Integration of Anesthesia into the OMOP CDM : proposol of aggregation methods

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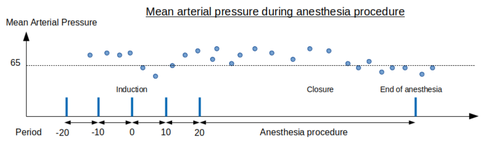
INTRODUCTION

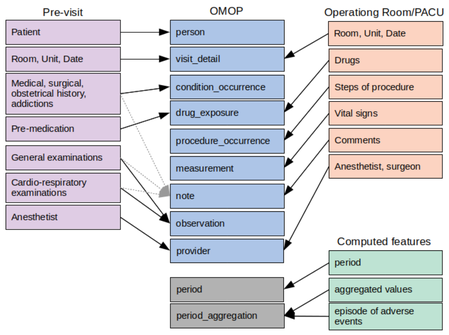
After the integration of raw and fine-grained data into the OMOP CDM (e.g. arterial pressure signal), we need to perform aggregation to obtain usable information.



In this work, we integrated raw data from the anesthesia management information system of the Lille University Hospital. We proposed an aggregation method to transform raw data into information.

METHODS

1. We integrated anesthesia data into the OMOP CDM through semantic and structural mapping.
2. Based on clinical case studies we have generalized the aggregation method necessary to transform raw data into information that can be used for the analysis of the data.
2.We defined two new concepts : the period and the period_aggregate.



Two aggregate concepts :

Period

1 event → visit in intensive care unit
or 1 event +/- interval → first 10 days after a visit
or 2 events → administration of hypnotics (drug) + extubation (procedure)
or a set of candidate events → hypnotics or induction or tidal volume

Aggregation

\+ statistical unit → patient, visit_occurrence, visit_detail
\+ period → visit in intensive care unit
\+ signal → mean arterial pressure or creatinine
\+ aggregation method → duration < 65 mmHg or min/max/mean value

R Package :

\+ basic functions known on R,
\+ more complex functions proposed in this package
\+ functions developed by the user on his working environment

Two new tables :

PERIOD

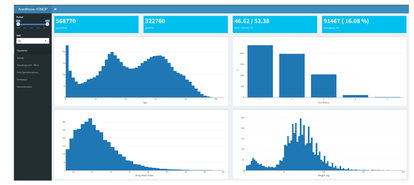
Field	Required	Type
period_id	yes	Integer
person_id	yes	Integer
period_concept_id	yes	Integer
start_period_event_id	no	Integer
start_event_field_concept_id	no	Integer
periode_start_date	no	Date
periode_start_datetime	yes	datetime
end_period_event_id	no	Integer
end_event_field_concept_id	no	Integer
periode_end_date	no	Date
periode_end_datetime	yes	datetime
duration	no	Integer
duration_unit_concept_id	no	Integer
visit_occurrence_id	no	Integer
visit_detail_id	no	Integer
period_type_concept_id	yes	Integer

PERIOD_AGGREGATE

Id	Required	Type
aggregated_measurement_id	Yes	integer
person_id	Yes	integer
period_id	No	integer
signal_concept_id	Yes	integer
aggregation_method_concept_id	Yes	integer
period_concept_id	Yes	integer
value_as_number	No	float
value_as_concept_id	No	integer
visit_occurrence_id	No	integer
visit_detail_id	No	integer
signal_source_concept_id	Yes	integer
method_source_concept_id	Yes	integer
period_source_concept_id	Yes	integer

RESULTS

1. We integrated data from the 585 846 anesthesia procedures, realized between 2010 and 2018 in the Lille University Hospital, into 8 tables of the Standardized Clinical Data Tables section.Based on the CDM, we produced clinical dashboards with Rshiny.



2. Aggregation methods were implemented in a R package

3. Aggregation results were stored ables PERIOD and PERIOD_AGGREGATE

GitLab

https://gitlab.com/mathilde.frchrt/aggregate
https://gitlab.com/antoinelamer/omop_anesthesia

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