## Overview

For more detailed documentation about the Medical Information Mart for Intensive Care III (MIMIC-III) research database see the CBDRH [**Health Gym**](https://healthgym.ai/acute-hypotension/) (Variables.csv) and [**Overview of MIMIC\_III data website**](https://mimic.mit.edu/docs/iii/tables/)( Overview of the MIMIC-III data.docx).

Things to watch out for:

* Incorrect values: MIMIC was not collected for research, and is a combination of two different electronic medical record systems (CareVue and Metavision). This increases the likelihood of inaccuracies in data entry and extraction.
* Missing data/sparseness: there is variation in the information recorded between patients due to different uses of the EMR (e.g. use of a separate system for recording lab results, or medications) across time, and the data being collected for clinical relevance rather than research.

Of the tables below a minimal set of tables to start with (e.g. in predicting mortality) would be:

* *pt\_icu\_outcome*
* *vitals\_hourly*
* *labs\_hourly*
* *gcs\_hourly*

## Patients, Hospital Admissions and ICU Stays.

All patients have a unique identifying ID (subject\_id), a hospital stay ID (hadm\_id) and an ICU stay ID (icustay\_id). These IDs can be used to identify readmissions to hospital and ICU.

### The patients table is a direct extract from MIMIC, see ‘The patients table.docx’

### The admissions table is a direct extract from MIMIC, see [**‘**](https://mimic.mit.edu/docs/iii/tables/admissions/) The admissions table.docx’

All of patients admissions will be recorded. For example subject 58526 has three admissions, but only one ICU stay.

### The icustays table is a direct extract from MIMIC, see [‘](https://mimic.mit.edu/docs/iii/tables/icustays/) The icustays table.docx’

## The next two tables are designed to aid in data analysis, and combine information from the above tables

### pt\_icu\_outcome

Patient outcomes per ICU stay can be found in the **‘pt\_icu\_outcome’**. The **intime** and **outtime** indicate ICU entry and exit times. The **admittime** and **dischtime** indicate hospital admission and discharge times. The patients time to death from ICU entry in days is found in the **ttd** column. Note that since MIMIC contains readmitted patients, those that die after a discharge from a particular ICU stay could have been readmitted in the intervening period.

**age\_years** is the patient’s age at ICU admission. If the patient was over 89 their DOB has been shifted to hide their true age. All these patients have **age\_years**=91.4 (see ‘The patients table.docx’).

Note that the **icustay\_id** should be unique to each row, however there is one patient with errors in their admission/discharge dates (icustay\_id = 229922) resulting in duplication.

### pt\_stay\_hr

ICU stays are further outlined in the **‘pt\_stay\_hr‘** table. The **intime** and **outtime** indicate ICU entry and exit times. The table is built in a verbose (by hour) method to allow you to use the table as a building block for constructing additional analysis tables (e.g. using the raw MIMIC tables; most of the below tables have been built using *pt\_stay\_hr*). The **dy** and **hr** columns allow you to break an ICU stay into discrete time intervals (by day or hour) for data analysis purposes. They count the patient length of stay, and start one day prior to ICU admission (dy = 0; hr = -24) as as MIMIC contains some lab results taken prior to a patients ICU admission. **starttime** and **endtime** indicate the start and end time of each hour **hr** discrete time interval.

## Others

### Bedside measurements ‘vitals\_hourly’

The **‘vitals\_hourly’** table describes commonly measured bedside readings, e.g. heart rate, blood pressure. It is averaged to hourly (MIMIC is not much more frequent). No pre-ICU information is available on bedside, and so the time variable **hr** begins at 1 for all patients. Be aware that since these patients are in ICU some values (e.g FiO2 or respiratory rate may be “artificial”).

### Lab results

The **‘lab’** table contains the results of a large number of blood tests. As pre-ICU information on lab values negative values are possible for the time variable **hr**. The time variable indicates the time the sample was taken, the time at which the test result was available (4-12 hours later) is not available.

### Glasgow Coma Score

Wikipedia: The Glasgow Coma Scale (GCS) is a neurological scale which aims to give a reliable and objective way of recording the state of a person’s consciousness for initial as well as subsequent assessment. A person is assessed against the criteria of the scale, and the resulting points give a person’s score between 3 (indicating deep unconsciousness) and either 14 (original scale) or 15 (more widely used, modified or revised scale).

**gcs** is the Glasgow Coma Score, with **gcsmotor**, **gcsverbal** and **gcseyes** the motor, verbal and eyes components of the score.

**endotrachflag** indicates the patient was under mechanical ventilation at the time the score was taken.

### Daily patient weight

### Fluid output

The *output\_hourly* table indicates urine output events and amounts (mL).

### Blood Cultures

The *bloodculture* table describes the results of tests for bacteria. The **charttime**/**chartdate** denote the time/date the test was taken. The time at which the test result was available (possibly days later) is not available. The **org\_name** (e.g. PSEUDOMONAS AERUGINOSA) is the organism tested for, and **positiveculture** is whether the test was positive or negative. Bacteria are also checked for antibiotic resistance, **ab\_name** is the antibiotic tested (e.g. PENICILLIN) and **antibioticresistance** is the result, with R and S indicating the bacteria is resistance and sensistive to the antibiotic.

Note that if a blood culture lacks an **icustay\_id** then the blood culture was taken more than 24 hours before a patients ICU stay.

### Antibiotics

The *antibiotics* table describes antibiotic prescriptions. It is not easy to use this table as more than an indicator that an antibiotic was precribed/given. Most (all?) **starttime** and **endtime** are separated by 1 minute, with **amount**=1 (amount of the drug) and **amountuom**=dose (uom = units of measure). The **totalamount** is generally the amount of fluid the antibiotic was delivered with (since most are IV administered), rather than the antibiotic dose.

Rewritten indicates the antibiotic was prescribed but not administered, whereas FinishedRunning indicates the full dosage was administered.

### Vasopressors

Wikipedia: An antihypotensive agent, also known as a vasopressor agent or simply vasopressor, or pressor, is any medication that tends to raise low blood pressure

Unlike the antibiotics table the vasopressors table contains information on the amount and time period over which a vasopressor was administered. However, be careful to ensure the values make sense. Prescription of vasopressors indicates cardiac organ failure.

### Mechanical ventilation

A large percentage of ICU patients require mechanical ventilation. You can check if a patient is ventilated over a certain time period using the **mechvent** table, and whether this was the first, second, … ventilation episode using **ventnum**. There is a large amount of information about mechanical ventilation recorded in MIMIC with 15 additional columns in this table that could be used in research about mechanical ventilation settings (e.g. PEEP) and patient outcomes.

### ICD 9 codes

Note that these are assigned after the hospital stay so care is needed in their use as a predictive variable (e.g. which chronic diabetes was likely known on arrival to ICU, sepsis may have only been suspected). The seq\_num indicates priority.

### Transfers

There are at least 5699 who change location (e.g. ICU) during an ICU stay. These can be found using the following SQL query select icustay\_id from mimiciii.icustays where first\_wardid != last\_wardid. If you wish to know the time and direction of the change the *transfers* table contains this information. It also identifies the tyoe of ICU (e.g. allowing subsetting to cardiac ICU patients).

The *transfers* table is a direct extract from MIMIC, see [**https://mimic.mit.edu/docs/iii/tables/transfers/**](https://mimic.mit.edu/docs/iii/tables/transfers/)

- 重点关注“mimic\_data”文件夹中的以下预处理表格：

- `admissions.csv`：入院详情，包括入院和出院时间。

- `antibiotics.csv`：抗生素使用数据。

- `bloodculture.csv`：血培养测试结果。

- `gcs\_hourly.csv`：格拉斯哥昏迷评分记录。

- `icd9\_diag.cs​​v`：患者病情的 ICD-9 诊断代码。

- `icustays.csv`：ICU 住院详情（例如入院、出院时间）。

- `labs\_hourly.csv`：每小时实验室结果。

- `output\_hourly.csv`：液体输出数据。

- `patients.csv`：人口统计和死亡率信息。

- `pt\_icu\_outcome.csv`：每次 ICU 住院的患者结果（例如死亡率）。

- `pt\_stay\_hr.csv`：ICU 住院的每小时记录。

- `pt\_weight.csv`：患者体重记录。

- `pv\_mechvent.csv`：机械通气数据。

- `transfers.csv`：医院内患者转院信息。

- `vasopressors.csv`：血管加压药管理。

- `vitals\_hourly.csv`：每小时生命体征测量值。

- 使用 `data.table` 高效加载大型数据集。