Reproduction template

The goal of this template is to guide documentation of a reproduction of a study in an electronic health record database. Reproductions are assumed to be retrospective observational studies.

This template is based on material from the OSF, as well as from Brandt et al., 2013.

Title of the study

Mechanical power of ventilation is associated with mortality in critically ill patients: an analysis of patients in two observational cohorts

https://doi.org/10.1007/s00134-018-5375-6

Dataset(s) used

Describe the dataset used in the reproduction. Include the same information as above, that is at least:

data stored in the databases of the MIMIC-IV https://doi.org/10.13026/a3wn-hq05. Johnson, A., Bulgarelli, L., Pollard, T., Horng, S., Celi, L. A., & Mark, R. (2020). MIMIC-IV (version 0.4). PhysioNet. https://doi.org/10.13026/a3wn-hq05.

If the same dataset in the original study is used for the reproduction, reference the prior section.

Data extraction

Inclusion/Exclusion criteria

Provide the column names for your proposed "cohort" table, which will apply all inclusion/exclusion criteria. Include the description of the criteria, the table in the dataset you will use, and how missing data will be interpreted (e.g. missing values will be assumed to include the patient).

exclusion_young - Remove patients with age younger than 16 or unknown Will use the patients and admissions table, and define age as the age at first hospitalization. exclusion_non_first_hadm-Remove hosptial admissions that are not the first on record, use icustay_detail. exclusion_non_first_icu_stay-Remove ICU admissions that are not the patients first on record, use icustay_detail. exclusion_non_invasive-Remove patients who did not receive invasive ventilation, will use the ventilation table in mimic_derived, will only consider the earliest ventilation per stay_id. exclusion_outside_cohort - Remove patients outside the 2001 - 2012 cohort, will use anchor year and anchor_year_group in patients table. exclusion_extubated-Remove patients who were not ventilated for at least 48 consecutive hours. exclusion_missing-Remove patients missing variables needed to compute MP, they used them for sensitivity analysis however.

Variables

List out the planned source for all covariates and exposures extracted for the study, e.g. admission source. If describing a time-varying covariate, be specific regarding the aggregation and the time window (e.g. "lowest mean arterial pressure during the first 24 hours of the ICU stay."). The following template is a useful guide.

Variable name	Description	Timing	Aggregation	Source	Notes
Tidal Volume Size	Observed ventilator tidal volume	during the second 24 hours in the ICU stay	All_Values()	ventilator_setting	Needed to calculate MP
Plateau Pressure	Observed ventilator plateau pressure	during the second 24 hours in the ICU stay	All_Values()	ventilator_setting	Needed to calculate MP
Respiratory Rate	Observed Respiratory rate	during the second 24 hours in the ICU stay	All_Values()	ventilator_setting	Needed to calculate MP, if observed is 0.0, use spontaneous
Peep	Ventilator positive end expiratory-pressure	during the second 24 hours in the ICU stay	All_Values()	ventilator_setting	Needed to calculate Driving pressure, which is used to calculate MP
Heart Rate Day 1	Patient heart rate	First 24 hours of ICU stay	Mean between the highest and the lowest values measured during the day	chartevents	
MAP Day 1	Patient mean arterial pressure	First 24 hours of ICU stay	Mean between the highest and the lowest values measured during the day	chartevents	label is Arterial Blood Pressure mean
SpO2 Day 1	Patient Oxygen saturation	First 24 hours of ICU stay	Mean between the highest and the lowest values measured during the day	chartevents	label O2 saturation pulseoxymetry
Temperature Day 1	Patient Temperature	First 24 hours of ICU stay	Mean between the highest and the lowest values measured during the day	chartevents	label-Temperature celsius
pH Day 1	Patient pH	First 24 hours of ICU stay	Mean between the highest and the lowest values measured during the day	chartevents	label-arterial PH

Variable name	Description	Timing	Aggregation	Source	Notes
PaO2/FiO2	Patient arterial oxygen pressure divided by Inspired O2 Fraction	First 24 hours of ICU stay	Mean between the highest and the lowest values measured during the day	chartevents	labels- Arterial O2 pressure and Inspired O2 Fraction
PaCO2 Day 1	Patient arterial CO2 pressure	First 24 hours of ICU stay	Mean between the highest and the lowest values measured during the day	chartevents	label-Arterial CO2 Pressure
SAS Day 1	Patient sedation agitation scale	First 24 hours of ICU stay	Mean between the highest and the lowest values measured during the day	chartevents	label-Riker-SAS Scale
Heart Rate Day 2	Patient heart rate	second 24 hours of ICU stay	Mean between the highest and the lowest values measured during the day	chartevents	
MAP Day 2	Patient mean arterial pressure	second 24 hours of ICU stay	Mean between the highest and the lowest values measured during the day	chartevents	label is Arterial Blood Pressure mean
SpO2 Day 2	Patient Oxygen saturation	second 24 hours of ICU stay	Mean between the highest and the lowest values measured during the day	chartevents	label O2 saturation pulseoxymetry
Temperature Day 2	Patient Temperature	second 24 hours of ICU stay	Mean between the highest and the lowest values measured during the day	chartevents	label-Temperature celsius
pH Day 2	Patient pH	second 24 hours of ICU stay	Mean between the highest and the lowest values measured during the day	chartevents	label-arterial PH

Variable name	Description	Timing	Aggregation	Source	Notes
PaO2/FiO2	Patient arterial oxygen pressure divided by Inspired O2 Fraction	second 24 hours of ICU stay	Mean between the highest and the lowest values measured during the day	chartevents	labels- Arterial O2 pressure and Inspired O2 Fraction
PaCO2	Patient arterial CO2 pressure	second 24 hours of ICU stay	Mean between the highest and the lowest values measured during the day	chartevents	label-Arterial CO2 Pressure
SAS Day 2	Patient sedation agitation scale	second 24 hours of ICU stay	Mean between the highest and the lowest values measured during the day	chartevents	label-Riker-SAS Scale
Age	Patient age	admission	ANY_VALUES()	patients	
Gender	Patient gender	admission	ANY_VALUES()	patients	
Weight	Patient weight	admission weight	ANY_VALUES()	chartevents	label-Admission Weight (Kg)
Height	Patient height	admission height	ANY_VALUES()	chartevents	label-Height
BMI	Patient BMI	admission BMI	weight/(height squared)	chartevents	
PBW	Patient predicted body weight				
Admission Type	Patient admission type	On admission	ANY_VALUES()	admissions	
Source of Admission	Patient source of admission	On admission	ANY_VALUES()	admissions	
Ethnicity	Patient ethnicity	On admission	ANY_VALUES()	admissions	
Initial Diagnosis	First diagnosis of patient	First available	ANY_VALUES()	diagnosis_icd	
COPD					
Smoking					
Comorbidities Score					
ARDS severity					
Vassopressor	If the patient used vasopressors	second 24 hours of ventilation	ANY_VALUES	vasopressin or vasoactive_agent	by stay_id or hadm_id
Renal replacement therapy					

Variable name	Description	Timing	Aggregation	Source	Notes
SAPS II	SAPS II score	second 24 hours of ventilation	Mean between the highest and the lowest values measured during the day	sapsii	by stay_id or hadm_id
OASIS	OASIS score	second 24 hours of ventilation	Mean between the highest and the lowest values measured during the day	oasis	by stay_id or hadm_id
SOFA	SOFA score	second 24 hours of ventilation	Mean between the highest and the lowest values measured during the day	sofa	by stay_id or hadm_id

If unsure about the source, write all possibilities, and justify them in the notes. Also include in the notes whether outliers were processed (and how), as well as the approach for missing data.

Outcome(s)

List the outcome(s) used in the study, e.g. 28-day mortality, with similar detail as the above variables.

Variable name	Description	Timing	Aggregation	Source	Notes
In Hospital Mortality	whether the patient died while in the hospital	Anytime after 48 hour ventilation	ANY_VALUES() patients		existence of dod indicates patient died
ICU Mortality	whether the patient died while in the ICU	Anytime after 48 hour ventilation	ANY_VALUES() icustay_detail		indicates patient died while in the ICU, alternatively, if dod is before or on ICU date of discharge.
30 Day mortality	Whether patient was still alive	30 Days after 48 hour ventilation	ANY_VALUES() patients		existance of dod which is less than 30 days after 48 hours of ventilation, MIMIC-IV only has in-hospital mortality information

Variable name	Description	Timing	Aggregation	Source	Notes
1-year mortality	Whether patient was still alive	1 year after 48 hour ventilation	ANY_VALUES() patients		existance of dod which is less than 1-year after 48 hours of ventilation, MIMIC-IV only has in-hospital mortality information
Ventilator free days	Number of days free of ventilator after weaning	28 days	28 day date-ventilation end	ventilation	28 day mark from ventilation start
Hospital Length of stay	How long the patient was in the hospital	Discharge time	Discharge Time-Admit time	icustay_detail	—
ICU Length of stay	How long the patient was in the ICU	Discharge time	ICU Discharge Time-ICU Admit time	icustay_detail	—