Cohort Incidence
Robust Incidence Rates for the Common Data Model in R

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INTRO:
- There currently isn't an open source, standardized package for calculating incidence rates.
- Atlas does contain an Incidence Rate function but is limited to a single Time-At-Risk and excludes prior outcomes.
- A new method of incidence rate and proportion is needed to allow multiple time-at-risk periods per person, allow prior outcomes and account for clean window to avoid immortal time bias.
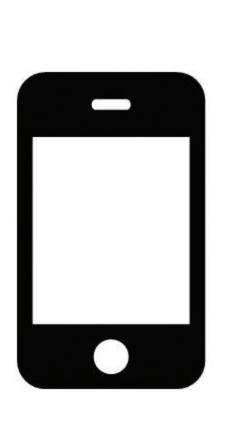
METHODS

1. Users define target and outcome cohorts in advance.
2. Time-at-risk is defined by specifying the offsets from the cohort entry and exit.
3. Clean window (a timespan from the end of the outcome end date) is used to exclude time at risk from incidence rate calculation.
4. Subgroups can be used to isolate incidence rate calculations to specific sub-populations
5. **Incidence rate = cases / (time_at_risk – excluded time); Incidence Proportion = distinct subjects with cases / distinct subjects with at least 1 day at risk.**
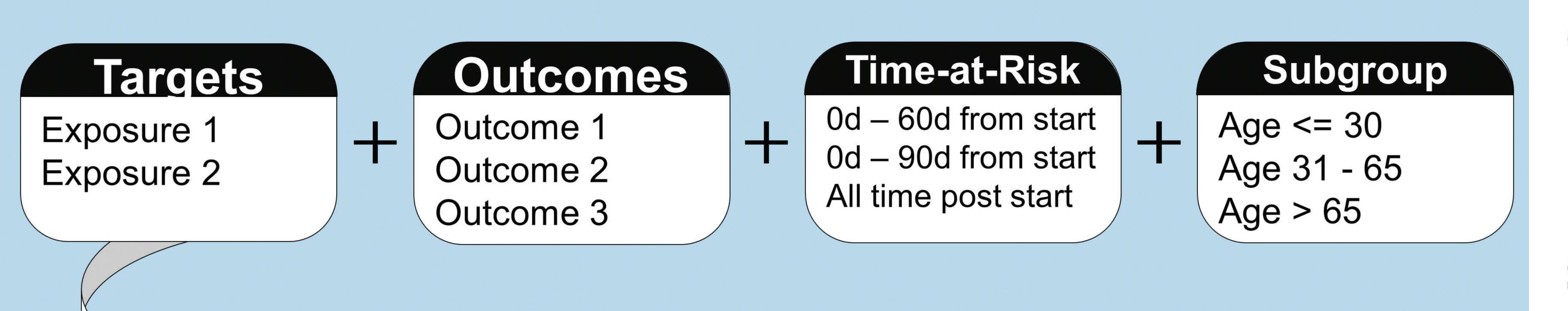
RESULTS
- Source code is opensource and available at GitHub.
- A standardized object-model that can be persisted to JSON syntax.
- A standard results schema to persist results
- Test cases that verify integrity of methods
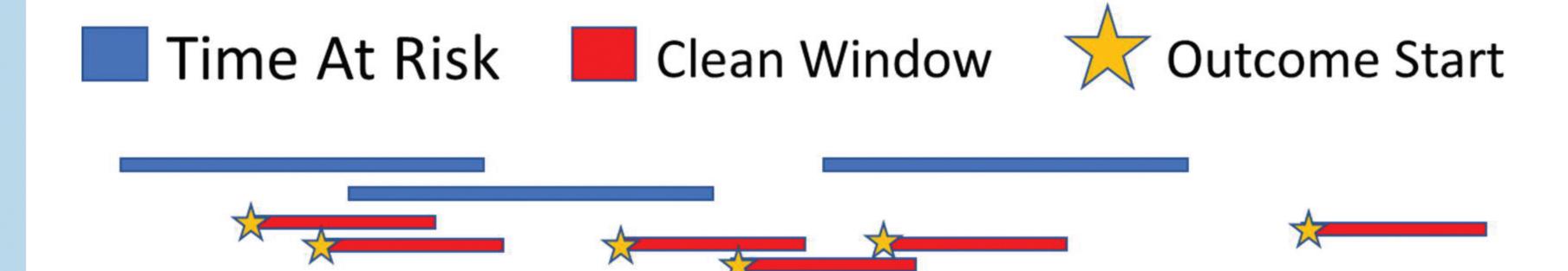
Take a picture to download materials

CohortIncidence is a new OHDSI R package and standardized framework for characterizing Incidence Rates at scale.

Targets		Outcomes		Time-at-Risk		Subgroup
Exposure 1 Exposure 2	+	Outcome 1 Outcome 2 Outcome 3	+	0d – 60d from start 0d – 90d from start All time post start	+	Age <= 30 Age 31 - 65 Age > 65

Cohort Incidence

Target	Outcome	TAR	Subgroup	Rate	Proportion
Exposure 1	Outcome 1	0d-60d	Age <= 30	103.24	24.7
Exposure 1	Outcome 1	0d-60d	Age 31 – 65	97.2	22.4
Exposure 1	Outcome 1	0d-60d	Age > 65	211.4	32.1
Exposure 1	Outcome 1	0d – 90d	Age <= 30	71.4	101.4
Exposure 1	Outcome 1	0d – 90d	Age 31 – 65	39.8	97.2
Exposure 1	Outcome 1	0d – 90d	Age > 65	101.7	132.7
Exposure 1	Outcome 1	All Time	Age <= 30	211.4	32.1
Exposure 1	Outcome 1	All Time	Age 31 – 65	71.4	101.4
Exposure 1	Outcome 1	All Time	Age > 65	39.8	97.2
Exposure 1	Outcome 1	0d-60d	Age <= 30	101.4	211.4
Exposure 1	Outcome 1	0d-60d	Age 31 – 65	97.2	71.4
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Exposure 2	Outcome 3	All Time	Age > 65	71.4	101.4

Example Use-case: A single person with multiple exposures and multiple outcomes:

🟦 Time At Risk 🟥 Clean Window ⭐ Outcome Start

Step 1: Derive time-at-risk episodes (from target cohort) and clean windows (from outcome cohort).

Step 2: Collapse time-at-risk and clean windows

Step 3: Exclude clean window from time-at-risk

Step 4: Calculate incidence rate (or proportion) from remaining time at risk and cases.

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