GiViTI

Gruppo Italiano per la Valutazione degli Interventi In Terapia Intensiva

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Report
PROSAFE project

Year 2019

National report (7 ICUs)

SLOVENIA

PROSAFE project - **National report** (7 ICUs)
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use within the Intensive Care Units of the Local Health Authorities.

Contents

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 2019 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 Colonisation Petal, designed to collect detailed information on active surveillance cultures in individual ICUs and the isolated germs;
- the MUSE Petal, that collects clinical and epidemiological data on patients colonised and/or infected by CRE (carbapenem-resistant Enterobacterales);
- 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 (Collaborative REsearch on ACute Traumatic brain Injury in intensiVe care medicine in Europe) and CAF (Creactive Ambulatory Follow-up) Petals, that aim 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 BIO-AX-TBI Petal, whose aim is to identify biological and imaging biomarkers that best characterize axonal injury in traumatic brain injury;
- the TUONO Petal, designed to permit comparison of chest ultrasound reports;
- the Liver Transplantation Petal, a specialist petal containing variables on the perioperative period, early outcomes and one-year survival in patients who have undergone liver transplantation.

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 271 ICUs collected data during 2019, 246 Italian and 25 foreign ICUs, for a total of 92831 patients registered in PROSAFE. Only the ICUs that collected valid data (205) 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 85226 patients admitted to intensive care during 2019.

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 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.

Description of the statistics

Project participation

The table on page 17 summarizes the participation in the project of the 205 ICUs which collected valid data in 2019 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 2019 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.

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

- 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.

$$\text{Rotation index} = \frac{\text{Number of patients}}{\text{Number of beds}} \tag{2}$$

- 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.

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

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

Admissions

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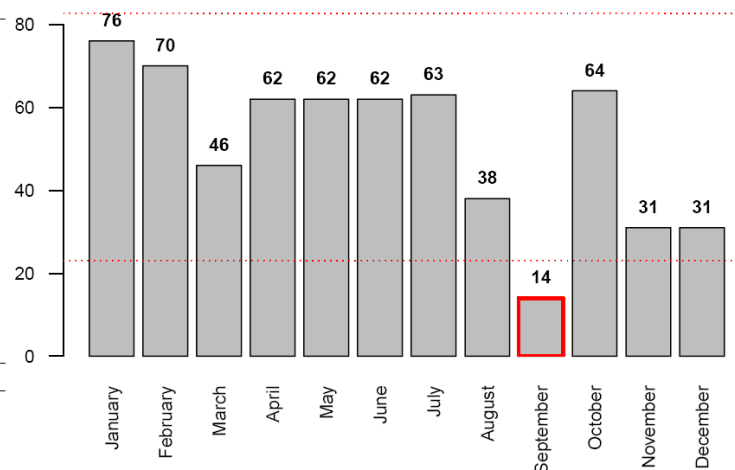
WARNING! The highligthed months have a number of patients quite different from the average. Please verify the correctness of the data and, particularly, that all consecutive patients have been registered in the Prosafe software.

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 hight). Hence, the analysis on hospital outcome will involve 378 patients on 619 admitted.
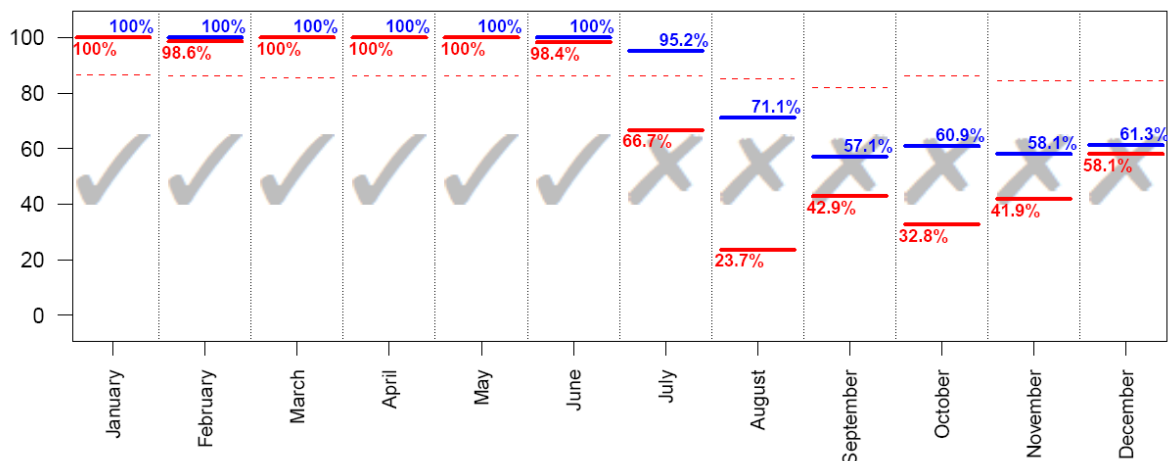
Patients admitted in months with % of patients in status 3 or 4 over the threshold (drawn in the graph with a dashed line): **441**; patients in status 4: **378**.

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:

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

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 sorgical 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:

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

where

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

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

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

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:

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

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 SEPSIS (15/17=88.2%). Conversely, the condition of SEPSIS developed into SEPTIC SHOCK in 2 patients (2/17=11.8%).

Severity evolution	During the stay				
N (R %)	None	Infection without SEPSIS	SEPSIS	SEPTIC SHOCK	TOT
None	173 (93.0%)	9 (4.8%)	1 (0.5%)	3 (1.6%)	186
Infection without SEPSIS	-	19 (95.0%)	0 (0.0%)	1 (5.0%)	20
SEPSIS	-	-	15 (88.2%)	2 (11.8%)	17
SEPTIC SHOCK	-	-	-	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 and developing within 2 days of the end of ventilation).

Incidence of VAP Two different incidence rates are presented:

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

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.

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

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:

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

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

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 mainteinance -> 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 2019	Last hospital mortality
Pediatric	PIM 2	ICU mortality
	PIM 3	ICU mortality
	PELOD	ICU mortality

Statistics

National report - Year 2019
Project participation*

Nation	TYPE								Total
	General	Cardiosurgical	Surgical	Neurosurgical	Pediatrics	HDC	Other		
Cyprus	1 ICUs 195 patients								1 ICUs 195 patients
Greece	1 ICUs 435 patients								1 ICUs 435 patients
Hungary				1 ICUs 362 patients					1 ICUs 362 patients
Israel					2 ICUs 1037 patients				2 ICUs 1037 patients
Italy	143 ICUs 55075 patients	16 ICUs 9565 patients	9 ICUs 4976 patients	9 ICUs 3747 patients	3 ICUs 1066 patients	6 ICUs 3067 patients	7 ICUs 3283 patients		193 ICUs 80779 patients
Slovenia	1 ICUs 328 patients		4 ICUs 1371 patients				2 ICUs 719 patients		7 ICUs 2418 patients
Total	**146 ICUs 56033 patients**	**16 ICUs 9565 patients**	**13 ICUs 6347 patients**	**10 ICUs 4109 patients**	**5 ICUs 2103 patients**	**6 ICUs 3067 patients**	**9 ICUs 4002 patients**		**205 ICUs 85226 patients**

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

Description of hospitals (N=7) - **Year 2019**

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	1	14.3
Surgical	5	71.4
Cardiological	3	42.9
Respiratory	0	0.0
Neurological (stroke unit)	3	42.9
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	6	85.7
Haematology	5	71.4
Emergency room	6	85.7
Traumatology	5	71.4
Emergency medical	5	71.4

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	6	85.7
Cardiosurgery	1	14.3
Major vascular surgery	1	14.3
Thoracic surgery	1	14.3
Pediatric surgery	4	57.1
Transplantation activities	3	42.9

Services/activities available in H (h24)	N	%
Neuroradiology	4	57.1
Interventional neuroradiology	2	28.6
Interventional vascular radiology	2	28.6
CT scan	7	100.0
MRI	5	71.4
Interventional hemodynamic	4	57.1
Endoscopy	7	100.0
Bronchoscopy	6	85.7
Hyperbaric chamber	0	0.0

Services/activities available in H (rep.)	N	%
Neuroradiology	1	14.3
Interventional neuroradiology	0	0.0
Interventional vascular radiology	3	42.9
CT scan	0	0.0
MRI	2	28.6
Interventional hemodynamic	1	14.3
Endoscopy	0	0.0
Bronchoscopy	1	14.3
Hyperbaric chamber	1	14.3

Legend: ■ Number of ICUs in hospital □ Number of subICUs in hospital
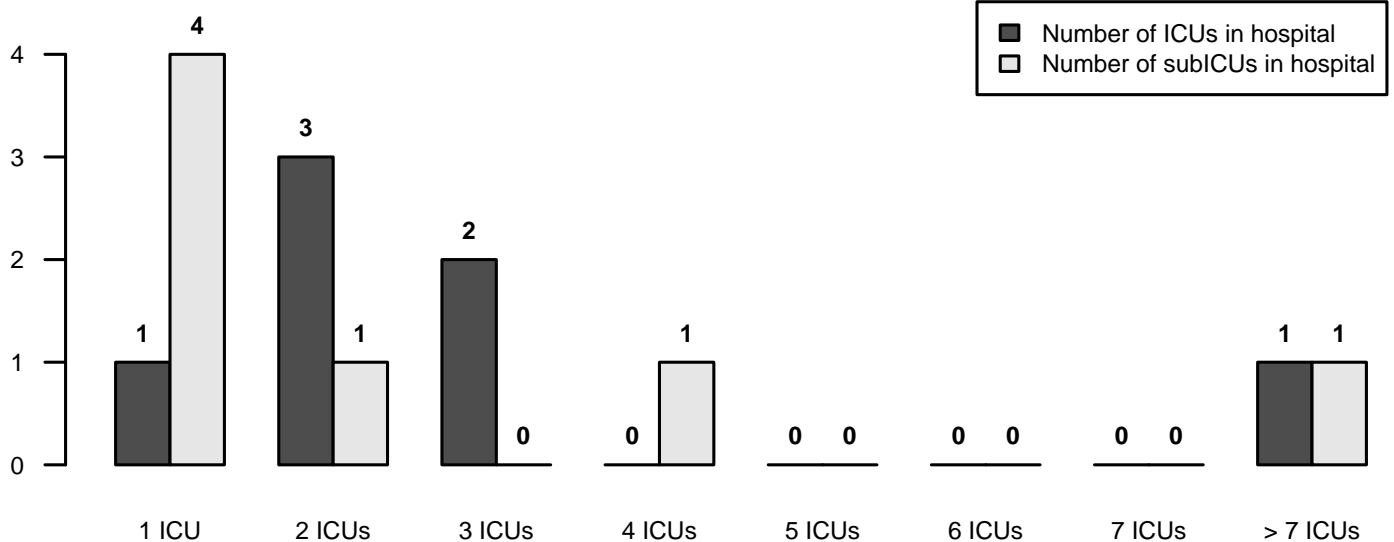
Description of ICUs (N=7) - **Year 2019**

Number of activable beds

Mean (SD)	10.1 (4.8)
Median (Q1−Q3)	9 (7−11)
Missing	0

Number of beds declared to hospital

Mean (SD)	200.0 (273.2)
Median (Q1−Q3)	20 (10−312.4)
Missing	0

University affiliation

	N	%
Yes	4	57.1
No	3	42.9
Missing	0	

Square meter per bed

Mean (SD)	25.6 (20.1)
Median (Q1−Q3)	21 (11.5−36.5)
Missing	0

Clinical psychologist

	N	%
No	4	57.1
For relatives	1	14.3
For patients	3	42.9
For personnel	0	0.0

ICU Structure

	N	%
NON OPEN-SPACE	2	28.6
OPEN-SPACE (or alike)	5	71.4
Missing	0	

Physicians

	N	%
Dedicated to ICU only	2	28.6
Dedicated to ICU on a rotation basis	1	14.3
Dedicated to ICU only and on a rotation basis	4	57.1
Missing	0	

Declared beds per physician (average)

Mean (SD)	91.0 (116.8)
Median (Q1−Q3)	9.6 (5.5−161.2)
Missing	0

Nurses

	N	%
Dedicated to ICU only	4	57.1
Dedicated to ICU on a rotation basis	0	0.0
Dedicated to ICU only and on a rotation basis	3	42.9
Missing	0	

Declared beds per nurse (average)

Mean (SD)	47.6 (60.8)
Median (Q1−Q3)	2.4 (1.7−89.9)
Missing	0

Number of hours conceeded for relatives' visits

	N	%
1	5	71.4
2	1	14.3
3-4	1	14.3
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	6	85.7
Three or more	0	0.0
Missing	0	

Biomedical devices per declared bed

	Median	Q1-Q3	<5 Years (mean %)
Total available monitors (excluding those dedicated to transport)	1.0	0.0−1.4	17.9
of which only for basic monitoring (without transducers detection of invasive pressure, pic, pvc, ...)	0.0	0.0−0.0	0.0
Invasive monitoring of cardiac output (Swan-Ganz)	0.0	0.0−0.0	0.0
Invasive monitoring of cardiac output (PiCCO)	0.0	0.0−0.2	25.0
Invasive monitoring of cardiac output (Vigileo)	0.0	0.0−0.3	34.4
Non-invasive monitoring of cardiac output (impedentiometry)	0.0	0.0−0.0	75.0
Defibrillators	0.1	0.0−0.1	0.0
Both invasive and non invasive ventilators	0.6	0.0−1.1	32.1
Non invasive ventilators	0.1	0.0−0.3	55.6
Syringe pumps	3.2	0.1−6.0	41.9
Peristaltic pumps	0.0	0.0−0.2	43.3

Biomedical equipment in ICU

	N	%
Transoesophageal echo	3	42.9
Basic ultrasounds	7	100.0
Advanced ultrasounds	6	85.7
Blood-gas analyzer	5	71.4
Haemodialysis - Haemofiltration	6	85.7
Transport ventilator	7	100.0
Fiberscope	7	100.0
Extracorporeal circulation system	2	28.6

Routine microbiological surveillance cultures

	N	%
Yes	7	100.0
No	0	0.0
Missing	0	

Description of ICUs (N=7) - **Year 2019**

Patients admitted

Mean (SD)	347.9 (152.1)
Median	365.4
Q1−Q3	286−427.3
Missing	3

Occupancy rate (%)

Mean (SD)	64.7 (11.0)
Median	65.2
Q1−Q3	57.6−72.4
Missing	3

Rotation index (patients/bed)

Mean (SD)	30.9 (6.6)
Median	30.9
Q1−Q3	25.4−36.5
Missing	3

Turnover (hours)

Mean (SD)	103.2 (45.2)
Median	87.7
Q1−Q3	76.4−114.4
Missing	3

Occupied beds per physician (average)

Mean (SD)	3.1 (1.2)
Median	3
Q1−Q3	2.3−3.8
Missing	0

Occupied beds per nurse (average)

Mean (SD)	1.2 (0.3)
Median	1.2
Q1−Q3	1−1.4
Missing	0

Occupancy rate (%)
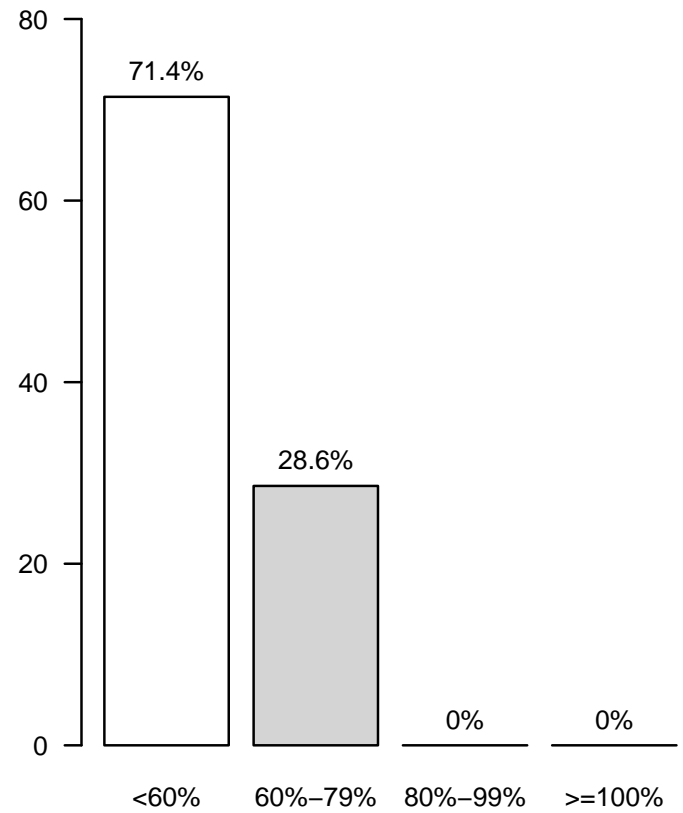
National report (7 ICUs) - **Year 2019**
Study flow-chart

PARTICIPATING ICUs	TOTAL RECRUITED PATIENTS
N=193	N=80779

ICUs	TOTAL RECRUITED PATIENTS
N=7	N=2418

ADULT patients admitted in months with % of patients in status 3 or 4 over the threshold[1]

N=2365

REPORT
1. All patients

PEDIATRIC patients admitted in months with % of patients in status 3 or 4 over the threshold[2]

N=14

Patients admitted in months with % of patients in status 3 or 4 under the threshold, or age missing

N=39

ADULT patients admitted in months with % of patients in status 4 over the threshold[1]

N=2175

Patients admitted in months with % of patients in status 4 under the threshold or readmissions

ADULTS	PEDIATRICS
N=190	N=0

PEDIATRIC patients admitted in months with % of patients in status 4 over the threshold[2]

N=14

Patients non CS

N=2167

Patients with Cardiac Surgery (CS)

N=8

Patients evaluated by the MODEL[3]

N=2050

REPORT
1. All patients
2. Non surgical patients
3. Elective surgical patients
4. Emergency surgical patients

Patients evaluated by the MODEL (PIM 3)[4]

N=11

REPORT
1. All patients

(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.

Flow-chart

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National report - **Year 2019**
Characteristics on admission - Adult patients

Patients (N): 2365

Sex	N	%
Male	1469	62.1
Female	896	37.9
Missing	0	

Age (years)	N	%
17-45	263	11.1
46-65	737	31.2
66-75	618	26.1
>75	747	31.6
Missing	0	
Mean	65.9	
SD	15.6	
Median	68	
Q1−Q3	59−77	
Min−Max	17−100	

Body mass Index (BMI)	N	%
Underweight	87	3.7
Normal	934	39.8
Overweight	841	35.9
Obese	483	20.6
Missing	20	

Pregnancy status Females (N=896)	N	%
Not fertile	467	52.1
Not pregnant/Unknown	420	46.9
Currently pregnant	3	0.3
Post partum	6	0.7
Missing	0	

Comorbidities	N	%
No	305	12.9
Yes	2057	87.1
Missing	3	

Comorbidities (top 10)	N	%
Hypertension	1347	57.0
Arrhythmia	487	20.6
NYHA class II-III	437	18.5
Diabetes Type II without insulin tr.	352	14.9
Any tumour without metastasis	347	14.7
Moderate or severe renal disease	314	13.3
Metastatic cancer	217	9.2
Diabetes Type II with insulin treatment	175	7.4
Endocrine-metabolic diseases	168	7.1
Moderate COPD	161	6.8
Missing	3	

Stay before ICU (days)	
Mean	4.9
SD	13.3
Median	1
Q1−Q3	0−4
Missing	3

Source of admission	N	%
Same hospital	2126	89.9
Other hospital	140	5.9
Long-term chronic care hospital	98	4.1
Directly from the community	0	0.0
Missing	1	

Ward of admission Hospital (N=2266)	N	%
Medical ward	371	16.4
Surgical ward	1119	49.4
Emergency room	585	25.8
Other ICU	108	4.8
High dependency care unit	83	3.7
Missing	0	

Reason for transfer from Other ICU (N=108)	N	%
Specialist expertise	33	30.6
Step-up care	18	16.7
Logistical/organizational reasons	56	51.9
Step-down care	1	0.9
Missing	0	

Ward of admission Same hospital (N=2126)	N	%
Medical ward	352	16.6
Surgical ward	1102	51.8
Emergency room	554	26.1
Other ICU	43	2.0
High dependency care unit	75	3.5
Missing	0	

Ward of admission Other hospital (N=140)	N	%
Medical ward	19	13.6
Surgical ward	17	12.1
Emergency room	31	22.1
Other ICU	65	46.4
High dependency care unit	8	5.7
Missing	0	

Scheduled admission	N	%
No	1826	77.3
Yes	537	22.7
Missing	2	

National report - **Year 2019**
Characteristics on admission - Adult patients

Trauma		N	%
	No	2003	84.8
	Yes	360	15.2
	Multiple trauma	137	5.8
	Missing	2	

Surgical status		N	%
	Non surgical	1092	46.2
	Elective surgical	631	26.7
	Emergency surgical	640	27.1
	Missing	2	

Surgical status

- Non surgical
- Elective surgical
- Emergency surgical
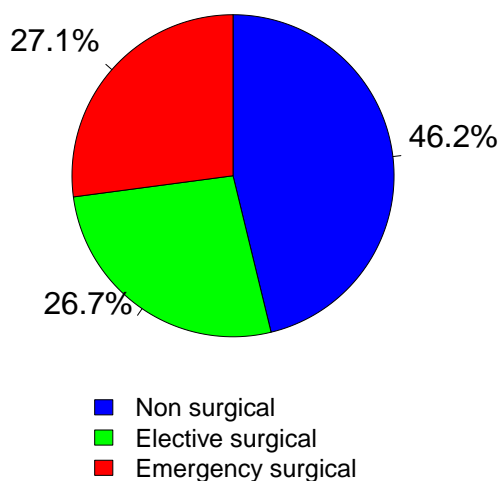
Source of admission			
Surgical pt. (N=1271)		N	%
Operating theatre of surgical ward		897	70.6
Operating theatre of emergency room		102	8.0
Surgical ward		95	7.5
Other		177	13.9
Missing		0	

Surgical interventions (top 10)			
Elective surgical (N=631)		N	%
Gastrointestinal surgery		353	55.9
Nephro/Urological surgery		72	11.4
Peripheral vascular surgery		64	10.1
Other surgery		40	6.3
Orthopaedic surgery		30	4.8
Gynaecological surgery		21	3.3
Abdominal vascular surgery		18	2.9
Neurosurgery		15	2.4
Hepatic surgery		13	2.1
Thoracic surgery		11	1.7
Missing		0	

Timing			
Elective surgical (N=631)		N	%
From -7 to -3 days		24	3.8
From -2 to -1 days		17	2.7
On ICU admission day		619	98.1
The day after ICU admission		5	0.8
Missing		0	

Surgical interventions (top 10)			
Emergency surgical (N=640)		N	%
Gastrointestinal surgery		293	45.8
Neurosurgery		112	17.5
Orthopaedic surgery		56	8.8
Other surgery		44	6.9
Peripheral vascular surgery		27	4.2
Thoracic surgery		22	3.4
Nephro/Urological surgery		21	3.3
Organ/s transplantation		19	3.0
Biliary tract surgery		18	2.8
ENT surgery		13	2.0
Missing		15	

Timing			
Emergency surgical (N=640)		N	%
From -7 to -3 days		29	4.5
From -2 to -1 days		66	10.3
On ICU admission day		564	88.1
The day after ICU admission		43	6.7
Missing		0	

Non surgical interventions		N	%
	None	2180	92.3
	Elective	12	0.5
	Emergency	171	7.2
	Missing	2	

Non surgical interventions			
Elective (N=12)		N	%
Interventional radiology		6	50.0
Interventional cardiology		1	8.3
Interventional neuroradiology		0	0.0
Interventional endoscopy		0	0.0
Missing		5	

Non surgical interventions			
Emergency (N=171)		N	%
Interventional cardiology		91	53.2
Interventional endoscopy		35	20.5
Interventional radiology		34	19.9
Interventional neuroradiology		1	0.6
Missing		10	

National report - **Year 2019**
Characteristics on admission - Adult patients

Reason for admission	N	%
Monitoring/Weaning	927	39.2
Post surgical weaning	15	0.6
Surgical monitoring	532	22.6
Post interventional weaning	0	0.0
Interventional monitoring	82	3.5
Non surgical monitoring	293	12.4
Missing	5	
Admission for procedures/treatments	0	0.0
Intensive Treatment	1431	60.6
Only ventilatory support	446	18.9
Only cardiovascular support	228	9.6
Ventilatory and cardiovascular support	757	32.0
Missing	0	
Palliative Sedation	5	0.2
Diagnosis of death/Organ donation	0	0.0
Missing	2	

Failures on admission (top 10)	N	%
A	251	10.6
ABEG	217	9.2
AB	202	8.5
E	147	6.2
ABE	106	4.5
B	70	3.0
BEG	66	2.8
AE	65	2.7
BE	62	2.6
ABCEG	58	2.5
Missing	0	

Respiratory failure	N	%
None	1162	49.1
Only hypoxic failure	604	25.5
Only hypercapnic failure	120	5.1
Hypoxic-hypercapnic failure	55	2.3
Intubation for airway maint.	424	17.9
Missing	0	

Number of failures (%)

Cardiovascular failure	N	%
None	1380	58.4
Without shock	347	14.7
Cardiogenic shock	91	3.8
Septic shock	331	14.0
Haemorrhagic/hypovolemic shock	96	4.1
Hypovolemic shock	25	1.1
Anaphylactic shock	4	0.2
Neurogenic shock	19	0.8
Other shock	28	1.2
Mixed shock	44	1.9
Missing	0	

Neurologic failure	N	%
None	1715	89.0
Cerebral coma	105	5.4
Metabolic coma	44	2.3
Postanoxic coma	49	2.5
Toxic coma	15	0.8
Missing or not evaluable	437	

Failures on admission	N	%
No	701	29.6
Yes	1664	70.4
A: Respiratory failure	1203	50.9
B: Cardiovascular failure	985	41.6
C: Neurological failure	213	9.0
D: Hepatic failure	33	1.4
E: Renal failure	912	38.6
F: Acute skin failure	4	0.2
G: Metabolic failure	611	25.8
H: Coagulation failure	75	3.2
Missing	0	

Renal failure (AKIN)	N	%
None	1442	61.3
Mild	492	20.9
Moderate	221	9.4
Severe	199	8.5
Missing	11	

Metabolic failure	N	%
None	1743	74.0
pH $<=$ 7.3, PaCO2 $<$ 45 mmHg	292	12.4
Base deficit $>=$ 5 mmol/L, lactate $>$1.5x	319	13.6
Missing	11	

Adult patients

National report - **Year 2019**
Characteristics on admission - Adult patients

Clinical conditions on admission	N	%
Respiratory	369	15.6
Pleural effusion	109	4.6
Aspiration pneumonia	86	3.6
Pulmonary embolism	51	2.2
Atelectasis	41	1.7
Upper respiratory tract disease	29	1.2
Cardiovascular	542	22.9
Cardiac arrest	100	4.2
Peripheral vascular disease	82	3.5
Acute severe arrhythmia: tachycardias	78	3.3
Acute myocardial infarction	73	3.1
Left heart failure without pulm. edema	58	2.5
Neurological	202	8.6
Cerebral artery stroke	62	2.6
Seizures	40	1.7
Brain tumour	22	0.9
Metabolic/postanoxic encephalopathy	17	0.7
Chronic Subdural haematoma	15	0.6
Gastrointestinal and hepatic	677	28.7
Digestive tract malignancy	315	13.3
Intestinal occlusion	91	3.9
Gastrointestinal perforation	75	3.2
Paralytic Ileus	46	1.9
Gastrointestinal bleeding: upper tract	44	1.9
Trauma (anatomical districts)	360	15.2
Head	219	9.3
Chest	119	5.0
Pelvis/bone/joint & muscle	107	4.5
Spine	74	3.1
Abdomen	57	2.4
Major vessels injury	20	0.8
Miscellaneous	1	0.0
Other	696	29.5
Other disease	369	15.6
Nephrourologic disease	177	7.5
Metabolic disorder	114	4.8
Coagulation disorder	75	3.2
Haematological disease	35	1.5
Post transplantation	45	1.9
Liver transplantation	25	1.1
Lung transplantation	11	0.5
Infections	999	42.3
Pneumonia	489	20.7
NON-surgical urinary tract infection	112	4.7
NON-surgical secondary peritonitis	90	3.8
Post-surgical peritonitis	74	3.1
NON-surgical skin/soft tissue infection	51	2.2
L.R.T.I. other than pneumonia	43	1.8
Cholecystitis/cholangitis	38	1.6
Primary peritonitis	34	1.4
Upper respiratory tract infection	26	1.1
Post-surgical skin/soft tissue infection	23	1.0
Missing	3	

Trauma (anatomical districts)	N	%
Head	219	9.3
Traumatic Subdural haematoma	139	5.9
Traumatic subarachnoid haemorrhage	116	4.9
Skull fracture	104	4.4
Cerebral contusion/laceration	101	4.3
Maxillofacial fracture	59	2.5
Spine	74	3.1
Vertebral fracture, without deficit	55	2.3
Cervical injury, incomplete deficit	7	0.3
Lumbar injury, incomplete deficit	5	0.2
Chest	119	5.0
Other injuries of the chest	74	3.1
Traum. haemothorax/pneumothorax	66	2.8
Severe lung contusion/laceration	38	1.6
Abdomen	57	2.4
Minor injuries of the abdomen	22	0.9
Bowel transection/perforation	15	0.6
Liver: Moderate-Severe laceration	10	0.4
Pelvis/bone/joint & muscle	107	4.5
Long bone fracture	96	4.1
Multiple fracture of the pelvis	20	0.8
Very severe or open fracture of the pelvis	4	0.2
Major vessels injury	20	0.8
Aorta: rupture/dissection	8	0.3
Major abdominal vessels: transection	7	0.3
Proximal limbs vessels: transection	5	0.2
Miscellaneous	1	0.0
Burns (>30% BSA)	1	0.0
-	0	0.0
Missing	3	

Infection severity on admission	N	%
None	1363	58.3
INFECTION WITHOUT SEPSIS	430	18.4
SEPSIS	174	7.4
SEPTIC SHOCK	369	15.8
Missing	29	

Infection severity on admission

Patients infected (N=973)

- INFECTION WITHOUT SEPSIS
- SEPSIS
- SEPTIC SHOCK
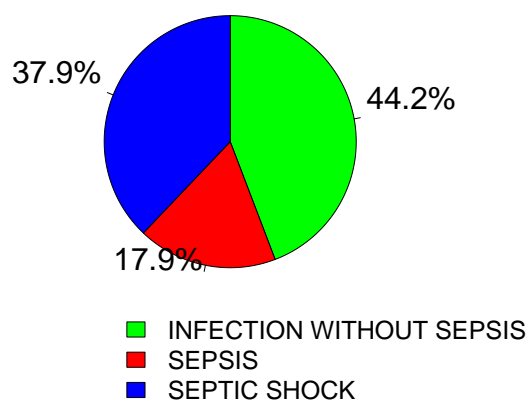
National report - **Year 2019**
Severity scores - Adult patients

Glasgow Coma Scale (%)
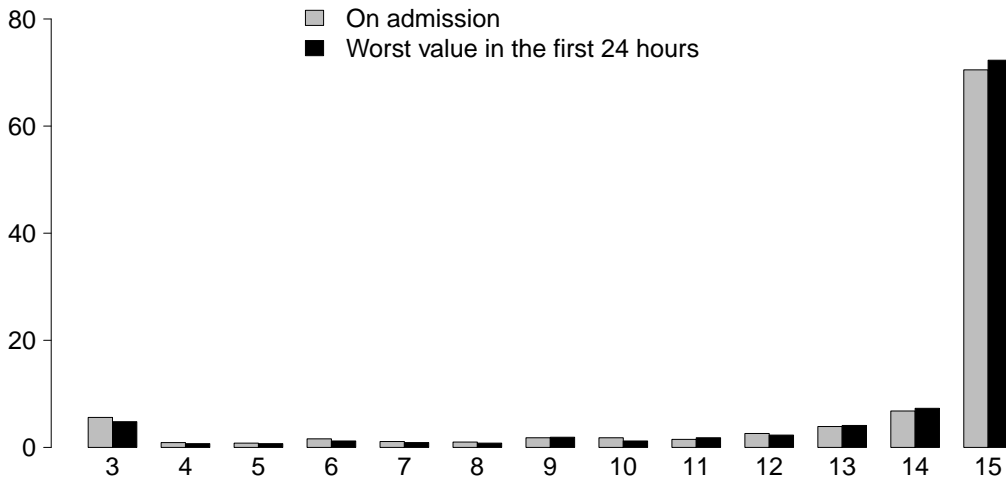
GCS (admission)	
Median	15
Q1−Q3	14−15
Not evaluable	432
Missing	5

GCS (first 24 hours)	
Median	15
Q1−Q3	14−15
Not evaluable	593
Missing	11

SAPS II (%)
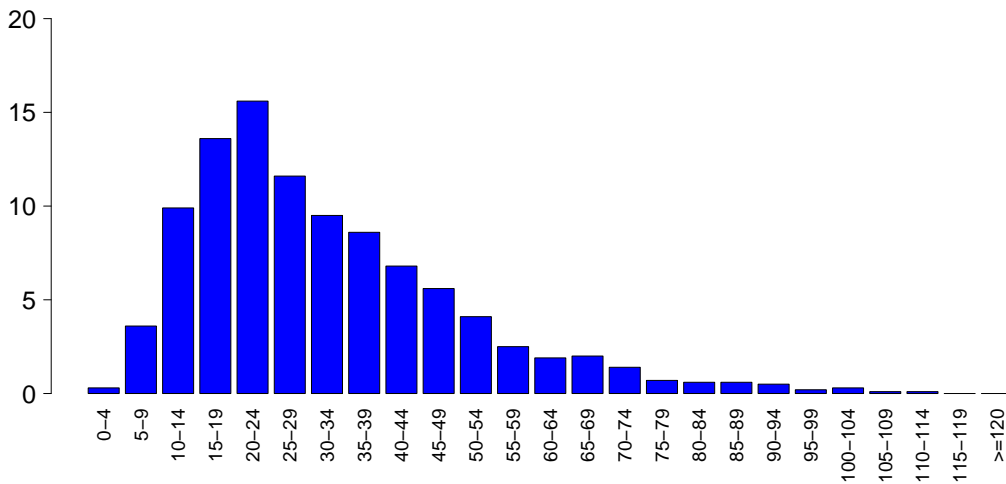
SAPSII	
Mean	31.8
SD	17.9
Median	28
Q1−Q3	18−41
Not evaluable	593
Missing	11

SOFA (%)
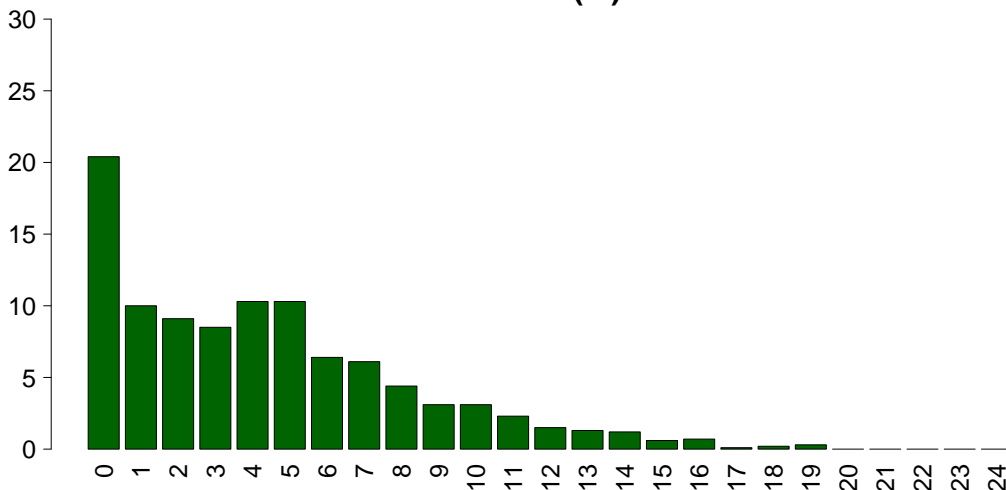
SOFA	
Mean	4.3
SD	3.9
Median	4
Q1−Q3	1−6
Not evaluable	593
Missing	11

Adult patients

National report - **Year 2019**
Characteristics during the stay - Adult patients

Complications during the stay	N	%
No	1377	58.5
Yes	978	41.5
Missing	10	

Failures during the stay	N	%
No	1991	84.2
Yes	374	15.8
A: Respiratory failure	140	5.9
B: Cardiovascular failure	132	5.6
C: Neurological failure	45	1.9
D: Hepatic failure	43	1.8
E: Renal failure (AKIN)	160	6.8
F: Acute skin failure	2	0.1
G: Metabolic failure	67	2.8
H: Coagulation failure	25	1.1
Missing	0	

Failures during the stay (top 10)	N	%
E	68	2.9
A	54	2.3
B	43	1.8
G	30	1.3
AB	26	1.1
ABE	17	0.7
D	16	0.7
AE	12	0.5
BE	12	0.5
C	12	0.5
Missing	0	

Respiratory failure occured	N	%
None	2215	94.1
Intubation for airway maint.	37	1.6
Hypoxic failure	80	3.4
Hypercapnic failure	57	2.4
Missing	10	

Cardiovascular failure occured	N	%
None	2223	94.4
Cardiogenic shock	44	1.9
Hypovolemic shock	6	0.3
Haemorrhagic/hypovolemic shock	13	0.6
Septic shock	68	2.9
Anaphylactic shock	0	0.0
Neurogenic shock	1	0.0
Other shock	18	0.8
Missing	10	

Neurological failure occured	N	%
None	2310	98.1
Cerebral coma	27	1.1
Metabolic coma	15	0.6
Postanoxic coma	5	0.2
Missing	10	

Renal failure occured (AKIN)	N	%
None	2195	93.2
Mild	38	1.6
Moderate	38	1.6
Severe	84	3.6
Missing	10	

Complications during the stay	N	%
Respiratory	207	8.8
Pleural effusion	97	4.1
Aspiration pneumonia	36	1.5
Atelectasis	30	1.3
Severe ARDS	25	1.1
Pneumothorax/Pneumomediastinum	20	0.8
Cardiovascular	240	10.2
Acute severe arrhythmia: tachycardias	115	4.9
Cardiac arrest	46	2.0
Pulmonary edema	30	1.3
Acute severe arrhythmia: bradycardias	25	1.1
Left heart failure w/o pulm. edema	17	0.7
Neurological	223	9.5
Drowsiness/agitation/delirium	132	5.6
Brain edema	47	2.0
Intracranial hypertension	33	1.4
Seizures	20	0.8
CrIMyNe	17	0.7
Gastrointestinal and hepatic	202	8.6
Paralytic Ileus	69	2.9
Liver Dysfunction Syndrome	37	1.6
Anastomotic dehiscence	26	1.1
Gastrointestinal bleeding: upper tract	24	1.0
Gastrointestinal perforation	22	0.9
Other	251	10.7
Other disease	140	5.9
Nephrourologic disease	69	2.9
Metabolic disorder	67	2.8
Other skin and/or soft tissue pathology	11	0.5
Iatrogenic major vessels injury	9	0.4
Category/Stage II: Partial Thickness Skin Loss	4	0.2
Fat embolism	2	0.1
Infections	454	19.3
Pneumonia	198	8.4
Post-surgical peritonitis	76	3.2
NON-surgical urinary tract infection	57	2.4
Post-surgical skin/soft tissue infection	37	1.6
L.R.T.I. other than pneumonia	30	1.3
Other fungal infections	19	0.8
Clinical sepsis	18	0.8
Upper respiratory tract infection	18	0.8
NON-surgical secondary peritonitis	14	0.6
NON-surgical skin/soft tissue infection	14	0.6
Missing	10	

National report - **Year 2019**
Characteristics during the stay - Adult patients

Infections	N	%
None	1093	46.4
Only on admission	808	34.3
On admission and during ICU stay	187	7.9
Only during ICU stay	267	11.3
Missing	10	

Maximum severity of infection	N	%
None	1093	47.2
INFECTION WITHOUT SEPSIS	564	24.3
SEPSIS	255	11.0
SEPTIC SHOCK	405	17.5
Missing	48	

Severity evolution

	N (R %)	During the stay				
		None	INFECTION WITHOUT SEPSIS	SEPSIS	SEPTIC SHOCK	TOT
Admission	None	1093 (81.4%)	175 (13.0%)	55 (4.1%)	19 (1.4%)	1342
	INFECTION WITHOUT SEPSIS	-	389 (90.9%)	32 (7.5%)	7 (1.6%)	428
	SEPSIS	-	-	164 (94.8%)	9 (5.2%)	173
	SEPTIC SHOCK	-	-	-	369 (100.0%)	369
	TOT	1093	564	251	404	2312

Ventil. Associat. Pneumonia (VAP)	N	%
No	2193	92.8
Yes	170	7.2
Missing	2	

Catheter Bacteraemia (CR-BSI)	N	%
No	2346	99.6
Yes	9	0.4
Missing	10	

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

Estimate	29.1
CI (95%)	24.9−33.8

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

Estimate	0.7
CI (95%)	0.3−1.3

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

Estimate	23.2%
CI (95%)	19.9−27.0

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

Estimate	0.8%
CI (95%)	0.4−1.6

Adult patients

National report - Year 2019
Process indicators - Adult patients

Procedures and/or treatments (Missing=6)	Use N	Use %	On admission N	On admission %	On discharge N	On discharge %	Length (days) Median	Length Q1-Q3	Length Missing	Days from admission Median	Days Q1-Q3	Days Missing
Procedures (antibiotics excluded)	2153	91.3										
Invasive ventilation	1009	42.8	684	29	191	8.1	4	1–10	3	0	0–0	1
Non invasive ventilation	598	25.3	105	4.5	204	8.6	2	1–4	2	0	0–2	1
Tracheostomy	120	5.1	12	0.5	96	4.1	8	4–18	0	16	9–22	0
iNO (inhaled nitric oxide)	49	2.1	13	0.6	6	0.3	5	2–14	0	2	0–6	0
Central Venous Catheter	1607	68.1	1060	44.9	1225	51.9	4	2–10	5	0	0–0	1
PICC	175	7.4	47	2	134	5.7	4	2–7	0	0	0–2	0
Arterial Catheter	1734	73.5	1075	45.6	618	26.2	4	2–9	5	0	0–0	1
Vasoactive drugs	1373	58.2	694	29.4	139	5.9	3	1–6	5	0	0–0	1
Antiarrhythmics	259	11.0	47	2	71	3	2	1–6	0	1	0–3	0
IABP	3	0.1	0	0	0	0	1	0–8	0	13	6–16	0
Invasive monitoring of C.O.	110	4.7	30	1.3	24	1	7	3–12	1	0	0–2	1
Continous monitoring of ScVO2	8	0.3	5	0.2	1	0	4	1–8	0	4	2–8	0
Temporary pacing	20	0.8	5	0.2	5	0.2	4	1–6	0	0	0–1	0
Ventricular assistance	2	0.1	2	0.1	2	0.1	40	32–47	0			
DC-shock	35	1.5								2	0–3	0
CPR	59	2.5								0	0–1	0
Massive blood transfusion	28	1.2								0	0–0	0
ICP monitoring without CSF drainage	97	4.1	76	3.2	11	0.5	8	4–15	0	0	0–1	0
ICP monitoring with CSF drainage	18	0.8	10	0.4	5	0.2	8	4–20	0	2	0–4	0
External ventricular drainage without ICP	13	0.6	5	0.2	5	0.2	3	2–4	0	3	0–16	0
Haemofiltration	11	0.5	0	0	3	0.1	6	3–21	0	5	2–14	0
Haemodialysis	199	8.4	51	2.2	78	3.3	4	1–9	0	1	1–4	0
ECMO	4	0.2	2	0.1	1	0	10	7–13	0	14	7–22	0
Hepatic clearance techniques	1	0.0										
Clearance techniques during sepsis	12	0.5	2	0.1	2	0.1	1	0–1	0	1	1–1	0
IAP (intra-abdominal pressure)	143	6.1										
Hypothermia	25	1.1	5	0.2	1	0	2	1–3	0	0	0–1	0
Enteral nutrition	1023	43.4	188	8	741	31.4	4	2–10	1	1	1–2	1
Parenteral nutrition	1135	48.1	165	7	692	29.3	3	2–8	1	1	0–1	1
SDD (Topical, Topical and systemic)	0	0.0										
Patient restraint	185	7.8										
Peridural catheter	176	7.5	171	7.2	143	6.1	2	2–3	0	0	0–2	0
Electrical cardioversion	8	0.3								1	0–1	0
Vacuum therapy	19	0.8										
Antibiotics	1900	80.5										
Antibiotic prophylaxis	860	36.5	590	25	351	14.9	2	1–3	0	0	0–0	0
Empirical antibiotic therapy	921	39.0	422	17.9	341	14.5	3	2–5	4	0	0–1	1
Empirical antibiotic therapy in unconfirmed diagnosis	75	3.2	23	1	42	1.8	3	2–6	0	0	0–1	0
Targeted antibiotic therapy	692	29.3	158	6.7	473	20.1	6	3–12	2	3	2–5	1

National report - **Year 2019**
Process indicators - Adult patients

Invasive ventilation (N=1009)	N	%	Mean	SD	Median	Q1-Q3	Missing
			Length (days)				
Due to pulmonary failure	526	38.9	7.5	9.2	4	2−10	2
For airway mainteinance	421	31.1	9.7	13.0	5	1−12	0
In weaning	22	1.6	0.4	0.5	0	0−1	0
Not evaluable	384	28.4	3.3	4.3	1	1−4	346
Reintubation within 48 hours	10	0.7	6.6	4.9	7	2.25−9	0

Non invasive ventilation (N=598)	N	%
Non invasive ventilation only	368	61.5
Non invasive ventilation failed	47	7.9
For weaning	163	27.3
Other	20	3.3
Missing	0	

Tracheostomy not present on admission (N=108)	N	%
Surgical	23	21.3
Percutwist	37	34.3
Ciaglia	13	12.0
Monodil. Ciaglia	0	0.0
Fantoni	1	0.9
Griggs	5	4.6
Other Kind	14	13.0
Unknown	15	13.9
Missing	0	

Tracheostomy - Days after the beginning of inv. vent.
Not present on admission (N=108)

Mean	16.1
SD	9.7
Median	15.5
Q1−Q3	9−22
Missing	0

Invasive monitoring of C.O. (N=110)	N	%
Swan Ganz	3	2.7
PICCO	57	51.8
LIDCO	9	8.2
Vigileo-PRAM	0	0.0
Other	40	36.4
Missing	1	

SDD (N=0)	N	%
Topical	0	0.0
Topical and systemic	0	0.0
Missing	0	

Antibiotic therapy
Pt. infected in ICU only (N=267)

	N	%
No therapy	14	5.2
Only empirical	95	35.6
Only targeted	47	17.6
Targeted after empirical	100	37.5
Other	11	4.1
Missing	0	

Surgical interventions	N	%
No	2165	91.9
Yes	191	8.1
Missing	9	

Number of surgical interventions	N	%
0	2165	91.9
1	128	5.4
2	28	1.2
3	13	0.6
>3	22	0.9
Missing	9	

Surgical interventions
Days from admission

Mean	9.9
SD	7.7
Median	8
Q1−Q3	4−14
Missing	1

Surgical interventions (top 10)	N	%
Gastrointestinal surgery	147	6.2
Other surgery	46	2.0
Orthopaedic surgery	31	1.3
Neurosurgery	21	0.9
Plastic surgery	17	0.7
ENT surgery	17	0.7
Thoracic surgery	17	0.7
Nephro/Urological surgery	11	0.5
Maxillo-Facial surgery	6	0.3
Thoracic vascular surgery	5	0.2
Missing	9	

Non surgical interventions	N	%
No	2282	96.9
Yes	74	3.1
Missing	9	

Non surgical interventions
Days from admission

Mean	12.3
SD	12.4
Median	8
Q1−Q3	4−16
Missing	2

Non surgical interventions	N	%
Interventional endoscopy	43	1.8
Interventional radiology	31	1.3
Interventional cardiology	19	0.8
Interventional neuroradiology	0	0.0
Missing	9	

National report - **Year 2019**
Outcome indicators - Adult patients

ICU outcome	N	%
Dead	335	14.4
Transferred to same hospital	1848	79.3
Transferred to other hospital	124	5.3
Discharged home	24	1.0
Disch. terminally ill	0	0.0
Missing	34	

Transferred to (N=1972)	N	%
Ward	1465	74.3
Other ICU	149	7.6
High dependency care unit	358	18.2
Rehabilitation	0	0.0
Day hospital or Long-term care	0	0.0
Missing	0	

Reason of transfer to Other ICU (N=149)	N	%
Specialist expertise	26	17.4
Step-up care	25	16.8
Logistical/organizational reasons	84	56.4
Step-down care	14	9.4
Missing	0	

Transferred to Same hospital (N=1848)	N	%
Ward	1417	76.7
Other ICU	90	4.9
High dependency care unit	341	18.5
Rehabilitation	0	0.0
Day hospital or Long-term care	0	0.0
Missing	0	

Transferred to Other hospital (N=124)	N	%
Ward	48	38.7
Other ICU	59	47.6
High dependency care unit	17	13.7
Rehabilitation	0	0.0
Day hospital or Long-term care	0	0.0
Missing	0	

ICU mortality	N	%
Alive	1996	85.6
Dead	335	14.4
Missing	34	

Timing of ICU mortality (N=335)	N	%
Daytime (08:00AM - 07:59PM)	199	59.4
Nighttime (08:00PM - 07:59AM)	136	40.6
Weekdays (Monday - Friday)	260	77.6
Weekend (Saturday - Sunday)	75	22.4
Missing	0	

Hospital mortality *	N	%
Alive	1694	78.5
Dead	464	21.5
Missing	17	

Timing of hosp. mortality * (N=464)	N	%
In ICU	298	64.2
Within 24 hours after ICU	11	2.4
24-47 hours after ICU	8	1.7
48-71 hours after ICU	8	1.7
72-95 hours after ICU	11	2.4
After 95 hours after ICU	128	27.6
Missing	0	

**Timing of hosp. mortality (days from ICU disch.) *
Discharged alive from ICU** (N=166)

Mean	20.5
SD	24.8
Median	12
Q1−Q3	4−28
Missing	0

* Statistics computed on patients admitted in months with % of patients in status 4 over the threshold (readmissions excluded) (N=2175).

National report - **Year 2019**
Outcome indicators - Adult patients

Last hospital mortality *		N	%
	Alive	1680	77.8
	Dead	478	22.2
	Missing	17	

Readmission from ward		N	%
	No	2323	98.3
	Yes	41	1.7
	Missing	1	

Number of readmissions (N=41)	N	%
1	38	92.7
2	3	7.3
>2	0	0.0
Missing	0	

Timing of readmission (N=41)	N	%
Within 48 hours	12	29.3
48-71 hours	1	2.4
72-95 hours	4	9.8
After 95 hours	24	58.5
Missing	0	

Timing readmission (days)	
N	41
Mean	9.8
SD	15.0
Median	4.2
Q1−Q3	1.8−10.3

ICU stay (days)	
Mean	6.8
SD	9.2
Median	3
Q1−Q3	2−8
Missing	13

ICU stay (days) Alive (N=1996)	
Mean	6.3
SD	8.7
Median	3
Q1−Q3	1−7
Missing	1

ICU stay (days) Dead (N=335)	
Mean	9.4
SD	11.3
Median	5
Q1−Q3	2−12.5
Missing	0

Stay after ICU (days) * Alive (N=1852)	
Mean	15.3
SD	20.6
Median	8
Q1−Q3	4−19
Missing	15

Hospital stay (days) *	
Mean	24.4
SD	29.8
Median	15
Q1−Q3	8−30
Missing	19

Hospital stay (days) * Alive (N=1694)	
Mean	24.6
SD	30.1
Median	15
Q1−Q3	8−30
Missing	2

Hospital stay (days) * Dead (N=464)	
Mean	24.0
SD	28.8
Median	14
Q1−Q3	6−31
Missing	0

* Statistics computed on patients admitted in months with % of patients in status 4 over the threshold (readmissions excluded) (N=2175).

National report - **Year 2019**
Characteristics on admission - Adult patients evaluated in the GiViTI model

Patients (N): 2050

Sex	N	%
Male	1274	62.1
Female	776	37.9
Missing	0	

Age (years)	N	%
17-45	239	11.7
46-65	644	31.4
66-75	529	25.8
>75	638	31.1
Missing	0	
Mean	65.5	
SD	15.8	
Median	68	
Q1−Q3	58−77	
Min−Max	17−100	

Body mass Index (BMI)	N	%
Underweight	73	3.6
Normal	812	39.6
Overweight	744	36.3
Obese	421	20.5
Missing	0	

Pregnancy status Females (N=776)	N	%
Not fertile	392	50.5
Not pregnant/Unknown	376	48.5
Currently pregnant	2	0.3
Post partum	6	0.8
Missing	0	

Comorbidities	N	%
No	277	13.5
Yes	1773	86.5
Missing	0	

Comorbidities (top 10)	N	%
Hypertension	1142	55.7
Arrhythmia	415	20.2
NYHA class II-III	353	17.2
Any tumour without metastasis	330	16.1
Diabetes Type II without insulin tr.	306	14.9
Moderate or severe renal disease	260	12.7
Metastatic cancer	206	10.0
Endocrine-metabolic diseases	161	7.9
Diabetes Type II with insulin treatment	142	6.9
Moderate COPD	137	6.7
Missing	0	

Stay before ICU (days)	
Mean	4.8
SD	12.8
Median	1
Q1−Q3	0−4
Missing	0

Source of admission	N	%
Same hospital	1931	94.2
Other hospital	119	5.8
Long-term chronic care hospital	0	0.0
Directly from the community	0	0.0
Missing	0	

Ward of admission Hospital (N=2050)	N	%
Medical ward	311	15.2
Surgical ward	1054	51.4
Emergency room	512	25.0
Other ICU	96	4.7
High dependency care unit	77	3.8
Missing	0	

Reason for transfer from Other ICU (N=96)	N	%
Specialist expertise	30	31.2
Step-up care	16	16.7
Logistical/organizational reasons	49	51.0
Step-down care	1	1.0
Missing	0	

Ward of admission Same hospital (N=1931)	N	%
Medical ward	295	15.3
Surgical ward	1040	53.9
Emergency room	483	25.0
Other ICU	42	2.2
High dependency care unit	71	3.7
Missing	0	

Ward of admission Other hospital (N=119)	N	%
Medical ward	16	13.4
Surgical ward	14	11.8
Emergency room	29	24.4
Other ICU	54	45.4
High dependency care unit	6	5.0
Missing	0	

Scheduled admission	N	%
No	1527	74.5
Yes	523	25.5
Missing	0	

National report - **Year 2019**
Characteristics on admission - Adult patients evaluated in the GiViTI model

Trauma		N	%
	No	1707	83.3
	Yes	343	16.7
	Multiple trauma	134	6.5
	Missing	0	

Surgical status		N	%
	Non surgical	834	40.7
	Elective surgical	612	29.9
	Emergency surgical	604	29.5
	Missing	0	

Surgical status

- Non surgical
- Elective surgical
- Emergency surgical

Source of admission			
Surgical pt. (N=1216)		N	%
Operating theatre of surgical ward		860	70.7
Operating theatre of emergency room		99	8.1
Surgical ward		89	7.3
Other		168	13.8
Missing		0	

Surgical interventions (top 10)			
Elective surgical (N=612)		N	%
Gastrointestinal surgery		350	57.2
Nephro/Urological surgery		70	11.4
Peripheral vascular surgery		58	9.5
Other surgery		37	6.0
Orthopaedic surgery		26	4.2
Gynaecological surgery		21	3.4
Abdominal vascular surgery		18	2.9
Neurosurgery		14	2.3
Hepatic surgery		13	2.1
Thoracic surgery		11	1.8
Missing		0	

Timing			
Elective surgical (N=612)		N	%
From -7 to -3 days		22	3.6
From -2 to -1 days		17	2.8
On ICU admission day		600	98.0
The day after ICU admission		5	0.8
Missing		0	

Surgical interventions (top 10)			
Emergency surgical (N=604)		N	%
Gastrointestinal surgery		275	45.5
Neurosurgery		107	17.7
Orthopaedic surgery		55	9.1
Other surgery		42	7.0
Peripheral vascular surgery		26	4.3
Thoracic surgery		22	3.6
Nephro/Urological surgery		21	3.5
Organ/s transplantation		18	3.0
Biliary tract surgery		15	2.5
ENT surgery		13	2.2
Missing		10	

Timing			
Emergency surgical (N=604)		N	%
From -7 to -3 days		27	4.5
From -2 to -1 days		64	10.6
On ICU admission day		535	88.6
The day after ICU admission		39	6.5
Missing		0	

Non surgical interventions		N	%
	None	1917	93.5
	Elective	12	0.6
	Emergency	121	5.9
	Missing	0	

Non surgical interventions			
Elective (N=12)		N	%
Interventional radiology		6	50.0
Interventional cardiology		1	8.3
Interventional neuroradiology		0	0.0
Interventional endoscopy		0	0.0
Missing		5	

Non surgical interventions			
Emergency (N=121)		N	%
Interventional cardiology		56	46.3
Interventional radiology		34	28.1
Interventional endoscopy		21	17.4
Interventional neuroradiology		0	0.0
Missing		10	

National report - **Year 2019**
Characteristics on admission - Adult patients evaluated in the GiViTI model

Reason for admission	N	%
Monitoring/Weaning	785	38.3
Post surgical weaning	14	0.7
Surgical monitoring	516	25.2
Post interventional weaning	0	0.0
Interventional monitoring	45	2.2
Non surgical monitoring	205	10.0
Missing	5	
Admission for procedures/treatments	0	0.0
Intensive Treatment	1265	61.7
Only ventilatory support	399	19.5
Only cardiovascular support	193	9.4
Ventilatory and cardiovascular support	673	32.8
Missing	0	
Palliative Sedation	0	0.0
Diagnosis of death/Organ donation	0	0.0
Missing	0	

Failures on admission (top 10)	N	%
A	234	11.4
AB	187	9.1
ABEG	181	8.8
E	122	6.0
ABE	99	4.8
B	65	3.2
BEG	54	2.6
AE	53	2.6
ABCEG	50	2.4
ABG	49	2.4
Missing	0	

Respiratory failure	N	%
None	978	47.7
Only hypoxic failure	521	25.4
Only hypercapnic failure	100	4.9
Hypoxic-hypercapnic failure	48	2.3
Intubation for airway maint.	403	19.7
Missing	0	

Number of failures (%)

Cardiovascular failure	N	%
None	1184	57.8
Without shock	302	14.7
Cardiogenic shock	74	3.6
Septic shock	289	14.1
Haemorrhagic/hypovolemic shock	89	4.3
Hypovolemic shock	24	1.2
Anaphylactic shock	4	0.2
Neurogenic shock	19	0.9
Other shock	26	1.3
Mixed shock	39	1.9
Missing	0	

Neurologic failure	N	%
None	1480	89.0
Cerebral coma	91	5.5
Metabolic coma	34	2.0
Postanoxic coma	43	2.6
Toxic coma	14	0.8
Missing or not evaluable	388	

Failures on admission	N	%
No	602	29.4
Yes	1448	70.6
A: Respiratory failure	1072	52.3
B: Cardiovascular failure	866	42.2
C: Neurological failure	182	8.9
D: Hepatic failure	32	1.6
E: Renal failure	763	37.2
F: Acute skin failure	4	0.2
G: Metabolic failure	512	25.0
H: Coagulation failure	65	3.2
Missing	0	

Renal failure (AKIN)	N	%
None	1287	62.8
Mild	404	19.7
Moderate	182	8.9
Severe	177	8.6
Missing	0	

Metabolic failure	N	%
None	1538	75.0
pH $<=$ 7.3, PaCO2 $<$ 45 mmHg	225	11.0
Base deficit $>=$ 5 mmol/L, lactate $>$1.5x	287	14.0
Missing	0	

National report - **Year 2019**
Characteristics on admission - Adult patients evaluated in the GiViTI model

Clinical conditions on admission	N	%
Respiratory	315	15.4
Pleural effusion	87	4.2
Aspiration pneumonia	79	3.9
Pulmonary embolism	39	1.9
Atelectasis	34	1.7
Upper respiratory tract disease	28	1.4
Cardiovascular	437	21.3
Cardiac arrest	80	3.9
Peripheral vascular disease	74	3.6
Acute severe arrhythmia: tachycardias	66	3.2
Left heart failure without pulm. edema	50	2.4
Acute myocardial infarction	45	2.2
Neurological	151	7.4
Seizures	33	1.6
Cerebral artery stroke	31	1.5
Brain tumour	22	1.1
Metabolic/postanoxic encephalopathy	14	0.7
Neuropathy/myopathy	13	0.6
Gastrointestinal and hepatic	629	30.7
Digestive tract malignancy	312	15.2
Intestinal occlusion	89	4.3
Gastrointestinal perforation	70	3.4
Paralytic Ileus	41	2.0
Ascites	39	1.9
Trauma (anatomical districts)	343	16.7
Head	207	10.1
Chest	114	5.6
Pelvis/bone/joint & muscle	104	5.1
Spine	73	3.6
Abdomen	56	2.7
Major vessels injury	20	1.0
Miscellaneous	1	0.0
Other	635	31.0
Other disease	355	17.3
Nephrourologic disease	166	8.1
Metabolic disorder	86	4.2
Coagulation disorder	65	3.2
Haematological disease	32	1.6
Post transplantation	42	2.0
Liver transplantation	24	1.2
Lung transplantation	10	0.5
Infections	850	41.5
Pneumonia	397	19.4
NON-surgical urinary tract infection	95	4.6
NON-surgical secondary peritonitis	85	4.1
Post-surgical peritonitis	65	3.2
NON-surgical skin/soft tissue infection	50	2.4
Cholecystitis/cholangitis	35	1.7
L.R.T.I. other than pneumonia	35	1.7
Primary peritonitis	34	1.7
Upper respiratory tract infection	21	1.0
Clinical sepsis	19	0.9
Missing	0	

Trauma (anatomical districts)	N	%
Head	207	10.1
Traumatic Subdural haematoma	132	6.4
Traumatic subarachnoid haemorrhage	110	5.4
Skull fracture	99	4.8
Cerebral contusion/laceration	96	4.7
Maxillofacial fracture	56	2.7
Spine	73	3.6
Vertebral fracture, without deficit	55	2.7
Cervical injury, incomplete deficit	7	0.3
Tetraplegia	4	0.2
Chest	114	5.6
Other injuries of the chest	72	3.5
Traum. haemothorax/pneumothorax	62	3.0
Severe lung contusion/laceration	36	1.8
Abdomen	56	2.7
Minor injuries of the abdomen	22	1.1
Bowel transection/perforation	15	0.7
Kidney: Rupture/laceration	10	0.5
Pelvis/bone/joint & muscle	104	5.1
Long bone fracture	93	4.5
Multiple fracture of the pelvis	20	1.0
Very severe or open fracture of the pelvis	4	0.2
Major vessels injury	20	1.0
Aorta: rupture/dissection	8	0.4
Major abdominal vessels: transection	7	0.3
Proximal limbs vessels: transection	5	0.2
Miscellaneous	1	0.0
Burns (>30% BSA)	1	0.0
-	0	0.0
Missing	0	

Infection severity on admission	N	%
None	1200	59.2
INFECTION WITHOUT SEPSIS	355	17.5
SEPSIS	149	7.4
SEPTIC SHOCK	323	15.9
Missing	23	

Infection severity on admission

Patients infected (N=827)
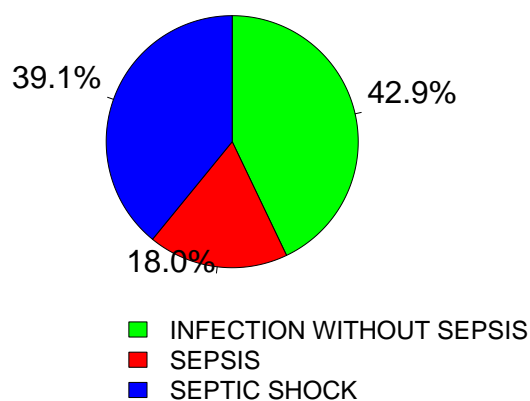
39.1%   42.9%

18.0%

- INFECTION WITHOUT SEPSIS
- SEPSIS
- SEPTIC SHOCK

National report - **Year 2019**
Severity scores - Adult patients evaluated in the GiViTI model

Glasgow Coma Scale (%)

On admission
Worst value in the first 24 hours
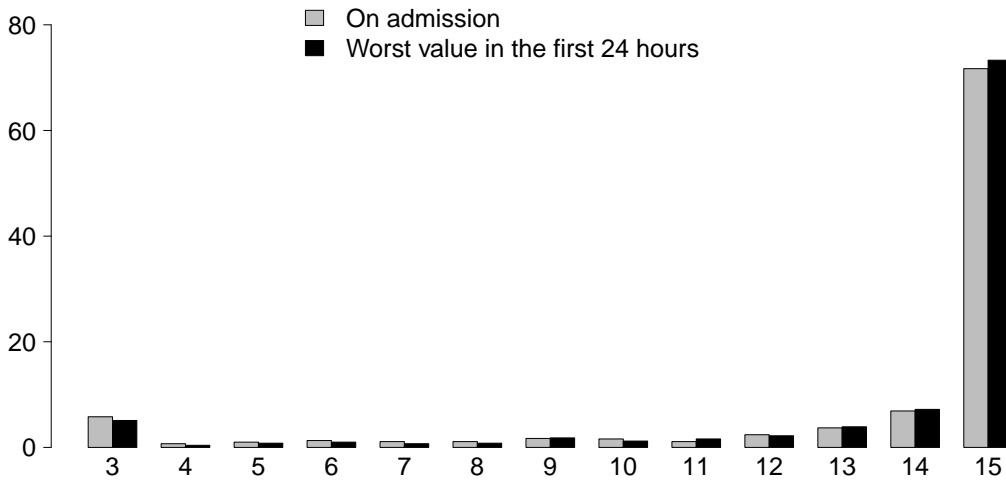
GCS (admission)	
Median	15
Q1−Q3	14−15
Not evaluable	388
Missing	0

GCS (first 24 hours)	
Median	15
Q1−Q3	14−15
Not evaluable	518
Missing	0

SAPS II (%)
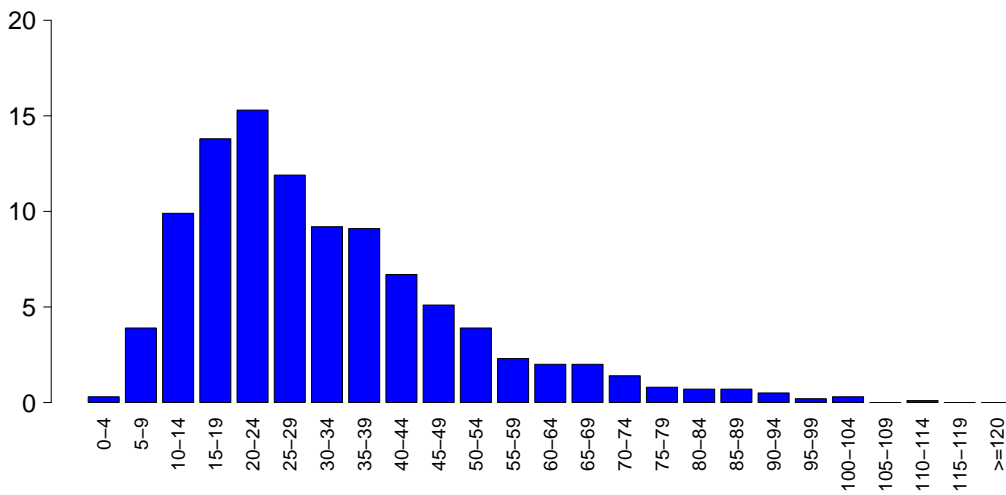
SAPSII	
Mean	31.7
SD	18.1
Median	27
Q1−Q3	18−40
Not evaluable	518
Missing	0

SOFA (%)
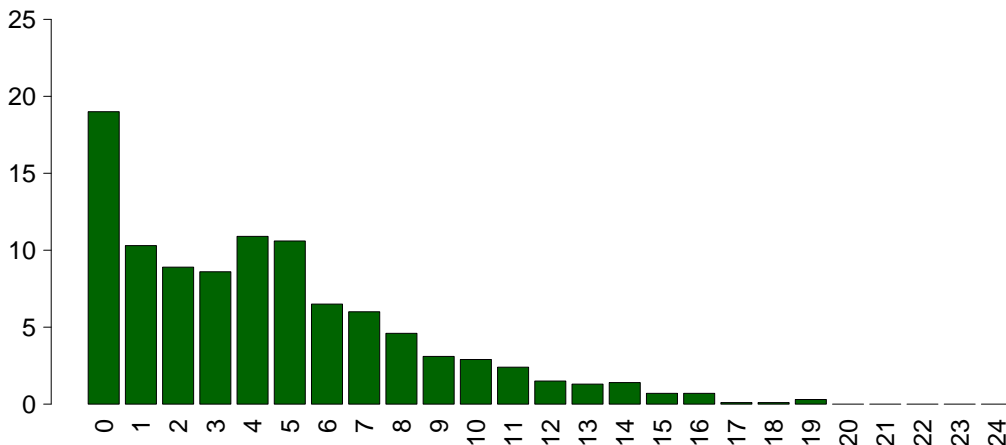
SOFA	
Mean	4.4
SD	3.9
Median	4
Q1−Q3	1−7
Not evaluable	518
Missing	0

Adult patients (GiViTI model)

National report - **Year 2019**
Characteristics during the stay - Adult patients evaluated in the GiViTI model

Complications during the stay	N	%
No	1156	56.4
Yes	894	43.6
Missing	0	

Failures during the stay	N	%
No	1714	83.6
Yes	336	16.4
A: Respiratory failure	123	6.0
B: Cardiovascular failure	118	5.8
C: Neurological failure	43	2.1
D: Hepatic failure	42	2.0
E: Renal failure (AKIN)	146	7.1
F: Acute skin failure	2	0.1
G: Metabolic failure	62	3.0
H: Coagulation failure	25	1.2
Missing	0	

Failures during the stay (top 10)	N	%
E	61	3.0
A	45	2.2
B	37	1.8
G	27	1.3
AB	23	1.1
ABE	15	0.7
D	15	0.7
C	12	0.6
BE	11	0.5
AE	10	0.5
Missing	0	

Respiratory failure occured	N	%
None	1927	94.0
Intubation for airway maint.	32	1.6
Hypoxic failure	69	3.4
Hypercapnic failure	53	2.6
Missing	0	

Cardiovascular failure occured	N	%
None	1932	94.2
Cardiogenic shock	38	1.9
Hypovolemic shock	6	0.3
Haemorrhagic/hypovolemic shock	13	0.6
Septic shock	61	3.0
Anaphylactic shock	0	0.0
Neurogenic shock	1	0.0
Other shock	16	0.8
Missing	0	

Neurological failure occured	N	%
None	2007	97.9
Cerebral coma	25	1.2
Metabolic coma	14	0.7
Postanoxic coma	5	0.2
Missing	0	

Renal failure occured (AKIN)	N	%
None	1904	92.9
Mild	35	1.7
Moderate	36	1.8
Severe	75	3.7
Missing	0	

Complications during the stay	N	%
Respiratory	192	9.4
Pleural effusion	89	4.3
Aspiration pneumonia	35	1.7
Atelectasis	27	1.3
Severe ARDS	25	1.2
Pneumothorax/Pneumomediastinum	18	0.9
Cardiovascular	220	10.7
Acute severe arrhythmia: tachycardias	108	5.3
Cardiac arrest	41	2.0
Pulmonary edema	26	1.3
Acute severe arrhythmia: bradycardias	22	1.1
Left heart failure w/o pulm. edema	15	0.7
Neurological	201	9.8
Drowsiness/agitation/delirium	118	5.8
Brain edema	44	2.1
Intracranial hypertension	30	1.5
CrlMyNe	17	0.8
Seizures	15	0.7
Gastrointestinal and hepatic	184	9.0
Paralytic Ileus	63	3.1
Liver Dysfunction Syndrome	36	1.8
Anastomotic dehiscence	23	1.1
Gastrointestinal bleeding: upper tract	20	1.0
Intrabdominal bleeding	20	1.0
Other	241	11.8
Other disease	137	6.7
Nephrourologic disease	64	3.1
Metabolic disorder	62	3.0
Other skin and/or soft tissue pathology	11	0.5
Iatrogenic major vessels injury	9	0.4
Category/Stage II: Partial Thickness Skin Loss	3	0.1
Fat embolism	2	0.1
Infections	419	20.4
Pneumonia	183	8.9
Post-surgical peritonitis	70	3.4
NON-surgical urinary tract infection	52	2.5
Post-surgical skin/soft tissue infection	34	1.7
L.R.T.I. other than pneumonia	24	1.2
Clinical sepsis	18	0.9
Other fungal infections	18	0.9
Upper respiratory tract infection	17	0.8
NON-surgical secondary peritonitis	14	0.7
NON-surgical skin/soft tissue infection	13	0.6
Missing	0	

National report - **Year 2019**
Characteristics during the stay - Adult patients evaluated in the GiViTI model

Infections	N	%
None	954	46.5
Only on admission	677	33.0
On admission and during ICU stay	173	8.4
Only during ICU stay	246	12.0
Missing	0	

Maximum severity of infection	N	%
None	954	47.3
INFECTION WITHOUT SEPSIS	485	24.1
SEPSIS	218	10.8
SEPTIC SHOCK	358	17.8
Missing	35	

Severity evolution

	N (R %)	None	INFECTION WITHOUT SEPSIS	SEPSIS	SEPTIC SHOCK	TOT
Admission	None	954 (80.6%)	161 (13.6%)	50 (4.2%)	18 (1.5%)	1183
	INFECTION WITHOUT SEPSIS	-	324 (91.3%)	24 (6.8%)	7 (2.0%)	355
	SEPSIS	-	-	140 (94.0%)	9 (6.0%)	149
	SEPTIC SHOCK	-	-	-	323 (100.0%)	323
	TOT	954	485	214	357	2010

During the stay spans the None / INFECTION WITHOUT SEPSIS / SEPSIS / SEPTIC SHOCK columns.

Ventil. Associat. Pneumonia (VAP)	N	%
No	1891	92.2
Yes	159	7.8
Missing	0	

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

Estimate	29.9
CI (95%)	25.5−35.0

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

Estimate	23.9%
CI (95%)	20.4−28.0

Catheter Bacteraemia (CR-BSI)	N	%
No	2042	99.6
Yes	8	0.4
Missing	0	

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

Estimate	0.7
CI (95%)	0.3−1.4

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

Estimate	0.8%
CI (95%)	0.4−1.6

Adult patients (GiViTI model)

National report - Year 2019

Process indicators - Adult patients evaluated in the GiViTI model

Procedures and/or treatments (Missing=0)	Use N	Use %	On admission N	On admission %	On discharge N	On discharge %	Length (days) Median	Length Q1-Q3	Length Missing	Days from admission Median	Days Q1-Q3	Days Missing
Procedures (antibiotics excluded)	1921	93.7										
Invasive ventilation	895	43.7	638	31.1	177	8.6	4	1–11	0	0	0–1	0
Non invasive ventilation	551	26.9	96	4.7	197	9.6	2	1–4	0	0	0–2	0
Tracheostomy	112	5.5	12	0.6	89	4.3	8	4–18	0	16	9–21	0
iNO (inhaled nitric oxide)	43	2.1	12	0.6	6	0.3	5	2–14	0	2	0–6	0
Central Venous Catheter	1448	70.6	996	48.6	1132	55.2	4	2–10	0	0	0–0	0
PICC	152	7.4	42	2	120	5.9	4	2–7	0	0	0–2	0
Arterial Catheter	1565	76.3	1026	50	583	28.4	4	2–9	0	0	0–0	0
Vasoactive drugs	1228	59.9	640	31.2	119	5.8	3	1–6	0	0	0–0	0
Antiarrhythmics	228	11.1	41	2	66	3.2	3	1–6	0	1	0–3	0
IABP	1	0.0	0	0	0	0	0	0–0	0	18	18–18	0
Invasive monitoring of C.O.	97	4.7	27	1.3	21	1	7	3–12	0	0	0–2	0
Continous monitoring of ScVO2	8	0.4	5	0.2	1	0	4	1–8	0	4	2–8	0
Temporary pacing	13	0.6	4	0.2	3	0.1	2	1–6	0	1	0–1	0
Ventricular assistance	2	0.1	2	0.1	2	0.1	40	32–47	0			
DC-shock	32	1.6								2	0–3	0
CPR	45	2.2								0	0–2	0
Massive blood transfusion	25	1.2								0	0–0	0
ICP monitoring without CSF drainage	93	4.5	72	3.5	11	0.5	8	4–15	0	0	0–1	0
ICP monitoring with CSF drainage	17	0.8	10	0.5	5	0.2	7	3–21	0	2	0–7	0
External ventricular drainage without ICP	13	0.6	5	0.2	5	0.2	3	2–4	0	3	0–16	0
Haemofiltration	7	0.3	0	0	1	0	14	3–30	0	5	2–6	0
Haemodialysis	170	8.3	48	2.3	65	3.2	4	1–10	0	2	1–5	0
ECMO	4	0.2	2	0.1	1	0	10	7–13	0	14	7–22	0
Hepatic clearance techniques	1	0.0										
Clearance techniques during sepsis	12	0.6	2	0.1	2	0.1	1	0–1	0	1	1–1	0
IAP (intra-abdominal pressure)	138	6.7										
Hypothermia	17	0.8	4	0.2	1	0	2	1–3	0	0	0–1	0
Enteral nutrition	947	46.2	170	8.3	700	34.1	4	2–10	0	1	1–2	0
Parenteral nutrition	1080	52.7	148	7.2	659	32.1	3	2–8	0	1	0–1	0
SDD (Topical, Topical and systemic)	0	0.0										
Patient restraint	167	8.1										
Peridural catheter	175	8.5	170	8.3	142	6.9	2	2–3	0	0	0–2	0
Electrical cardioversion	5	0.2								1	1–1	0
Vacuum therapy	17	0.8										
Antibiotics	1717	83.8										
Antibiotic prophylaxis	829	40.4	570	27.8	336	16.4	2	1–3	0	0	0–0	0
Empirical antibiotic therapy	791	38.6	376	18.3	291	14.2	3	2–5	0	0	0–1	0
Empirical antibiotic therapy in unconfirmed diagnosis	69	3.4	22	1.1	40	2	3	2–5	0	0	0–2	0
Targeted antibiotic therapy	626	30.5	138	6.7	424	20.7	6	3–12	0	3	2–5	0

National report - **Year 2019**
Process indicators - Adult patients evaluated in the GiViTI model

Invasive ventilation (N=895)	N	%	Mean	SD	Median	Q1-Q3	Missing
Due to pulmonary failure	447	36.9	7.7	9.3	4	2−10	0
For airway mainteinance	399	32.9	9.7	12.9	5	1−13	0
In weaning	19	1.6	0.4	0.5	0	0−1	0
Not evaluable	347	28.6	4.0	4.7	1	1−7	318
Reintubation within 48 hours	10	0.8	6.6	4.9	7	2.25−9	0

Non invasive ventilation (N=551)	N	%
Non invasive ventilation only	335	60.8
Non invasive ventilation failed	43	7.8
For weaning	157	28.5
Other	16	2.9
Missing	0	

Tracheostomy not present on admission (N=100)	N	%
Surgical	21	21.0
Percutwist	34	34.0
Ciaglia	13	13.0
Monodil. Ciaglia	0	0.0
Fantoni	1	1.0
Griggs	4	4.0
Other Kind	14	14.0
Unknown	13	13.0
Missing	0	

Tracheostomy - Days after the beginning of inv. vent.
Not present on admission (N=100)

Mean	15.8
SD	9.5
Median	15.5
Q1−Q3	9−21.2
Missing	0

Invasive monitoring of C.O. (N=97)	N	%
Swan Ganz	3	3.1
PICCO	54	55.7
LIDCO	8	8.2
Vigileo-PRAM	0	0.0
Other	32	33.0
Missing	0	

SDD (N=0)	N	%
Topical	0	0.0
Topical and systemic	0	0.0
Missing	0	

Antibiotic therapy
Pt. infected in ICU only (N=246)

	N	%
No therapy	12	4.9
Only empirical	86	35.0
Only targeted	42	17.1
Targeted after empirical	95	38.6
Other	11	4.5
Missing	0	

Surgical interventions	N	%
No	1878	91.6
Yes	172	8.4
Missing	0	

Number of surgical interventions	N	%
0	1878	91.6
1	120	5.9
2	24	1.2
3	8	0.4
>3	20	1.0
Missing	0	

Surgical interventions
Days from admission

Mean	9.7
SD	7.9
Median	7
Q1−Q3	3−13.8
Missing	0

Surgical interventions (top 10)	N	%
Gastrointestinal surgery	130	6.3
Other surgery	39	1.9
Orthopaedic surgery	28	1.4
Plastic surgery	17	0.8
ENT surgery	17	0.8
Thoracic surgery	15	0.7
Neurosurgery	15	0.7
Nephro/Urological surgery	11	0.5
Maxillo-Facial surgery	6	0.3
Thoracic vascular surgery	5	0.2
Missing	0	

Non surgical interventions	N	%
No	1983	96.7
Yes	67	3.3
Missing	0	

Non surgical interventions
Days from admission

Mean	11.7
SD	12.5
Median	7
Q1−Q3	3.2−14.8
Missing	2

Non surgical interventions	N	%
Interventional endoscopy	41	2.0
Interventional radiology	26	1.3
Interventional cardiology	17	0.8
Interventional neuroradiology	0	0.0
Missing	0	

National report - **Year 2019**
Outcome indicators - Adult patients evaluated in the GiViTI model

ICU outcome	N	%
Dead	275	13.5
Transferred to same hospital	1642	80.6
Transferred to other hospital	102	5.0
Discharged home	17	0.8
Disch. terminally ill	0	0.0
Missing	14	

Transferred to (N=1744)	N	%
Ward	1267	72.6
Other ICU	135	7.7
High dependency care unit	342	19.6
Rehabilitation	0	0.0
Day hospital or Long-term care	0	0.0
Missing	0	

Reason of transfer to Other ICU (N=135)	N	%
Specialist expertise	24	17.8
Step-up care	18	13.3
Logistical/organizational reasons	80	59.3
Step-down care	13	9.6
Missing	0	

Transferred to Same hospital (N=1642)	N	%
Ward	1231	75.0
Other ICU	84	5.1
High dependency care unit	327	19.9
Rehabilitation	0	0.0
Day hospital or Long-term care	0	0.0
Missing	0	

Transferred to Other hospital (N=102)	N	%
Ward	36	35.3
Other ICU	51	50.0
High dependency care unit	15	14.7
Rehabilitation	0	0.0
Day hospital or Long-term care	0	0.0
Missing	0	

ICU mortality	N	%
Alive	1761	86.5
Dead	275	13.5
Missing	14	

Timing of ICU mortality (N=275)	N	%
Daytime (08:00AM - 07:59PM)	167	60.7
Nighttime (08:00PM - 07:59AM)	108	39.3
Weekdays (Monday - Friday)	218	79.3
Weekend (Saturday - Sunday)	57	20.7
Missing	0	

Hospital mortality	N	%
Alive	1612	78.6
Dead	438	21.4
Missing	0	

Timing of hosp. mortality (N=438)	N	%
In ICU	275	62.8
Within 24 hours after ICU	10	2.3
24-47 hours after ICU	8	1.8
48-71 hours after ICU	8	1.8
72-95 hours after ICU	11	2.5
After 95 hours after ICU	126	28.8
Missing	0	

Timing of hosp. mortality (days from ICU disch.) Discharged alive from ICU (N=163)	
Mean	20.7
SD	24.9
Median	12
Q1−Q3	4−28
Missing	0

National report - **Year 2019**
Outcome indicators - Adult patients evaluated in the GiViTI model

Last hospital mortality		N	%
	Alive	1598	78.0
	Dead	452	22.0
	Missing	0	

ICU stay (days)		
	Mean	6.9
	SD	9.1
	Median	3
	Q1−Q3	2−8
	Missing	1

ICU stay (days) Alive (N=1761)		
	Mean	6.4
	SD	8.5
	Median	3
	Q1−Q3	2−7
	Missing	1

ICU stay (days) Dead (N=275)		
	Mean	10.1
	SD	11.7
	Median	6
	Q1−Q3	2−14
	Missing	0

Stay after ICU (days) Alive (N=1761)		
	Mean	15.3
	SD	20.8
	Median	8
	Q1−Q3	4−19
	Missing	1

Hospital stay (days)		
	Mean	24.6
	SD	29.1
	Median	15
	Q1−Q3	8−30
	Missing	1

Hospital stay (days) Alive (N=1612)		
	Mean	24.6
	SD	29.1
	Median	15
	Q1−Q3	8−30
	Missing	1

Hospital stay (days) Dead (N=438)		
	Mean	24.7
	SD	29.1
	Median	15
	Q1−Q3	6.2−31.8
	Missing	0

National report - **Year 2019**
Characteristics on admission - Adult non surgical patients evaluated in the GiViTI model

Patients (N): 834

Sex	N	%
Male	561	67.3
Female	273	32.7
Missing	0	

Age (years)	N	%
17-45	97	11.6
46-65	252	30.2
66-75	215	25.8
>75	270	32.4
Missing	0	
Mean	65.7	
SD	15.8	
Median	68	
Q1−Q3	58−77.8	
Min−Max	18−95	

Body mass Index (BMI)	N	%
Underweight	35	4.2
Normal	333	39.9
Overweight	288	34.5
Obese	178	21.3
Missing	0	

Pregnancy status Females (N=273)	N	%
Not fertile	159	58.2
Not pregnant/Unknown	111	40.7
Currently pregnant	2	0.7
Post partum	1	0.4
Missing	0	

Comorbidities	N	%
No	100	12.0
Yes	734	88.0
Missing	0	

Comorbidities (top 10)	N	%
Hypertension	434	52.0
Arrhythmia	195	23.4
NYHA class II-III	184	22.1
Diabetes Type II without insulin tr.	144	17.3
Moderate or severe renal disease	112	13.4
Metastatic cancer	77	9.2
Any tumour without metastasis	69	8.3
Diabetes Type II with insulin treatment	67	8.0
Moderate COPD	63	7.6
Alcohol addiction	61	7.3
Missing	0	

Stay before ICU (days)	
Mean	5.7
SD	14.0
Median	1
Q1−Q3	0−5
Missing	0

Source of admission	N	%
Same hospital	743	89.1
Other hospital	91	10.9
Long-term chronic care hospital	0	0.0
Directly from the community	0	0.0
Missing	0	

Ward of admission Hospital (N=834)	N	%
Medical ward	262	31.4
Surgical ward	105	12.6
Emergency room	368	44.1
Other ICU	61	7.3
High dependency care unit	38	4.6
Missing	0	

Reason for transfer from Other ICU (N=61)	N	%
Specialist expertise	11	18.0
Step-up care	10	16.4
Logistical/organizational reasons	39	63.9
Step-down care	1	1.6
Missing	0	

Ward of admission Same hospital (N=743)	N	%
Medical ward	248	33.4
Surgical ward	97	13.1
Emergency room	354	47.6
Other ICU	11	1.5
High dependency care unit	33	4.4
Missing	0	

Ward of admission Other hospital (N=91)	N	%
Medical ward	14	15.4
Surgical ward	8	8.8
Emergency room	14	15.4
Other ICU	50	54.9
High dependency care unit	5	5.5
Missing	0	

Scheduled admission	N	%
No	834	100.0
Yes	0	0.0
Missing	0	

National report - **Year 2019**
Characteristics on admission - Adult non surgical patients evaluated in the GiViTI model

Trauma		N	%
	No	701	84.1
	Yes	133	15.9
	Multiple trauma	51	6.1
	Missing	0	

Surgical status		N	%
	Non surgical	834	100.0
	Elective surgical	0	0.0
	Emergency surgical	0	0.0
	Missing	0	

Surgical status

0.0%

100.0%

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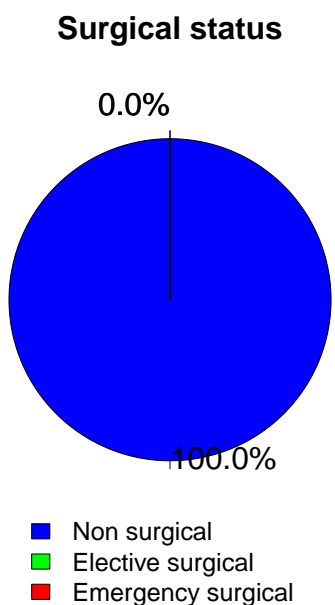
Source of admission			
Surgical pt. (N=0)		N	%
	Operating theatre of surgical ward	0	0.0
	Operating theatre of emergency room	0	0.0
	Surgical ward	0	0.0
	Other	0	0.0
	Missing	0	

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

Timing			
Elective surgical (N=0)		N	%
	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)			
Emergency surgical (N=0)		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	0.0
	Missing	0	

Timing			
Emergency surgical (N=0)		N	%
	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	741	88.8
	Elective	3	0.4
	Emergency	90	10.8
	Missing	0	

Non surgical interventions			
Elective (N=3)		N	%
	Interventional radiology	2	66.7
	Interventional cardiology	1	33.3
	Interventional neuroradiology	0	0.0
	Interventional endoscopy	0	0.0
	Missing	0	

Non surgical interventions			
Emergency (N=90)		N	%
	Interventional cardiology	53	58.9
	Interventional radiology	18	20.0
	Interventional endoscopy	18	20.0
	Interventional neuroradiology	0	0.0
	Missing	1	

National report - **Year 2019**
Characteristics on admission - Adult non surgical patients evaluated in the GiViTI model

Reason for admission	N	%
Monitoring/Weaning	255	30.6
Post surgical weaning	0	0.0
Surgical monitoring	0	0.0
Post interventional weaning	0	0.0
Interventional monitoring	45	5.4
Non surgical monitoring	205	24.7
Missing	5	
Admission for procedures/treatments	0	0.0
Intensive Treatment	579	69.4
Only ventilatory support	171	20.5
Only cardiovascular support	107	12.8
Ventilatory and cardiovascular support	301	36.1
Missing	0	
Palliative Sedation	0	0.0
Diagnosis of death/Organ donation	0	0.0
Missing	0	

Failures on admission (top 10)	N	%
ABEG	93	11.2
A	77	9.2
AB	58	7.0
E	51	6.1
ABE	42	5.0
ABCEG	35	4.2
BE	34	4.1
BEG	34	4.1
AC	25	3.0
ABG	24	2.9
Missing	0	

Respiratory failure	N	%
None	362	43.4
Only hypoxic failure	259	31.1
Only hypercapnic failure	83	10.0
Hypoxic-hypercapnic failure	22	2.6
Intubation for airway maint.	108	12.9
Missing	0	

Number of failures (%)

Bar	Value
0	20.5%
1	18.9%
2	20.7%
3	18.1%
>3	21.7%

Cardiovascular failure	N	%
None	426	51.1
Without shock	137	16.4
Cardiogenic shock	55	6.6
Septic shock	153	18.3
Haemorrhagic/hypovolemic shock	18	2.2
Hypovolemic shock	3	0.4
Anaphylactic shock	3	0.4
Neurogenic shock	10	1.2
Other shock	11	1.3
Mixed shock	18	2.2
Missing	0	

Neurologic failure	N	%
None	557	82.2
Cerebral coma	44	6.5
Metabolic coma	27	4.0
Postanoxic coma	36	5.3
Toxic coma	14	2.1
Missing or not evaluable	156	

Failures on admission	N	%
No	171	20.5
Yes	663	79.5
A: Respiratory failure	472	56.6
B: Cardiovascular failure	408	48.9
C: Neurological failure	121	14.5
D: Hepatic failure	23	2.8
E: Renal failure	408	48.9
F: Acute skin failure	2	0.2
G: Metabolic failure	281	33.7
H: Coagulation failure	31	3.7
Missing	0	

Renal failure (AKIN)	N	%
None	426	51.1
Mild	213	25.5
Moderate	109	13.1
Severe	86	10.3
Missing	0	

Metabolic failure	N	%
None	553	66.3
pH $<=$ 7.3, PaCO2 $<$ 45 mmHg	140	16.8
Base deficit $>=$ 5 mmol/L, lactate $>$1.5x	141	16.9
Missing	0	

National report - **Year 2019**
Characteristics on admission - Adult non surgical patients evaluated in the GiViTI model

Clinical conditions on admission	N	%
Respiratory	189	22.7
Pleural effusion	54	6.5
Aspiration pneumonia	34	4.1
Pulmonary embolism	27	3.2
Pneumothorax/Pneumomediastinum	19	2.3
Upper respiratory tract disease	16	1.9
Cardiovascular	250	30.0
Cardiac arrest	60	7.2
Acute severe arrhythmia: tachycardias	42	5.0
Acute myocardial infarction	39	4.7
Left heart failure with pulmonary edema	27	3.2
Left heart failure without pulm. edema	23	2.8
Neurological	100	12.0
Cerebral artery stroke	26	3.1
Seizures	23	2.8
Metabolic/postanoxic encephalopathy	13	1.6
Vertebral basilar ischemic stroke	10	1.2
Neuropathy/myopathy	10	1.2
Gastrointestinal and hepatic	89	10.7
Ascites	22	2.6
Gastrointestinal bleeding: upper tract	19	2.3
Paralytic Ileus	14	1.7
Digestive tract malignancy	12	1.4
Liver Dysfunction Syndrome	12	1.4
Trauma (anatomical districts)	133	15.9
Head	96	11.5
Chest	51	6.1
Spine	24	2.9
Pelvis/bone/joint & muscle	24	2.9
Abdomen	20	2.4
Major vessels injury	8	1.0
-	0	0.0
Other	200	24.0
Other disease	94	11.3
Metabolic disorder	52	6.2
Nephrourologic disease	50	6.0
Coagulation disorder	31	3.7
Haematological disease	21	2.5
Post transplantation	5	0.6
Renal transplantation	3	0.4
Liver transplantation	1	0.1
Infections	471	56.5
Pneumonia	289	34.7
NON-surgical urinary tract infection	67	8.0
L.R.T.I. other than pneumonia	31	3.7
NON-surgical skin/soft tissue infection	17	2.0
Upper respiratory tract infection	16	1.9
Pleurisy/Pleural empyema	11	1.3
Cholecystitis/cholangitis	10	1.2
Clinical sepsis	9	1.1
Pandemic influenza A/H1N1	9	1.1
Primary bacteraemia of unknown origin	8	1.0
Missing	0	

Trauma (anatomical districts)	N	%
Head	96	11.5
Traumatic subarachnoid haemorrhage	56	6.7
Traumatic Subdural haematoma	52	6.2
Skull fracture	45	5.4
Cerebral contusion/laceration	41	4.9
Maxillofacial fracture	29	3.5
Spine	24	2.9
Vertebral fracture, without deficit	19	2.3
Cervical injury, incomplete deficit	3	0.4
Paraplegia	1	0.1
Chest	51	6.1
Traum. haemothorax/pneumothorax	34	4.1
Other injuries of the chest	32	3.8
Flail chest	14	1.7
Abdomen	20	2.4
Minor injuries of the abdomen	10	1.2
Kidney: Rupture/laceration	7	0.8
Liver: Moderate-Severe laceration	2	0.2
Pelvis/bone/joint & muscle	24	2.9
Long bone fracture	20	2.4
Multiple fracture of the pelvis	6	0.7
Very severe or open fracture of the pelvis	1	0.1
Major vessels injury	8	1.0
Aorta: rupture/dissection	6	0.7
Major abdominal vessels: transection	4	0.5
-	0	0.0
Miscellaneous	0	0.0
-	0	0.0
-	0	0.0
Missing	0	

Infection severity on admission	N	%
None	363	44.1
INFECTION WITHOUT SEPSIS	210	25.5
SEPSIS	78	9.5
SEPTIC SHOCK	172	20.9
Missing	11	

Infection severity on admission

Patients infected (N=460)

45.7%
37.4%
17.0%

- INFECTION WITHOUT SEPSIS
- SEPSIS
- SEPTIC SHOCK
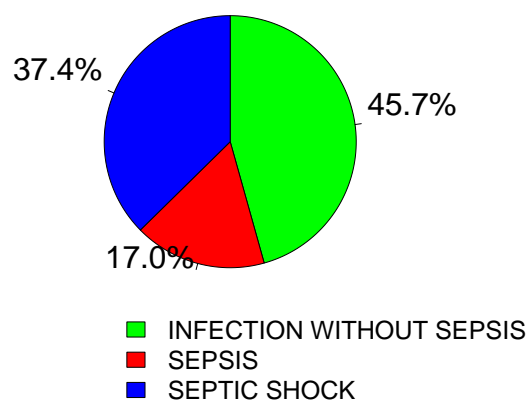
National report - **Year 2019**
Severity scores - Adult non surgical patients evaluated in the GiViTI model

Glasgow Coma Scale (%)

Legend:
- On admission (grey)
- Worst value in the first 24 hours (black)
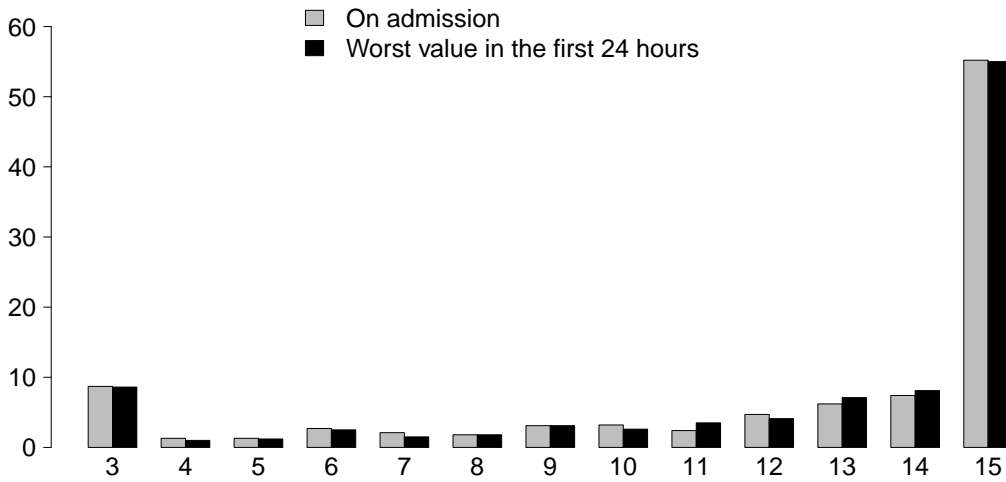
GCS (admission)	
Median	15
Q1−Q3	11−15
Not evaluable	156
Missing	0

GCS (first 24 hours)	
Median	15
Q1−Q3	11−15
Not evaluable	228
Missing	0

SAPS II (%)
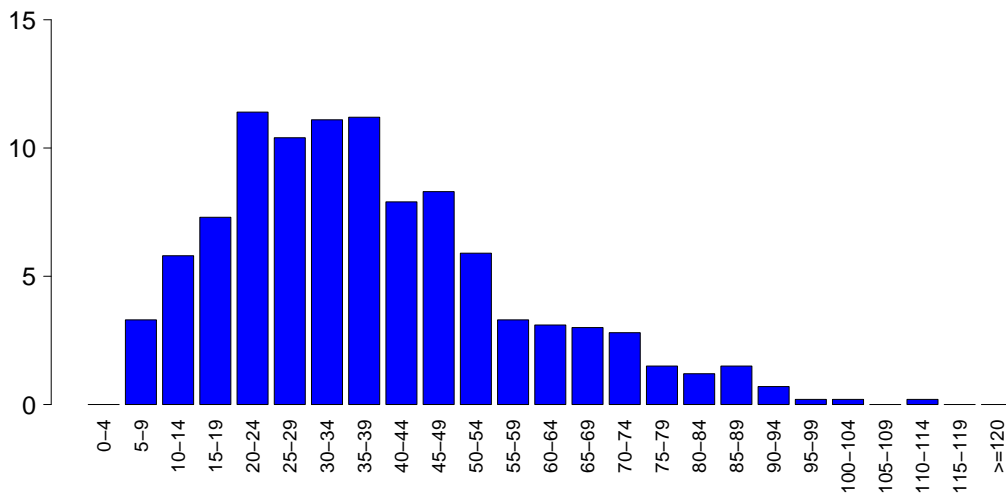
SAPSII	
Mean	38.0
SD	19.3
Median	35
Q1−Q3	24−48
Not evaluable	228
Missing	0

SOFA (%)
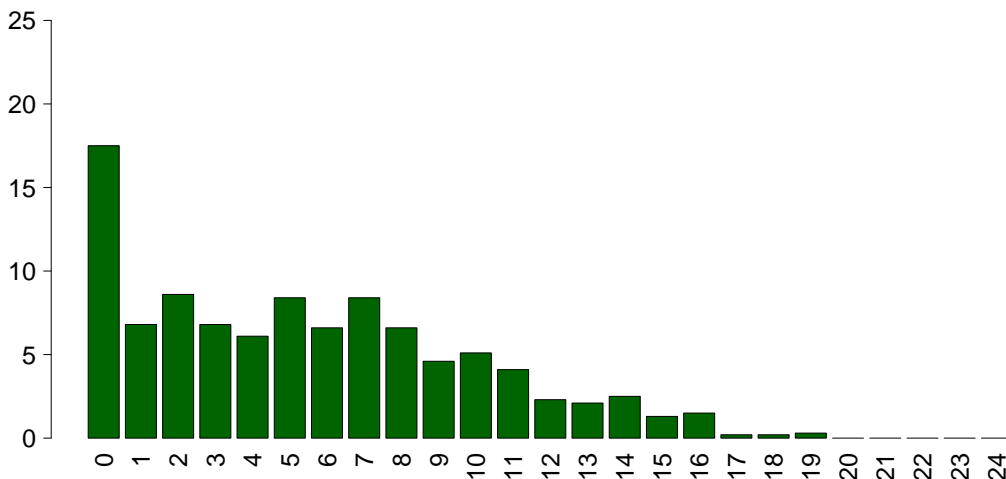
SOFA	
Mean	5.5
SD	4.4
Median	5
Q1−Q3	2−8
Not evaluable	228
Missing	0

National report - **Year 2019**
Characteristics during the stay - Adult non surgical patients evaluated in the GiViTI model

Complications during the stay	N	%
No	514	61.6
Yes	320	38.4
Missing	0	

Failures during the stay	N	%
No	694	83.2
Yes	140	16.8
A: Respiratory failure	53	6.4
B: Cardiovascular failure	56	6.7
C: Neurological failure	13	1.6
D: Hepatic failure	20	2.4
E: Renal failure (AKIN)	54	6.5
F: Acute skin failure	2	0.2
G: Metabolic failure	30	3.6
H: Coagulation failure	5	0.6
Missing	0	

Failures during the stay (top 10)	N	%
E	21	2.5
A	20	2.4
B	20	2.4
G	11	1.3
AB	9	1.1
D	7	0.8
ABE	6	0.7
BE	5	0.6
AE	3	0.4
C	3	0.4
Missing	0	

Respiratory failure occured	N	%
None	781	93.6
Intubation for airway maint.	10	1.2
Hypoxic failure	35	4.2
Hypercapnic failure	22	2.6
Missing	0	

Cardiovascular failure occured	N	%
None	778	93.3
Cardiogenic shock	25	3.0
Hypovolemic shock	1	0.1
Haemorrhagic/hypovolemic shock	2	0.2
Septic shock	25	3.0
Anaphylactic shock	0	0.0
Neurogenic shock	1	0.1
Other shock	5	0.6
Missing	0	

Neurological failure occured	N	%
None	821	98.4
Cerebral coma	7	0.8
Metabolic coma	3	0.4
Postanoxic coma	3	0.4
Missing	0	

Renal failure occured (AKIN)	N	%
None	780	93.5
Mild	11	1.3
Moderate	12	1.4
Severe	31	3.7
Missing	0	

Complications during the stay	N	%
Respiratory	77	9.2
Pleural effusion	32	3.8
Aspiration pneumonia	15	1.8
Severe ARDS	14	1.7
Atelectasis	7	0.8
Pulmonary embolism	7	0.8
Cardiovascular	97	11.6
Acute severe arrhythmia: tachycardias	52	6.2
Cardiac arrest	17	2.0
Acute severe arrhythmia: bradycardias	11	1.3
Pulmonary edema	11	1.3
Deep venous thrombosis	5	0.6
Neurological	71	8.5
Drowsiness/agitation/delirium	39	4.7
Brain edema	19	2.3
CrIMyNe	12	1.4
Intracranial hypertension	11	1.3
Seizures	6	0.7
Gastrointestinal and hepatic	53	6.4
Liver Dysfunction Syndrome	15	1.8
Paralytic Ileus	13	1.6
Gastrointestinal bleeding: upper tract	8	1.0
Ascites	7	0.8
Gastrointestinal bleeding: lower tract	7	0.8
Other	72	8.6
Other disease	42	5.0
Metabolic disorder	30	3.6
Nephrourologic disease	20	2.4
Category/Stage II: Partial Thickness Skin Loss	3	0.4
Other skin and/or soft tissue pathology	3	0.4
Blunt cerebral vessels trauma	1	0.1
Delayed liver rupture	1	0.1
Infections	134	16.1
Pneumonia	63	7.6
L.R.T.I. other than pneumonia	16	1.9
NON-surgical urinary tract infection	16	1.9
NON-surgical skin/soft tissue infection	9	1.1
F.U.O. fever of unknown origin	7	0.8
Upper respiratory tract infection	7	0.8
Clinical sepsis	6	0.7
Catheter-related bacteremia (CR-BSI)	5	0.6
Other fungal infections	5	0.6
Other viral infections	4	0.5
Missing	0	

National report - **Year 2019**
Characteristics during the stay - Adult non surgical patients evaluated in the GiViTI model

Infections	N	%
None	295	35.4
Only on admission	405	48.6
On admission and during ICU stay	66	7.9
Only during ICU stay	68	8.2
Missing	0	

Maximum severity of infection	N	%
None	295	36.1
INFECTION WITHOUT SEPSIS	245	30.0
SEPSIS	97	11.9
SEPTIC SHOCK	181	22.1
Missing	16	

Severity evolution

	N (R %)	During the stay				
		None	INFECTION WITHOUT SEPSIS	SEPSIS	SEPTIC SHOCK	TOT
Admission	None	295 (82.6%)	55 (15.4%)	6 (1.7%)	1 (0.3%)	357
	INFECTION WITHOUT SEPSIS	-	190 (90.5%)	16 (7.6%)	4 (1.9%)	210
	SEPSIS	-	-	74 (94.9%)	4 (5.1%)	78
	SEPTIC SHOCK	-	-	-	172 (100.0%)	172
	TOT	295	245	96	181	817

Ventil. Associat. Pneumonia (VAP)	N	%
No	784	94.0
Yes	50	6.0
Missing	0	

Catheter Bacteraemia (CR-BSI)	N	%
No	829	99.4
Yes	5	0.6
Missing	0	

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

Estimate	20.3
CI (95%)	15.1−26.8

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

Estimate	1.1
CI (95%)	0.3−2.5

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

Estimate	16.3%
CI (95%)	12.1−21.4

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

Estimate	1.3%
CI (95%)	0.4−3.0

National report - Year 2019
Process indicators - Adult non surgical patients evaluated in the GiViTI model

Procedures and/or treatments (Missing=0)	Use N	Use %	On admission N	On admission %	On discharge N	On discharge %	Length (days) Median	Length (days) Q1-Q3	Length (days) Missing	Days from admission Median	Days from admission Q1-Q3	Days from admission Missing
Procedures (antibiotics excluded)	718	86.1										
Invasive ventilation	418	50.1	248	29.7	86	10.3	4	1–9	0	0	0–0	0
Non invasive ventilation	168	20.1	35	4.2	53	6.4	2	1–4	0	0	0–1	0
Tracheostomy	37	4.4	7	0.8	28	3.4	7	3–14	0	10	6–17	0
iNO (inhaled nitric oxide)	11	1.3	3	0.4	2	0.2	3	2–6	0	5	4–8	0
Central Venous Catheter	553	66.3	287	34.4	378	45.3	6	3–11	0	0	0–0	0
PICC	50	6.0	15	1.8	37	4.4	4	1–8	0	0	0–6	0
Arterial Catheter	597	71.6	290	34.8	229	27.5	5	2–10	0	0	0–0	0
Vasoactive drugs	484	58.0	215	25.8	67	8	3	1–6	0	0	0–0	0
Antiarrhythmics	135	16.2	27	3.2	37	4.4	3	1–6	0	1	0–3	0
IABP	1	0.1	0	0	0	0	0	0–0	0	18	18–18	0
Invasive monitoring of C.O.	51	6.1	19	2.3	11	1.3	4	2–9	0	0	0–1	0
Continous monitoring of ScVO2	6	0.7	3	0.4	1	0.1	2	1–6	0	4	2–8	0
Temporary pacing	10	1.2	4	0.5	3	0.4	4	1–6	0	0	0–1	0
Ventricular assistance	0	0.0										
DC-shock	20	2.4								2	1–3	0
CPR	26	3.1								0	0–1	0
Massive blood transfusion	1	0.1								1	1–1	0
ICP monitoring without CSF drainage	17	2.0	11	1.3	1	0.1	6	3–9	0	0	0–0	0
ICP monitoring with CSF drainage	1	0.1	0	0	0	0	0	0–0	0	0	0–0	0
External ventricular drainage without ICP	2	0.2	0	0	2	0.2	4	3–6	0	1	0–2	0
Haemofiltration	0	0.0										
Haemodialysis	87	10.4	24	2.9	31	3.7	3	1–7	0	1	1–3	0
ECMO	0	0.0										
Hepatic clearance techniques	0	0.0										
Clearance techniques during sepsis	3	0.4	1	0.1	1	0.1	1	0–1	0	1	1–1	0
IAP (intra-abdominal pressure)	29	3.5										
Hypothermia	12	1.4	3	0.4	1	0.1	2	1–2	0	0	0–1	0
Enteral nutrition	412	49.4	133	15.9	287	34.4	5	3–11	0	1	0–2	0
Parenteral nutrition	249	29.9	43	5.2	125	15	5	2–11	0	1	0–1	0
SDD (Topical, Topical and systemic)	0	0.0										
Patient restraint	122	14.6										
Peridural catheter	2	0.2	2	0.2	0	0	1	1–1	0			
Electrical cardioversion	4	0.5								1	1–1	0
Vacuum therapy	2	0.2										
Antibiotics	600	71.9										
Antibiotic prophylaxis	97	11.6	46	5.5	52	6.2	3	2–6	0	0	0–1	0
Empirical antibiotic therapy	383	45.9	186	22.3	153	18.3	3	2–5	0	0	0–1	0
Empirical antibiotic therapy in unconfirmed diagnosis	26	3.1	9	1.1	15	1.8	3	2–5	0	0	0–1	0
Targeted antibiotic therapy	294	35.3	87	10.4	203	24.3	6	3–11	0	2	1–4	0

National report - **Year 2019**
Process indicators - Adult non surgical patients evaluated in the GiViTI model

Invasive ventilation (N=418)	N	%	Length (days) Mean	SD	Median	Q1-Q3	Missing
Due to pulmonary failure	290	61.8	7.0	8.4	4	2−9	0
For airway mainteinance	107	22.8	7.7	9.1	4	1−10.5	0
In weaning	4	0.9	0.5	0.6	0.5	0−1	0
Not evaluable	68	14.5	5.2	5.2	4	1−8	51
Reintubation within 48 hours	3	0.6	4.7	3.8	3	2.5−6	0

Non invasive ventilation (N=168)	N	%
Non invasive ventilation only	103	61.3
Non invasive ventilation failed	21	12.5
For weaning	35	20.8
Other	9	5.4
Missing	0	

Tracheostomy not present on admission (N=30)	N	%
Surgical	8	26.7
Percutwist	6	20.0
Ciaglia	3	10.0
Monodil. Ciaglia	0	0.0
Fantoni	1	3.3
Griggs	2	6.7
Other Kind	7	23.3
Unknown	3	10.0
Missing	0	

Tracheostomy - Days after the beginning of inv. vent.
Not present on admission (N=30)

Mean	12.0
SD	7.7
Median	10.5
Q1−Q3	6−16.8
Missing	0

Invasive monitoring of C.O. (N=51)	N	%
Swan Ganz	0	0.0
PICCO	19	37.3
LIDCO	2	3.9
Vigileo-PRAM	0	0.0
Other	30	58.8
Missing	0	

SDD (N=0)	N	%
Topical	0	0.0
Topical and systemic	0	0.0
Missing	0	

Antibiotic therapy
Pt. infected in ICU only (N=68)

	N	%
No therapy	4	5.9
Only empirical	22	32.4
Only targeted	13	19.1
Targeted after empirical	26	38.2
Other	3	4.4
Missing	0	

Surgical interventions	N	%
No	794	95.2
Yes	40	4.8
Missing	0	

Number of surgical interventions	N	%
0	794	95.2
1	34	4.1
2	5	0.6
3	0	0.0
>3	1	0.1
Missing	0	

Surgical interventions
Days from admission

Mean	8.8
SD	6.7
Median	6
Q1−Q3	4−12
Missing	0

Surgical interventions (top 10)	N	%
Orthopaedic surgery	13	1.6
ENT surgery	10	1.2
Other surgery	8	1.0
Gastrointestinal surgery	4	0.5
Nephro/Urological surgery	3	0.4
Maxillo-Facial surgery	2	0.2
Thoracic surgery	2	0.2
Neurosurgery	2	0.2
Plastic surgery	1	0.1
Abdominal vascular surgery	1	0.1
Missing	0	

Non surgical interventions	N	%
No	800	95.9
Yes	34	4.1
Missing	0	

Non surgical interventions
Days from admission

Mean	8.1
SD	8.4
Median	4.5
Q1−Q3	3−9.2
Missing	2

Non surgical interventions	N	%
Interventional cardiology	16	1.9
Interventional endoscopy	14	1.7
Interventional radiology	8	1.0
Interventional neuroradiology	0	0.0
Missing	0	

National report - **Year 2019**
Outcome indicators - Adult non surgical patients evaluated in the GiViTI model

ICU outcome	N	%
Dead	171	20.9
Transferred to same hospital	563	68.7
Transferred to other hospital	72	8.8
Discharged home	14	1.7
Disch. terminally ill	0	0.0
Missing	14	

Transferred to (N=635)	N	%
Ward	484	76.2
Other ICU	56	8.8
High dependency care unit	95	15.0
Rehabilitation	0	0.0
Day hospital or Long-term care	0	0.0
Missing	0	

Reason of transfer to Other ICU (N=56)	N	%
Specialist expertise	17	30.4
Step-up care	12	21.4
Logistical/organizational reasons	24	42.9
Step-down care	3	5.4
Missing	0	

Transferred to Same hospital (N=563)	N	%
Ward	453	80.5
Other ICU	27	4.8
High dependency care unit	83	14.7
Rehabilitation	0	0.0
Day hospital or Long-term care	0	0.0
Missing	0	

Transferred to Other hospital (N=72)	N	%
Ward	31	43.1
Other ICU	29	40.3
High dependency care unit	12	16.7
Rehabilitation	0	0.0
Day hospital or Long-term care	0	0.0
Missing	0	

ICU mortality	N	%
Alive	649	79.1
Dead	171	20.9
Missing	14	

Timing of ICU mortality (N=171)	N	%
Daytime (08:00AM - 07:59PM)	101	59.1
Nighttime (08:00PM - 07:59AM)	70	40.9
Weekdays (Monday - Friday)	132	77.2
Weekend (Saturday - Sunday)	39	22.8
Missing	0	

Hospital mortality	N	%
Alive	588	70.5
Dead	246	29.5
Missing	0	

Timing of hosp. mortality (N=246)	N	%
In ICU	171	69.5
Within 24 hours after ICU	2	0.8
24-47 hours after ICU	4	1.6
48-71 hours after ICU	5	2.0
72-95 hours after ICU	7	2.8
After 95 hours after ICU	57	23.2
Missing	0	

Timing of hosp. mortality (days from ICU disch.) Discharged alive from ICU (N=75)	
Mean	17.1
SD	19.4
Median	8
Q1−Q3	4−23.5
Missing	0

National report - **Year 2019**
Outcome indicators - Adult non surgical patients evaluated in the GiViTI model

Last hospital mortality	N	%
Alive	581	69.7
Dead	253	30.3
Missing	0	

ICU stay (days)

	Mean	7.2
	SD	8.2
	Median	4
	Q1−Q3	2−9
	Missing	0

ICU stay (days)
  Alive (N=649)

	Mean	6.7
	SD	7.6
	Median	4
	Q1−Q3	2−8
	Missing	0

ICU stay (days)
  Dead (N=171)

	Mean	9.2
	SD	10.0
	Median	5
	Q1−Q3	2−11.5
	Missing	0

Stay after ICU (days)
  Alive (N=649)

	Mean	14.5
	SD	19.8
	Median	8
	Q1−Q3	3−18
	Missing	1

Hospital stay (days)

	Mean	23.1
	SD	26.1
	Median	14
	Q1−Q3	7−29
	Missing	1

Hospital stay (days)
  Alive (N=588)

	Mean	24.0
	SD	27.7
	Median	15
	Q1−Q3	7−30
	Missing	1

Hospital stay (days)
  Dead (N=246)

	Mean	20.9
	SD	21.9
	Median	13.5
	Q1−Q3	6−28
	Missing	0

National report - **Year 2019**
Characteristics on admission - Adult elective surgical patients evaluated in the GiViTI model

Patients (N): 612

Sex	N	%
Male	332	54.2
Female	280	45.8
Missing	0	

Age (years)	N	%
17-45	49	8.0
46-65	228	37.3
66-75	175	28.6
>75	160	26.1
Missing	0	
Mean	65.5	
SD	13.3	
Median	67	
Q1−Q3	59−76	
Min−Max	18−95	

Body mass Index (BMI)	N	%
Underweight	18	2.9
Normal	235	38.4
Overweight	236	38.6
Obese	123	20.1
Missing	0	

Pregnancy status Females (N=280)	N	%
Not fertile	101	36.1
Not pregnant/Unknown	178	63.6
Currently pregnant	0	0.0
Post partum	1	0.4
Missing	0	

Comorbidities	N	%
No	65	10.6
Yes	547	89.4
Missing	0	

Comorbidities (top 10)	N	%
Hypertension	377	61.6
Any tumour without metastasis	188	30.7
Metastatic cancer	86	14.1
Diabetes Type II without insulin tr.	85	13.9
Arrhythmia	80	13.1
Moderate or severe renal disease	66	10.8
NYHA class II-III	61	10.0
Peripheral vascular disease	47	7.7
Moderate COPD	41	6.7
Cerebrovascular disease	39	6.4
Missing	0	

Stay before ICU (days)	
Mean	4.1
SD	11.5
Median	1
Q1−Q3	1−3
Missing	0

Source of admission	N	%
Same hospital	610	99.7
Other hospital	2	0.3
Long-term chronic care hospital	0	0.0
Directly from the community	0	0.0
Missing	0	

Ward of admission Hospital (N=612)	N	%
Medical ward	14	2.3
Surgical ward	585	95.6
Emergency room	0	0.0
Other ICU	7	1.1
High dependency care unit	6	1.0
Missing	0	

Reason for transfer from Other ICU (N=7)	N	%
Specialist expertise	3	42.9
Step-up care	2	28.6
Logistical/organizational reasons	2	28.6
Step-down care	0	0.0
Missing	0	

Ward of admission Same hospital (N=610)	N	%
Medical ward	14	2.3
Surgical ward	584	95.7
Emergency room	0	0.0
Other ICU	6	1.0
High dependency care unit	6	1.0
Missing	0	

Ward of admission Other hospital (N=2)	N	%
Medical ward	0	0.0
Surgical ward	1	50.0
Emergency room	0	0.0
Other ICU	1	50.0
High dependency care unit	0	0.0
Missing	0	

Scheduled admission	N	%
No	89	14.5
Yes	523	85.5
Missing	0	

National report - **Year 2019**
Characteristics on admission - Adult elective surgical patients evaluated in the GiViTI model

Trauma	N	%
No	600	98.0
Yes	12	2.0
Multiple trauma	1	0.2
Missing	0	

Surgical status	N	%
Non surgical	0	0.0
Elective surgical	612	100.0
Emergency surgical	0	0.0
Missing	0	

Surgical status

0.0% 0.0%

100.0%

- ■ Non surgical
- ■ Elective surgical
- ■ Emergency surgical

Source of admission		
Surgical pt. (N=612)	N	%
Operating theatre of surgical ward	552	90.2
Operating theatre of emergency room	0	0.0
Surgical ward	33	5.4
Other	27	4.4
Missing	0	

Surgical interventions (top 10)		
Elective surgical (N=612)	N	%
Gastrointestinal surgery	350	57.2
Nephro/Urological surgery	70	11.4
Peripheral vascular surgery	58	9.5
Other surgery	37	6.0
Orthopaedic surgery	26	4.2
Gynaecological surgery	21	3.4
Abdominal vascular surgery	18	2.9
Neurosurgery	14	2.3
Hepatic surgery	13	2.1
Thoracic surgery	11	1.8
Missing	0	

Timing		
Elective surgical (N=612)	N	%
From -7 to -3 days	22	3.6
From -2 to -1 days	17	2.8
On ICU admission day	600	98.0
The day after ICU admission	5	0.8
Missing	0	

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

Timing		
Emergency surgical (N=0)	N	%
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	600	98.0
Elective	8	1.3
Emergency	4	0.7
Missing	0	

Non surgical interventions		
Elective (N=8)	N	%
Interventional radiology	3	37.5
Interventional cardiology	0	0.0
Interventional neuroradiology	0	0.0
Interventional endoscopy	0	0.0
Missing	5	

Non surgical interventions		
Emergency (N=4)	N	%
Interventional radiology	2	50.0
Interventional cardiology	0	0.0
Interventional neuroradiology	0	0.0
Interventional endoscopy	0	0.0
Missing	2	

National report - **Year 2019**
Characteristics on admission - Adult elective surgical patients evaluated in the GiViTI model

Reason for admission	N	%
Monitoring/Weaning	406	66.3
Post surgical weaning	4	0.7
Surgical monitoring	402	65.7
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	206	33.7
Only ventilatory support	99	16.2
Only cardiovascular support	41	6.7
Ventilatory and cardiovascular support	66	10.8
Missing	0	
Palliative Sedation	0	0.0
Diagnosis of death/Organ donation	0	0.0
Missing	0	

Failures on admission (top 10)	N	%
A	80	13.1
E	41	6.7
AB	31	5.1
B	29	4.7
AE	13	2.1
ABE	12	2.0
ABEG	10	1.6
EG	10	1.6
G	9	1.5
BEG	7	1.1
Missing	0	

Respiratory failure	N	%
None	447	73.0
Only hypoxic failure	108	17.6
Only hypercapnic failure	9	1.5
Hypoxic-hypercapnic failure	3	0.5
Intubation for airway maint.	45	7.4
Missing	0	

Number of failures (%)

Cardiovascular failure	N	%
None	505	82.5
Without shock	50	8.2
Cardiogenic shock	9	1.5
Septic shock	14	2.3
Haemorrhagic/hypovolemic shock	15	2.5
Hypovolemic shock	9	1.5
Anaphylactic shock	1	0.2
Neurogenic shock	0	0.0
Other shock	7	1.1
Mixed shock	2	0.3
Missing	0	

Neurologic failure	N	%
None	574	98.8
Cerebral coma	4	0.7
Metabolic coma	1	0.2
Postanoxic coma	2	0.3
Toxic coma	0	0.0
Missing or not evaluable	31	

Failures on admission	N	%
No	344	56.2
Yes	268	43.8
A: Respiratory failure	165	27.0
B: Cardiovascular failure	107	17.5
C: Neurological failure	7	1.1
D: Hepatic failure	3	0.5
E: Renal failure	106	17.3
F: Acute skin failure	0	0.0
G: Metabolic failure	50	8.2
H: Coagulation failure	4	0.7
Missing	0	

Renal failure (AKIN)	N	%
None	506	82.7
Mild	71	11.6
Moderate	23	3.8
Severe	12	2.0
Missing	0	

Metabolic failure	N	%
None	562	91.8
pH $<=$ 7.3, PaCO2 $<$ 45 mmHg	28	4.6
Base deficit $>=$ 5 mmol/L, lactate $>$1.5x	22	3.6
Missing	0	

Elective surgical (GiViTI model)

National report - **Year 2019**
**Characteristics on admission** - Adult elective surgical patients evaluated in the GiViTI model

Clinical conditions on admission	N	%
Respiratory	40	6.5
Pleural effusion	9	1.5
Aspiration pneumonia	9	1.5
Pulmonary embolism	8	1.3
Atelectasis	6	1.0
Upper respiratory tract disease	5	0.8
Cardiovascular	107	17.5
Peripheral vascular disease	58	9.5
Non-ruptured aneurysm	13	2.1
Left heart failure without pulm. edema	10	1.6
Acute severe arrhythmia: tachycardias	8	1.3
Cardiac arrest	7	1.1
Neurological	14	2.3
Brain tumour	8	1.3
Non traumatic cerebral oedema	3	0.5
Intracranial hypertension	2	0.3
Seizures	2	0.3
Cerebral artery stroke	1	0.2
Gastrointestinal and hepatic	318	52.0
Digestive tract malignancy	264	43.1
Intestinal occlusion	22	3.6
Hepatic malignancy	21	3.4
Gastrointestinal perforation	8	1.3
Pancreatic malignancy	8	1.3
Trauma (anatomical districts)	12	2.0
Pelvis/bone/joint & muscle	11	1.8
Head	1	0.2
Spine	1	0.2
-	0	0.0
-	0	0.0
-	0	0.0
-	0	0.0
Other	253	41.3
Other disease	166	27.1
Nephrourologic disease	68	11.1
Gynaecological disease	17	2.8
Orthopaedic disease	13	2.1
Metabolic disorder	10	1.6
Post transplantation	9	1.5
Liver transplantation	5	0.8
Lung transplantation	2	0.3
Infections	71	11.6
Post-surgical peritonitis	19	3.1
Pneumonia	14	2.3
NON-surgical secondary peritonitis	7	1.1
NON-surgical urinary tract infection	7	1.1
Clinical sepsis	4	0.7
Primary peritonitis	4	0.7
NON-surgical skin/soft tissue infection	4	0.7
Cholecystitis/cholangitis	3	0.5
Post-surgical urinary tract infection	3	0.5
Post-surgical mediastinitis	2	0.3
Missing	0	

Trauma (anatomical districts)	N	%
Head	1	0.2
Cerebral contusion/laceration	1	0.2
-	0	0.0
-	0	0.0
-	0	0.0
-	0	0.0
Spine	1	0.2
Dorsal injury, incomplete deficit	1	0.2
-	0	0.0
-	0	0.0
Chest	0	0.0
-	0	0.0
-	0	0.0
-	0	0.0
Abdomen	0	0.0
-	0	0.0
-	0	0.0
-	0	0.0
Pelvis/bone/joint & muscle	11	1.8
Long bone fracture	11	1.8
-	0	0.0
-	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	541	89.1
INFECTION WITHOUT SEPSIS	39	6.4
SEPSIS	12	2.0
SEPTIC SHOCK	15	2.5
Missing	5	

Infection severity on admission

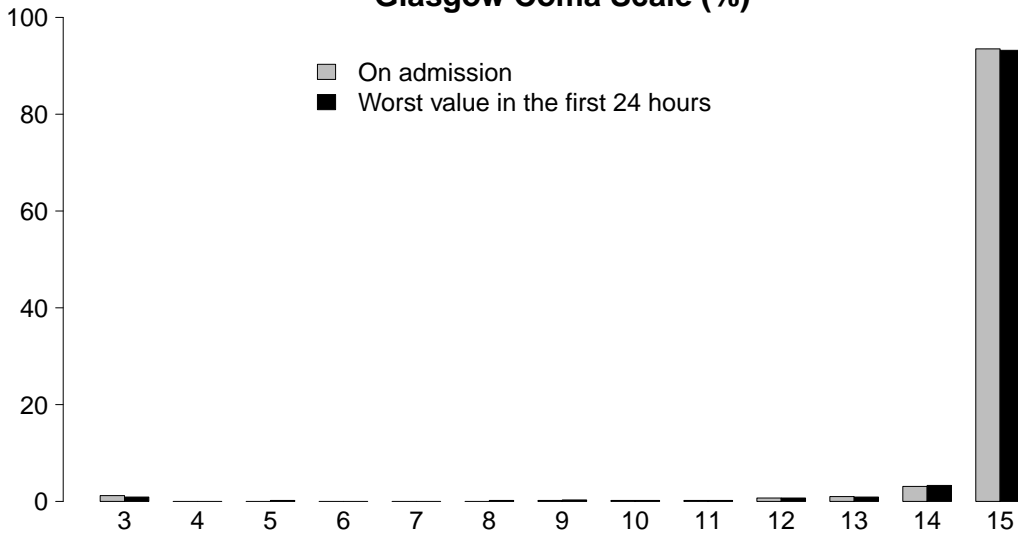Patients infected (N=66)
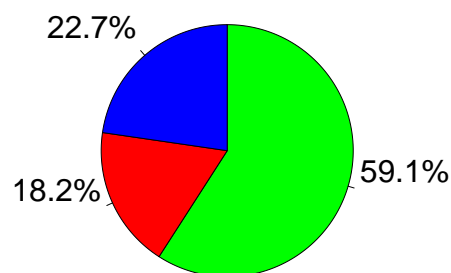
22.7%
18.2%
59.1%

- ■ INFECTION WITHOUT SEPSIS
- ■ SEPSIS
- ■ SEPTIC SHOCK

National report - **Year 2019**
Severity scores - Adult elective surgical patients evaluated in the GiViTI model
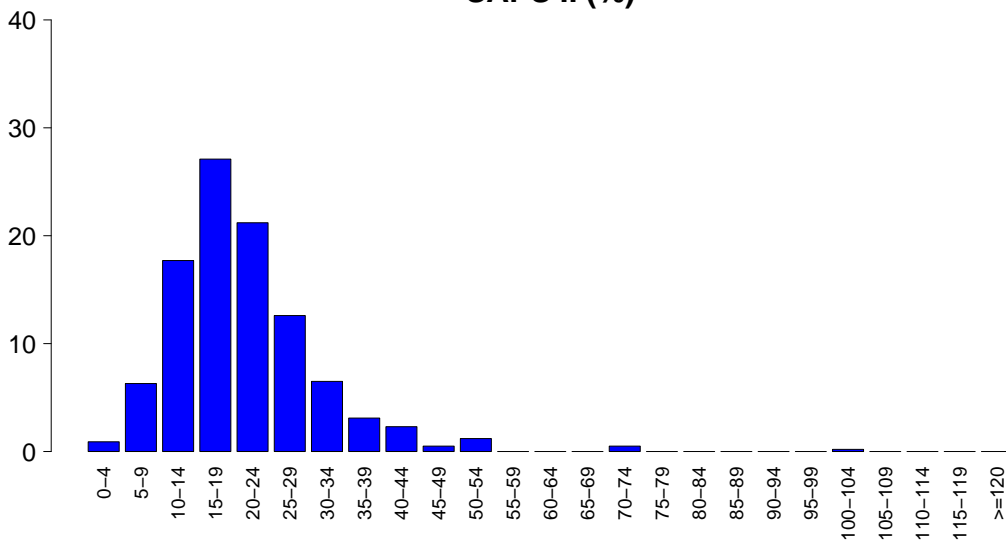
Glasgow Coma Scale (%)

- On admission
- Worst value in the first 24 hours

GCS (admission)	
Median	15
Q1−Q3	15−15
Not evaluable	31
Missing	0

GCS (first 24 hours)	
Median	15
Q1−Q3	15−15
Not evaluable	40
Missing	0

SAPS II (%)

SAPSII	
Mean	20.9
SD	10.1
Median	19
Q1−Q3	15−25
Not evaluable	40
Missing	0

SOFA (%)
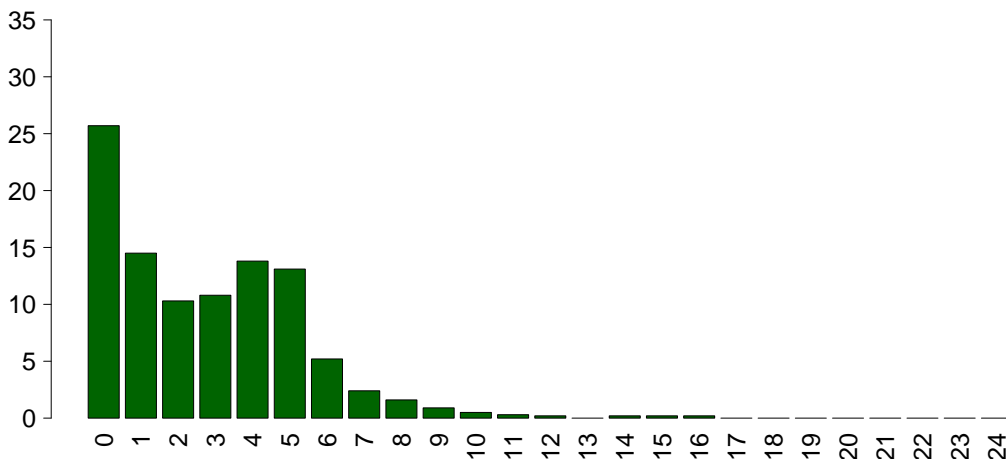
SOFA	
Mean	2.8
SD	2.6
Median	2
Q1−Q3	0−4
Not evaluable	40
Missing	0

Elective surgical (GiViTI model)

National report - **Year 2019**
Characteristics during the stay - Adult elective surgical patients evaluated in the GiViTI model

Complications during the stay	N	%
No	414	67.6
Yes	198	32.4
Missing	0	

Failures during the stay	N	%
No	561	91.7
Yes	51	8.3
A: Respiratory failure	15	2.5
B: Cardiovascular failure	18	2.9
C: Neurological failure	1	0.2
D: Hepatic failure	7	1.1
E: Renal failure (AKIN)	23	3.8
F: Acute skin failure	0	0.0
G: Metabolic failure	13	2.1
H: Coagulation failure	3	0.5
Missing	0	

Failures during the stay (top 10)	N	%
E	12	2.0
G	9	1.5
B	8	1.3
A	4	0.7
ABE	4	0.7
AB	2	0.3
AE	2	0.3
D	2	0.3
DG	2	0.3
ABDEH	1	0.2
Missing	0	

Respiratory failure occured	N	%
None	597	97.5
Intubation for airway maint.	6	1.0
Hypoxic failure	6	1.0
Hypercapnic failure	5	0.8
Missing	0	

Cardiovascular failure occured	N	%
None	594	97.1
Cardiogenic shock	2	0.3
Hypovolemic shock	1	0.2
Haemorrhagic/hypovolemic shock	5	0.8
Septic shock	10	1.6
Anaphylactic shock	0	0.0
Neurogenic shock	0	0.0
Other shock	2	0.3
Missing	0	

Neurological failure occured	N	%
None	611	99.8
Cerebral coma	1	0.2
Metabolic coma	0	0.0
Postanoxic coma	0	0.0
Missing	0	

Renal failure occured (AKIN)	N	%
None	589	96.2
Mild	11	1.8
Moderate	7	1.1
Severe	5	0.8
Missing	0	

Complications during the stay	N	%
Respiratory	35	5.7
Pleural effusion	18	2.9
Severe ARDS	6	1.0
Acute asthma/bronchospasm	4	0.7
Atelectasis	4	0.7
Upper resp. tract disease	4	0.7
Cardiovascular	43	7.0
Acute severe arrhythmia: tachycardias	20	3.3
Pulmonary edema	9	1.5
Cardiac arrest	7	1.1
Acute ischaemia	4	0.7
Acute severe arrhythmia: bradycardias	3	0.5
Neurological	32	5.2
Drowsiness/agitation/delirium	27	4.4
Seizures	3	0.5
Brain edema	2	0.3
CrIMyNe	2	0.3
Intracranial hypertension	1	0.2
Gastrointestinal and hepatic	48	7.8
Paralytic Ileus	23	3.8
Anastomotic dehiscence	8	1.3
Intrabdominal bleeding	7	1.1
Liver Dysfunction Syndrome	7	1.1
Gastrointestinal bleeding: lower tract	6	1.0
Other	90	14.7
Other disease	66	10.8
Nephrourologic disease	14	2.3
Metabolic disorder	13	2.1
Iatrogenic major vessels injury	6	1.0
Other skin and/or soft tissue pathology	3	0.5
Acute rejection	1	0.2
Category/Stage I: Nonblanchable Erythema	1	0.2
Infections	86	14.1
Post-surgical peritonitis	39	6.4
Pneumonia	21	3.4
Post-surgical skin/soft tissue infection	10	1.6
Clinical sepsis	7	1.1
NON-surgical urinary tract infection	6	1.0
Upper respiratory tract infection	5	0.8
NON-surgical secondary peritonitis	3	0.5
Catheter-related bacteremia (CR-BSI)	1	0.2
Catheter-related local infection	1	0.2
Extra/retroperitoneal abscess	1	0.2
Missing	0	

National report - **Year 2019**
Characteristics during the stay - Adult elective surgical patients evaluated in the GiViTI model

Infections	N	%
None	469	76.6
Only on admission	57	9.3
On admission and during ICU stay	14	2.3
Only during ICU stay	72	11.8
Missing	0	

Maximum severity of infection	N	%
None	469	78.0
INFECTION WITHOUT SEPSIS	67	11.1
SEPSIS	40	6.7
SEPTIC SHOCK	25	4.2
Missing	11	

Severity evolution

		During the stay				
	N (R %)	None	INFECTION WITHOUT SEPSIS	SEPSIS	SEPTIC SHOCK	TOT
Admission	None	469 (88.0%)	32 (6.0%)	24 (4.5%)	8 (1.5%)	533
	INFECTION WITHOUT SEPSIS	-	35 (89.7%)	3 (7.7%)	1 (2.6%)	39
	SEPSIS	-	-	12 (100.0%)	0 (0.0%)	12
	SEPTIC SHOCK	-	-	-	15 (100.0%)	15
	TOT	469	67	39	24	599

Ventil. Associat. Pneumonia (VAP)	N	%
No	596	97.4
Yes	16	2.6
Missing	0	

Catheter Bacteraemia (CR-BSI)	N	%
No	611	99.8
Yes	1	0.2
Missing	0	

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

Estimate	44.0
CI (95%)	25.1−71.4

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

Estimate	0.6
CI (95%)	0.0−3.1

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

Estimate	35.2%
CI (95%)	20.1−57.1

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

Estimate	0.7%
CI (95%)	0.0−3.8

National report - Year 2019
Process indicators - Adult elective surgical patients evaluated in the GiViTI model

Procedures and/or treatments (Missing=0)	Use N	Use %	On admission N	On admission %	On discharge N	On discharge %	Length (days) Median	Length Q1-Q3	Length Missing	Days from admission Median	Days Q1-Q3	Days Missing
Procedures (antibiotics excluded)	602	98.4										
Invasive ventilation	89	14.5	63	10.3	12	2	2	1–7	0	1	0–4	0
Non invasive ventilation	172	28.1	40	6.5	43	7	2	1–3	0	0	0–0	0
Tracheostomy	5	0.8	0	0	3	0.5	6	5–10	0	19	10–27	0
iNO (inhaled nitric oxide)	6	1.0	3	0.5	4	0.7	8	3–16	0	4	2–5	0
Central Venous Catheter	409	66.8	354	57.8	368	60.1	3	2–4	0	0	0–0	0
PICC	47	7.7	18	2.9	41	6.7	4	2–6	0	0	0–1	0
Arterial Catheter	441	72.1	344	56.2	71	11.6	2	1–4	0	0	0–0	0
Vasoactive drugs	298	48.7	148	24.2	20	3.3	2	1–3	0	0	0–0	0
Antiarrhythmics	28	4.6	5	0.8	6	1	1	1–1	0	2	0–4	0
IABP	0	0.0										
Invasive monitoring of C.O.	9	1.5	2	0.3	3	0.5	4	2–10	0	6	0–10	0
Continous monitoring of ScVO2	0	0.0										
Temporary pacing	1	0.2	0	0	0	0	1	1–1	0	0	0–0	0
Ventricular assistance	1	0.2	1	0.2	1	0.2	25	25–25	0			
DC-shock	6	1.0								1	0–4	0
CPR	5	0.8								0	0–2	0
Massive blood transfusion	7	1.1								0	0–0	0
ICP monitoring without CSF drainage	1	0.2	0	0	0	0	25	25–25	0	0	0–0	0
ICP monitoring with CSF drainage	1	0.2	1	0.2	0	0	7	7–7	0			
External ventricular drainage without ICP	3	0.5	3	0.5	0	0	4	2–4	0			
Haemofiltration	0	0.0										
Haemodialysis	10	1.6	2	0.3	6	1	6	1–10	0	2	0–16	0
ECMO	1	0.2	1	0.2	1	0.2	12	12–12	0			
Hepatic clearance techniques	0	0.0										
Clearance techniques during sepsis	1	0.2	0	0	0	0	0	0–0	0	1	1–1	0
IAP (intra-abdominal pressure)	10	1.6										
Hypothermia	1	0.2	0	0	0	0	2	2–2	0	0	0–0	0
Enteral nutrition	233	38.1	14	2.3	209	34.2	2	1–3	0	1	1–1	0
Parenteral nutrition	393	64.2	43	7	290	47.4	2	1–4	0	1	0–1	0
SDD (Topical, Topical and systemic)	0	0.0										
Patient restraint	13	2.1										
Peridural catheter	169	27.6	165	27	141	23	2	2–3	0	0	0–0	0
Electrical cardioversion	1	0.2								1	1–1	0
Vacuum therapy	4	0.7										
Antibiotics	542	88.6										
Antibiotic prophylaxis	465	76.0	356	58.2	178	29.1	1	0–2	0	0	0–0	0
Empirical antibiotic therapy	105	17.2	30	4.9	40	6.5	2	1–4	0	1	0–2	0
Empirical antibiotic therapy in unconfirmed diagnosis	13	2.1	3	0.5	8	1.3	3	2–4	0	0	0–4	0
Targeted antibiotic therapy	75	12.3	10	1.6	58	9.5	4	2–8	0	3	2–4	0

National report - **Year 2019**
Process indicators - Adult elective surgical patients evaluated in the GiViTI model

Invasive ventilation (N=89)	N	%	Mean	SD	Median	Q1-Q3	Missing
Due to pulmonary failure	37	15.2	5.8	6.8	3	2−7	0
For airway mainteinance	43	17.7	7.1	13.0	2	1−7	0
In weaning	4	1.6	0.2	0.5	0	0−0.2	0
Not evaluable	159	65.4	4.8	4.8	3.5	1−7.2	155
Reintubation within 48 hours	2	0.8	1.0	0.0	1	1−1	0

Non invasive ventilation (N=172)	N	%
Non invasive ventilation only	142	82.6
Non invasive ventilation failed	9	5.2
For weaning	20	11.6
Other	1	0.6
Missing	0	

Tracheostomy not present on admission (N=5)	N	%
Surgical	1	20.0
Percutwist	2	40.0
Ciaglia	0	0.0
Monodil. Ciaglia	0	0.0
Fantoni	0	0.0
Griggs	0	0.0
Other Kind	0	0.0
Unknown	2	40.0
Missing	0	

Tracheostomy - Days after the beginning of inv. vent.
Not present on admission (N=5)

Mean	24.2
SD	21.1
Median	19
Q1−Q3	10−27
Missing	0

Invasive monitoring of C.O. (N=9)	N	%
Swan Ganz	1	11.1
PICCO	7	77.8
LIDCO	0	0.0
Vigileo-PRAM	0	0.0
Other	1	11.1
Missing	0	

SDD (N=0)	N	%
Topical	0	0.0
Topical and systemic	0	0.0
Missing	0	

Antibiotic therapy
Pt. infected in ICU only (N=72)

	N	%
No therapy	4	5.6
Only empirical	34	47.2
Only targeted	9	12.5
Targeted after empirical	24	33.3
Other	1	1.4
Missing	0	

Surgical interventions	N	%
No	582	95.1
Yes	30	4.9
Missing	0	

Number of surgical interventions	N	%
0	582	95.1
1	22	3.6
2	2	0.3
3	5	0.8
>3	1	0.2
Missing	0	

Surgical interventions
Days from admission

Mean	8.3
SD	6.4
Median	6.5
Q1−Q3	3−9
Missing	0

Surgical interventions (top 10)	N	%
Gastrointestinal surgery	28	4.6
Other surgery	11	1.8
Nephro/Urological surgery	6	1.0
Thoracic surgery	1	0.2
Thoracic vascular surgery	1	0.2
Neurosurgery	1	0.2
-	0	0.0
-	0	0.0
-	0	0.0
-	0	0.0
Missing	0	

Non surgical interventions	N	%
No	605	98.9
Yes	7	1.1
Missing	0	

Non surgical interventions
Days from admission

Mean	22.2
SD	20.1
Median	11.5
Q1−Q3	5−41
Missing	0

Non surgical interventions	N	%
Interventional endoscopy	5	0.8
Interventional radiology	4	0.7
Interventional cardiology	1	0.2
Interventional neuroradiology	0	0.0
Missing	0	

National report - **Year 2019**
Outcome indicators - Adult elective surgical patients evaluated in the GiViTI model

ICU outcome	N	%
Dead	21	3.4
Transferred to same hospital	586	95.8
Transferred to other hospital	3	0.5
Discharged home	2	0.3
Disch. terminally ill	0	0.0
Missing	0	

Transferred to (N=589)	N	%
Ward	525	89.1
Other ICU	16	2.7
High dependency care unit	48	8.1
Rehabilitation	0	0.0
Day hospital or Long-term care	0	0.0
Missing	0	

Reason of transfer to Other ICU (N=16)	N	%
Specialist expertise	3	18.8
Step-up care	1	6.2
Logistical/organizational reasons	11	68.8
Step-down care	1	6.2
Missing	0	

Transferred to Same hospital (N=586)	N	%
Ward	523	89.2
Other ICU	15	2.6
High dependency care unit	48	8.2
Rehabilitation	0	0.0
Day hospital or Long-term care	0	0.0
Missing	0	

Transferred to Other hospital (N=3)	N	%
Ward	2	66.7
Other ICU	1	33.3
High dependency care unit	0	0.0
Rehabilitation	0	0.0
Day hospital or Long-term care	0	0.0
Missing	0	

ICU mortality	N	%
Alive	591	96.6
Dead	21	3.4
Missing	0	

Timing of ICU mortality (N=21)	N	%
Daytime (08:00AM - 07:59PM)	12	57.1
Nighttime (08:00PM - 07:59AM)	9	42.9
Weekdays (Monday - Friday)	15	71.4
Weekend (Saturday - Sunday)	6	28.6
Missing	0	

Hospital mortality	N	%
Alive	575	94.0
Dead	37	6.0
Missing	0	

Timing of hosp. mortality (N=37)	N	%
In ICU	21	56.8
Within 24 hours after ICU	2	5.4
24-47 hours after ICU	0	0.0
48-71 hours after ICU	0	0.0
72-95 hours after ICU	1	2.7
After 95 hours after ICU	13	35.1
Missing	0	

Timing of hosp. mortality (days from ICU disch.) Discharged alive from ICU (N=16)	
Mean	22.1
SD	25.1
Median	14
Q1−Q3	5.5−25
Missing	0

National report - **Year 2019**
Outcome indicators - Adult elective surgical patients evaluated in the GiViTI model

Last hospital mortality		N	%
	Alive	575	94.0
	Dead	37	6.0
	Missing	0	

ICU stay (days)

Mean	3.5
SD	5.4
Median	2
Q1−Q3	1−4
Missing	1

ICU stay (days)
  Alive (N=591)

Mean	3.4
SD	5.0
Median	2
Q1−Q3	1−4
Missing	1

ICU stay (days)
  Dead (N=21)

Mean	8.1
SD	10.8
Median	4
Q1−Q3	2−7
Missing	0

Stay after ICU (days)
  Alive (N=591)

Mean	11.0
SD	19.4
Median	6
Q1−Q3	4−12
Missing	0

Hospital stay (days)

Mean	19.0
SD	29.2
Median	11
Q1−Q3	7−20
Missing	0

Hospital stay (days)
  Alive (N=575)

Mean	18.6
SD	29.2
Median	11
Q1−Q3	7.5−19
Missing	0

Hospital stay (days)
  Dead (N=37)

Mean	25.8
SD	29.8
Median	14
Q1−Q3	7−33
Missing	0

Elective surgical (GiViTI model)

National report - **Year 2019**
Characteristics on admission - Adult emergency surgical patients evaluated in the GiViTI model

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Patients (N): 604

Sex	N	%
Male	381	63.1
Female	223	36.9
Missing	0	

Age (years)	N	%
17-45	93	15.4
46-65	164	27.2
66-75	139	23.0
>75	208	34.4
Missing	0	
Mean	65.3	
SD	18.0	
Median	69	
Q1−Q3	56−79	
Min−Max	17−100	

Body mass Index (BMI)	N	%
Underweight	20	3.3
Normal	244	40.4
Overweight	220	36.4
Obese	120	19.9
Missing	0	

Pregnancy status Females (N=223)	N	%
Not fertile	132	59.2
Not pregnant/Unknown	87	39.0
Currently pregnant	0	0.0
Post partum	4	1.8
Missing	0	

Comorbidities	N	%
No	112	18.5
Yes	492	81.5
Missing	0	

Comorbidities (top 10)	N	%
Hypertension	331	54.8
Arrhythmia	140	23.2
NYHA class II-III	108	17.9
Moderate or severe renal disease	82	13.6
Diabetes Type II without insulin tr.	77	12.7
Any tumour without metastasis	73	12.1
Drug-induced coagulopathy	72	11.9
Endocrine-metabolic diseases	67	11.1
Diabetes Type II with insulin treatment	44	7.3
Metastatic cancer	43	7.1
Missing	0	

Stay before ICU (days)	
Mean	4.4
SD	12.4
Median	1
Q1−Q3	0−4
Missing	0

Source of admission	N	%
Same hospital	578	95.7
Other hospital	26	4.3
Long-term chronic care hospital	0	0.0
Directly from the community	0	0.0
Missing	0	

Ward of admission Hospital (N=604)	N	%
Medical ward	35	5.8
Surgical ward	364	60.3
Emergency room	144	23.8
Other ICU	28	4.6
High dependency care unit	33	5.5
Missing	0	

Reason for transfer from Other ICU (N=28)	N	%
Specialist expertise	16	57.1
Step-up care	4	14.3
Logistical/organizational reasons	8	28.6
Step-down care	0	0.0
Missing	0	

Ward of admission Same hospital (N=578)	N	%
Medical ward	33	5.7
Surgical ward	359	62.1
Emergency room	129	22.3
Other ICU	25	4.3
High dependency care unit	32	5.5
Missing	0	

Ward of admission Other hospital (N=26)	N	%
Medical ward	2	7.7
Surgical ward	5	19.2
Emergency room	15	57.7
Other ICU	3	11.5
High dependency care unit	1	3.8
Missing	0	

| Scheduled admission	N	%
No	604	100.0
Yes	0	0.0
Missing	0	

National report - **Year 2019**
Characteristics on admission - Adult emergency surgical patients evaluated in the GiViTI model

Trauma		N	%
	No	406	67.2
	Yes	198	32.8
	Multiple trauma	82	13.6
	Missing	0	

Surgical status	N	%
Non surgical	0	0.0
Elective surgical	0	0.0
Emergency surgical	604	100.0
Missing	0	

Surgical status

- Non surgical
- Elective surgical
- Emergency surgical
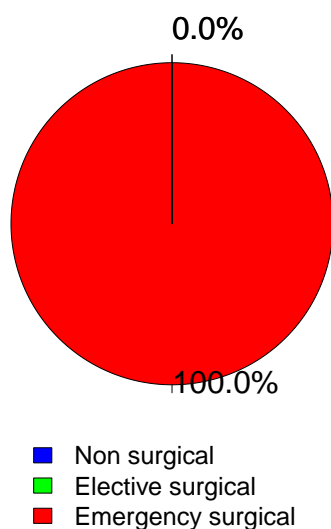
Source of admission			
Surgical pt. (N=604)		N	%
Operating theatre of surgical ward		308	51.0
Operating theatre of emergency room		99	16.4
Surgical ward		56	9.3
Other		141	23.3
Missing		0	

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

Timing			
Elective surgical (N=0)		N	%
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)			
Emergency surgical (N=604)		N	%
Gastrointestinal surgery		275	45.5
Neurosurgery		107	17.7
Orthopaedic surgery		55	9.1
Other surgery		42	7.0
Peripheral vascular surgery		26	4.3
Thoracic surgery		22	3.6
Nephro/Urological surgery		21	3.5
Organ/s transplantation		18	3.0
Biliary tract surgery		15	2.5
ENT surgery		13	2.2
Missing		10	

Timing			
Emergency surgical (N=604)		N	%
From -7 to -3 days		27	4.5
From -2 to -1 days		64	10.6
On ICU admission day		535	88.6
The day after ICU admission		39	6.5
Missing		0	

Non surgical interventions		N	%
	None	576	95.4
	Elective	1	0.2
	Emergency	27	4.5
	Missing	0	

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

Non surgical interventions			
Emergency (N=27)		N	%
Interventional radiology		14	51.9
Interventional cardiology		3	11.1
Interventional endoscopy		3	11.1
Interventional neuroradiology		0	0.0
Missing		7	

National report - **Year 2019**
Characteristics on admission - Adult emergency surgical patients evaluated in the GiViTI model

Reason for admission	N	%
Monitoring/Weaning	124	20.5
Post surgical weaning	10	1.7
Surgical monitoring	114	18.9
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	480	79.5
Only ventilatory support	129	21.4
Only cardiovascular support	45	7.5
Ventilatory and cardiovascular support	306	50.7
Missing	0	
Palliative Sedation	0	0.0
Diagnosis of death/Organ donation	0	0.0
Missing	0	

Failures on admission (top 10)	N	%
AB	98	16.2
ABEG	78	12.9
A	77	12.7
ABE	45	7.5
E	30	5.0
ABG	21	3.5
AE	20	3.3
ABCEG	14	2.3
B	14	2.3
ABC	13	2.2
Missing	0	

Respiratory failure	N	%
None	169	28.0
Only hypoxic failure	154	25.5
Only hypercapnic failure	8	1.3
Hypoxic-hypercapnic failure	23	3.8
Intubation for airway maint.	250	41.4
Missing	0	

Number of failures (%)

Bar chart — Number of failures (%): 0: 14.4%, 1: 20.7%, 2: 25.7%, 3: 17.7%, >3: 21.5%

Cardiovascular failure	N	%
None	253	41.9
Without shock	115	19.0
Cardiogenic shock	10	1.7
Septic shock	122	20.2
Haemorrhagic/hypovolemic shock	56	9.3
Hypovolemic shock	12	2.0
Anaphylactic shock	0	0.0
Neurogenic shock	9	1.5
Other shock	8	1.3
Mixed shock	19	3.1
Missing	0	

Neurologic failure	N	%
None	349	86.6
Cerebral coma	43	10.7
Metabolic coma	6	1.5
Postanoxic coma	5	1.2
Toxic coma	0	0.0
Missing or not evaluable	201	

Failures on admission	N	%
No	87	14.4
Yes	517	85.6
A: Respiratory failure	435	72.0
B: Cardiovascular failure	351	58.1
C: Neurological failure	54	8.9
D: Hepatic failure	6	1.0
E: Renal failure	249	41.2
F: Acute skin failure	2	0.3
G: Metabolic failure	181	30.0
H: Coagulation failure	30	5.0
Missing	0	

Renal failure (AKIN)	N	%
None	355	58.8
Mild	120	19.9
Moderate	50	8.3
Severe	79	13.1
Missing	0	

Metabolic failure	N	%
None	423	70.0
pH $<=$ 7.3, PaCO2 $<$ 45 mmHg	57	9.4
Base deficit $>=$ 5 mmol/L, lactate $>$1.5x	124	20.5
Missing	0	

National report - **Year 2019**
Characteristics on admission - Adult emergency surgical patients evaluated in the GiViTI model

Clinical conditions on admission	N	%
Respiratory	86	14.2
Aspiration pneumonia	36	6.0
Pleural effusion	24	4.0
Atelectasis	14	2.3
Upper respiratory tract disease	7	1.2
Lung cancer	5	0.8
Cardiovascular	80	13.2
Left heart failure without pulm. edema	17	2.8
Acute severe arrhythmia: tachycardias	16	2.6
Cardiac arrest	13	2.2
Left heart failure with pulmonary edema	10	1.7
Peripheral vascular disease	10	1.7
Neurological	37	6.1
Seizures	8	1.3
Brain tumour	7	1.2
Chronic Subdural haematoma	5	0.8
CNS degenerative disease	5	0.8
Cerebral artery stroke	4	0.7
Gastrointestinal and hepatic	222	36.8
Intestinal occlusion	63	10.4
Gastrointestinal perforation	62	10.3
Digestive tract malignancy	36	6.0
Bowel ischaemia	30	5.0
Paralytic Ileus	20	3.3
Trauma (anatomical districts)	198	32.8
Head	110	18.2
Pelvis/bone/joint & muscle	69	11.4
Chest	63	10.4
Spine	48	7.9
Abdomen	36	6.0
Major vessels injury	12	2.0
Miscellaneous	1	0.2
Other	182	30.1
Other disease	95	15.7
Nephrourologic disease	48	7.9
Coagulation disorder	30	5.0
Metabolic disorder	24	4.0
Other skin and/or soft tissue pathology	8	1.3
Post transplantation	28	4.6
Liver transplantation	18	3.0
Lung transplantation	7	1.2
Infections	308	51.0
Pneumonia	94	15.6
NON-surgical secondary peritonitis	75	12.4
Post-surgical peritonitis	42	7.0
NON-surgical skin/soft tissue infection	29	4.8
Primary peritonitis	25	4.1
Cholecystitis/cholangitis	22	3.6
NON-surgical urinary tract infection	21	3.5
Post-surgical skin/soft tissue infection	8	1.3
Pleurisy/Pleural empyema	7	1.2
Clinical sepsis	6	1.0
Missing	0	

Trauma (anatomical districts)	N	%
Head	110	18.2
Traumatic Subdural haematoma	80	13.2
Cerebral contusion/laceration	54	8.9
Traumatic subarachnoid haemorrhage	54	8.9
Skull fracture	54	8.9
Maxillofacial fracture	27	4.5
Spine	48	7.9
Vertebral fracture, without deficit	36	6.0
Cervical injury, incomplete deficit	4	0.7
Tetraplegia	4	0.7
Chest	63	10.4
Other injuries of the chest	40	6.6
Traum. haemothorax/pneumothorax	28	4.6
Severe lung contusion/laceration	25	4.1
Abdomen	36	6.0
Bowel transection/perforation	15	2.5
Minor injuries of the abdomen	12	2.0
Liver: Moderate-Severe laceration	7	1.2
Pelvis/bone/joint & muscle	69	11.4
Long bone fracture	62	10.3
Multiple fracture of the pelvis	14	2.3
Massive crush/amputation	4	0.7
Major vessels injury	12	2.0
Proximal limbs vessels: transection	5	0.8
Major abdominal vessels: transection	3	0.5
Aorta: rupture/dissection	2	0.3
Miscellaneous	1	0.2
Burns (>30% BSA)	1	0.2
-	0	0.0
Missing	0	

Infection severity on admission	N	%
None	296	49.6
INFECTION WITHOUT SEPSIS	106	17.8
SEPSIS	59	9.9
SEPTIC SHOCK	136	22.8
Missing	7	

Infection severity on admission

Patients infected (N=301)

35.2%
45.2%
19.6%

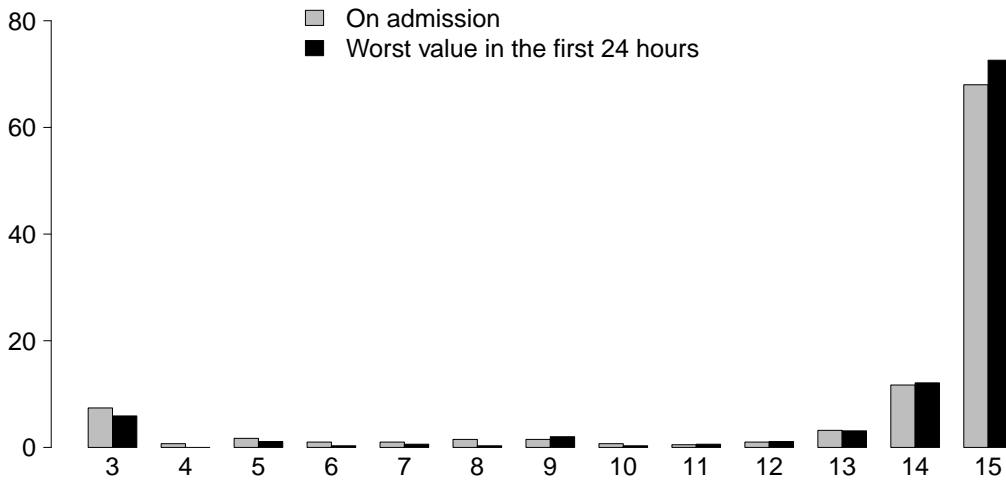- ■ INFECTION WITHOUT SEPSIS
- ■ SEPSIS
- ■ SEPTIC SHOCK
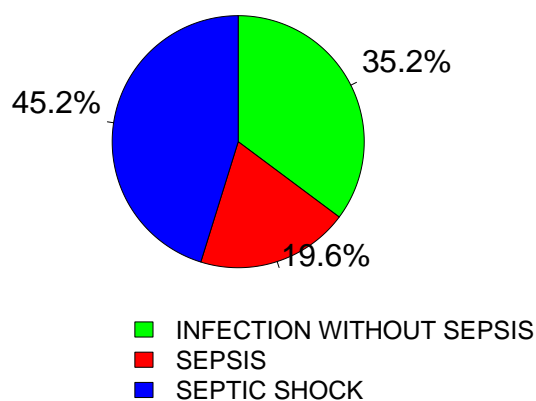
National report - **Year 2019**
Severity scores - Adult emergency surgical patients evaluated in the GiViTI model

Glasgow Coma Scale (%)

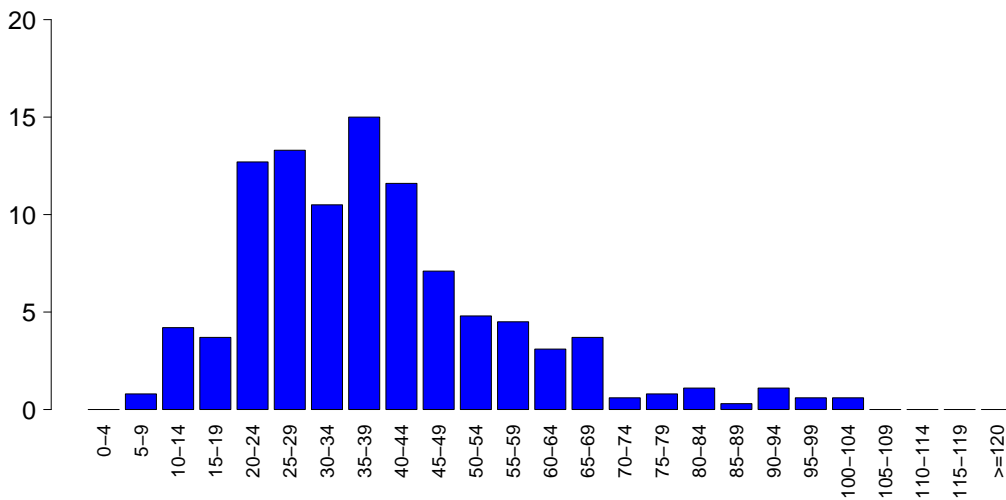| GCS (admission)	
Median	15
Q1−Q3	14−15
Not evaluable	201
Missing	0

GCS (first 24 hours)	
Median	15
Q1−Q3	14−15
Not evaluable	250
Missing	0

SAPS II (%)

SAPSII	
Mean	38.5
SD	17.6
Median	37
Q1−Q3	26−47
Not evaluable	250
Missing	0

SOFA (%)
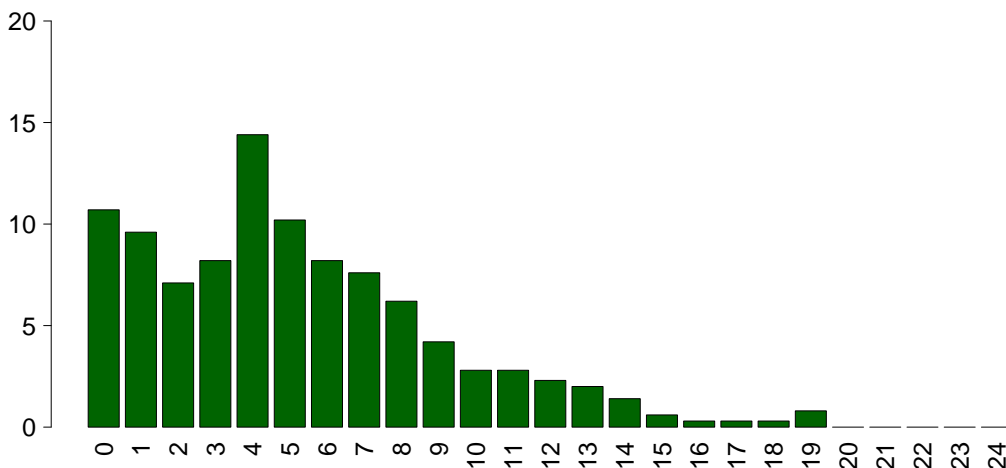
SOFA	
Mean	5.2
SD	4.0
Median	4.5
Q1−Q3	2−7
Not evaluable	250
Missing	0

National report - **Year 2019**
Characteristics during the stay - Adult emergency surgical patients evaluated in the GiViTI model

Complications during the stay	N	%
No	228	37.7
Yes	376	62.3
Missing	0	

Failures during the stay	N	%
No	459	76.0
Yes	145	24.0
A: Respiratory failure	55	9.1
B: Cardiovascular failure	44	7.3
C: Neurological failure	29	4.8
D: Hepatic failure	15	2.5
E: Renal failure (AKIN)	69	11.4
F: Acute skin failure	0	0.0
G: Metabolic failure	19	3.1
H: Coagulation failure	17	2.8
Missing	0	

Failures during the stay (top 10)	N	%
E	28	4.6
A	21	3.5
AB	12	2.0
B	9	1.5
C	9	1.5
G	7	1.2
D	6	1.0
ABE	5	0.8
AE	5	0.8
BE	5	0.8
Missing	0	

Respiratory failure occured	N	%
None	549	90.9
Intubation for airway maint.	16	2.6
Hypoxic failure	28	4.6
Hypercapnic failure	26	4.3
Missing	0	

Cardiovascular failure occured	N	%
None	560	92.7
Cardiogenic shock	11	1.8
Hypovolemic shock	4	0.7
Haemorrhagic/hypovolemic shock	6	1.0
Septic shock	26	4.3
Anaphylactic shock	0	0.0
Neurogenic shock	0	0.0
Other shock	9	1.5
Missing	0	

Neurological failure occured	N	%
None	575	95.2
Cerebral coma	17	2.8
Metabolic coma	11	1.8
Postanoxic coma	2	0.3
Missing	0	

Renal failure occured (AKIN)	N	%
None	535	88.6
Mild	13	2.2
Moderate	17	2.8
Severe	39	6.5
Missing	0	

Complications during the stay	N	%
Respiratory	80	13.2
Pleural effusion	39	6.5
Aspiration pneumonia	17	2.8
Atelectasis	16	2.6
Pneumothorax/Pneumomediastinum	13	2.2
Upper resp. tract disease	6	1.0
Cardiovascular	80	13.2
Acute severe arrhythmia: tachycardias	36	6.0
Cardiac arrest	17	2.8
Acute severe arrhythmia: bradycardias	8	1.3
Deep venous thrombosis	8	1.3
Left heart failure w/o pulm. edema	8	1.3
Neurological	98	16.2
Drowsiness/agitation/delirium	52	8.6
Brain edema	23	3.8
Intracranial hypertension	18	3.0
Post-surgical intracranial bleeding	9	1.5
New ischaemic stroke	6	1.0
Gastrointestinal and hepatic	83	13.7
Paralytic Ileus	27	4.5
Anastomotic dehiscence	15	2.5
Liver Dysfunction Syndrome	14	2.3
Gastrointestinal perforation	13	2.2
Gastrointestinal bleeding: upper tract	11	1.8
Other	79	13.1
Nephrourologic disease	30	5.0
Other disease	29	4.8
Metabolic disorder	19	3.1
Other skin and/or soft tissue pathology	5	0.8
Iatrogenic major vessels injury	3	0.5
Fat embolism	2	0.3
Anastomotic stricture or leak	2	0.3
Infections	199	32.9
Pneumonia	99	16.4
Post-surgical peritonitis	31	5.1
NON-surgical urinary tract infection	30	5.0
Post-surgical skin/soft tissue infection	21	3.5
Other fungal infections	12	2.0
NON-surgical secondary peritonitis	10	1.7
L.R.T.I. other than pneumonia	7	1.2
Primary peritonitis	6	1.0
Post-surgical urinary tract infection	6	1.0
Cholecystitis/cholangitis	5	0.8
Missing	0	

National report - **Year 2019**
Characteristics during the stay - Adult emergency surgical patients evaluated in the GiViTI model

Infections	N	%
None	190	31.5
Only on admission	215	35.6
On admission and during ICU stay	93	15.4
Only during ICU stay	106	17.5
Missing	0	

Maximum severity of infection	N	%
None	190	31.9
INFECTION WITHOUT SEPSIS	173	29.0
SEPSIS	81	13.6
SEPTIC SHOCK	152	25.5
Missing	8	

Severity evolution

	N (R %)	During the stay				
		None	INFECTION WITHOUT SEPSIS	SEPSIS	SEPTIC SHOCK	TOT
Admission	None	190 (64.8%)	74 (25.3%)	20 (6.8%)	9 (3.1%)	293
	INFECTION WITHOUT SEPSIS	-	99 (93.4%)	5 (4.7%)	2 (1.9%)	106
	SEPSIS	-	-	54 (91.5%)	5 (8.5%)	59
	SEPTIC SHOCK	-	-	-	136 (100.0%)	136
	TOT	190	173	79	152	594

Ventil. Associat. Pneumonia (VAP)	N	%
No	511	84.6
Yes	93	15.4
Missing	0	

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

Estimate	37.4
CI (95%)	30.2−45.8

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

Estimate	29.9%
CI (95%)	24.1−36.6

Catheter Bacteraemia (CR-BSI)	N	%
No	602	99.7
Yes	2	0.3
Missing	0	

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

Estimate	0.4
CI (95%)	0.0−1.4

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

Estimate	0.5%
CI (95%)	0.1−1.7

National report - Year 2019
Process indicators - Adult emergency surgical patients evaluated in the GiViTI model

Procedures (antibiotics excluded)

Procedures and/or treatments (Missing=0)	Use N	Use %	On admission N	On admission %	On discharge N	On discharge %	Length Median	Length Q1-Q3	Length Missing	Days Median	Days Q1-Q3	Days Missing
Procedures (antibiotics excluded)	601	99.5										
Invasive ventilation	388	64.2	327	54.1	79	13.1	4	1–13	0	0	0–0	0
Non invasive ventilation	211	34.9	21	3.5	101	16.7	2	1–4	0	1	0–4	0
Tracheostomy	70	11.6	5	0.8	58	9.6	8	4–19	0	17	11–22	0
iNO (inhaled nitric oxide)	26	4.3	6	1	0	0	6	2–15	0	1	0–6	0
Central Venous Catheter	486	80.5	355	58.8	386	63.9	6	3–13	0	0	0–0	0
PICC	55	9.1	9	1.5	42	7	4	2–8	0	1	0–2	0
Arterial Catheter	527	87.3	392	64.9	283	46.9	6	2–13	0	0	0–0	0
Vasoactive drugs	446	73.8	277	45.9	32	5.3	3	2–7	0	0	0–0	0
Antiarrhythmics	65	10.8	9	1.5	23	3.8	4	1–10	0	1	0–4	0
IABP	0	0.0										
Invasive monitoring of C.O.	37	6.1	6	1	7	1.2	11	5–17	0	0	0–2	0
Continous monitoring of ScVO2	2	0.3	2	0.3	0	0	12	10–13	0			0
Temporary pacing	2	0.3	0	0	0	0	5	2–8	0	6	4–9	0
Ventricular assistance	1	0.2	1	0.2	1	0.2	54	54–54	0			
DC-shock	6	1.0								0	0–2	0
CPR	14	2.3								2	0–13	0
Massive blood transfusion	17	2.8								0	0–0	0
ICP monitoring without CSF drainage	75	12.4	61	10.1	10	1.7	8	4–16	0	0	0–1	0
ICP monitoring with CSF drainage	15	2.5	9	1.5	5	0.8	9	4–22	0	2	0–10	0
External ventricular drainage without ICP	8	1.3	2	0.3	3	0.5	3	3–11	0	8	1–24	0
Haemofiltration	7	1.2	0	0	1	0.2	14	3–30	0	5	2–6	0
Haemodialysis	73	12.1	22	3.6	28	4.6	6	2–16	0	3	1–6	0
ECMO	3	0.5	1	0.2	0	0	8	6–12	0	14	7–22	0
Hepatic clearance techniques	1	0.2										
Clearance techniques during sepsis	8	1.3	1	0.2	1	0.2	1	0–1	0	1	1–1	0
IAP (intra-abdominal pressure)	99	16.4										
Hypothermia	4	0.7	1	0.2	0	0	6	3–9	0	1	0–2	0
Enteral nutrition	302	50.0	23	3.8	204	33.8	6	2–14	0	1	1–3	0
Parenteral nutrition	438	72.5	62	10.3	244	40.4	5	2–10	0	1	0–2	0
SDD (Topical, Topical and systemic)	0	0.0										
Patient restraint	32	5.3										
Peridural catheter	4	0.7	3	0.5	1	0.2	2	2–4	0	3	3–3	0
Electrical cardioversion	0	0.0										
Vacuum therapy	11	1.8										
Antibiotics	575	95.2										
Antibiotic prophylaxis	267	44.2	168	27.8	106	17.5	2	1–4	0	0	0–0	0
Empirical antibiotic therapy	303	50.2	160	26.5	98	16.2	3	1–5	0	0	0–2	0
Empirical antibiotic therapy in unconfirmed diagnosis	30	5.0	10	1.7	17	2.8	4	2–5	0	0	0–2	0
Targeted antibiotic therapy	257	42.5	41	6.8	163	27	7	3–14	0	3	2–5	0

National report - **Year 2019**
Process indicators - Adult emergency surgical patients evaluated in the GiViTI model

Invasive ventilation (N=388)	N	%	Length (days) Mean	SD	Median	Q1-Q3	Missing
Due to pulmonary failure	120	24.0	10.1	11.4	6	2−14.2	0
For airway mainteinance	249	49.8	11.0	14.1	5	2−15	0
In weaning	11	2.2	0.5	0.5	0	0−1	0
Not evaluable	120	24.0	1.0	0.5	1	1−1	112
Reintubation within 48 hours	5	1.0	10.0	3.8	9	8−11	0

Non invasive ventilation (N=211)	N	%
Non invasive ventilation only	90	42.7
Non invasive ventilation failed	13	6.2
For weaning	102	48.3
Other	6	2.8
Missing	0	

Tracheostomy not present on admission (N=65)	N	%
Surgical	12	18.5
Percutwist	26	40.0
Ciaglia	10	15.4
Monodil. Ciaglia	0	0.0
Fantoni	0	0.0
Griggs	2	3.1
Other Kind	7	10.8
Unknown	8	12.3
Missing	0	

Tracheostomy - Days after the beginning of inv. vent.
Not present on admission (N=65)

Mean	17.0
SD	8.4
Median	17
Q1−Q3	11−22
Missing	0

Invasive monitoring of C.O. (N=37)	N	%
Swan Ganz	2	5.4
PICCO	28	75.7
LIDCO	6	16.2
Vigileo-PRAM	0	0.0
Other	1	2.7
Missing	0	

SDD (N=0)	N	%
Topical	0	0.0
Topical and systemic	0	0.0
Missing	0	

Antibiotic therapy
Pt. infected in ICU only (N=106)

	N	%
No therapy	4	3.8
Only empirical	30	28.3
Only targeted	20	18.9
Targeted after empirical	45	42.5
Other	7	6.6
Missing	0	

Surgical interventions	N	%
No	502	83.1
Yes	102	16.9
Missing	0	

Number of surgical interventions	N	%
0	502	83.1
1	64	10.6
2	17	2.8
3	3	0.5
>3	18	3.0
Missing	0	

Surgical interventions
Days from admission

Mean	10.3
SD	8.5
Median	8
Q1−Q3	3−14
Missing	0

Surgical interventions (top 10)	N	%
Gastrointestinal surgery	98	16.2
Other surgery	20	3.3
Plastic surgery	16	2.6
Orthopaedic surgery	15	2.5
Thoracic surgery	12	2.0
Neurosurgery	12	2.0
ENT surgery	7	1.2
Maxillo-Facial surgery	4	0.7
Hepatic surgery	3	0.5
Peripheral vascular surgery	3	0.5
Missing	0	

Non surgical interventions	N	%
No	578	95.7
Yes	26	4.3
Missing	0	

Non surgical interventions
Days from admission

Mean	12.4
SD	11.9
Median	8.5
Q1−Q3	5−15.2
Missing	0

Non surgical interventions	N	%
Interventional endoscopy	22	3.6
Interventional radiology	14	2.3
Interventional cardiology	0	0.0
Interventional neuroradiology	0	0.0
Missing	0	

National report - **Year 2019**
Outcome indicators - Adult emergency surgical patients evaluated in the GiViTI model

ICU outcome	N	%
Dead	83	13.7
Transferred to same hospital	493	81.6
Transferred to other hospital	27	4.5
Discharged home	1	0.2
Disch. terminally ill	0	0.0
Missing	0	

Transferred to (N=520)	N	%
Ward	258	49.6
Other ICU	63	12.1
High dependency care unit	199	38.3
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	4	6.3
Step-up care	5	7.9
Logistical/organizational reasons	45	71.4
Step-down care	9	14.3
Missing	0	

Transferred to Same hospital (N=493)	N	%
Ward	255	51.7
Other ICU	42	8.5
High dependency care unit	196	39.8
Rehabilitation	0	0.0
Day hospital or Long-term care	0	0.0
Missing	0	

Transferred to Other hospital (N=27)	N	%
Ward	3	11.1
Other ICU	21	77.8
High dependency care unit	3	11.1
Rehabilitation	0	0.0
Day hospital or Long-term care	0	0.0
Missing	0	

ICU mortality	N	%
Alive	521	86.3
Dead	83	13.7
Missing	0	

Timing of ICU mortality (N=83)	N	%
Daytime (08:00AM - 07:59PM)	54	65.1
Nighttime (08:00PM - 07:59AM)	29	34.9
Weekdays (Monday - Friday)	71	85.5
Weekend (Saturday - Sunday)	12	14.5
Missing	0	

Hospital mortality	N	%
Alive	449	74.3
Dead	155	25.7
Missing	0	

Timing of hosp. mortality (N=155)	N	%
In ICU	83	53.5
Within 24 hours after ICU	6	3.9
24-47 hours after ICU	4	2.6
48-71 hours after ICU	3	1.9
72-95 hours after ICU	3	1.9
After 95 hours after ICU	56	36.1
Missing	0	

Timing of hosp. mortality (days from ICU disch.)
Discharged alive from ICU (N=72)

Mean	24.0
SD	29.4
Median	12.5
Q1−Q3	4.8−33.2
Missing	0

National report - **Year 2019**
Outcome indicators - Adult emergency surgical patients evaluated in the GiViTI model

Last hospital mortality		N	%
	Alive	442	73.2
	Dead	162	26.8
	Missing	0	

ICU stay (days)

Mean	9.8
SD	11.8
Median	5
Q1−Q3	2.8−12
Missing	0

ICU stay (days)
  Alive (N=521)

Mean	9.4
SD	11.3
Median	5
Q1−Q3	3−11
Missing	0

ICU stay (days)
  Dead (N=83)

Mean	12.6
SD	14.5
Median	8
Q1−Q3	2−16.5
Missing	0

Stay after ICU (days)
  Alive (N=521)

Mean	21.2
SD	22.4
Median	14
Q1−Q3	6−29
Missing	0

Hospital stay (days)

Mean	32.4
SD	31.2
Median	23
Q1−Q3	12−43.2
Missing	0

Hospital stay (days)
  Alive (N=449)

Mean	33.1
SD	28.8
Median	24
Q1−Q3	13−44
Missing	0

Hospital stay (days)
  Dead (N=155)

Mean	30.5
SD	37.2
Median	18
Q1−Q3	8−39.5
Missing	0

National report - **Year 2019**
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.
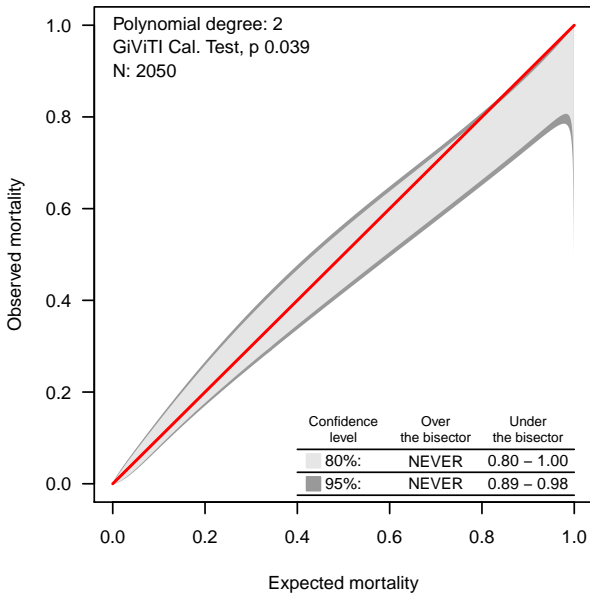
These pages show the calibration belts built on 2019 data using PIM 2, PIM 3, PELOD, SAPSII, GiViTI 2018 and GiViTI 2019 prognostic models. For further informations please look at [PLoS ONE 6(2): e16110].
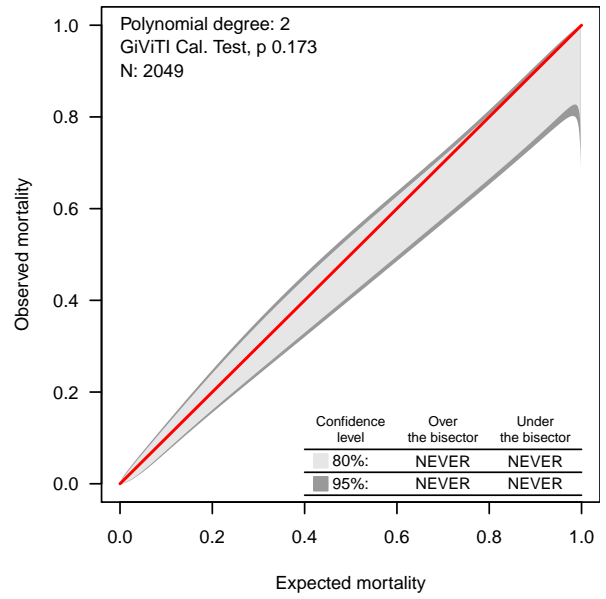
National report - **Year 2019**
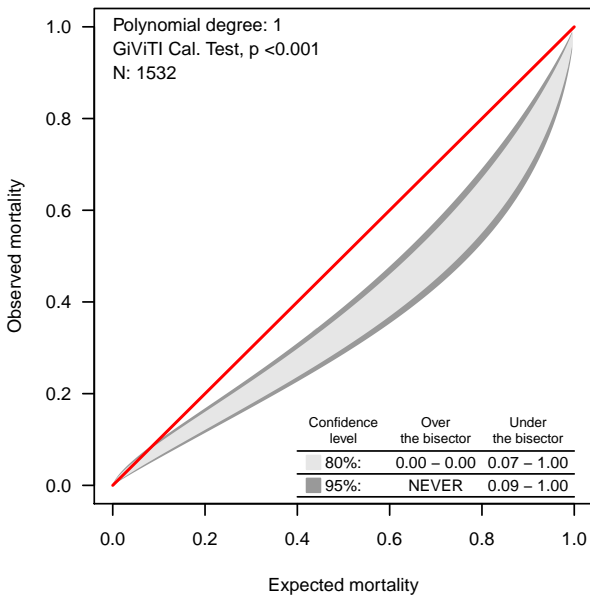**Validity of the models** - Calibration belts
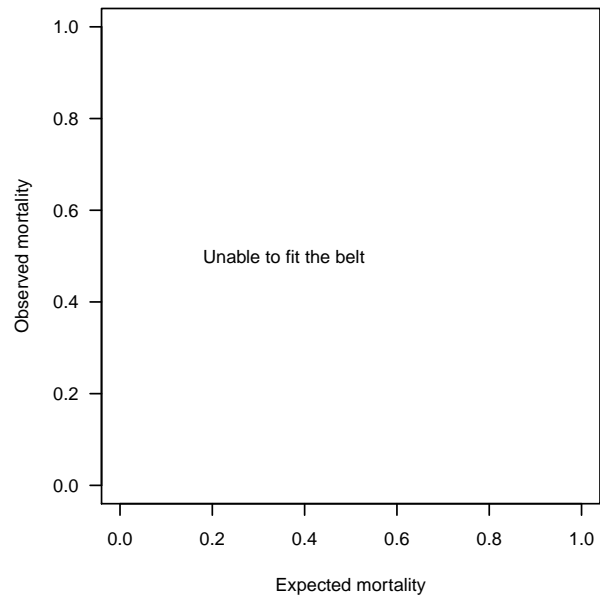
EXTERNAL SCORE

Predictive model: GiViTI 2019

Polynomial degree: 2
GiViTI Cal. Test, p 0.039
N: 2050

Confidence level	Over the bisector	Under the bisector
80%:	NEVER	0.80 – 1.00
95%:	NEVER	0.89 – 0.98

Observed mortality / Expected mortality

Predictive model: GiViTI 2018

Polynomial degree: 2
GiViTI Cal. Test, p 0.173
N: 2049

Confidence level	Over the bisector	Under the bisector
80%:	NEVER	NEVER
95%:	NEVER	NEVER

Observed mortality / Expected mortality

Predictive model: SAPSII

Polynomial degree: 1
GiViTI Cal. Test, p <0.001
N: 1532

Confidence level	Over the bisector	Under the bisector
80%:	0.00 – 0.00	0.07 – 1.00
95%:	NEVER	0.09 – 1.00

Observed mortality / Expected mortality

Predictive model : PELOD

Unable to fit the belt

Observed mortality / Expected mortality

Predictive model: PIM2

Unable to fit the belt

Observed mortality / Expected mortality

Predictive model: PIM3

Unable to fit the belt

Observed mortality / Expected mortality
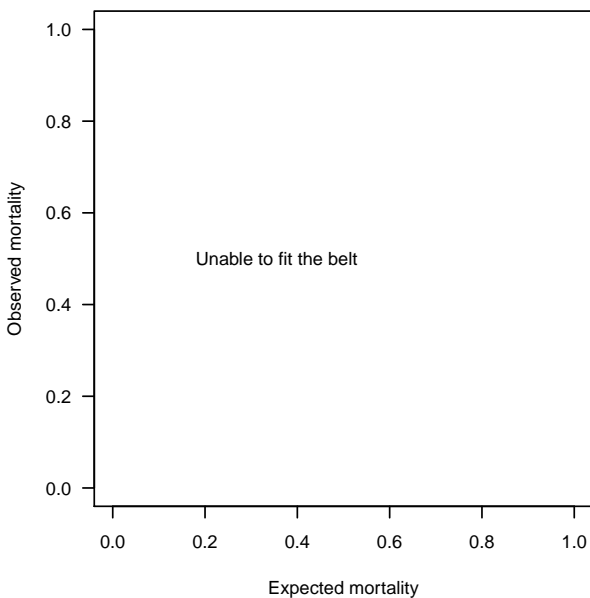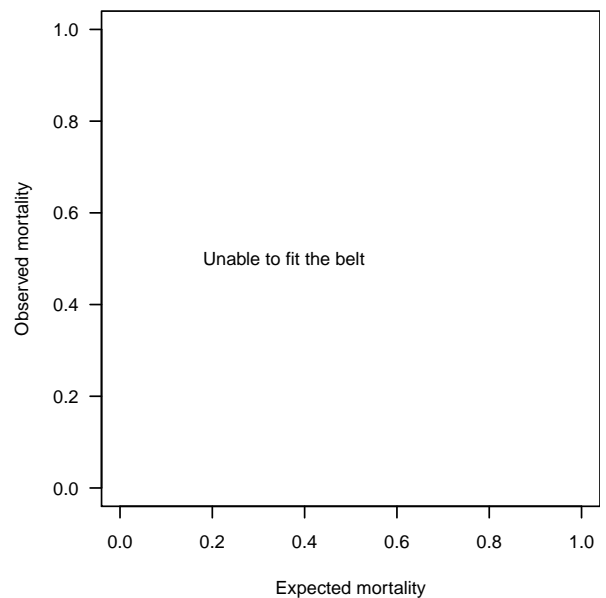
Appendix

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