

COVID-19 DATA PLATFORM DOCUMENTATION

Data Dictionary

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About this document

This document has been produced by Ziekenhuis Oost Limburg (ZOL) to fulfil the requirement of the Interreg Euregion Maas-Rijn (EMR) study concerning a COVID Data Platform (CoDaP). The study has three aims:

1. To study the heterogeneity differences in ICU patient populations;
2. To improve clinical decisions guidelines; and
3. To build an IT-infrastructure for secure and efficient data-exchange and analysis.

This document is intended for EMR project reviewers and individuals working on the study on behalf of participating institutions. All comments on this document should be directed to:

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Introduction

The goal of the CoDaP study is to set-up a novel and secure IT infrastructure for a multi-hospital data sharing environment. By creating a dataset that coalesces patient data from multiple intuitions, CoDaP participants will be able study heterogeneity in ICU patient populations. To achieve this goal ICU physicians must reach a consensus on data definitions. Furthermore, these definitions must be transformed into logical definitions that can be understood by both physicians and data scientists. This data dictionary provides for each field in the dataset a clear definition of terms, units, the format of output and the time of measurement.

Minimal dataset (MDS)

The Minimal Dataset (MDS) is the core record of the CoDaP study and consists of fields for containing information related to demography, admission and discharge, physiology, and primary and secondary outcomes. The prognostic models APACHE II and Glasgow Coma Scale (GCS/EMV) are used to describe the severity of illness and the level of consciousness.

MDS structure

The MDS comprises of 59 datapoints or 'fields'. Table 1 contains a simple overview of the dataset to be submitted. Although only two fields are mandatory (required), namely Patient ID and ICU Admission Date, it is advantageous to the CoDaP study to obtain as many datapoints as possible. In light of this, we request that participating institutions devote sufficient time to ensuring that the data they provide for each patient is as complete as possible.

Table 1 MDS overview

Variable group	Field name	Field type
Baseline: on admission	Patient ID	Text
	Age	Number
	Gender	Number
	ICU admission date	Date & Time
	Intubation date	Date & Time
	Length	Number
	Weight	Number
	BMI	Number
	Admission origin	Number
	Chronic liver disease	No/Yes
	Chronic lung disease	No/Yes
	Chronic renal disease	No/Yes
	Diabetes	No/Yes
	Hypertension	No/Yes
	Smoking	No/Yes
	Dyslipidaemia	No/Yes
	Obesity	No/Yes
	Corticosteroid use	No/Yes
	APACHE II	Number
	Glasgow Coma Scale	Number
Baseline: first 24 hours	Invasive ventilation	No/Yes
	Ventilation modality	Number
	Lowest mean arterial pressure	Number
	Highest respiratory rate	Number
	Lowest P/F ratio	Number
	Highest FiO2	Number
	Total urine production	Number
	Vasopressor use	No/Yes
	Noradrenaline	Number
	Adrenaline	Number
	Dopamine	Number
	Dobutamine	Number
	Dialysis	No/Yes
	pH	Number
	pO2	Number
	pCO2	Number
	Bilirubin	Number
	Creatinine	Number
	Thrombocytes	Number
	CRP	Number
Primary outcome	ICU survival	No/Yes
	Date of ICU discharge	Date & Time
	Date of ICU death	Date & Time
	Discharge location	Number

Variable group	Field name	Field type
Secondary outcome	Pulmonary embolism	No/Yes
	Deep venous thrombosis	No/Yes
	Reintubation	No/Yes
	Reintubation date	Date & Time
	Extubation date	Date & Time
	Renal replacement therapy	No/Yes
	Extracorporeal membrane oxygenation	No/Yes
	Antibacterial therapy	No/Yes
	Corticosteroids	No/Yes
	Chloroquine	No/Yes
	Remdesivir	No/Yes
	Lopinavir/ritonavir	No/Yes
	Oseltamivir	No/Yes
	Interleukin inhibitors	No/Yes
	Anti-fungal medication	No/Yes

Time of measurement

The 'time of measure' is the moment or period within which data values for inclusion in the DEF are collected. As such, the time of measurement may differ from the time when the measurement or diagnosis actually took place. For example, some of the fields concerning the presence of a chronic disease, the diagnosis thereof is likely to have occurred before the patient was admitted to the ICU. The following sections contain definitions of the three time periods when data should be collected.

On admission to the ICU

The 20 fields pertaining to data that is collected when the patient is admitted to the ICU are listed in Table 2. Table 3 contains examples of situations which clarify when an admission to the ICU has begins.

Table 2 Field values obtained on admission to the ICU

Patient ID	Chronic lung disease
Age	Chronic renal disease
Gender	Diabetes
ICU admission date	Hypertension
Intubation date	Smoking
Length	Dyslipidaemia
Weight	Obesity
BMI	Corticosteroid use
Admission origin	APACHE II
Chronic liver disease	Glasgow Coma Scale

Table 3 Examples of the start of an ICU admission

Situation A	The ICU admission begins as soon as the patient arrives in the ICU from the general ward.
Situation B	The ICU admission begins as soon as the patient arrives in the ICU from the operating theatre.
Situation C	The first ICU admission begins as soon as the patient arrives in the ICU from the operating theatre. The second the ICU admission begins when the patient arrives in the ICU from the general ward. This second the ICU admission is a readmission.
Situation D	The ICU admission begins as soon as the patient arrives in the ICU from the operating theatre. During this ICU admission the patient goes back into the operation theatre, after which they are returned directly to the same the ICU. The two periods in which the patient stayed in the ICU are considered to be a single ICU admission.
Situation E	The ICU admission begins as soon as the patient arrives in the ICU from the general ward. The patient visits the operating theatre and afterwards returns to the ICU. The stay in the ICU following the visit to the operating theatre is a continuation of the original admission. It is not a readmission because the patient was not discharged from the ICU.

During the first 24 hours in the ICU

The first 24 hours of the ICU admission begins as soon as the patient arrives in the ICU. During this time values for the 20 fields listed in Table 4 are obtained. Physiological and laboratory values arising from the operating theatre or other temporary forms of treatment should not be included. An admission laboratory result is a sufficient value for fields that refer to a laboratory result. If this is unavailable, then the worst value within first 24 hours should be used. Table 5 contains examples of situations which clarify what is understood as the first 24 hours ICU admission.

Table 4 Fields values obtained during the first 24 in the ICU

Invasive ventilation	dopamine
Ventilation modality	dobutamine
Lowest mean arterial pressure	Dialysis
Highest respiratory rate	pH
Lowest P/F ratio	pO2
Highest FiO2	pCO2
Total urine production	Bilirubin
Vasopressor use	Creatinine
noradrenaline	Thrombocytes
adrenaline	CRP

Table 5 Examples of the first 24 hours of the ICU admission

Situation F	The first 24-hour period begins as soon as the patient arrives in the ICU from the general ward. This is at 09:00. The first 24-hour period ends the following day at 09:00.
Situation G	The first 24-hour period begins as soon as the patient arrives in the ICU from operating theatre. This is around 11:00. The first 24-hour period ends the following day at 09:00, which results in 22 hours in the ICU admission.
Situation H	The first 24-hour period begins as soon as the patient arrives in the ICU from the operating theatre. This is around 10:00. The first 24-hour period ends prematurely if the patient is

	transferred to the general ward. If the patient is re-admitted to the ICU from the general ward, then this is a <u>Readmission</u> . The first 24-hour period of this second ICU admission begins when the patient arrives in the ICU from the general ward at 08:00 and ends when the patient is transferred to the general ward at 10:00.
Situation I	The first 24-hour period begins as soon as the patient arrives in the ICU from the operating theatre. This is around 10:00. The first 24-hour period continues if the patient is transferred to the operating theatre in the interim. The first 24-hour period ends if the patient is transferred to the general ward at 08:00. No physiological and laboratory values are included from the period in the operating theatre.
Situation J	The first 24-hour period begins as soon as the patient arrives in the ICU from the general ward. This is at 09:00. The following day at 08:00 the patient visits the operating theatre and remains there for over an hour. The patient's first 24 hours in the ICU was effectively 23 hours long because physiological and laboratory data values are not extracted during the time spent in the operating theatre.

Any time during the ICU stay

The values that can be obtained at any time during the patient's stay in the ICU are largely concerned with secondary and primary outcomes. The fields related to these values are listed in Table 6. Four of these values which can only be obtained when the patient is discharged from the ICU. These are denoted in the table by an asterisk (*).

Table 6 Fields values obtained at any time during the ICU stay

Pulmonary embolism	Antibacterial therapy	Interleukin inhibitors
Deep venous thrombosis	Corticosteroids	Anti-fungal medication
Reintubation	Chloroquine	ICU survival*
Reintubation date	Remdesivir	Date of ICU discharge*
Extubation date	Lopinavir/ritonavir	Date of ICU death*
Renal replacement therapy	Oseltamivir	Discharge location*
Extracorporeal membrane oxygenation		

Readmission

A readmission occurs when a patient has a second stay in the ICU within the same hospital admission period. In other words: the patient is discharged from the ICU to another ward within the hospital, but they later return to the ICU. A readmission is not the same as an internal transfer or other admission types. To help with these distinctions, Table 7 contains examples of situations in which a readmission has not transpired.

Table 7 Examples of a when a readmission has not occurred

Situation K	The patient visits the operating theatre temporarily during the ICU admission and returns to the same the ICU. This situation is a continuation of the first ICU admission.
Situation L	The patient is discharged from the general ward to a destination outside of the hospital. The patient later returns to the ICU, either via the general ward or the operating theatre. This situation is a new hospital admission.
Situation M	The patient is transferred from one ICU to another ICU within the same hospital. This admission is an internal transfer because the hospital in which the second ICU admission originated is the same as for the first ICU admission.
Situation N	The patient is discharged from the ICU to another location within the same hospital. Within 2 hours the patient is sent back to the ICU from which they were discharged. This is an internal transfer.

Data extraction file

Each participating institution must prepare a Data Extraction File (DEF) that contains information about patients infected with COVID-19 that were admitted the ICU during the first wave.

The DEF must be a Character Separated Values (CSV) file, where each row relates to one ICU admission and each datapoint is separated by a semicolon character (;). The DEF should be named according to this convention:

```
codap_[institution name]_[submission date].extension.
```

For example, a DEF prepared by ZOL could be named:

```
codap_zol_31122020.csv
```

To protect the identity of the patient, institutions must anonymise patient identifiers (e.g. Patient ID) before it is added to the DEF.

MDS field descriptions

A description of each field in the MDS is provided in accordance with the details listed in Table 8. Any detail that is not applicable is left blank. For example, a unit of measurement is not provided for the field Patient ID because it is unmeasurable.

Table 8 MDS field details description

Name	The name of the field	
Simple data type	A non-technical description of the sort of data the field contains	
Unit of measurement	The standard used to determine quantity.	
Technical data type	The SQL data type	
Output format	How the information is expressed. Minimum and maximum values are stated when they apply.	
	Min. value	The minimum value that may be given.
	Max. value	The minimum value that may be given.
Time of measurement	The moment when the data is recorded	
Example	An example of the data that the field contains.	
Mandatory	Indicates if a value must be provided for the field.	

On admission

The fields containing values that are obtained when the patient is admitted to the ICU relate to demography, admission, physiology and severity of illness.

Patient ID

This field's value identifies a patient within an institution. It must be provided for each row in the DEF and it must be anonymised.

Name	Patient ID
Simple data type	Text
Unit of measurement	---
Technical data type	Varchar
Output format	String
Time of measurement	On ICU admission
Example	CODAP0001
Mandatory	Yes

Age

This value of this field is the age of the patient. The field must be left blank when the age is unknown (do not estimate a value).

Name	Age
Simple data type	Number
Unit of measurement	Years
Technical data type	Int
Output format	---
Time of measurement	On ICU admission
Example	73
Mandatory	No

Gender

This field's value refers to the gender of the patient. In this context, 'gender' refers to a set of biological attributes, i.e. the sex of the patient, rather than a socially constructed role with which the patient identifies.

Name	Gender
Simple data type	Number
Unit of measurement	---
Technical data type	Tinyint
Output format	0 = male 1 = female
Time of measurement	On ICU admission
Example	1
Mandatory	No

ICU admission date

The value of this field is the date on which the patient was admitted to the ICU. This value must be provided for each record in the DEF. For guidance on patients admitted twice or more to the same ICU, refer to the sections [On admission to the ICU](#) and [Readmission](#).

Name	ICU admission date
Simple data type	Date & Time
Unit of measurement	---
Technical data type	Datetime
Output format	yyyy-mm-dd hh:mm
Time of measurement	On ICU admission
Example	2020-04-01 16:15
Mandatory	Yes

Intubation date

The value of this field is the date on which the patient was incubated.

Name	Intubation date
Simple data type	Date & Time
Unit of measurement	---
Technical data type	Datetime
Output format	yyyy-mm-dd hh:mm
Time of measurement	On ICU admission
Example	2020-04-01 16:15
Mandatory	No

Length

This field's value is the length (height) of the patient in centimetres. The field must be left blank when the height is unknown (do not estimate a value).

Name	Length
Simple data type	Number
Unit of measurement	Centimetres (cm)
Technical data type	Double
Output format	---
Time of measurement	On ICU admission
Example	183.0
Mandatory	No

Weight

The value of this field is the weight of the patient in kilograms. The field must be left blank when the weight is unknown (do not estimate a value).

Name	Weight
Simple data type	Number
Unit of measurement	Kilograms (kg)
Technical data type	Double
Output format	---
Time of measurement	On ICU admission
Example	87.0
Mandatory	No

BMI

This field's value is the Body Mass Index (BMI) of the patient. It is calculated by dividing the patient's weight by the square of their length (height).

Name	BMI
Simple data type	Number
Unit of measurement	m/kg ²
Technical data type	Double
Output format	---
Time of measurement	On ICU admission
Example	28.41
Mandatory	No

Admission origin

The value of this field is the location of the patient immediately prior to their admission to the ICU. This value is important for determining if an admission concerns an internal transfer.

Name	Admission origin
Simple data type	Number
Unit of measurement	---
Technical data type	Int
Output format	1 = emergency department 2 = hospital ward 3 = other hospital
Time of measurement	On ICU admission
Example	2
Mandatory	No

- For ICU admissions arriving from the emergency department within the same institution, the value is '1' (emergency department).
- For ICU admissions arriving from a general ward within the same institution, the value is '2' (hospital ward).
- For ICU admissions arriving from a different institution, the value is '3' (other hospital).

If an admission to the ICU is planned for a patient but, due to a shortage of beds in the ICU, the patient is transferred to recovery from the operating theatre, then the stay in recovery is disregarded and the initial origin is entered in terms of 1, 2, or 3.

Chronic liver disease

This field's value indicates if the patient has chronic liver disease. The diagnosis could have taken place before the current ICU admission.

Name	Chronic liver disease
Simple data type	No/Yes
Unit of measurement	---
Technical data type	Bit
Output format	0 = no 1 = yes
Time of measurement	On ICU admission
Example	0
Mandatory	No

Chronic lung disease

The value of this field indicates if the patient has chronic lung disease. The diagnosis may have taken place before the current admission to the ICU.

Name	Chronic lung disease
Simple data type	No/Yes
Unit of measurement	---
Technical data type	Bit
Output format	0 = no 1 = yes
Time of measurement	On ICU admission
Example	0
Mandatory	No

Chronic renal disease

This field's value indicates if the patient has chronic renal disease. The diagnosis may have taken place before the current admission to the ICU.

Name	Chronic renal disease
Simple data type	No/Yes
Unit of measurement	---
Technical data type	Bit
Output format	0 = no 1 = yes
Time of measurement	On ICU admission
Example	0
Mandatory	No

Diabetes

The value of this field indicates if the patient has a medication-dependent form of diabetes. The diagnosis must have occurred before the current admission to the ICU.

Name	Diabetes
Simple data type	No/Yes
Unit of measurement	---
Technical data type	Bit
Output format	0 = no 1 = yes
Time of measurement	On ICU admission
Example	0
Mandatory	No

- The value is '1' (yes) for patients that use an insulin preparation and/or take oral antidiabetics.
- The value is '0' (no) for:
 - patients that use diet alone to regulate their diabetes; and
 - female patients who developed pregnancy diabetes during gravidity and are no longer taking medication to treat it.

Hypertension

This field's value indicates if the patient has hypertension.

Name	Hypertension
Simple data type	No/Yes
Unit of measurement	---
Technical data type	Bit
Output format	0 = no 1 = yes
Time of measurement	On ICU admission
Example	0
Mandatory	No

Smoking

The value of this field indicates if the patient is a smoker.

Name	Smoking
Simple data type	No/Yes
Unit of measurement	---
Technical data type	Bit
Output format	0 = no 1 = yes
Time of measurement	On ICU admission
Example	0
Mandatory	No

Dyslipidaemia

This field's value indicates if the patient has dyslipidaemia.

Name	Dyslipidaemia
Simple data type	No/Yes
Unit of measurement	---
Technical data type	Bit
Output format	0 = no 1 = yes
Time of measurement	On ICU admission
Example	0
Mandatory	No

Obesity

The value of this field indicates if the patient is obese. A patient is obese if they have a BMI equal to or greater than 30.

Name	Obesity
Simple data type	No/Yes
Unit of measurement	---
Technical data type	Bit
Output format	0 = no 1 = yes
Time of measurement	On ICU admission
Example	0
Mandatory	No

Corticosteroid use

This field's value indicates if the patient uses corticosteroid at home.

Name	Corticosteroid use
Simple data type	No/Yes
Unit of measurement	---
Technical data type	Bit
Output format	0 = no 1 = yes
Time of measurement	On ICU admission
Example	0
Mandatory	No

APACHE II

The value of this field indicates the foremost reason for the patient's admission to the ICU. It should contain the Apache II model score that was calculated on the patient's admission to the ICU.

Name	APACHE II	
Simple data type	Number	
Unit of measurement	---	
Technical data type	Int	
Output format	Min. value	0
	Max. value	71
Time of measurement	On ICU admission	
Example	29	
Mandatory	No	

Glasgow Coma Scale

This field's value is the Glasgow Coma Scale (GCS) score on the patient's admission to the ICU. It refers to the eye, motor and verbal (EMV) responses of the patient prior to sedation or intubation.

Name	Glasgow Coma Scale	
Simple data type	Number	
Unit of measurement	---	
Technical data type	Int	
Output format	Min. value	3
	Max. value	15
Time of measurement	On ICU admission	
Example	15	
Mandatory	No	

A value lower than '15' may only be given if there is a truly objective reduction in consciousness that is not due to death or sedation.

The maximum value of '15' should be given to patients admitted to the ICU postoperatively, but are still under the effect of anaesthetic. The sole exception to this is patients whose consciousness was reduced preoperatively. The value given for these patients should reflect the pre-operative GCS score, unless there are indications that the score has changed irrespective of the effects of anaesthesia or sedation.

Other factors affecting the field value are:

- If the patient is currently sedated but was previously conscious, then give the GCS score ascertained prior to sedation.
- If the patient is currently sedated, but was not conscious prior to the sedation and may have brain damage, then estimate the GCS score without sedation.
- If the patient responds with only one eye, then provide the GCS score for that eye.
- If the patient cannot open their eyes without assistance due to oedema or bleeding, then the most appropriate GCS score should be given.
- If the patient responds with only 1 limb, then provide the GCS score for that limb.
- If the patient cannot move by themselves due to trauma, immobilisation, fixation or any other cause, then the most appropriate GCS score should be given.
- If the patient is intubated, then the verbal response during intubation should be estimated and the most appropriate GCS score should be given.

During the first 24 hours

There are 20 fields referencing values obtained within the first 24 hours of a stay in the ICU. For fields that refer to laboratory results, the admission laboratory result may be given. If this is unavailable, then the worst value obtained within first 24 hours of the ICU stay should be used. Physiological and laboratory values arising from the operating theatre, or other temporary forms of treatment, should not be included.

Invasive ventilation

The value of this field indicates if the patient received mechanical ventilation by an endotracheal tube or tracheal cannula. This includes controlled forms of ventilation in which the patient must not actively participate, such as pressure control, and also forms in which the patient partially breathes for themselves, such as CPAP.

Name	Invasive ventilation
Simple data type	No/Yes
Unit of measurement	---
Technical data type	Bit
Output format	0 = no 1 = yes
Time of measurement	Within the first 24 hours in the ICU
Example	1
Mandatory	No

The value '1' (yes) should be given when:

- the patient has been intubated at any time during the first 24 hours of ICU treatment.
- the patient is physically connected to a respirator that measures the breath minute volume.

The value '0' (no) should be given when:

- the patient is transferred postoperatively from recovery and is extubated in recovery.
- the patient is transferred postoperatively, is still intubated whilst in the ICU, receives an 'artificial nose' from the anaesthetist, and is extubated two hours later.
- If flow is only generated using the respirator, such as Optiflow® on the Draeger Evita (this is not considered to be invasive ventilation).

Ventilation modality

This field's value indicates the mode of ventilation given to the patient by a mechanical ventilator.

Name	Ventilation modality
Simple data type	Number
Unit of measurement	---
Technical data type	Int
Output format	0 = Pressure control (PC) 1 = CPAP 2 = Pressure support (PS) 3 = Other
Time of measurement	Within the first 24 hours in the ICU
Example	3
Mandatory	No

Lowest mean arterial pressure

The value of this field refers to the lowest Mean Arterial Pressure (MAP) recorded within first 24 hours of the patient's stay in the ICU. The short-term blood pressure change due to a pump exchange should not be given unless it is clinically relevant. For example, it is clinically relevant if reanimation was performed in response to a major decrease in MAP.

Name	Lowest mean arterial pressure
Simple data type	Number
Unit of measurement	mmHg
Technical data type	Int
Output format	---
Time of measurement	Within the first 24 hours in the ICU
Example	65.0
Mandatory	No

Highest respiratory rate

This field's value refers to the highest spontaneous or mechanical Respiratory Rate (RR) within the first 24 hours of the patient's stay in the ICU.

Name	Highest respiratory rate
Simple data type	Number
Unit of measurement	/min
Technical data type	Int
Output format	---
Time of measurement	Within the first 24 hours in the ICU
Example	24.0
Mandatory	No

Lowest P/F ratio

The value of this field refers to the ratio of arterial oxygen partial pressure (PaO₂ in mmHg) to inspired oxygen, where FiO₂ is expressed as a fraction and not as a percentage.

Name	Lowest P/F ratio
Simple data type	Number
Unit of measurement	---
Technical data type	Double
Output format	---
Time of measurement	Within the first 24 hours in the ICU
Example	68.71
Mandatory	No

Highest FiO2

This field's value is the highest level of oxygen inhaled, expressed as a percentage, in the first 24 hours of the patient's stay in the ICU. The value should be the highest alveolar-arterial oxygen pressure difference. The difference is calculated using the formula: $AaDO_2 = 7.13 \times FiO_2 - PaO_2 - PaCO_2$.

Name	Highest FiO2
Simple data type	Number
Unit of measurement	Percentage (%)
Technical data type	Int
Output format	---
Time of measurement	Within the first 24 hours in the ICU
Example	80.0
Mandatory	No

For patients that are ventilated but are not receiving oxygen, the FiO2 value is 21.0.

For patients that were intubated during the first 24 hours of their ICU stay, the value that arose during intubation should be given.

For patients that were not intubated, such as those who received oxygen via a nebuliser or a mask, the value should be converted from litres per minute to FiO2. Table 9 lists the conversions to be used.

Table 9 FiO2 conversion table

Nasal cannula		Mask	
l/min	FiO2	l/min	FiO2
1	22	2	25
2	25	3	27
3	27	4	30
4	30	5	35
>=5	35	6	40
		7	45
		>=8	50

Total urine production

The value of this field is the total urine output during first 24 hours of the ICU admission. Anything extracted via CVVH or dialysis should not be included in the total urine output. Production via nefrodrain, however, should be included.

Name	Total urine production
Simple data type	Number
Unit of measurement	cc
Technical data type	Double
Output format	---
Time of measurement	Within the first 24 hours in the ICU
Example	1800
Mandatory	No

For patients that stay in the ICU for less than 24 hours, the value should be the proportionate quantity for 24 hours. For example, 1000 cc during an 8-hour stay in the ICU can be extrapolated to 3000 cc for a 24-hour period.

Vasopressor use

This field's value indicates if the patient received vasoactive medication for a minimum period of one hour during their first 24 hours in the ICU. This includes positive inotropics such as vasopressin, dopamine, dobutamine hydrochloride, vasopressors and phosphodiesterase inhibitors.

Name	Vasopressor use
Simple data type	No/Yes
Unit of measurement	---
Technical data type	Bit
Output format	0 = no 1 = yes
Time of measurement	Within the first 24 hours in the ICU
Example	1
Mandatory	No

For dopamine and dobutamine hydrochloride, the value '1' (yes) should be given when the dose is greater than 5 µg/kg per minute. If the dosage is less than 5 µg/kg per minute, then the value '0' (no) should be given. The other types of vasoactive medication do not have any dosage requirements.

The following conditions apply to all types of vasoactive medication, unless stated otherwise:

- The medication should have been administered to increase blood pressure for a consecutive period of at least one hour.
- Adjustments in dosage quantity may be counted during that consecutive period of one hour, except in cases where dopamine or dobutamine were administered, as stated above.
- Periods which together make up one hour may not be counted. For example: when a patient first receives noradrenaline for 30 minutes, then does not receive any type of vasoactive medication for an hour, before finally receiving another bolus of noradrenaline for 30 minutes.

Noradrenaline

The value of this field is the highest noradrenaline speed for a minimum of 1 hour during the first 24 hours in the ICU. Short term increases in infusion speed (less than 1 hour) should not be given.

Name	Noradrenaline
Simple data type	Number
Unit of measurement	µg/kg/min
Technical data type	Double
Output format	---
Time of measurement	Within the first 24 hours in the ICU
Example	0.0267
Mandatory	No

Adrenaline

The value of this field is the highest adrenaline speed for a minimum of 1 hour during the first 24 hours in the ICU. Short term increases in infusion speed (less than 1 hour) should not be given.

Name	Adrenaline
Simple data type	Number
Unit of measurement	µg/kg/min
Technical data type	Double
Output format	---
Time of measurement	Within the first 24 hours in the ICU
Example	0.0847
Mandatory	No

Dopamine

The value of this field is the highest dopamine speed for a minimum of 1 hour during the first 24 hours in the ICU. Short term increases in infusion speed (less than 1 hour) should not be given.

Name	Dopamine
Simple data type	Number
Unit of measurement	µg/kg/min
Technical data type	Double
Output format	---
Time of measurement	Within the first 24 hours in the ICU
Example	0.0267
Mandatory	No

Dobutamine

The value of this field is the highest dobutamine speed for a minimum of 1 hour during the first 24 hours in the ICU. Short term increases in infusion speed (less than 1 hour) should not be given.

Name	Dobutamine
Simple data type	Number
Unit of measurement	µg/kg/min
Technical data type	Double
Output format	---
Time of measurement	Within the first 24 hours in the ICU
Example	0.5
Mandatory	No

Dialysis

This field's value indicates the direct start of dialysis within the patient's first 24 hours in the ICU due to severity of disease or the presence of chronic dialysis. Chronic dialysis is the state where the patient has received haemodialysis or peritoneal dialysis on a long-term basis prior to the current hospital admission.

Name	Dialysis
Simple data type	No/Yes
Unit of measurement	---
Technical data type	Bit
Output format	0 = No 1 = Yes
Time of measurement	Within the first 24 hours in the ICU
Example	1
Mandatory	No

For patients whose renal function was supported by artificial, extracorporeal support for a minimum of 1 hour, the value '1' (yes) should be given. This value conveys that a continuous extracorporeal detoxification method in association with renal failure was executed for a minimum duration of 1 hour on the day of measurement.

Molecular Adsorbents Recirculating System (extracorporeal) treatment with (pig) hepatocytes should be considered. The value '0' (no) must be given in cases where this occurred solely in the operating theatre, such as within the context of a heart operation, and is not continued in the ICU.

pH

The value of this field refers to the pH of the arterial blood gas measured in the same blood sample that was used to measure oxygenation. This value may not be replaced with the pH for venous gas when arterial gas is not present.

Name	pH
Simple data type	Number
Unit of measurement	---
Technical data type	Double
Output format	---
Time of measurement	Within the first 24 hours in the ICU
Example	7.53
Mandatory	No

pO₂

The value of this field refers to the patient's arterial oxygen pressure. This value may not be replaced with the pO₂ for venous gas when arterial gas is not present.

Name	pO ₂
Simple data type	Number
Unit of measurement	kPa
Technical data type	Double
Output format	---
Time of measurement	Within the first 24 hours in the ICU
Example	6.09
Mandatory	No

The value provided must relate to the sample that yielded the highest alveolar-arterial oxygen pressure difference during the first 24 hours of the ICU admission.

In cases where the patient was intubated during their first 24 hours in the ICU, provide the value that arose during intubation.

pCO₂

The value of this field refers to the arterial carbon dioxide pressure. This value may not be replaced with the pCO₂ for venous gas when arterial gas is not present.

Name	pCO ₂
Simple data type	Number
Unit of measurement	kPa
Technical data type	Double
Output format	---
Time of measurement	Within the first 24 hours in the ICU
Example	4.21
Mandatory	No

The value provided must relate to the sample that yielded the highest alveolar-arterial oxygen pressure difference during the first 24 hours of the ICU admission.

For cases where the patient was intubated during their first 24 hours in the ICU, only the value that arose during intubation should be given.

Bilirubin

The field's value refers to the highest level of total bilirubin arising during the first 24 hours of the ICU stay.

Name	Bilirubin
Simple data type	Number
Unit of measurement	µg/l
Technical data type	Double
Output format	---
Time of measurement	Within the first 24 hours in the ICU
Example	6000.0
Mandatory	No

The admission laboratory result may be given. If this is unavailable, then the worst value obtained within first 24 hours of the ICU stay should be used. Physiological and laboratory values arising from the operating theatre, or other temporary forms of treatment, should not be included.

Creatinine

The value of this field refers to the highest level of serum creatinine arising during the first 24 hours of the ICU admission.

Name	Creatinine
Simple data type	Number
Unit of measurement	µmol/l
Technical data type	Double
Output format	---
Time of measurement	Within the first 24 hours in the ICU
Example	47.74
Mandatory	No

The admission laboratory result may be given. If this is unavailable, then the worst value obtained within first 24 hours of the ICU stay should be used. Physiological and laboratory values arising from the operating theatre, or other temporary forms of treatment, should not be included.

Thrombocytes

The value of this field refers to the first measurement of thrombocytes during the first 24 hours of the ICU admission. The admission laboratory result may be given. If this is unavailable, then the worst value obtained within first 24 hours of the ICU stay should be used. Physiological and laboratory values arising from the operating theatre, or other temporary forms of treatment, should not be included.

Name	Thrombocytes
Simple data type	Number
Unit of measurement	10E9/l
Technical data type	Double
Output format	---
Time of measurement	Within the first 24 hours in the ICU
Example	253
Mandatory	No

CRP

This field's value is the amount of C-reactive protein in the blood. The admission laboratory result may be given. If this is unavailable, then the worst value obtained within first 24 hours of the ICU stay should be used. Physiological and laboratory values arising from the operating theatre, or other temporary forms of treatment, should not be included.

Name	CRP
Simple data type	Number
Unit of measurement	mg/l
Technical data type	Double
Output format	---
Time of measurement	Within the first 24 hours in the ICU
Example	116.3
Mandatory	No

Any time during the ICU stay

There are 19 fields for collecting values that may be obtained at any time during the patient's stay in the ICU. These values relate to primary and secondary outcomes.

Pulmonary embolism

The value of this field indicates if the patient had a pulmonary embolism at any time during their ICU stay.

Name	Pulmonary embolism
Simple data type	No/Yes
Unit of measurement	---
Technical data type	Bit
Output format	0 = no 1 = yes
Time of measurement	Anytime during the ICU stay
Example	0
Mandatory	No

Deep venous thrombosis

This field's value indicates if the patient has had a deep venous thrombosis at any time during their ICU stay.

Name	Deep venous thrombosis
Simple data type	No/Yes
Unit of measurement	---
Technical data type	Bit
Output format	0 = no 1 = yes
Time of measurement	Anytime during the ICU stay
Example	0
Mandatory	No

Reintubation

The value of this field indicates if a previously extubated patient has undergone repeated ventilation episodes (two or more) during their stay in the ICU.

Name	Reintubation
Simple data type	No/Yes
Unit of measurement	---
Technical data type	Bit
Output format	0 = no 1 = yes
Time of measurement	Anytime during the ICU stay
Example	1
Mandatory	No

Reintubation date

This field's value is the date that a patient was reintubated for the first time.

Name	Reintubation date
Simple data type	Date & Time
Unit of measurement	---
Technical data type	DateTime
Output format	yyyy-mm-dd hh:mm
Time of measurement	Anytime during the ICU stay
Example	2020-04-28 08:20
Mandatory	No

Extubation date

The value of this field is the date that a patient was extubated for the first time.

Name	Extubation date
Simple data type	Date & Time
Unit of measurement	---
Technical data type	DateTime
Output format	yyyy-mm-dd hh:mm
Time of measurement	Anytime during the ICU stay
Example	2020-04-07 12:14
Mandatory	No

Renal replacement therapy

The value of this field indicates if the patient received Renal Replacement Therapy (RRT) for a minimum duration of 1 hour at any time during their stay in the ICU. All forms of RRT delivered in the ICU should be considered, such as of Continuous Veno-Venous Hemofiltration (CVVH), Continuous Arteriovenous Hemofiltration (CAVH) or Intermittent Haemodialysis (IHD) or peritoneal dialysis.

Name	Renal replacement therapy
Simple data type	No/Yes
Unit of measurement	---
Technical data type	Bit
Output format	0 = no 1 = yes
Time of measurement	Anytime during the ICU stay
Example	0
Mandatory	No

The value '1' (yes) should be given for patients that were transported to the dialysis unit prior to the RRT and were returned to the ICU after the RRT.

A value of '0' (no) should be given in cases where:

- The RRT occurred only in the operating theatre, such as within the context of a heart operation.

Extracorporeal membrane oxygenation

This field's value indicates if the patient's circulation was supported by Extracorporeal Membrane Oxygenation (ECMO) for a minimum of 1 hour at any time during their stay in the ICU.

Name	Extracorporeal membrane oxygenation
Simple data type	No/Yes
Unit of measurement	---
Technical data type	Bit
Output format	0 = no 1 = yes
Time of measurement	Anytime during the ICU stay
Example	1
Mandatory	No

The value given should be '0' (no) in cases where ECMO occurred only in the operating theatre, such as within the context of a heart operation.

Antibacterial therapy

The value of this field indicates if the patient received medication in conjunction with antibacterial therapy. This includes IV antibiotics, such as antiviral substances.

Name	Antibacterial therapy
Simple data type	No/Yes
Unit of measurement	---
Technical data type	Bit
Output format	0 = no 1 = yes
Time of measurement	Anytime during the ICU stay
Example	0
Mandatory	No

Corticosteroids

The value of this field indicates if the patient received corticosteroids medication during their stay in the ICU.

Name	Corticosteroids
Simple data type	No/Yes
Unit of measurement	---
Technical data type	Bit
Output format	0 = no 1 = yes
Time of measurement	Anytime during the ICU stay
Example	0
Mandatory	No

Chloroquine

The value of this field indicates if the patient received Chloroquine during their stay in the ICU.

Name	Chloroquine
Simple data type	No/Yes
Unit of measurement	---
Technical data type	Bit
Output format	0 = no 1 = yes
Time of measurement	Anytime during the ICU stay
Example	0
Mandatory	No

Remdesivir

The value of this field indicates if the patient received Remdesivir during their stay in the ICU.

Name	Remdesivir
Simple data type	No/Yes
Unit of measurement	---
Technical data type	Bit
Output format	0 = no 1 = yes
Time of measurement	Anytime during the ICU stay
Example	0
Mandatory	No

Lopinavir/ritonavir

The value of this field indicates if the patient received Lopinavir or Ritonavir during their stay in the ICU.

Name	Lopinavir/ritonavir
Simple data type	No/Yes
Unit of measurement	---
Technical data type	Bit
Output format	0 = no 1 = yes
Time of measurement	Anytime during the ICU stay
Example	0
Mandatory	No

Oseltamivir

The value of this field indicates if the patient received the Oseltamivir during their stay in the ICU.

Name	Oseltamivir
Simple data type	No/Yes
Unit of measurement	---
Technical data type	Bit
Output format	0 = no 1 = yes
Time of measurement	Anytime during the ICU stay
Example	0
Mandatory	No

Interleukin inhibitors

The value of this field indicates if the patient received interleukin inhibitors during their stay in the ICU.

Name	Interleukin inhibitors
Simple data type	No/Yes
Unit of measurement	---
Technical data type	Bit
Output format	0 = no 1 = yes
Time of measurement	Anytime during the ICU stay
Example	0
Mandatory	No

Anti-fungal medication

The value of this field indicates if the patient received one or more of the following antifungal medications:

- Voriconazole
- Anidulafungin
- Isavuconazole.

Name	Anti-fungal medication
Simple data type	No/Yes
Unit of measurement	---
Technical data type	Bit
Output format	0 = no 1 = yes
Time of measurement	Anytime during the ICU stay
Example	0
Mandatory	No

ICU survival

The value of this field indicates if the patient died during their stay in the ICU. This field is crucial for calculating a mortality ratio.

Name	ICU survival
Simple data type	No/Yes
Unit of measurement	---
Technical data type	Bit
Output format	0 = no 1 = yes
Time of measurement	Anytime during the ICU stay
Example	0
Mandatory	No

The value '0' (no) should be given to patients that have died during their stay in the ICU. If a (living) patient is transferred to another institution, then '1' (yes) should be entered. A '1' value should also be given in cases where a patient has died in another location within the same institution.

Date of ICU discharge

The value of this field is the date that a patient was discharged from, or deceased whilst in, the ICU. The date given must be the day on which the discharge occurred.

Name	Date of ICU discharge
Simple data type	Date & Time
Unit of measurement	---
Technical data type	DateTime
Output format	dd/mm/yyyy [hh:mm]
Time of measurement	Anytime during the ICU stay
Example	2020-04-06 18:07
Mandatory	No

Date of ICU death

This field's value is the date that the patient became deceased. Only the deaths in the current institution should be reported.

Name	Date of ICU death
Simple data type	Date & Time
Unit of measurement	---
Technical data type	DateTime
Output format	dd/mm/yyyy [hh:mm]
Time of measurement	Anytime during the ICU stay
Example	2020-05-14 00:00
Mandatory	No

Discharge location

The value of this field indicates the destination of patient following their discharge from the ICU. A value for this field should not be given for patients who died during their stay in the ICU.

Name	Discharge location
Simple data type	Number
Unit of measurement	---
Technical data type	Tinyint
Output format	0 = hospital ward 1 = other
Time of measurement	Anytime during the ICU stay
Example	1
Mandatory	No

Glossary

Bit

An integer (number-based) data type that can take a value of 1, 0, or NULL.

BMI

An initialism of *Body Mass Index*, which is calculated by dividing a person's weight in kilograms by the square of their height in meters.

Boolean

A data type that can hold one of two possible values, usually denoted true and false.

CoDaP

An acronym for *COVID Data Platform*.

CSV

An initialism of *Comma Separated Values*. It refers to a plain text file and is normally used to list tabular data, where each line is a single data record and datapoints (i.e. values) are separated by a single character.

Dataset

A collection of data normally presented in a tabular pattern, where each column pertains a variable and each row corresponds to a given member of the data set.

DEF

An abbreviation for *Data Extraction File*. It is the CSV file that contains datapoints (values) pertaining to patients infected with COVID-19 that have been admitted to an ICU.

EMV

An initialisation of *Eye, Motor and Verbal*.

GCS

An initialisation of *Glasgow Coma Scale*.

Institution

A hospital that is participating in this CoDaP study.

MUMC+

An initialism of *Maastricht University Medical Centre+*, a healthcare provider that is a participating in the CoDaP project.

NICE

An abbreviation for *Nationale Intensive Care Evaluatie*, a Dutch foundation that provides information for audit, communication and research purposes.

Participant

An individual that contributes to the CODAP project in a professional capacity.

String

A data type used in programming to represent text (letters) rather than numbers.

Tinyint

An integer (number-based) data type that can hold a value ranging between 0 and 255.

Varchar

An abbreviation for *Variable Character Field*. It refers to a data type that can contain any type of data, including numbers, letters, spaces and punctuation.

ZMK

An abbreviation for *Ziekenhuis Maas en Kempen*, a hospital that has recently merged with Ziekenhuis Oost-Limburg.

ZOL

An acronym for *Ziekenhuis Oost-Limburg*, the healthcare provider that is the Lead Partner in the CoDaP study.