

ATLAS Training Guide

HOW TO CREATE A COHORT

What is a Cohort?

Before conducting the analysis in ATLAS for your research question, you will need to create a patient cohort. In ATLAS, most of the analysis functions are driven by cohorts. Once a cohort is created, you can use Feature Analysis in the Characterization tab to learn more about the makeup of your patients. You can analyze Treatment Pathways and even do advanced estimation.

A cohort is a set of patients who satisfy one or more inclusion criteria for a duration of time. Cohorts can vary from study to study depending on the research question of interest (e.g. a drug exposure or a condition occurrence). The cohort entry event specifies how a patient enters a cohort and how a patient exits the cohort.

Components of a Cohort

Initial Event

The initial event is used to establish your entry into the cohort.

Domains

A Domain defines the set of allowable concepts for the standardized field in the CDM tables.

Using Concept-Sets

Concept sets are expressions representing a list of concepts that can be used as a reusable component in different analyses.

Index Event

Defines the time when patients enter the initial event cohort.

Inclusion Criteria Definition

Inclusion criteria are applied to the initial event cohort to further restrict the set of patients.

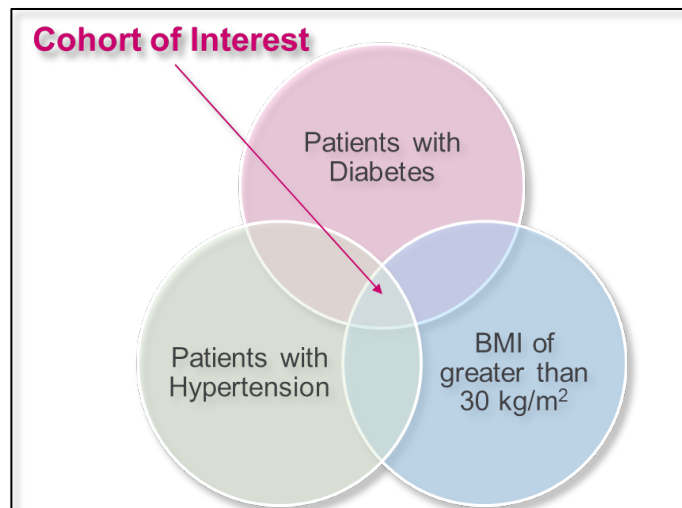
Exit Criteria Definition

The cohort exit event signifies when a person no longer qualifies for cohort membership.

Important Considerations

1. A person may belong to multiple cohorts
2. A person may belong to the same cohort at multiple distinct time periods
3. A person may not belong to the same cohort multiple times during the *same* time period

4. A cohort may have zero or more members



Two Approaches to Construct a Cohort

This tip-sheet will review the primary way to construct a cohort in Atlas, using Rule-Based methods.

Rule-Based cohort definition

Uses explicit rules to describe when a patient is in the cohort. Defining these rules typically relies heavily on the domain expertise for cohort inclusion criteria.

Probabilistic cohort definition

Uses a probabilistic model to compute a probability between 0 and 100 percent of patient being in the cohort and can translate it into 0 and 1 classification thresholds. Here, supervised learning algorithms allows for better phenotyping our cohort samples and their characterization.

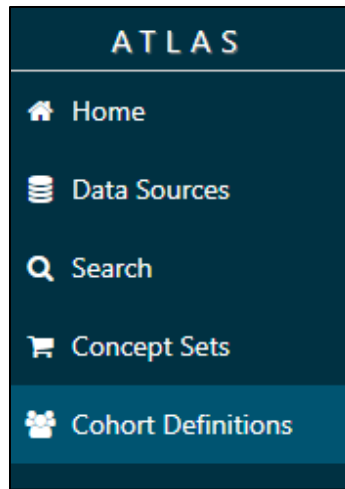
Two Steps to Construct a Cohort Using ATLAS

Initial Event

As we saw above, we will need to define the Initial Event, Inclusion Criteria, and Cohort Exit when building our cohort.

Note: Make sure you have all the required concept-sets you will need for your analysis. Refer to the Concept Set documentation for more information.

1. On the ATLAS home page click on the **Cohort Definition** from the *Navigation Menu*.



2. On the new screen click on **New Cohort** to initiate creating a cohort.
3. Define cohort name and description, make sure to click the green **Save** button to the right of the Cohort Name. It is good practice to continue saving after you make changes to the cohort definition.

4. Click on blue **Add Initial Event** button in the *Cohort Entry Events* section, to see a list of domains which you can use to build your criteria. The initial event defines the cohort start date for all other events in your analysis.

Example:

When configuring your initial event, remember to ask yourself a question:

Which domain will have the initial event?

- a. Is it a **Condition Occurrence** based criteria?
Ex. Patients diagnosed with heart failure in the last 3 months
- b. Is it a **Drug Exposure** based criteria?
Ex. Patients who received aspirin in last 2 weeks
- c. Is it a **Procedure Occurrence** based criteria?
Ex. Patients who had a kidney transplant in the last 1 year

- Once you choose your domain from add initial event tab, select the concept sets related to the event you want to use in your cohort definition.

Note: The button name will change depending on the type of initial event criteria you select, here we chose a measurement

- Next, click the blue **Add Attributes** button for additional domain attributes. This will be where you can enter the criteria corresponding to your concept-set.

Example:

- Is there a time interval criteria to consider?
 - Are you looking for patients with a specific measurement value?
 - Is there a demographic criteria to include?
 - Is there an exclusion criteria to consider?
- Finally, to ensure capturing the first observed event and mandate a minimum amount of time for events we use the drop downs next to *continuous observation of at least __ days before and after __ days* to configure the time index.

Note: This criteria is about prior history and does not involve time after the index event.

Cohort Inclusion Criteria

We add new criteria using the **Inclusion Criteria** or **Restrict Initial Events** functions. these criteria are applied to the initial event cohort to further restrict the set of people in your cohort definition.

- Make sure you have all the required concept-sets you will need for your analysis. Refer to the Concept Set documentation for more information.
- On the screen click on green button **New Inclusion Criteria**.

- Define a criteria and description add specific domain.

- From **Add criteria to group** add specific domain and select the Concept Sets you want to use in your inclusion criteria.
- Limit qualifying events to all events, earliest event, latest event according to the study question you have in mind.

Cohort Exit Criteria

Cohort exit can be defined in multiple ways.

Event Persistence Types

End of continuous observation

Select **End of continuous observation** when choosing a condition under observation. If you have selected an end date for your observation in the initial event entry, its helpful to use this tab instead of others. Also, when we are not sure about the end date of a condition.

The screenshot shows a 'Cohort Exit' configuration window. Under 'Event Persistence', the dropdown menu is set to 'end of continuous observation'. Below this, the 'Censoring Events' section is empty, with a button to '+ Add Censoring Event'.

Fixed duration relative to initial event

When the end date of a drug exposure or visit length is specified. this will assure that the cohort end date will be no greater than the selected start/end date plus offset days.

- Select event date from offset, its good practice to select start date.
- Add days offset to fix for your drug exposure date.

The screenshot shows the 'Cohort Exit' configuration window with 'Event Persistence' set to 'fixed duration relative to initial event'. A detailed explanation of this persistence type is provided. Below the explanation, there are two configuration options: 'Event date to offset from' set to 'start date' and 'Number of days offset' set to '0' days. The 'Censoring Events' section is also empty with the '+ Add Censoring Event' button.

End of a continuous drug exposure

Refers to a drug era containing of one or more drugs will be derived from all drug exposure, using the specified persistence window as a maximum allowable gap in days between exposure events. If no exposure event end date is provided, then the event end date will be start date plus persistence window.

- Select concept sets which describes the era for your drug exposure or ingredients using Select Drug Concept Set blue tab.
- Select the maximum allowable gap days between two successive drug exposures.

Event Persistence:Event will persist until: **Continuous Exposure Persistence:**

Specify a concept set that contains one or more drugs. A drug era will be derived from all drug exposure events for any of the drugs within the concept set, using the specified persistence window as a maximum allowable gap in days between successive exposure events and adding a specified surveillance window to the final exposure event. If no exposure event end date is provided, then an exposure event end date is inferred to be event start date + days supply in cases when days supply is available or event start date + 1 day otherwise. This event persistence assures that the cohort end date will be no greater than the drug era end date.

Concept set containing the drug(s) of interest:

- Persistence window: allow for a maximum of days between exposure records when inferring the era of persistence exposure
- Surveillance window: add days to the end of the era of persistence exposure as an additional period of surveillance prior to cohort exit.

Censoring Events:

Exit Cohort based on the following criteria:

No censoring events selected.