

ELISE - An open pediatric intensive care data set

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Introduction

This dataset includes patient data of a Pediatric Intensive Care Unit (PICU) in a German University Medical Center (a maximum care hospital).

Publishing this data was not done lightly. We had long discussions about whether this step was morally and ethically correct. Our primary concern was data security and privacy of not only included but further future patients. This is why we closely coordinated our approach with experts in data security and research data management. Clearance for this publication was granted from the responsible data protection officers and medical directors of the ward. Ultimately, we are confident in the scientific progress that can be made through this large pediatric dataset.

To ensure these target, we began a long process from anonymization, selecting only necessary parameters, to screening for vulnerabilities and data leaks. All these measures were done to the best of our knowledge, very conscientiously with state of the art methods. Access to this dataset is regulated and only allowed for scientific, non-commercial purposes. Ensuring anonymity must remain guaranteed and must not be sacrificed to economic interests.

This dataset is exclusively for scientific research purposes. Any usage of this dataset towards a commercial purpose is not within the scope of this project and will violate the concluded agreement to gain access to this data set. Violations will be reported and may be subject to criminal prosecution. Furthermore, any attempt to de-anonymize data or disclose the data without authorization is a criminal offense and will be reported.

In the future, we plan a evolutionary development of this dataset in the same style to improve its usability for scientific research. For more details, see Wulff et al. [doi: 10.3233/SHTI220670].

Data-source	1520-bed Maximum Care Hospital [1]
Critical-Care	150-ICU beds (in total) [1] 18 PICU 12 NICU
Language	English (translated from German)
Number of Patients	4.206
Number of records	5.791

Median Age of Patients at beginning of record	587 days
Clinician notes	No

Structural overview

The following table 1 gives a structural overview about the ELISE data set. The use of classes for the categorization of the contents of this data set is not only providing a quick overview but furthermore allows us to organically integrate further data in upcoming, planned versions of the data set.

The provided data in this data set is organized parameter-wise instead of patient-wise. Consequently, a data file contains all available data of the respective information for all included patients.

Class	Chapter	File	Content
Patient Master Data	1.1	Patient Master Data.csv	Patient master data
	1.2	Mapping SMID	Mapping from Stay Master ID to Patient Master ID
	1.3	Cause of Death.csv	Cause of death for patients that died on Ward G
	1.4	Patient Transfer.csv	Transfer, Admission and Discharge information
	1.5	Diagnose.csv	Diagnostic information
	1.6	Procedure.csv	Documented procedures
	1.7	Body Height.csv	Measurements of body height
	1.8	Body Weight.csv	Measurements of body weight
Vital Signs	2.1	Blood Pressure invasive.csv	Invasively measured blood pressure
	2.2.	Blood Pressure non-invasive.csv	Non-invasively measured blood-pressure
	2.3	Heart Rate.csv	Measurements of heart rate
	2.4	Respiratory Rate.csv	Measurement of respiratory rate
	2.5	Temperature.csv	Measurements of temperature
	2.6	Transcutaneous Oxygen Measurement.csv	Measurements of transcutaneous oxygen measurement
	2.7	Pulse.csv	Measurement of pulse rates
Physical Status	3.1	Braden Scale.csv	Information related to Braden Scale
	3.2	Capillary Refill.csv	Measurements of the capillary refill time
	3.3	Glasgow Coma Scale.csv	Information related to Glasgow Coma Scale
Fluid balancing	4.1	Fluid output.csv	Measurements of fluid outputs
	4.2	Drain.csv	Documentation of surgical drains
Laboratory	5.1	Laboratory.csv	Laboratory test results
	5.2	Microbiology.csv	Microbiological test results including antibiogram

Ventilation	6.1	Horovitz.csv	Calculation of the Horovitz Index (P/F ratio)
	6.2	Respiration Material.csv	Information related to respiratory material
	6.3	Respiration Supplement.csv	Information related to respiration
	6.4	Ventilation.csv	Information related to ventilation
Therapy	7.1	ECMO.csv	Information related to Extracorporeal membrane oxygenation (ECMO)
	7.2	Dialysis.csv	Information related to Dialysis
	7.3	Pacing.csv	Information related to pacemaker
	7.4	Temperature Regulation.csv	Information related to temperature regulation
Medication	8.1	Blood Products.csv	Information about given blood products
	8.2	Medication.csv	Information about given medications including syringe pumps

Table 1. Structural overview of the data set

Identifier and anonymization

Documented timestamps and identifiers within this data set have been anonymized to prevent conclusions about identities of patients included in this data set. However, to recognize data from the same patient the Patient_Master_ID (PMID) has been introduced. Data from the same patient can be identified by the same PMID. Furthermore, the Stay_Master_ID (SMID) has been introduced to identify data of the same stay of the patient within the hospital. A patient can have multiple separated stays in the hospital. Therefore, there can be more than one SMID per PMID, representing a **1:n** relationship.

To ensure the temporal sequence within the data, every data point comes with a timestamp documenting its measurement time or in some cases the documentation timestamp.

Any form of de-anonymization attempts are treated as criminal interest and will be prosecuted criminally.

Data intervals

Usually, data in this dataset have an interval with which the respective data points were measured. However, there is no rule without an exception. In addition to the basic data intervals, Table 2 also shows deviating documentation times, if these are available.

Chapter	File	Basic data interval	Deviating regulations
1.1	Patient Master Data.csv	Singular / one time data	
1.2	Mapping SMID	Singular / one time data	
1.3	Cause of Death.csv	Event based	
1.4	Patient Transfer.csv	Event based	
1.5	Diagnose.csv	Event based	
1.6	Procedure.csv	Event based	

1.7	Body Height.csv	a) Admission-time b) In case of Long patient stay event-based	
1.8	Body Weight.csv	a) Admission-time b) Irregular (ventilated patient more rare; edematous patients more often	
2.1	Blood Pressure invasive.csv	a) 1 minute (automatic raw data transfer[State="R"]) b) 15 minutes (validated values [State="F"])	
2.2.	Blood Pressure non- invasive.csv	Different continuous time intervals depending on necessity	If invasive-measurement is established, non-invasive measuring after at the latest 8h for countercheck
2.3	Heart Rate.csv	a) 1 minute (automatic raw data transfer[State="R"]) b) 15 minutes (validated values [State="F"])	
2.4	Respiratory Rate.csv	a) 1 minute (automatic raw data transfer[State="R"]) b) 15 minutes (validated values [State="F"])	
2.5	Temperature.csv	a) 1 minute (automatic raw data transfer[State="R"]) b) 15 minutes (validated values [State="F"]) c) non-invasive measurements irregular (mainly every 8h)	
2.6	Transcutaneous Oxygen Measurement.csv	a) 1 minute (automatic raw data transfer[State="R"]) b) 15 minutes (validated values [State="F"])	
2.7	Pulse.csv	a) 1 minute (automatic raw data transfer[State="R"]) b) 15 minutes (validated values [State="F"])	
3.1	Braden Scale.csv	Event based	
3.2	Capillary Refill.csv	Event based	
3.3	Glasgow Coma Scale.csv	Event based	
4.1	Fluid Balance.csv	a) Urine: hourly (mainly) b) Blood, secretions: event based	
	Fluid Balance.csv	event based	
	Drain.csv	event based	
5.1	Laboratory.csv	Event based	Critical Patients more frequently
5.2	Microbiology.csv	Event based	
6.1	Horovitz.csv	Event based of laboratory test (paO ₂)	
6.2	Respiration Material.csv	Event based	

6.3	Respiration Supplement.csv	Event based	
6.4	Ventilation.csv	15 minutes (automatic data transfer); if not possible irregular user input	Plus: Event based (after changes of configuration)
7.1	ECMO.csv	a) Implementation b) Every 8h c) Event based (changes in configuration)	
7.2	Dialysis.csv	a) Implementation b) Every 8h c) Event based (changes in configuration)	
7.3	Pacing.csv	a) Every 8h b) Event based (changes in configuration)	
7.4	Temperature Regulation.csv	a) Continuous invasive measurements b) Irregular non-invasive measurements	
8.1	Blood Products.csv	Event based	
8.2	Medication.csv	a) Single-use b) Regular intervals	

Table 2. Overview of data intervals within the data set

Wards

Type of Ward	Ward ID	Peripheral	Intermediate Care	Intensive Care
Ear, nose and throat medicine	A	1	-	-
Interdisciplinary pediatric admission ward	B	1	-	-
Neonatology [IMC]	C	-	1	-
Neonatology [Infant] Ward]	D	1	-	-
Neonatology [NICU]	E	-	-	1
Neurosurgery	F	-	-	1
Interdisciplinary pediatric intensive care unit	G	-	-	1
Pediatric bone marrow transplant ward	H	1	-	-
Pediatric Cardiology	J	1	1	-
Pediatric cardiology infant ward	K	1	-	-
Pediatric gastroenterology & hepatology	L	1	1	-
Pediatric nephrology & metabolic disorders	M	1	-	-
Pediatric oncology	N	1	-	-
Pediatric palliative care	O	1	-	-
Pediatric pneumology	P	1	1	-
Pediatric surgery	S	1	-	-

Table 3. Overview of wards contained in the data set

1. Patient Master Data

This chapter contains general information about patients included in the data set. This data includes personal data in anonymized form, if anonymization is necessary to prevent conclusions about the identity of the patient. Besides information on birthdate and sex, further personal data like transfers within the hospital, diagnosis and performed procedures are included.

For other research interests this class might offer the most insights when it comes to the selection of patients with specific characteristics like a restriction to certain age groups or patients with underlying diseases.

1.1. Patient Master Data.csv

This file contains general information about the patient including the date of birth, date of death, if known, and the sex of the patient. The date of death is only available if the patient deceased during a hospital stay included in this data set.

Column Name	Description	Comment
PMID	Unique numerical ID for identifying patients	anonymized
Sex	Sex of the patient	0 = not specified, m = male, f = female
DateOfBirth	Date of birth	anonymized
DateOfDeath	Date of death, if known	anonymized

1.2. Lookup SMID.csv

This file contains a mapping between Patient Master IDs (PMIDs) and Stay Master IDs (SMIDs). This makes it possible to assign the stays to the respective patients.

Column Name	Description	Comment
PMID	Unique numerical ID for identifying patients	anonymized
SMID	Unique numerical ID for identifying stays	anonymized

1.3. Cause of Death.csv

This file contains information about the cause of death. This information is only available for patients that died associated with the Interdisciplinary pediatric intensive care unit (Ward ID:G).

For some patients no return of spontaneous circulation (ROSC) is documented as a cause of death. Further data within this dataset may not be available for these patients.

Column Name	Description	Comment
PMID	Unique numerical ID for identifying patients	anonymized
SMID	Date of birth	anonymized
DateOfDeath	Date of death	anonymized
AgeAtDeath	Age of the patient on the day of death	In days
CauseOfDeath	Textual information about the cause of death	Textual description

1.4. Patient Transfer.csv

Within this file information regarding patient transfers are summarized. Documented transfers are referring from and to wards within the hospital.

Column Name	Description	Comment
PMID	Unique numerical ID for identifying patients	anonymized
SMID	Unique numerical ID for identifying stays	anonymized
MovementType	Information what type of patient transfer is documented	Textual description. One of the following: Absence start, Transfer, Absence end, Outpatient visit, Admission, Discharge
Admission	Timestamp the patient transfer on the ward is	anonymized
Discharge	Timestamp the follow-up patient transfer is	anonymized
Ward	Unique alphabetical ID for identifying the nursing ward	anonymized
Ward_Type	Type of nursing ward	Textual description

1.5. Diagnoses.csv

This file displays diagnoses made during their hospitalization and may not reflect the complete history of the patient. However, the most important underlying diseases were documented.

Column Name	Description	Comment
PMID	Unique numerical ID for the identification of	anonymized
SMID	Unique numerical ID for the identification of	anonymized
Timestamp	Documented Timestamp	anonymized
ICDCODE	ICD-10 Code of the documented diagnosis	
DiagnosticConfidence	Certainty of the documented diagnosis if	
ReferralDiagnosisIndicator	This characteristic specifies the diagnosis that is noted on the patients letter of referral.	
TreatmentDiagnosisIndicator	This characteristic specifies that a treatment diagnosis is involved.	
AdmissionDiagnosisIndicator	Specially indicated diagnosis that is made during the admission examination.	
DischargeDiagnosisIndicator	This characteristic specifies whether a diagnosis is relevant to the discharge of a	
DepartmentMainDiagnosis_	This characteristic specifies whether a diagnosis is the reason for treatment in a	
HospitalMainDiagnosis Indicator	This characteristic specifies whether a diagnosis is the reason for inpatient or outpatient treatment.	
SurgeryDiagnosisIndicator	This characteristic specifies whether a diagnosis is directly linked to surgery.	
Localization	Localization specifying the diagnosis	

1.6. Procedure.csv

This file summarizes performed procedures during the patient's hospitalization. The presented data may not reflect the complete medical history of the patient.

Column Name	Description	Comment
PMID	Unique numerical ID for the identification of patients	anonymized
SMID	Unique numerical ID for the identification of stays	anonymized
DocumentationPerdiod	Documented timestamp of the procedure	anonymized
OPSCode	OPS Code of the procedure	
Localisation	Localization of the procedure	

1.7. Body Height.csv

This file contains available measurements of the patient's body height. Although the determination of the body height is a measurement, the height information is located in the Patient Master Data class because these are relatively non-dynamic values that do not change much over the course of the hospital stay.

Column Name	Description	Comment
PMID	Unique numerical ID for the identification of patients	anonymized
SMID	Unique numerical ID for the identification of stays	anonymized
MeasurementTimestamp	Documented time the height was measured	anonymized
Type	Description of measurement	
Height	Value of the measurement	
Unit	Unit of Value	
Ward	Unique alphabetical ID for identifying the nursing ward	anonymized
Ward_Type	Type of nursing ward	Textual description

1.8. Body Weight.csv

This file contains available measurements of the patient's body weight. Although the determination of the body weight is a measurement, the weight information is located in the Patient Master Data class because these are relatively non-dynamic values that do not change much over the course of the hospital stay.

Column Name	Description	Comment
PMID	Unique numerical ID for the identification of patients	anonymized
SMID	Unique numerical ID for the identification of stays	anonymized
MeasurementTimestamp	Documented time the height was measured	anonymized
Type	Description of measurement	
Weight	Value of the measurement	
Unit	Unit of Value	
Ward	Unique alphabetical ID for identifying the nursing ward	anonymized
Ward_Type	Type of nursing ward	Textual description

2. Vital parameters

Vital parameters are mainly generated by the bedside monitors and validated by nurses (usually every 15 minutes). Vital parameters are sensitive, but not very specific signs for changes in the body and external influence. Compared to adults, vital parameters of children are different. Even in different age-groups of childhood, they are diverse. For example, the heart rate is higher in the younger children but the blood pressure is lower. Body temperature in infants is very instable. Another example is that for example fever causes the heart rate to increase, as does pain and anxiety. Hypothermia causes a decrease in heart rate and can lead to cardiac arrhythmias. These circumstances cannot be determined from the presented "vital signs". ECG curves would be necessary for this (not currently available in this data set)

2.1. Blood Pressure invasive.csv

This file contains the invasively measured blood pressure of the patient. Therefore, a cannulization of a peripheral arteria is necessary. However, this is not always possible. Although lower blood pressure levels are reliable to be measured.

The main advantage over the non-invasive method is the continuous visualization of the pulse wave and the blood pressure values in the monitoring system. The curve display allows the trained person to judge the quality of the recording. Note that extremely high values are measured when the measuring system is recalibrated or the measurement is interrupted, e. g. at time of arterial blood sampling. Currently, the pulse wave is not included in this data set.

Column Name	Description	Comment
PMID	Unique numerical ID for identifying patients	anonymized
SMID	Unique numerical ID for identifying stays	anonymized
MeasurementTimestamp	Documented timestamp of the measurement of the capillary refill	anonymized
BloodPressureSystolic	Documented value of the systolic blood pressure	in mmHg
BloodPressureDiastolic	Documented value of the diastolic blood pressure	in mmHg
StateSystolic	State of the data (see chapter 9.2)	
StateDiastolic	State of the data (see chapter 9.2)	
Invasive/NonInvasive	Information whether the blood pressure was measured invasively or non-invasively	
Ward	Unique alphabetical ID for identifying the nursing ward	anonymized
Ward_Type	Type of nursing ward	Textual description

2.2. Blood Pressure non-invasive.csv

This file contains the non-invasively measured blood pressure of the patient. Due to the simpler measuring method, non-invasive blood pressure is in principle quicker to establish than invasive. However, in case of non-cooperative patients (like in pediatric collective), reliability may be limited. Note that, physiologically, blood pressure would be approximately the same at all extremities, provided the patient is lying down. However, some diseases cause different blood pressure levels in different extremities at the same time.

Column Name	Description	Comment
PMID	Unique numerical ID for identifying patients	anonymized
SMID	Unique numerical ID for identifying stays	anonymized
MeasurementTimestamp	Documented timestamp of the measurement of the capillary refill	anonymized
BloodPressureSystolic	Documented value of the systolic blood pressure	in mmHg
BloodPressureDiastolic	Documented value of the diastolic blood pressure	in mmHg
StateSystolic	State of the data (see chapter 9.2)	
StateDiastolic	State of the data (see chapter 9.2)	
Invasive/NonInvasive	Information whether the blood pressure was measured invasively or non-invasively	
Ward	Unique alphabetical ID for identifying the nursing ward	anonymized
Ward_Type	Type of nursing ward	Textual description

2.3. Heart Rate.csv

This file includes measured heart rate per minute. Since the displayed data represent the electrical excitation of the heart, this does not necessarily correspond to the ejection rate (=pulse).

Column Name	Description	Comment
PMID	Unique numerical ID for identifying patients	Anonymized
SMID	Unique numerical ID for identifying stays	Anonymized
Timestamp	Documented timestamp of the measurement of the heart rate	Anonymized
HeartRate	Value of the heart rate	electrical excitation of the heart (not always equal to the ejection rate = pulse rate)
Unit	Unit the heart rate is measured in	
State	State of the data (see chapter 9.2)	

Ward	Unique alphabetical ID for identifying the nursing ward	anonymized
Ward_Type	Type of nursing ward	Textual description

2.4. Respiratory Rate.csv

This file includes the patient's respiratory rate per minute.

Column Name	Description	Comment
PMID	Unique numerical ID for identifying patients	anonymized
SMID	Unique numerical ID for identifying stays	anonymized
Timestamp	Documented timestamp of the measurement of the respiratory rate	anonymized
RespiratoryRate	Value of the respiratory rate	In non-ventilated patients, a sensitive but non-specific measure of body stress
Unit	Unit the respiratory rate is measured in	
State	State of the data (see chapter 9.2)	
Ward	Unique alphabetical ID for identifying the nursing ward	anonymized
Ward_Type	Type of nursing ward	Textual description

2.5. Body Temperature.csv

This file includes measured patient's body temperature. The body temperature is measured in everyday clinical practice using various methods.

Column Name	Description	Comment
PMID	Unique numerical ID for identifying patients	anonymized
SMID	Unique numerical ID for identifying stays	anonymized
Timestamp	Documented timestamp of the measurement of the respiratory rate	anonymized
BodyTemperature	Documented value of the temperature	
Unit	Unit the temperature is measured in	
State	State of the data (see chapter 9.2)	
Ward	Unique alphabetical ID for identifying the nursing ward	anonymized
Ward_Type	Type of nursing ward	Textual description

2.6. Transcutaneous Oxygen Measurement.csv

This file contains transcutaneous oxygen measurements via a CO-oximeter.

Column Name	Description	Comment
PMID	Unique numerical ID for identifying patients	anonymized
SMID	Unique numerical ID for identifying stays	anonymized
MeasurementTimestamp	Documented timestamp of the measurement	anonymized
SaO2	Value of the transcutaneous oxygen measurement	
Unit	Unit SaO2 is documented	
State	State of the data (see chapter 9.2)	
Ward	Unique alphabetical ID for identifying the nursing ward	anonymized
Ward_Type	Type of nursing ward	Textual description

2.7. Pulse.csv

This file includes measured pulse rate per minute. The displayed data represent the ejection rate.

Column Name	Description	Comment
PMID	Unique numerical ID for identifying patients	Anonymized
SMID	Unique numerical ID for identifying stays	Anonymized
Timestamp	Documented timestamp of the measurement of the pulse rate	Anonymized
Pulse	Value of the pulse rate	ejection rate
Unit	Unit the pulse rate is measured in	
State	State of the data (see chapter 9.2)	
Ward	Unique alphabetical ID for identifying the nursing ward	anonymized
Ward_Type	Type of nursing ward	Textual description

3. Physical Status

3.1. Braden Scale.csv

This file contains results regarding the braden scale, a scale for predicting pressure ulcer risk in patients.

Column Name	Description	Comment
PMID	Unique numerical ID for identifying patients	anonymized
SMID	Unique numerical ID for identifying stays	anonymized
Timestamp	Documented time	anonymized
Parameter	Parameter that was measured	
OriginalResult	Result of the Braden Scale as it comes from	
Ward	Unique alphabetical ID for identifying the nursing ward	anonymized
Ward_Type	Type of nursing ward	Textual description

3.2. Capillary Refill.csv

This file includes measurements of the capillary refill time. The capillary refill time assesses blood circulation in arms or legs and aims at detecting changes in blood flow.

Column Name	Description	Comment
PMID	Unique numerical ID for identifying patients	anonymized
SMID	Unique numerical ID for identifying stays	anonymized
MeasurementTimestamp	Documented timestamp of the measurement of the capillary refill	anonymized
Value	Documented value of the capillary refill time as it comes from the source system	
Unit	Unit the capillary refill is measured in	For the capillary refill this should always be in seconds
Examination	Describing text of the measurement	
Ward	Unique alphabetical ID for identifying the nursing ward	anonymized
Ward_Type	Type of nursing ward	Textual description

3.3. Glasgow Coma Scale.csv

This file contains information about measurements regarding the Glasgow Coma Scale (GCS). The GCS is a clinical scale for the measurement of the patient's consciousness.

Column Name	Description	Comment
PMID	Unique numerical ID for identifying patients	anonymized
SMID	Unique numerical ID for identifying stays	anonymized
MeasurementTimestamp	Documented time	anonymized
Value	Value of the GCS	
Parameter	Measured parameter	
Ward	Unique alphabetical ID for identifying the nursing ward	anonymized
Ward_Type	Type of nursing ward	Textual description

4. Fluid Balance

4.1. Fluid Balance.csv

This file includes information regarding the patient's fluid balance. This data consists of both in- and output related balances.

Column Name	Description	Comment
PMID	Unique numerical ID for identifying patients	anonymized
SMID	Unique numerical ID for identifying stays	anonymized
Timestamp	Documented time	anonymized
Volume	Amount of fluid	in ml
Unit	Unit of the measured balance	ml
FluidName	Description of the method of measurement	
Type	Type of Fluid Balance; either Export or Import plus addition "intra op"	
Ward	Unique alphabetical ID for identifying the nursing ward	anonymized
Ward_Type	Type of nursing ward	Textual description

4.2. Drain.csv

This file includes information regarding surgical drains. This data consists of a description of the drain and balance volumes.

Column Name	Description	Comment
PMID	Unique numerical ID for identifying patients	anonymized
SMID	Unique numerical ID for identifying stays	anonymized
Timestamp	Documented exact time of the specific action	anonymized
DrainName	Description of the surgical drain	Drain and localization if available
Start	Documented start time of the surgical drain, if available	anonymized
End	Documented end time of the surgical drain, if available	anonymized
Rowversion	Unique identifier to connect documented contents that belongs to the same process	anonymized
BalanceValue	Amount of fluid	in ml
Ward	Unique alphabetical ID for identifying the nursing ward	anonymized
Ward_Type	Type of nursing ward	Textual description

5. Laboratory

5.1. Laboratory.csv

This file contains laboratory observations, including various kinds of tests like blood gas tests. To improve the usability and understanding of the original data, we used a self-join to have information about the specimen available for each data point.

Column Name	Description	Comment
PMID	Unique numerical ID for identifying patients	anonymized
SMID	Unique numerical ID for identifying stays	anonymized
CollectionTimestamp	Documented timestamp of the measurement of the laboratory test results	anonymized
Parameter	Description of the laboratory parameter	
ParameterID	Unique ID for identifying parameter	Used for mapping the parameter to LOINC
OriginalValue	Documented value as it comes from the source system	
LaborPanelID	Unique ID for the laboratory panel	anonymized
SpecimenID	Unique ID for the specimen	anonymized
Unit	Unit the Parameter was measured in	
SpecimenOriginal	Information about the specimen and the sampling	„Arter.“ expresses an arterial specimen, “GemVen.” stands for a venous specimen
SpecimenType	Information about the type of the specimen	“Blut” stands for blood as specimen
BodySite	Information about the body site where the specimen was taken	
LOINC	LOINC of the parameter if available	
Ward	Unique alphabetical ID for identifying the nursing ward	anonymized
Ward_Type	Type of nursing ward	Textual description

5.2. Microbiology.csv

This file includes microbiological test results that were conducted during the hospitalization. This contains antibiotic sensitivity testing for positive findings.

Column Name	Description	Comment
PMID	Unique numerical ID for identifying patients	anonymized
SMID	Unique numerical ID for identifying stays	anonymized
Specimen ID	Unique ID for identifying the specimen	anonymized
SpecimenName	Name of the specimen	
TimestampSpecimenSubmission	Timestamp of the submission of the specimen	anonymized
TimestampSpecimenCollection	Timestamp of the collection of the specimen	anonymized
BodySite	Body site the specimen was collected from	
OrderRequest	Information about the microbiological laboratory test	
IsolateNumber	Isolate number, if available	
Pathogen	Pathogen that was found	
PathogenQuantity	Information about the amount of germs	
Unit	The unit of the pathogen quantity	
Antibiotic_Name	Antibiotic resulting from an antibiotic sensitivity testing	
MinimumInhibitoryConcentration	lowest concentration which prevents visible growth	Short: MIC
MICPREFIX	Prefix of the Minimum_Inhibitory_Concentration	
MICUnit	The unit of the MinimumInhibitoryConcentration	
Susceptibility	Information about the resistance	S Sensitive, I Intermediate, R Resistant
Laterality	Position information	
KEDIFF	Information about the germ differentiation	"after enrichment" = grown only in liquid enrichment media, not on agar plates
Ward	Unique alphabetical ID for identifying the nursing ward	anonymized
Ward_Type	Type of nursing ward	Textual description

6. Ventilation

6.1. Horovitz.csv

This file included information about calculated horovitz indices (also known as P/F ratio). This information is not included in the primary data source and has been calculated from FiO2 data from the respirator and PaO2 data from arterial blood gas analysis, which are included in the Ventilator.csv respectively in the Laboratory.csv.

Column Name	Description	Comment
PMID	Unique numerical ID for identifying patients	anonymized
SMID	Unique numerical ID for identifying stays	anonymized
Horovitz	Calculated Horovitz Index	
PaO2	Used arterial oxygen partial pressure	in mmHg
LaboratoryTimestamp	Timestamp of used laboratory test result	anonymized
LaboratoryPanelID	Unique ID of the used Labor_Panel	Equals the Labor_Panel_ID from Laboratory.csv
LaboratorySpecimenID	Unique ID of the used Specimen	Equals the SpecimenID from Laboratory.csv
FiO2	Used inspiratory oxygen fraction	
RespirationTimestamp	Timestamp of used FiO2 value	anonymized
RespirationValueID	Unique ID of the used respirations	Equals the Measurement_sequence_ID from Ventilation.csv
DeviceName	The device used to measure the FiO2	
Confidence	Confidence the calculated horovitz index should be used with	When the FiO2 comes from an userinput AND the FiO2 is lower than 0.21 or higher than 1, the confidence in the horovitz index is low.
Ward	Unique alphabetical ID for identifying the nursing ward	anonymized
Ward_Type	Type of nursing ward	Textual description

6.2. Respiration And Ventilation Equipment.csv

This file includes information about used types of ventilation equipment and the associated status information on the ventilation. Furthermore, information whether the ventilation is invasive or non-invasive.

Column Name	Description	Comment
PMID	Unique numerical ID for identifying patients	anonymized
SMID	Unique numerical ID for identifying stays	anonymized
Timestamp	Documented time	anonymized
Equipment Type	Type of the module	Type of ventilation equipment
StateDescription	Value for the documented StateName	Extended description and status information
StateCategory	Categorization of “StateValue”	
Invasive/NonInvasive	Information about invasive or non-invasive respiration material	Either IV for invasive or NIV for non-invasive
Ward	Unique alphabetical ID for identifying the nursing ward	anonymized
Ward_Type	Type of nursing ward	Textual description

6.3. Respiration Supplement.csv

This file contains various types of nursing information of appendice situation under ventilation. Origin of data is a form used by nurses. Due to heterogeneity of data input, we decided not to rename the original technical descriptions of each column (ModulName, StateValue, StateName). A specific column description is not possible in this case.

Column Name	Description	Comment
PMID	Unique numerical ID for identifying patients	anonymized
SMID	Unique numerical ID for identifying stays	anonymized
Timestamp	Documented time	anonymized
ModulName	Names of the module	
StateValue	Value for the documented StateName	
StateName	Documented State	
Ward	Unique alphabetical ID for identifying the nursing ward	anonymized
Ward_Type	Type of nursing ward	Textual description

6.4. Ventilation.csv

This file includes information about the mechanical ventilation of a patient.

Column Name	Description	Comment
PMID	Unique numerical ID for identifying patients	anonymized
SMID	Unique numerical ID for identifying stays	anonymized
MeasuremenSequenceID	Unique ID for identifying datafrom the same sequence	anonymized
ParameterName	Name of the documented parameter	
ParameterTerm	Term for the documented parameter	
ValueCategory	Value of the parameter category	This is either „Einstellparameter“(Setting parameter),„Messwert“ (Measured Parameter) or “Alarmparameter”
Timestamp	Documented time of the data	anonymized
Result	Actual value of the documented parameter	
Unit	Unit of the Result	
DeviceName	The used device	
Ward	Unique alphabetical ID for identifying the nursing ward	anonymized
Ward_Type	Type of nursing ward	Textual description

7. Therapy

7.1. Dialysis.csv

This file contains various types of nursing information of dialysis procedures. Origin of data is a form used by nurses. Due to heterogeneity of data input, we decided not to rename the original technical descriptions of each column (ModulName, StateValue, StateName). A specific column description is not possible in this case. Some data inputs contained sensitive free text information and were cleared, so that some NULL values will appear, now.

Column Name	Description	Comment
PMID	Unique numerical ID for identifying patients	anonymized
SMID	Unique numerical ID for identifying stays	anonymized
Timestamp	Documented time of the data	anonymized
ModulName	Modul that is documented	
StateValue	Value for the documented StateName	
StateName	Documented State	
Rowversion	Unique ID for related entries	anonymized
Ward	Unique alphabetical ID for identifying the nursing ward	anonymized
Ward_Type	Type of nursing ward	Textual description

7.2. ECMO.csv

This file includes information about Extracorporeal membrane oxygenation (ECMO). Due to heterogeneity of data input, we decided not to rename the original technical descriptions of each column (ModulName, StateValue, StateName).

Column Name	Description	Comment
PMID	Unique numerical ID for identifying patients	anonymized
SMID	Unique numerical ID for identifying stays	anonymized
Timestamp	Documented time of the data	anonymized
ModulName	Names of the modul	
StateValue	Value for the documented StateName	
StateName	Documented State	
Rowversion	Unique ID for related entries	anonymized
Ward	Unique alphabetical ID for identifying the nursing ward	anonymized
Ward_Type	Type of nursing ward	Textual description

7.3. Pacing.csv

This file contains data about status, configured modes and frequencies of implanted pacemakers. The mode of the pacemaker differs between active and inactive and is set with a specific frequency.

Column Name	Description	Comment
PMID	Unique numerical ID for identifying patients	anonymized
SMID	Unique numerical ID for identifying stays	anonymized
Timestamp	Documented time of the data	anonymized
PacemakerState	State of the pacemaker	On, off, NULL
PacemakerMode	Mode of the pacemaker	Active, inactive, NULL
Frequency	Set frequency	
Mode	Mode the pacemaker is set to	Most common are A00, AAI, D00, DDD or VVI
Comment	Comments from clinical user	
Ward	Unique alphabetical ID for identifying the nursing ward	anonymized
Ward_Type	Type of nursing ward	Textual description

7.4. Temperature Regulation.csv

This file includes data about temperature regulation by various external devices (e. g. cooling blankets).

Column Name	Description	Comment
PMID	Unique numerical ID for identifying patients	anonymized
SMID	Unique numerical ID for identifying stays	anonymized
Timestamp	Documented time of the data	anonymized
Manual	Manually set value (<i>configured</i> parameter)	
Automatic	Automatically set value (<i>configured</i> parameter)	
BodyTemperature	Measured temperature value from the device (<i>measured</i> parameter)	
Ward	Unique alphabetical ID for identifying the nursing ward	anonymized
Ward_Type	Type of nursing ward	Textual description

8. Medication

8.1. Blood Product.csv

This file contains data about administered blood products. For blood products from in-house production, a “BloodBottleID” is available as locally unique – but not nationally standardized – identifier for a specific blood bottle.

Column Name	Description	Comment
PMID	Unique numerical ID for identifying patients	anonymized
SMID	Unique numerical ID for identifying stays	anonymized
Start	Documented start of the medication	anonymized
End	Documented end of the medication	anonymized
Name	Name of the blood product	
BloodBottleID	Unique ID for in-house produced blood products	
ContainerQuantity	The amount of blood product per container.	
AdministrationRate	Hourly administered dose	In ml per hour
Unit	The unit of the blood product administered.	
Ward	Unique alphabetical ID for identifying the nursing ward	anonymized
Ward_Type	Type of nursing ward	Textual description

8.2. Medication.csv

This file includes administered medications including perfusions via syringe pumps. For medications, the individual components, if any, are listed separately. Changes in medication administration are also listed individually. Furthermore, information on feeding are included.

The listed Pharmazentralnummer (PZN) in the column PZNCode is a German standardized identifier for medications.

Column Name	Description	Comment
PMID	Unique numerical ID for identifying patients	anonymized
SMID	Unique numerical ID for identifying stays	anonymized
Start	Documented start of the medication	anonymized
End	Documented end of the medication	anonymized
Name	Name of the medication	
Category	Category of the medication	
Form	The dosage form / form of administration of the medication or medication component.	Medication, Infusion, Perfusor, Blood, Volume supply or Feeding
Dose	Amount of medication administered at one time.	
Unit	Unit of the medication administered.	
RateMLHour	Hourly amount that is used for the medication	In ml per hour
PZNCode	PZN is German for “Pharmazentralnummer”; it is a standardized catalogue for medication numbers.	
OrderApplyID		
ArticleID Type	Type of the ArticleID	
Ward	Unique alphabetical ID for identifying the nursing ward	anonymized
Ward_Type	Type of nursing ward	Textual description

9. Supplementary Material

9.1. LOINC.csv

For the identification of medical laboratory observations in this dataset Logical Observation Identifiers Names and Codes (LOINC) are listed, if available. A mapping of ParameterIDs from the Laboratory.csv and LOINC is included in this file.

Column Name	Description	Comment
ParameterID	Unique alphabetical ID for the identification of labor parameters	This column matches ParameterID in the Laboratory file
LOINC	Logical Observation Identifiers Names and Codes, if available	

9.2. Data flags

For some data a state from the primary source system is given documenting the state of the data.

R = READ (The records in the series have been read from the data source but have not yet been verified)

C = CORRECTED (The record has been corrected, usually by a human user)

P = PRELIMINARY (The records in the series have been read from the data source, but the data source may update the record)

I = INVALID (The value is out of limits and thus invalid)

D = DELETED (The records in the series have been deleted / cancelled)

F = FINAL (The records in the series have been validated, usually by a human user)

References

[1] Hannover Medical School. Annual Report 2021.

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[2] Wulff A, Mast M, Bode L, Rathert H, Jack T; Elise Study Group. Towards an Evolutionary Open Pediatric Intensive Care Dataset in the ELISE Project. Stud Health Technol Inform. 2022 Jun 29;295:100-103. doi: 10.3233/SHTI220670. PMID: 35773816