	

Renal failure (AKIN)	N	%
None	433	64.2
Mild	136	20.2
Moderate	62	9.2
Severe	43	6.4
Missing	0	

Metabolic failure	N	%
None	462	68.5
pH \leq 7.3, PaCO ₂ $<$ 45 mmHg	115	17.1
Base deficit \geq 5 mmol/L, lactate $>$ 1.5x	97	14.4
Missing	0	

National report - Year 2016**Characteristics on admission - Adult emergency surgical patients evaluated in the GiViTI model**

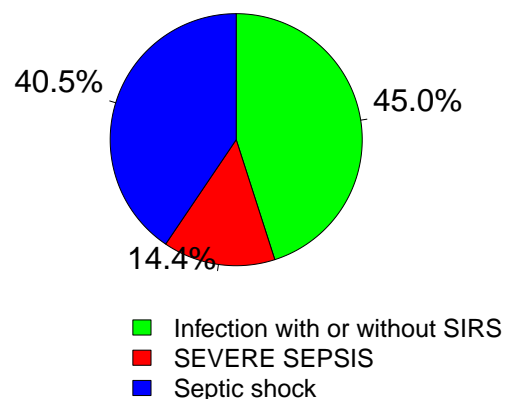
Clinical conditions on admission	N	%
Respiratory	68	10.1
Aspiration pneumonia	27	4.0
Pleural effusion	22	3.3
Atelectasis	14	2.1
Pulmonary embolism	6	0.9
Upper respiratory tract disease	5	0.7
Cardiovascular	98	14.5
Acute severe arrhythmia: tachycardias	23	3.4
Left heart failure without pulm. edema	17	2.5
Cardiac arrest	16	2.4
Peripheral vascular disease	16	2.4
Left heart failure with pulmonary edema	7	1.0
Neurological	33	4.9
Intracranial hypertension	9	1.3
Non traumatic cerebral oedema	8	1.2
Chronic Subdural haematoma	6	0.9
Brain tumour	5	0.7
Spontaneous Subarachnoid haemorrhage	5	0.7
Gastrointestinal and hepatic	287	42.6
Intestinal occlusion	79	11.7
Gastrointestinal perforation	66	9.8
Digestive tract malignancy	57	8.5
Paralytic Ileus	43	6.4
Bowel ischaemia	39	5.8
Trauma (anatomical districts)	189	28.0
Head	113	16.8
Pelvis/bone/joint & muscle	55	8.2
Chest	50	7.4
Spine	40	5.9
Abdomen	29	4.3
Major vessels injury	8	1.2
Miscellaneous	3	0.4
Other	175	26.0
Other disease	102	15.1
Nephrourologic disease	41	6.1
Metabolic disorder	34	5.0
Coagulation disorder	31	4.6
Other skin and/or soft tissue pathology	7	1.0
Post transplantation	21	3.1
Liver transplantation	16	2.4
Renal transplantation	4	0.6
Infections	293	43.5
NON-surgical secondary peritonitis	69	10.2
Pneumonia	60	8.9
Post-surgical peritonitis	44	6.5
Cholecystitis/choolangitis	24	3.6
NON-surgical skin/soft tissue infection	24	3.6
Primary peritonitis	22	3.3
Clinical sepsis	19	2.8
Post-surgical skin/soft tissue infection	11	1.6
NON-surgical urinary tract infection	10	1.5
Upper respiratory tract infection	9	1.3
Missing	0	

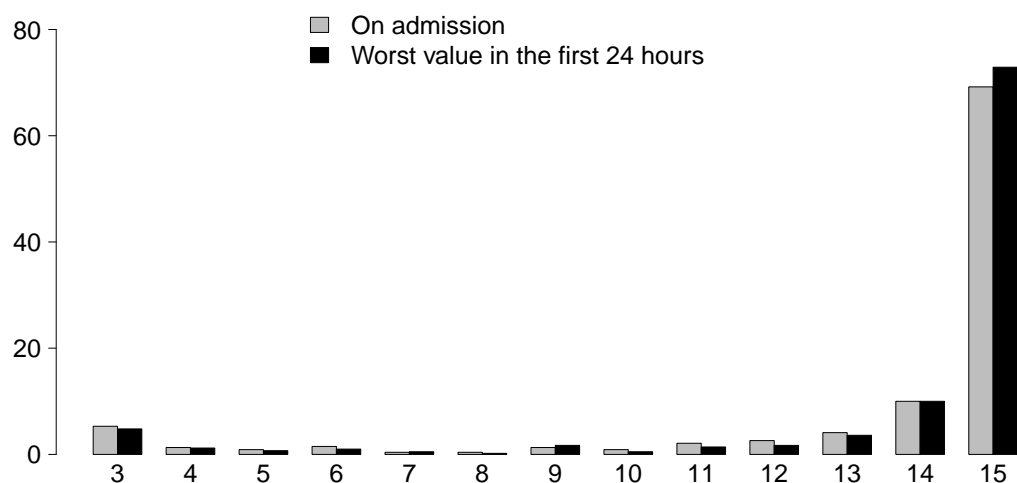
Trauma (anatomical districts)	N	%
Head	113	16.8
Traumatic Subdural haematoma	58	8.6
Traumatic subarachnoid haemorrhage	52	7.7
Skull fracture	39	5.8
Maxillofacial fracture	30	4.5
Cerebral contusion/laceration	19	2.8
Spine	40	5.9
Vertebral fracture, without deficit	19	2.8
Tetraplegia	9	1.3
Cervical injury, incomplete deficit	5	0.7
Chest	50	7.4
Other injuries of the chest	34	5.0
Traum. haemothorax/pneumothorax	27	4.0
Severe lung contusion/laceration	15	2.2
Abdomen	29	4.3
Spleen: Moderate-Severe laceration	8	1.2
Liver: Moderate-Severe laceration	7	1.0
Bowel transection/perforation	6	0.9
Pelvis/bone/joint & muscle	55	8.2
Long bone fracture	46	6.8
Multiple fracture of the pelvis	14	2.1
Very severe or open fracture of the pelvis	3	0.4
Major vessels injury	8	1.2
Proximal limbs vessels: transection	4	0.6
Aorta: rupture/dissection	3	0.4
Neck vessels: dissection/transection	1	0.1
Miscellaneous	3	0.4
Burns (>30% BSA)	3	0.4
-	0	0.0
Missing	0	

Infection severity on admission	N	%
None	381	56.7
Infection with or without SIRS	131	19.5
SEVERE SEPSIS	42	6.2
Septic shock	118	17.6
Missing	2	

Infection severity on admission

Patients infected (N=291)

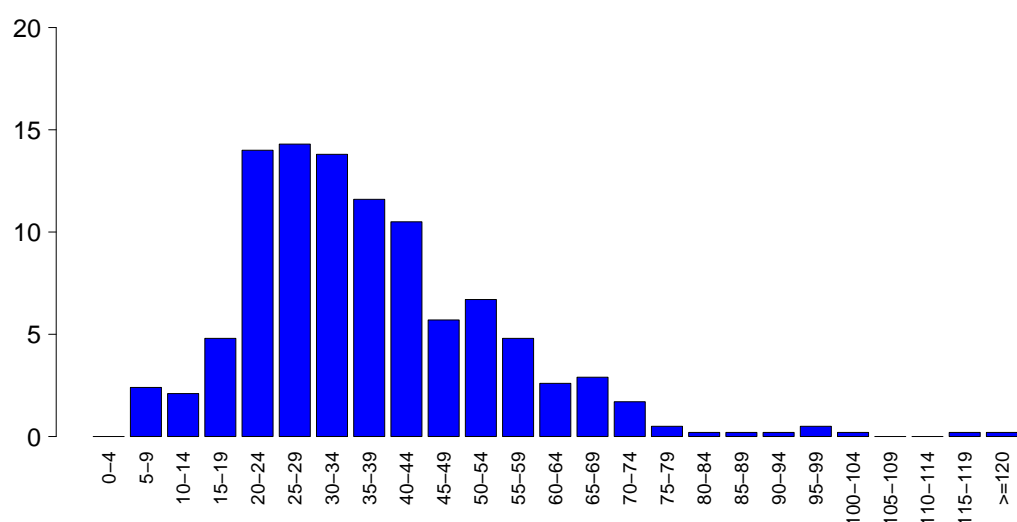


National report - Year 2016**Severity scores** - Adult emergency surgical patients evaluated in the GiViTI model**Glasgow Coma Scale (%)****GCS (admission)**

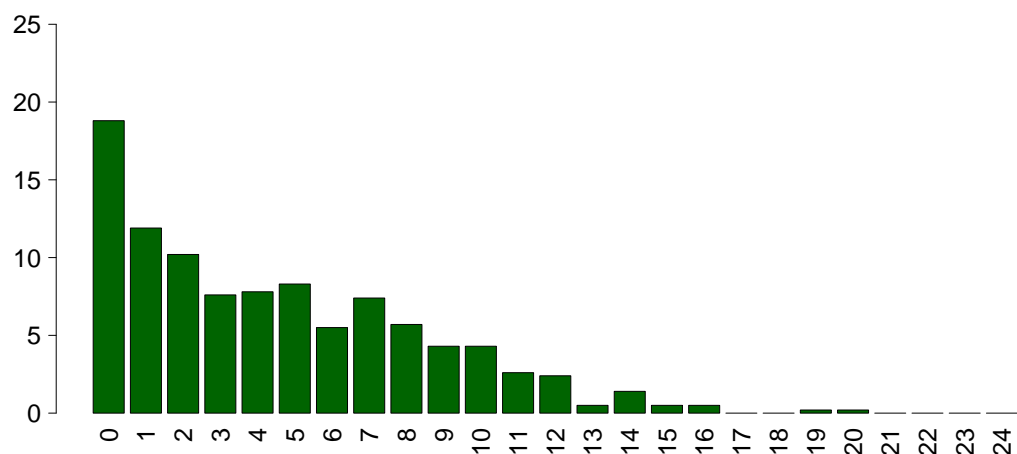
Median	15
Q1–Q3	14–15
Not evaluable	206
Missing	0

GCS (first 24 hours)

Median	15
Q1–Q3	14–15
Not evaluable	253
Missing	0

SAPS II (%)**SAPSII**

Mean	36.9
SD	17.1
Median	34
Q1–Q3	26–45
Not evaluable	253
Missing	0

SOFA (%)**SOFA**

Mean	4.5
SD	4.0
Median	4
Q1–Q3	1–7
Not evaluable	253
Missing	0

National report - Year 2016**Characteristics during the stay** - Adult emergency surgical patients evaluated in the GiViTI model

Complications during the stay	N	%
No	286	42.4
Yes	388	57.6
Missing	0	

Failures during the stay	N	%
No	573	85.0
Yes	101	15.0

A: Respiratory failure	31	4.6
B: Cardiovascular failure	39	5.8
C: Neurological failure	3	0.4
D: Hepatic failure	15	2.2
E: Renal failure (AKIN)	46	6.8
F: Acute skin failure	0	0.0
G: Metabolic failure	14	2.1
H: Coagulation failure	6	0.9
Missing	0	

Failures during the stay (top 10)	N	%
E	25	3.7
B	15	2.2
A	12	1.8
D	8	1.2
BE	6	0.9
AB	5	0.7
ABE	5	0.7
G	4	0.6
H	3	0.4
AE	2	0.3
Missing	0	

Respiratory failure occurred	N	%
None	643	95.4
Intubation for airway maint.	11	1.6
Hypoxic failure	19	2.8
Hypercapnic failure	12	1.8
Missing	0	

Cardiovascular failure occurred	N	%
None	635	94.2
Cardiogenic shock	5	0.7
Hypovolemic shock	2	0.3
Haemorrhagic/hypovolemic shock	6	0.9
Septic shock	24	3.6
Anaphylactic shock	0	0.0
Neurogenic shock	0	0.0
Other shock	2	0.3
Missing	0	

Neurological failure occurred	N	%
None	671	99.6
Cerebral coma	1	0.1
Metabolic coma	2	0.3
Postanoxic coma	0	0.0
Missing	0	

Renal failure occurred (AKIN)	N	%
None	628	93.2
Mild	12	1.8
Moderate	12	1.8
Severe	22	3.3
Missing	0	

Complications during the stay	N	%
Respiratory	88	13.1
Pleural effusion	40	5.9
Aspiration pneumonia	19	2.8
Atelectasis	18	2.7
Severe ARDS	8	1.2
Pulmonary embolism	7	1.0
Cardiovascular	85	12.6
Acute severe arrhythmia: tachycardias	30	4.5
Hypertensive crisis	28	4.2
Cardiac arrest	13	1.9
Left heart failure w/o pulm. edema	9	1.3
Acute severe arrhythmia: bradycardias	7	1.0
Neurological	122	18.1
Drowsiness/agitation/delirium	64	9.5
Intracranial hypertension	47	7.0
Seizures	8	1.2
Brain edema	6	0.9
Post-surgical intracranial bleeding	4	0.6
Gastrointestinal and hepatic	81	12.0
Paralytic Ileus	33	4.9
Anastomotic dehiscence	11	1.6
Liver Dysfunction Syndrome	11	1.6
Gastrointestinal bleeding: lower tract	9	1.3
Gastrointestinal perforation	9	1.3
Other	54	8.0
Other disease	19	2.8
Metabolic disorder	14	2.1
Nephrourologic disease	12	1.8
Iatrogenic major vessels injury	6	0.9
Category/Stage III: Full Thickness Skin Loss	3	0.4
Other skin and/or soft tissue pathology	3	0.4
Severe graft dysfunction	2	0.3
Infections	209	31.0
Pneumonia	99	14.7
L.R.T.I. other than pneumonia	30	4.5
Post-surgical peritonitis	20	3.0
Post-surgical skin/soft tissue infection	14	2.1
NON-surgical urinary tract infection	13	1.9
NON-surgical skin/soft tissue infection	10	1.5
Other fungal infections	9	1.3
NON-surgical secondary peritonitis	9	1.3
Clinical sepsis	8	1.2
Upper respiratory tract infection	5	0.7
Missing	0	

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

Infections	N	%
None	244	36.2
Only on admission	221	32.8
On admission and during ICU stay	72	10.7
Only during ICU stay	137	20.3
Missing	0	

Maximum severity of infection	N	%
None	244	36.5
Infection with or without SIRS	240	35.9
SEVERE SEPSIS	51	7.6
Septic shock	133	19.9
Missing	6	

Severity evolution

Severity evolution		During the stay				
		N (R %)	None	Infection with or without SIRS	SEVERE SEPSIS	Septic shock
Admission	None	244 (64.7%)	114 (30.2%)	10 (2.7%)	9 (2.4%)	377
	Infection with or without SIRS	-	126 (96.2%)	2 (1.5%)	3 (2.3%)	131
	SEVERE SEPSIS	-	-	39 (92.9%)	3 (7.1%)	42
	Septic shock	-	-	-	118 (100.0%)	118
	TOT	244	240	51	133	668

Ventil. Associat. Pneumonia (VAP)	N	%
No	585	86.8
Yes	89	13.2
Missing	0	

Incidence of VAP

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

Estimate	38.5
CI (95%)	30.9–47.4

Incidence of VAP

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

Estimate	30.8%
CI (95%)	24.7–37.9

Catheter Bacteraemia (CR-BSI)	N	%
No	673	99.9
Yes	1	0.1
Missing	0	

Incidence of CR-BSI

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

Estimate	0.2
CI (95%)	0.0–1.1

Incidence of CR-BSI

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

Estimate	0.2%
CI (95%)	0.0–1.3

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Process indicators - Adult emergency surgical patients evaluated in the GiViTI model

Procedures and/or treatments (Missing=0) Procedures (antibiotics excluded)	Use		On admission		On discharge		Length (days)		Days from admission	
	N	%	N	%	N	%	Median	Q1-Q3	Median	Q1-Q3
	661	98.1								
Invasive ventilation	451	66.9	362	53.7	84	12.5	3	1-9	0	0-1
Non invasive ventilation	206	30.6	25	3.7	66	9.8	2	1-4	0	0-3
Tracheostomy	69	10.2	8	1.2	47	7	5	1-13	0	9-21
iNO (inhaled nitric oxide)	10	1.5	3	0.4	0	0	3	1-5	0	3-12
Central Venous Catheter	549	81.5	387	57.4	453	67.2	6	3-12	0	0-0
PICC	32	4.7	17	2.5	26	3.9	4	2-5	0	0-1
Arterial Catheter	534	79.2	409	60.7	297	44.1	5	2-12	0	0-0
Vasoactive drugs	443	65.7	273	40.5	52	7.7	3	1-6	0	0-0
Antiarrhythmics	64	9.5	14	2.1	15	2.2	2	1-4	0	1-4
IABP	4	0.6	1	0.1	2	0.3	3	2-7	0	0-0
Invasive monitoring of C.O.	48	7.1	15	2.2	10	1.5	4	3-7	0	0-1
Continuous monitoring of ScVO2	0	0.0								
Temporary pacing	2	0.3	2	0.3	0	0	14	7-21		
Ventricular assistance	0	0.0								
DC-shock	14	2.1								
CPR	7	1.0							1	1-3
Massive blood transfusion	24	3.6							2	0-2
ICP monitoring without liquor-drainage	72	10.7	61	9.1	13	1.9	7	2-12	0	0-0
ICP monitoring with liquor-drainage	21	3.1	14	2.1	3	0.4	7	2-22	0	0-2
External ventricular drainage without ICP	10	1.5	6	0.9	5	0.7	7	3-13	0	6-11
Haemofiltration	2	0.3	0	0	0	0	8	6-10	0	0-1
Haemodialysis	37	5.5	6	0.9	12	1.8	5	1-14	0	2-6
ECMO	0	0.0								
Hepatic clearance techniques	0	0.0								
Clearance techniques during sepsis	1	0.1	0	0	0	0	5	5-5	0	1-1
IAP (intra-abdominal pressure)	61	9.1								
Hypothermia	14	2.1								
Enteral nutrition	304	45.1	30	4.5	217	32.2	5	2-14	0	1-3
Parenteral nutrition	499	74.0	121	18	300	44.5	4	2-8	0	0-1
SDD (Topical, Topical and systemic)	14	2.1								
Patient restraint	17	2.5								
Peridural catheter	11	1.6	9	1.3	9	1.3	2	2-3	0	0-1
Electrical cardioversion	4	0.6							2	1-10
Vacuum therapy	15	2.2								
Antibiotics	637	94.5								
Antibiotics for surgical prophylaxis	304	45.1	226	33.5	162	24	2	1-5	0	0-0
Antibiotics for medical prophylaxis	68	10.1	37	5.5	27	4	4	2-6	0	0-2
Empirical antibiotic therapy	268	39.8	144	21.4	100	14.8	3	2-5	0	0-2
Targeted antibiotic therapy	237	35.2	51	7.6	179	26.6	6	3-12	0	2-5

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

Invasive ventilation (N=451)				Length (days)						
	N	%		Mean	SD	Median	Q1-Q3	Missing		
Due to pulmonary failure	144	31.5		7.6	10.3	4	1–9	0		
For airway maintenance	251	54.9		7.9	9.5	3	1–11	0		
In weaning	23	5.0		0.5	0.5	1	0–1	0		
Not evaluable	39	8.5		5.3	7.8	2	1–6	6		
Reintubation within 48 hours	5	1.1		9.8	8.2	7	3–14	0		
Non invasive ventilation (N=206)			Number of surgical interventions							
Non invasive ventilation only	85	41.3					0	588	87.2	
Non invasive ventilation failed	15	7.3					1	58	8.6	
For weaning	98	47.6					2	17	2.5	
Other	8	3.9					3	6	0.9	
Missing	0						>3	5	0.7	
							Missing	0		
Tracheostomy not present on admission (N=61)			Surgical interventions							
			Days from admission							
Surgical	7	11.5					Mean		9.2	
Percutwist	25	41.0					SD		8.6	
Ciaglia	0	0.0					Median		6	
Monodil. Ciaglia	0	0.0					Q1–Q3		3–12	
Fantoni	0	0.0					Missing		0	
Griggs	2	3.3								
Other Kind	4	6.6								
Unknown	23	37.7								
Missing	0									
Tracheostomy - Days after the beginning of inv. vent. Not present on admission (N=61)			Surgical interventions (top 10)							
								N	%	
Mean	16.0							Gastrointestinal surgery	63	9.3
SD	12.9							Other surgery	26	3.9
Median	15							Orthopaedic surgery	12	1.8
Q1–Q3	9–21							Neurosurgery	12	1.8
Missing	0							Nephro/Urological surgery	5	0.7
								Peripheral vascular surgery	5	0.7
								Maxillo-Facial surgery	3	0.4
								Plastic surgery	3	0.4
								Hepatic surgery	2	0.3
								Biliary tract surgery	2	0.3
								Missing	0	
Invasive monitoring of C.O. (N=48)			Non surgical interventions							
									N	%
Swan Ganz	0	0.0						No	655	97.2
PICCO	26	54.2						Yes	19	2.8
LIDCO	21	43.8						Missing	0	
Vigileo-PRAM	1	2.1								
Other	0	0.0								
Missing	0									
SDD (N=14)			Non surgical interventions							
									N	%
Topical	14	100.0						Days from admission		
Topical and systemic	0	0.0						Mean		10.2
Missing	0							SD		7.0
								Median		11
								Q1–Q3		3.8–14
								Missing		0
Antibiotic therapy			Non surgical interventions							
Pt. infected in ICU only (N=137)	N	%							N	%
Only empirical	35	29.2						Interventional endoscopy	12	1.8
Only targeted	39	32.5						Interventional radiology	6	0.9
Targeted after empirical	41	34.2						Interventional cardiology	1	0.1
Other	5	4.2						Therapeutic bronchoscopy	1	0.1
Missing	17							Missing	0	
Surgical interventions			Non surgical interventions							
									N	%
No	588	87.2						Interventional endoscopy	12	1.8
Yes	86	12.8						Interventional radiology	6	0.9
Missing	0							Interventional cardiology	1	0.1

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

ICU outcome	N	%
Dead	76	11.3
Transferred to same hospital	561	83.2
Transferred to other hospital	35	5.2
Discharged home	2	0.3
Disch. terminally ill	0	0.0
Missing	0	

Transferred to (N=596)	N	%
Ward	275	46.1
Other ICU	54	9.1
High dependency care unit	267	44.8
Rehabilitation	0	0.0
Day hospital or Long-term care	0	0.0
Missing	0	

Reason of transfer to Other ICU (N=54)	N	%
Specialist expertise	11	20.4
Step-up care	2	3.7
Logistical/organizational reasons	36	66.7
Step-down care	5	9.3
Missing	0	

Transferred to Same hospital (N=561)	N	%
Ward	273	48.7
Other ICU	26	4.6
High dependency care unit	262	46.7
Rehabilitation	0	0.0
Day hospital or Long-term care	0	0.0
Missing	0	

Transferred to Other hospital (N=35)	N	%
Ward	2	5.7
Other ICU	28	80.0
High dependency care unit	5	14.3
Rehabilitation	0	0.0
Day hospital or Long-term care	0	0.0
Missing	0	

ICU mortality	N	%
Alive	598	88.7
Dead	76	11.3
Missing	0	

Timing of ICU mortality (N=76)	N	%
Daytime (08:00AM - 07:59PM)	46	60.5
Nighttime (08:00PM - 07:59AM)	30	39.5
Weekdays (Monday - Friday)	61	80.3
Weekend (Saturday - Sunday)	15	19.7
Missing	0	

Hospital mortality	N	%
Alive	512	76.0
Dead	162	24.0
Missing	0	

Timing of hosp. mortality (N=162)	N	%
In ICU	76	46.9
Within 24 hours after ICU	4	2.5
24-47 hours after ICU	8	4.9
48-71 hours after ICU	6	3.7
72-95 hours after ICU	6	3.7
After 95 hours after ICU	62	38.3
Missing	0	

Timing of hosp. mortality (days from ICU disch.) Discharged alive from ICU (N=86)		
Mean		21.8
SD		25.3
Median		11
Q1–Q3		3–34.5
Missing		0

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

Last hospital mortality	N	%
Alive	507	75.2
Dead	167	24.8
Missing	0	

ICU stay (days)		
	Mean	8.5
	SD	10.5
	Median	5
	Q1–Q3	2–10
	Missing	0

ICU stay (days)		
Alive (N=598)		
	Mean	8.3
	SD	9.5
	Median	5
	Q1–Q3	2–10
	Missing	0

ICU stay (days)		
Dead (N=76)		
	Mean	9.8
	SD	16.5
	Median	3
	Q1–Q3	1–13
	Missing	0

Stay after ICU (days)		
Alive (N=598)		
	Mean	19.2
	SD	22.6
	Median	11
	Q1–Q3	5–26
	Missing	0

Hospital stay (days)		
	Mean	29.8
	SD	29.7
	Median	20
	Q1–Q3	10.2–39
	Missing	0

Hospital stay (days)		
Alive (N=512)		
	Mean	29.9
	SD	28.7
	Median	21
	Q1–Q3	11–37
	Missing	0

Hospital stay (days)		
Dead (N=162)		
	Mean	29.6
	SD	32.5
	Median	18
	Q1–Q3	6–42
	Missing	0

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

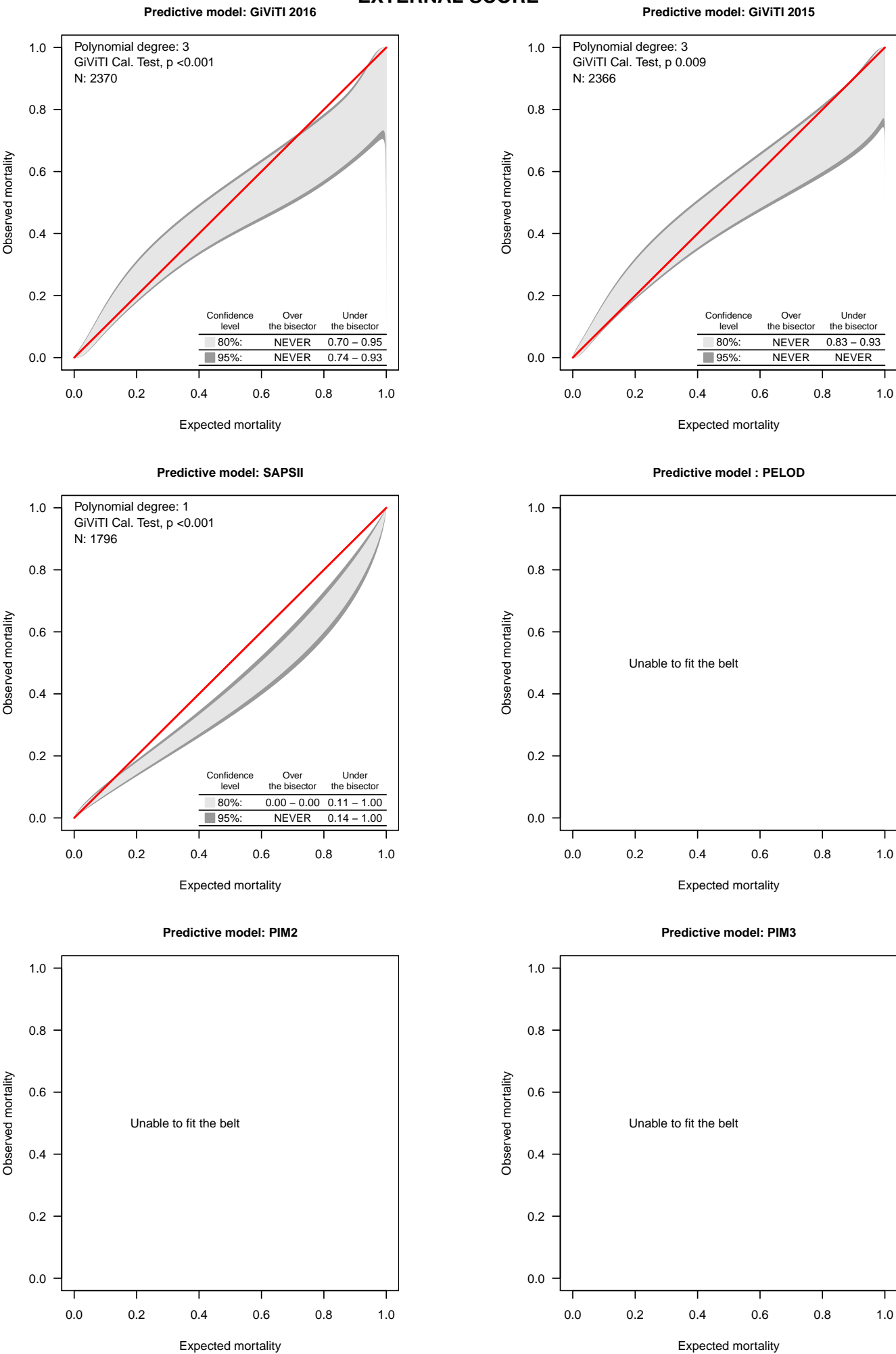
The calibration belt is designed to compare actually observed mortality with expected mortality according to a given prediction model. Expected mortality is plotted on the x axis while observed mortality is plotted on the y-axis. Two overlapping belts are presented in each graph: the first, in light 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, GiViTI 2015 and GiViTI 2016 prognostic models. For further informations please look at [PLoS ONE 6(2): e16110].

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Validity of the models - Calibration belts

EXTERNAL SCORE



Appendix

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