**Medical information important for the project**

1. **Important technical words or shortcut used in many features:**

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| **ICU** | Intensive care unit |
| **APACHE** | Acute Physiology, Age, Chronic Health Evaluation  one of several [ICU](https://en.wikipedia.org/wiki/Intensive_care_unit) [scoring systems](https://en.wikipedia.org/wiki/Medical_scoring). It is applied within 24 hours of admission of a patient to an [intensive care unit](https://en.wikipedia.org/wiki/Intensive_care_unit) (ICU): an integer score from 0 to 71 is computed based on several measurements; higher scores correspond to more severe disease and a higher risk of death. |
| **ARF** | Acute Renal Failure |
| **GCS** | **Glasgow Coma Scale :**  clinical scale used to reliably measure a person's level of consciousness after a brain injury. A person's GCS score can range from 3 (completely unresponsive) to 15 (responsive).  The score is given by the sum of the score of each component: eye, verbal, motor  Lower GCS scores are correlated with higher risk of death. high score means high responsiveness and low one means low conscious.  However, the GCS score alone should not be used on its own to predict the outcome for an individual person with brain injury. |
| **d1** | the first 24 hours (like day one) of the patients unit stay |
| **h1** | the first hour of the patients unit stay |

1. **Explication about features :**

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| **bmi** | The body mass index of the person on unit admission => BMI Categories:   * Underweight = <18.5 * Normal weight = 18.5–24.9 * Overweight = 25–29.9 * Obesity = BMI of 30 or greater   maybe change this numerical data to category : more meaningful for a model  because close number can have a very different impact depends on the exact value. |
| **elective surgery** | Whether the patient was admitted to the hospital for an elective  surgical operation (surgery that is scheduled in advance because it does not involve a medical emergency.) (binary : 0 or 1) |
| **icu\_admit\_**  **source** | The location of the patient prior to being admitted to the unit  (categorical: Accident & Emergency, OperatingRoom / Recovery,...) |
| **icu\_id** | A unique identifier for the unit to which the patient was admitted |
| **icu\_type** | A classification which indicates the type of care the unit is capable of providing |
| **pre\_icu\_los\_**  **days** | amount of time the patient wait for admission |
| **apache\_2\_**  **diagnosis** | APACHE II score is a general measure of disease severity based on current physiologic measurements, age & previous health conditions. The score can help in the assessment of patients to determine the level & degree of diagnostic & therapeutic intervention. |
| **apache\_3j\_**  **diagnosis** | methodology in order to more accurately predict hospital mortality risk for critically ill hospitalized adults. |
| **apache\_post\_**  **operative** | The APACHE operative status (binary: 1 for post-operative, 0 for non- operative) |
| **arf\_apache** | acute renal failure  remains highly prevalent with a high rate of morbidity and mortality.  binary:  1 means positive Acute Renal Failure and occurs if within the first 24 hrs of admission to hospital:   * + - Creatinine > 124 µmol/L and ≤ 177 µmol/L and subsequent creatinines show a steady increase > 177 µmol/L   OR   * + - Creatinine > 177 µmol/L and patient has documented pre-admission creatinine ≤ 124 µmol/L   OR   * creatinine decreases to < 124 µmol/L while patient is hospitalized.   Otherwise it will be 0 |
| **gcs\_eyes\_**  **apache** | The eye opening component of the Glasgow Coma Scale measured during the first 24 hours and part of apache score:  value between 1 and 4 integer so can be considered as categorical or numerical but with order. There are four grades starting with the most severe:   1. No opening of the eye 2. Eye opening in response to pain stimulus. A peripheral pain stimulus,   such as squeezing the lunula area of the person's fingernail  is more effective than a central stimulus such as a trapezius  squeeze, due to a grimacing effect.   1. Eye opening to speech. Not to be confused with the awakening of a sleeping   person; such people receive a score of 4, not 3.   1. Eyes opening spontaneously   There are case where we can t measure it: not testable and can be reason for missing value. |
| **gcs\_motor\_**  **apache** | The motor component of the Glasgow Coma Scale measured during the first 24 hours and part of apache score.  There are six grades starting with the most severe:   1. No motor response. Lack of any motor response should raise suspicion for spinal cord injury. 2. Abnormal Extension in response to pain. Different guidelines report different evaluation of abnormal extension. While some sources indicate extension at the elbow is sufficient, other sources use the language "decerebrate posturing". It is important to note that the original publication of the Glasgow Coma Scale explicitly avoided the term "decerebrate extension" because it implied specific anatomical findings. 3. Abnormal Flexion in response to pain. Different guidelines report different evaluation. While some sources focus on arm movements, other sources use the term "decorticate posturing". 4. Normal Flexion (absence of abnormal posturing; unable to lift hand past chin with supraorbital pain but does pull away when nailbed is pinched) 5. Localizes to pain (purposeful movements towards painful stimuli; e.g., brings hand up beyond chin when supraorbital pressure applied) 6. Obeys commands (the person does simple things as asked)   other possibility NT (Not testable) so it can be reason of missing data |
| **gcs\_verbal\_apache** | The verbal component of the Glasgow Coma Scale measured during the first 24 hours and part of apache score. There are five grades starting with the most severe:   1. No verbal response 2. Incomprehensible sounds. Moaning but no words. 3. Inappropriate words. Random or exclamatory articulated speech, but no 4. conversational exchange. Speaks words but no sentences. 5. Confused. The person responds to questions coherently but there is some disorientation and confusion. 6. Oriented. Person responds coherently and appropriately to questions such as   the person’s name and age, where they are and why, the year, month, etc.  Possibility of unable for this test because of: intubation, deafness, language barrier, sedation from drugs, and paralysis. |
| **gcs\_unable\_**  **apache** | binary value that is 1 if GCS was unable to be assessed due to patient sedation so this feature explain the missing values in other gcs features. |
| **map\_apache** | The mean arterial pressure measured during the first 24 hours which results in the highest APACHE III score, numerical. |
| **resprate\_**  **apache** | The respiratory rate measured during the first 24 hours which results in the highest APACHE III score, numerical |
| **temp\_apache** | temperature which is numerical |
| **ventilated\_**  **apache** | Whether the patient was invasively ventilated at the time of the highest scoring arterial blood gas using the oxygenation scoring algorithm, including any mode of positive pressure ventilation delivered through a circuit attached to an endo-tracheal tube or tracheostomy |
| **mbp** | mean blood pressure (the diastolic blood pressure) |
| **diasbp** | diastolic blood pressure, either non-invasively or invasively measured |
| **diasbp\_**  **noninvasive** | diastolic blood pressure, either non-invasively or invasively measured |
| **mbp\_noninvasive** | diastolic blood pressure, non- invasively measured |
| **spo2** | spo2: peripheral oxygen saturation |
| **sysbp** | systolic blood pressure, either non-invasively or invasively measured |
| **sysbp\_noninvasive** | systolic blood pressure, invasively measured |
| **potassium** | potassium concentration for the patient in their serum or plasma |
| **apache\_4a\_**  **hospital\_death\_prob** | The APACHE IVa probabilistic prediction of in-hospital mortality for the patient which utilizes the APACHE III score and other covariates, including diagnosis. |
| **apache\_4a\_icu\_death\_prob** | The APACHE IVa probabilistic prediction of in ICU mortality for the patient which utilizes the APACHE III score and other covariates, including diagnosis |
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| **aids** | Whether the patient has a definitive diagnosis of acquired immune deficiency syndrome  Binary? |
| **cirrhosis** | 1. Whether the patient has a history of heavy alcohol use with portal hypertension and varices, other causes of cirrhosis with evidence of portal hypertension and varices, or biopsy proven cirrhosis. This comorbidity does not apply to patients with a functioning liver transplant.   Binary? |
| **diabetes\_**  **mellitus** | Whether the patient has been diagnosed with diabetes, either juvenile or adult onset, which requires medication.  Binary?  Can be problematic because different types of diabete more or less dangerous |
| **hepatic\_failure** | Whether the patient has cirrhosis and additional complications including jaundice and ascites, upper GI bleeding, hepatic encephalopathy, or coma.  Binary? |
| **immunosuppression** | Whether the patient has their immune system suppressed within six months prior to ICU admission for any of the following reasons; radiation therapy, chemotherapy, use of non-cytotoxic immunosuppressive drugs, high dose steroids (at least 0.3 mg/kg/day of methylprednisolone or equivalent for at least 6 months).  Binary? |
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| **leukemia** | Whether the patient has been diagnosed with acute or chronic myelogenous leukemia, acute or chronic lymphocytic leukemia, or multiple myeloma.  Binary? |
| **lymphoma** | Whether the patient has been diagnosed with non-Hodgkin lymphoma.  Binary? |
| **solid\_**  **tumor\_with\_**  **metastasis** | Whether the patient has been diagnosed with any solid tumor carcinoma (including malignant melanoma) which has evidence of metastasis. |
| **apache\_3j\_**  **bodysystem** | apache\_3j\_bodysystem: Admission diagnosis group for APACHE III  what does it mean?  Binary? |
| **apache\_2\_bodysystem** | Admission diagnosis group for APACHE II  Binary?  What does it means? |

* Need to be update based on observation of the data or in case we make modification : add feature, remove, change representation, …
* Check if apache\_3j\_bodysystem and apache\_2\_bodysystem are really both necesery, equals, different, meaning of the value?