

Cosmos Quick Start Guide

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Cosmos Quick Start Guide

Getting Started

Introduction to Cosmos

Cosmos brings data together from across the Epic community to create the universe's largest repository of patient data to support point-of-care insights and ongoing healthcare innovation. If you're not familiar with Cosmos yet, start by reading the [Overview of Cosmos](#) document.

Cosmos is accessed through a web portal. You'll use SlicerDicer to search and investigate the data available through Cosmos.

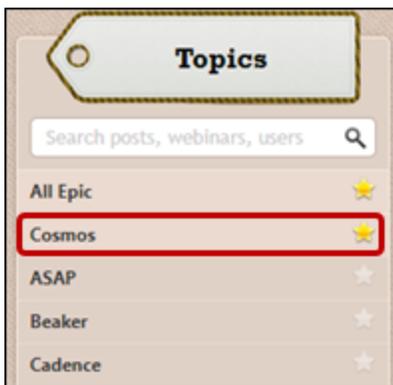
Access Cosmos directly

1. Go to <https://cosmos.epichosted.com/>
2. Log in to the Epic UserWeb using your organization's credentials.
3. Enter your Epic UserWeb [multi-factor authentication code](#).

 If you run into issues, please contact [Epic UserWeb support](#).

Access Cosmos via the Epic UserWeb

1. Go to <https://userweb.epic.com/>
2. Log into the Epic UserWeb using your organization's credentials.
3. Click the **Cosmos** topic on the left side of the screen.
 - You might have to search for the topic or scroll down if you have not favorited it.



4. Click **Access Cosmos Portal** on the right side of the screen.

About Cosmos

Overview of Cosmos
Cosmos Rules of the Road
Cosmos Publication Checklist

Cosmos Portal

[Access Cosmos Portal](#)

Cosmos Portal & Analytics Resources
Cosmos Data Science Overview
Cosmos Data Domain Encyclopedia

Cosmos Features

Overview of Look-Alikes
Overview of Clinical Trial Matchmaking

Questions

Reach out to Cosmos@epic.com!

5. Enter your Epic UserWeb [multi-factor authentication code](#).



If you run into any MFA-related issues, contact [Epic UserWeb support](#).
Otherwise, direct all access-related questions to
CosmosUserRequests@epic.com.

Create a Project

Create a new project

Before you start exploring the data available in Cosmos, you need to create a project.

1. From the Cosmos portal, click **Select Project** in the toolbar at the top.
2. Click **Let's Get Started!**
 - If this is not your first Cosmos project, click **Get Started with Something New.**
3. Fill out the required information, including a project title, a description, and any disclosures.
 - To add more information about any disclosures, click .
4. Click **Create a Project.**

Open an existing project

1. From the Cosmos portal, click **Select Project** in the toolbar at the top.
2. Select your project.

Dashboards

Overview of dashboards

Dashboards centralize information from Cosmos and can hold custom searches and components you add while you explore.

Your default favorited Radar dashboard appears when you log in and go to the **Dashboards**  activity.

Access other dashboards

You can access other dashboards by clicking the name of the dashboard and selecting another favorited dashboard. If you want to search for additional dashboards, type the name of the dashboard in the search bar or click **Show Catalog** to browse the full list.

 Favorite dashboards for easy access later. To make a favorited dashboard your default dashboard, drag it to the top of the list.

Navigate Dashboards

Switch to a favorited dashboard

Your commonly used dashboards should be favorited for easy access. You can favorite an individual dashboard or a group of related dashboards by clicking the star next to the name.

Search for and switch to a new dashboard

If you need a dashboard that isn't favorited, or simply want to browse the available reporting content, you can search for dashboards in the Analytics Catalog.

1. Click on the current dashboard name and click **Show Catalog**.
2. Enter a search term. Filter results by a content type of Dashboards.
3. Hover over a dashboard and click  to view more details about the record.
4. If appropriate, click  **Open**.
 - You can also hover over a dashboard and click  without viewing the record details.

 Plan on needing this dashboard again in the future? Hover and click  to favorite a dashboard for easy access later.

Create your own dashboard

1. From your dashboard, click  and select **Create Dashboard**.
2. Enter a title for your dashboard and click **Accept**.
3. Add your first component to your dashboard.
 - Click **Search the Catalog** to find existing content in the Analytics Catalog that you want to include. Look for a content type of Component.
 - Click **Create with SlicerDicer** to create a component based on data in a SlicerDicer session. You can add an existing SlicerDicer session to your dashboard or create a new one.
4. After you add one component, you can include additional existing components from the Analytics Catalog

or create SlicerDicer components by clicking  and selecting **Create Component**.

Dashboard Views

Dashboard views allow you to customize how you see a particular dashboard. You cannot make changes to a dashboard until you create a view.

Create a dashboard view

If you have different use cases for the same dashboard, you can create multiple views. Views save all your changes to a dashboard so you can quickly toggle between them depending on the use case at hand.

1. Open the dashboard you want to create a new view for.
2. Click  to open the view manager.
3. Click **+ New View**.
4. Enter a name.
5. Make any changes to the view, such as updating the layout or setting dashboard parameters.

Manage dashboard views

1. Click  to open the view manager.
2. For any views shown:
 - Click the view to open it.
 - Click  to edit the layout of the view.
 - Click  to delete the view.
3. Select the original dashboard to open the dashboard without any of your changes applied.

Organize the dashboard

Organize and customize components on the dashboard

1. Click  to open the view manager and click  next to the view you want to edit.
2. To move a component, drag it to where you want it to appear.
3. To resize a component, drag its bottom or side edge.
4. To customize the display settings (like changing the component's title), hover over the component and click  **Edit display settings**.
5. When finished making changes, click  **Accept**.

Add components from the Analytics Catalog

1. Click the dashboard name, and then click **Show Catalog**.
2. Enter a search term and filter the Content Type to Components.
3. Hover over a component and click the plus sign to add it to your dashboard.

View SlicerDicer data on your dashboard

Modify SlicerDicer data

 When you make changes to a SlicerDicer session in an existing component, you can save your changes in the component only if you created the original SlicerDicer session. When you modify a session you own, the session is updated for any users you shared the session with.

If you didn't create the session you're modifying, you can save your changes to a new component.

1. Next to the SlicerDicer data you want to modify on your dashboard, click .
2. Modify the SlicerDicer query to meet your needs. For example, you might:
 - Select a different visualization.
 - Modify or add new measures.
 - Modify the slices that appear.
3. If you want to show your modified query in a new component, click **Create Component**.
4. If you created the original session and want to overwrite your existing component with your changes, click **Save**.

Add SlicerDicer data

1. On your dashboard, click  and select **Create Component**.
2. Create or load a session that meets your needs.
3. When the query is completed, click **Create Component**.
4. In the Create Component window:
 - Optionally modify the display name for your component in the Name field.
 - Enter the date range that data should appear for. You can enter either fixed or dynamic dates.
 - If you included top or bottom slices in your query and don't want the top or bottom slices to be recalculated when you load a dashboard, clear the **Slice Config** check box.
5. Click **Add to Dashboard**.

Exploring with SlicerDicer

Use SlicerDicer to find the data you need to investigate a hunch. Refine your searches on the fly to better understand the data. Examine trends, save sessions, and add your searches to your dashboard for easy access.

Access SlicerDicer

1. Click the dashboard title (such as **Welcome to Cosmos**).
2. Click **Show Catalog**.
3. Search for SlicerDicer content, including data models and sessions.
 - Click to launch that content in SlicerDicer directly from the catalog.
 - If you're unsure what to select, hover and click  to view more information.



Alternatively, click  **Explore** to open SlicerDicer directly.

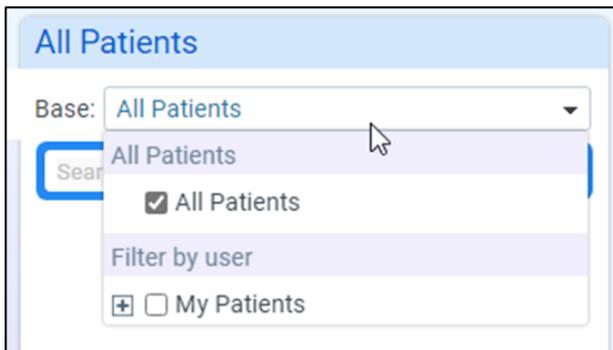
- Select a data model.
- If you're unsure which model to select, click  for more details.
- If you only have access to one data model, that model opens automatically.
- If you select the wrong data model, click  **Start Over** in the toolbar to clear your work and select a new data model.

Learn about SlicerDicer

1. After selecting a data model, click **Tutorials**.
2. Click **Begin Tutorial**.
 - Take 5-10 minutes to walk through the tutorial. You may return anytime to refresh your knowledge of the options in SlicerDicer.
 - To pick a specific topic, use the headers on the left.

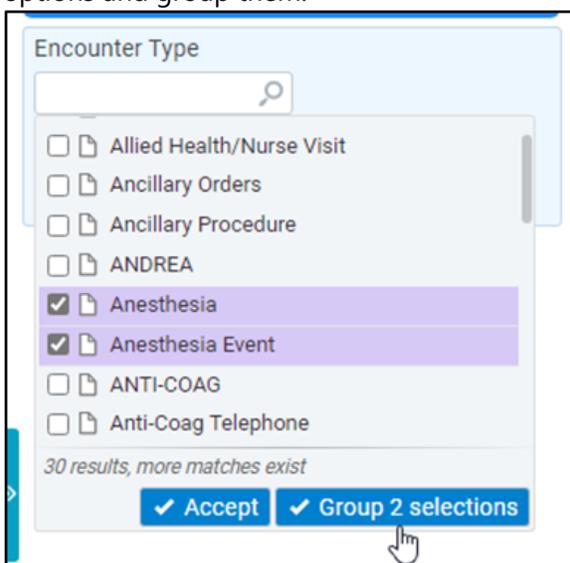
Define a Population

The population you can see by default in any given data model depends on your user security and the base filters configured for that data model. All users can view results for any base filters on the model, like My Patients, My Departments, or My Providers, but some users can view All Records. If a given data model has Base filters available, they appear in the Population section:

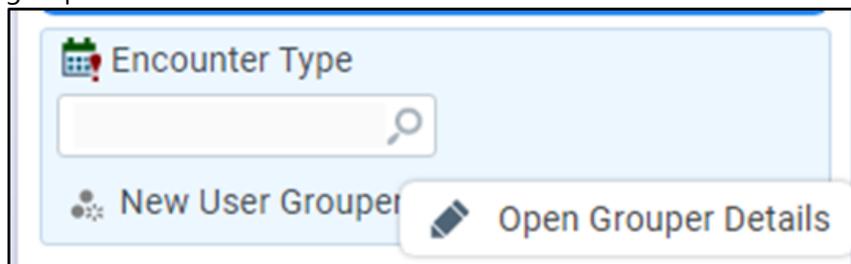


Use criteria to further narrow your starting population, filtering on items such as diagnoses, weight, or lab components. You can add multiple criteria, add sequential or overlapping criteria, and use additional advanced logic on criteria to get to the data you need.

1. Launch SlicerDicer and select a data model (for example, Patients).
2. Click **Browse** to search available criteria or use the search bar.
 - The search bar in the population section can find both filters and options (for example, individual diagnoses rather than simply the Diagnosis filter).
3. Select a criterion. If you want to learn more about a criterion, click **i**.
4. After selecting a criterion, you may need to provide additional details:
 - For criteria based on lists of records or category values, like Diagnosis, you need to select at least one option, like Hypertension. If you don't select an option, the criteria isn't active and doesn't affect your results.
 - You can select multiple options at once using Shift+click.
 - If you want to select many records that share a similar name, search for a common term, select the options and group them:

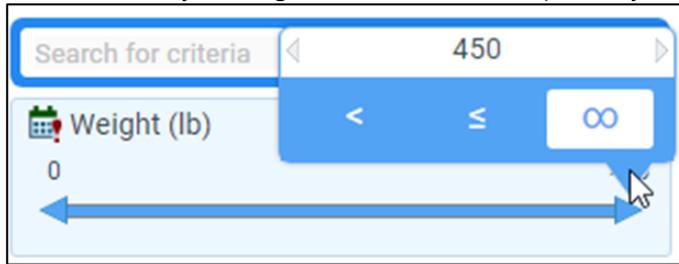


- Once grouped, you can edit, rename, or save your custom grouper as needed.
 - Custom groupers are not automatically updated, so if new values might match the search terms you used to create the grouper, you should manually update the grouper by creating a new grouper based on the original grouper including the new values.
 - Right-click the grouper and select **Open Grouper Details** to remove values from the grouper or rename it.



- For numeric criteria, like patient Weight, you need to choose a range on a slider bar. By default,

SlicerDicer shows patients with any value documented, even beyond the range on the slider bar. You can modify the logic of the slider's end point by clicking on one of the values.



- You can move the stops on the slider bar to further narrow the range.
 - Most numeric slider bars split the range evenly, but some are configured to use more meaningful ranges. For example, the BMI filter uses NIH Standard as its default slice range. When multiple ranges are available, you can select your desired range from the available list. You can always customize the range.
- For Boolean criteria, like Pregnant?, SlicerDicer automatically finds records that match the criteria. All Boolean criteria return two values - true and false.
- For free text criteria, like Component Result Text in the Lab Specimens and Tests data model, you need to enter a keyword or phrase for SlicerDicer to search for.

5. To exclude records that match the selected criterion, click  and select **Exclude**.

 Remove a criterion by hovering and clicking X.

 Click Undo (Ctrl +Z), Redo (Ctrl + Y), or Start Over in the toolbar to fix any mistakes.

Change the Active Date Range

Some data models have more than one relevant date for the query date range. For example, the ED Encounters data model can show results based on the ED encounter date, arrival date, or departure date. To change the date range used for your session:

1. Click the **Dates** section.
2. Select a new date range by clicking in the **Based On** field. Not all data models have multiple date ranges, so you might not see options here.
3. If your session has dates, you can divide the results by dates as well. By default, no date slices are applied. To add a date slice, choose an option in the **Slice By** field. You can choose from year, quarter, month, week, day, or none.

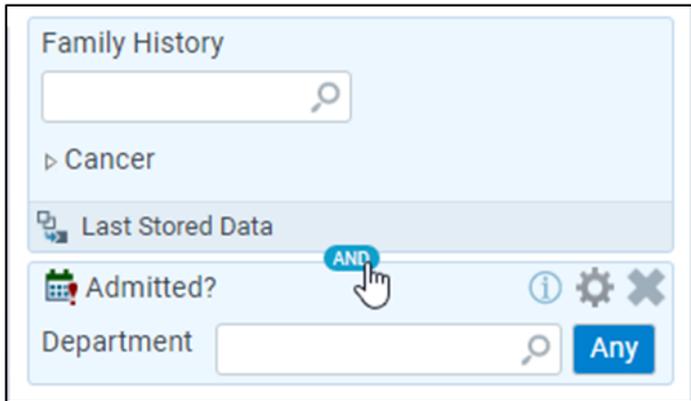
Some data models, like Patients, do not have associated date ranges. In these data models, dates are only added to your session if you add at least one filter with its own dates.



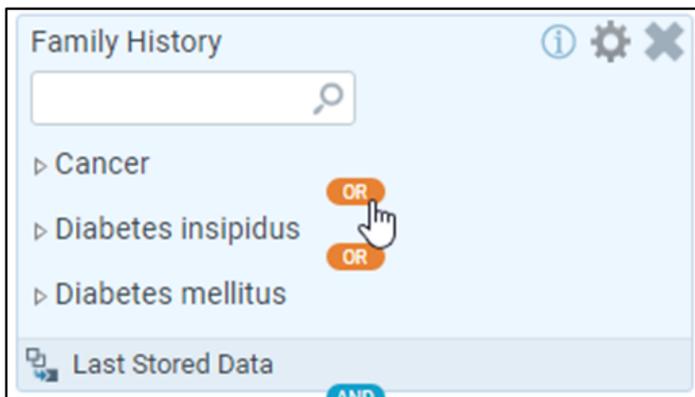
For example, adding a slice by Admitted? adds dates to your Patients session since the admissions themselves have associated dates. Multiple filters with different date ranges can be active at the same time. The results for each filter are compared to their own date ranges.

Change the Logic Between Filters

SlicerDicer allows both simple and advanced logic between criteria in the population card. You can toggle between AND and OR logic between your filters by clicking on the logic separator:



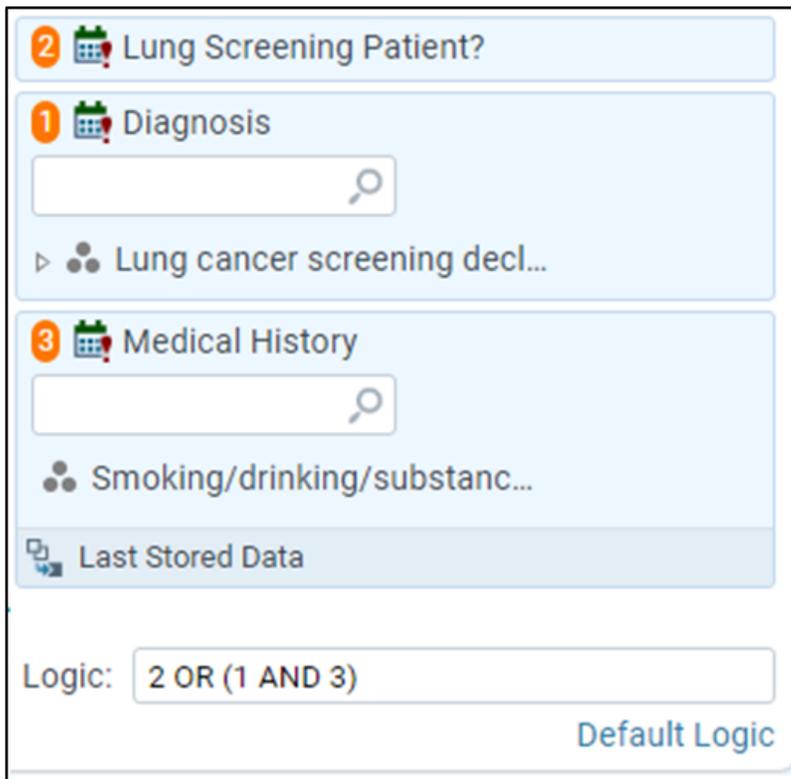
You can also toggle the logic between options within criteria based on lists of records:



SlicerDicer also offers an advanced logic mode for more complex scenarios. You might want to do this if you want to return a very specific set of results that cannot be replicated with AND or OR logic between each filter. To enable advanced logic mode, click the toggle at the bottom of the Population section in the sidebar:



In Advanced Logic mode, each filter shows an associated number you can use to define your logic. This is useful for grouping filters into sets, like in this example:



Create a Population Based on Multiple Data Models

The answers to some questions require data from multiple data models. For example, you might want to review patient data associated with transactions. If this data is not available in your current data model, you can link to additional models to investigate further.

1. Define your population in the starting data model.
2. Click  in the **Population** section.
3. Choose the data model where you want to continue your investigation.

Configure Advanced Options on Your Filters

The following topics allow you to further filter to a subset of your population.

Add Sequential or Overlapping Criteria

Sequential Criterion

This section applies to data models without a date range that also support filters with their own date ranges, like Patients, Patients with Cancer, Breast Imaging Lesions, or Pharmacogenomic Diplotypes. Suppose you're investigating root causes of opioid addictions and wondering whether having surgery within the last year could be a factor. SlicerDicer can show you the patients who had a surgery and were subsequently diagnosed with opioid dependence.

1. Add a criterion for the event that occurred first. In this example, filter results by an encounter type of surgery.
2. Right-click the criterion and select  **Add Sequential Criterion > Add New Criteria**.
3. Select the criterion for the event that occurred second.
 - a. In this example, select the **Diagnosis** criterion and enter opioid dependence.
4. Update the **Within** field for your use case.

- a. In this example, enter 12 months.

Overlapping Criterion

Overlapping date ranges require two criteria to have occurred simultaneously. For example, suppose you want to find pregnant patients who had a specific procedure. For this report, right-click the **Procedures** criterion, select **Add Overlapping Criterion**  > **Add New Criteria**, and select the **Pregnant?** filter. If you don't specify the criteria as overlapping, SlicerDicer returns patients who were pregnant and had the specified procedure at any time during the query date range, even if, for example, the pregnancy didn't begin until after the procedure occurred.

If you want to see sequential rates, the workflow for adding the criteria is slightly different than adding sequential criteria in your main population. For example, suppose you want to see the percentage of patients who were discharged and had an admission within 30 days.

1. Add a criterion for the event that occurred first.
 - a. In this example, add the Discharged? criterion.
2. Add a measure for the event you want to see the rate of and verify the Percentage calculation is selected.
 - a. In this example, add the Admitted? measure.
3. In the right pane, click **Make Rate Sequential**.
4. In the First section, choose the event that occurred first.
 - a. Choose the Discharged? criterion in this example.
5. In the And Then section, update the Within options to match the time frame for your use case.
 - a. In this example, enter 30 and select Days.

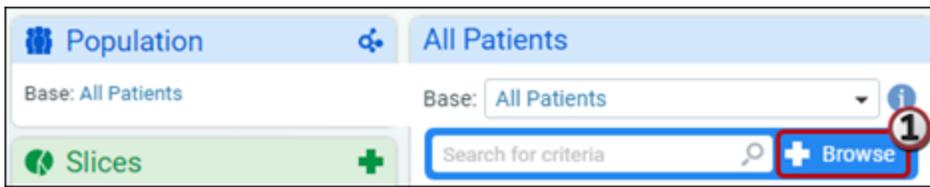
Not all criteria track data over time. If a criterion has a Last Stored banner, that means it uses only the most recent value. This has the following implications for SlicerDicer:

- The query date range doesn't apply to these criteria. For example, suppose your session includes only the MyChart Status criterion. If you try to use the line graph to see how the number of patients with an activated MyChart account has changed over time, the line will always be flat because SlicerDicer uses only patients' current MyChart status.
- Specifying sequential or overlapping criteria doesn't apply to these criteria.
- Using a different date range than the range on the graph doesn't apply to these criteria.
- Slice values for these criteria don't change across date slices.

Add Sequential or Overlapping Criterion directly

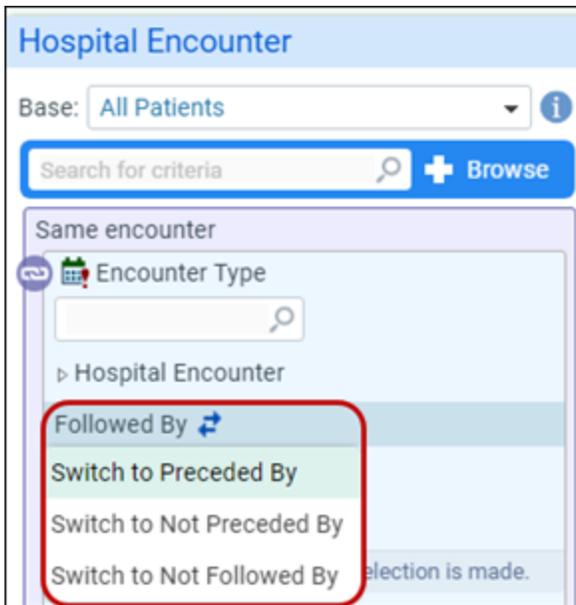
You can also add sequential or overlapping criterion directly from the Add Criterion menu.

1. Click  **Browse**.
2. Select **Sequential** at the top of the Add Criterion menu.
3. Search for and select a criterion.
4. Click **Add Sequential Criterion** or **Add Overlapping Criterion**.
5. Search for and select an additional criterion.



Control the Order of Events

- You can also control the order of events after configuring the criteria in the chain. You can choose from Followed By, Preceded By, Not Followed By, or Not Preceded By.
- The Not Followed By and Not Preceded By options can be used only once in the chain and only at the end of the chain.
- Click the banner between any two events to change your selection for the entire chain.



Add Multiple Values

You can add multiple values to a SlicerDicer filter at one time when creating reports in SlicerDicer. If you have an external list of values such as procedures, medications, or diagnoses, you can search for and add all of the values at once instead of one at a time. You can also save these values into a user grouper for quick access in the future.

1. Add a population criterion that lists values, like diagnoses or procedures.
2. Hover over the criterion and click  to open the Advanced Options menu.
3. Select  **Add Multiple Values**.
3. Search for a list of values in the **Search Terms** field.
4. Select the delimiter that is used to separate the search values or type a custom delimiter into the text box.
5. If you are searching for specific values, select the **Exact Matching** checkbox.
6. Click **Next**.
7. If you do not want to include a matched value, clear the checkbox to remove that value from your session.
8. Select the **Create User Grouper** checkbox to create a temporary user grouper from the options that you have selected.
 - a. This is beneficial when you are searching for multiple values that can be treated as a group.

9. When you're satisfied with your search terms, click one of the **Accept** or **Accept & Add More**.
 - a. **Accept** closes the window and saves your groupers.
 - b. **Accept & Add More** reopens the first window, allowing you to create additional user groupers.

If you created a temporary user grouper and want to use the grouper you created for other searches and reports, save the grouper.

1. Right-click the grouper and select **Open Grouper Details**.
2. Add a description and click **Save As**.

Specify the Age at Time of Event

In the Patients, Patients with Cancer, and Breast Imaging Lesions data models, you can filter your results by the patient's age when an event was recorded.

In these models, add a filter with dates, like Encounter Type, and select at least one Encounter Type. To narrow results to patients who were a specific age when the encounters occurred:

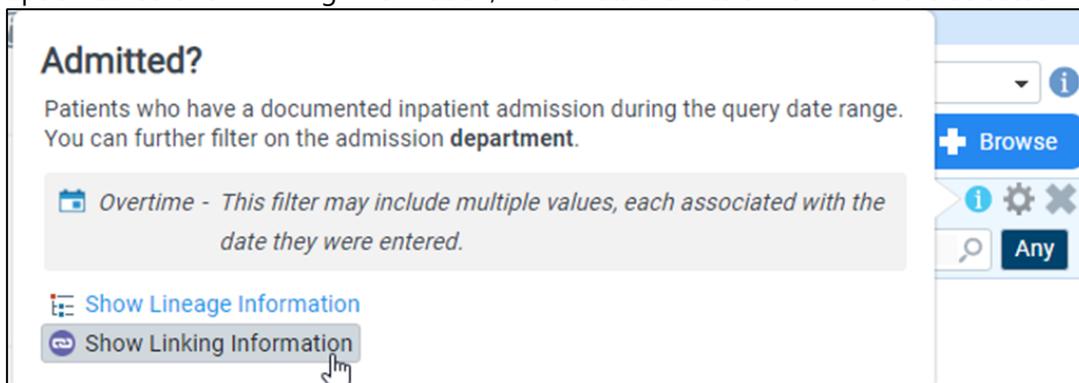
1. Hover over the criterion and click  to open the Advanced Options menu.
2. Select **Specify Age at Time of Event**.
3. Choose the age range relevant to your search. Options include years, months, weeks, and days.
4. You can further modify this behavior with the **Refine Search** options:
 - Enabling the first checkbox returns results from all time.
 - Enabling the second checkbox is relevant only to graphs with date slices. Select this option to ensure the patient was in the specified age range within each given date slice, rather than at any point in the date range on the graph.

Modify Event Linking

Linking indicates that the results of two or more filters were recorded during the same event, like an encounter. Linking allows users to examine related results more easily. To configure these options, hover over the criterion and click  to open the Advanced Options menu..

- Filter linking requires two or more criteria to be associated with the same event. For example, suppose you're using the Patients data model and you add the Department criterion for the North Department and the Encounter Type criterion for office visits.
 - If the criteria are linked together, as shown by the , SlicerDicer returns patients who had an office visit in the North Department.
 - If you unlink the criteria, as shown by the , SlicerDicer returns patients who had any type of encounter in the North Department if they also had an office visit in any department.
- Population filters and slices that can link do so by default. Measures that can link do not link by default, but you can choose to link them. Measures cannot link to only measures – you must include at least one population filter or slice.
- Many filters cannot link to other filters. Linking is more common in data models that have many filters representing events that did not occur on the data model's root event (for example, an Encounter is the root event of the Visits data model, while an Admission or Discharge is a separate event).
 - If a filter cannot link to any other filter in the session, no linking icon appears. After you add at least two linkable filters, the icons appear. There are many data models in which no filters can link.

- To check if a filter can link, you can check the information pane. Filters that can link include a menu option called Show Linking Information, which lists the filters with which the selected filter can link.



- Linking also applies to certain columns in the detail table. If a filter can link, it can be linked to other filters in the detail table. This does not change the results, but it does restrict the values you see in the table. Only those column values that occurred in the same event appear when columns are linked. Note that this formatting cannot be exported to Excel.

Admitted?	Department	Count
	MYC PST DEFAULT DEPT	2,228
	MYC PST DEFAULT DEPT	
	DDW FAMILY MEDICINE	
	WI HBN FAMILY PRACTICE	
	DDW FAMILY MEDICINE	
	JLB FAMILY PRACTICE	
	ANQA SURGERY MELBOURNE	
	FAMILY PRACTICE NORTH	
	DDW FAMILY MEDICINE	
	INITIAL DEPARTMENT	
Yes	WI HBN FAMILY PRACTICE	
	MONONA RESCARE	

Slice a Population to Make Comparisons

Use slices to split up your population to compare results among subgroups. For example, suppose you use criteria to narrow your starting population to patients with an active MyChart account. You could then slice this population by county to see which counties have the most MyChart users.

When you add slices, you can grab the top or bottom slices, such as the 10 counties with the most MyChart users. You can also enter specific slices, such as to compare the number of users in Dane, Jefferson, and Dodge counties.

Here are some other tips for working with slices:

1. Click **+** next to **Slices** to add a slice.
2. Select the appropriate filter.

3. Click the magnifying glass to select specific slices. Alternatively, click  to select the top or bottom slices for your current measure.
4. Repeat steps 1-3 as many times as you'd like to divide your population.
 - If you have similar slices you want to group together, select the check boxes next to those slices and click **Group**.
 - You can rename slices by clicking on the slice name. To reset the name back to the original, remove and re-add the slice.
 - You can remove slice options from your session by hovering over the slice and clicking . For numeric options, use the checkbox to the left of the range.
 - You can remove a slice from your session by hovering over the slice and clicking .
 - If you want to temporarily hide a slice on your graph, hover over the slice and click . This hides all slices in the group, not just individual options.
 - You can click and drag slices to reorder them.

Create Custom Slices

Custom slices make it possible to group slices together into a single concept. This allows for custom logic to be configured within individual slices. Within these custom slices, you can decide what advanced logic (such as AND, OR, or NOT) connects the filters, similar to what can be done with population criteria. This feature is available for filter records where you can choose non-numeric values, such as diagnoses and encounter types.

1. Click  in the **Slices** card.
2. Select the appropriate filter.
3. Click  in the Slices card.
4. Click **Convert to Custom Slice**.

Add a Measure

Use measures to change how you're analyzing your population. By default, SlicerDicer shows the number of records that match the criteria you've specified. You can use measures to show rates or other metrics. Not all filters have the same measures available.

1. Click  next to Measures.
 - a. You can add as many measures as you like. Hide, show, or remove measures on your graph by hovering over the measure in the measures section and clicking the icons:  
2. Select a measure type.

Measure type	Definition
Percentage with selected value	The percentage of patients have the value you choose and match the other criteria. If a measure has multiple values documented during the query date range, the percentage calculation uses all values documented instead of only the most recent.
Sequential rate	Applies only to filters that track data over time. When you configure these filters as percentage measures, you can choose to make the percentage a sequential rate. This calculates the

Measure type	Definition
measure	percentage of the filter value following or preceding another filter or slice value of your choice.
Percentage of sum	This measure divides the number of records in a slice by the number of records in the overall population. For example, suppose you use population criteria to show only records for patients with a legal sex of male, and then use slices to show the number of records in each department. The Percentage of Sum measure shows the number of male patients in each department divided by the total number of male patients.
Percentage of sliced sum	This measure applies only when there are two or more levels of slicing. It's similar to Percentage of Sum, but instead of dividing the values of each slice divided by the overall population, it divides the value of each subslice by the value of the slice the subslice is in. For example, suppose you slice by department and then slice by diagnosis. The Percentage of Sliced Sum measure shows the percentage of patients seen in each department with the specified diagnoses.
Maximum	The highest recorded value for a numeric filter.
Minimum	The lowest recorded value for a numeric filter.
Average	The mean of all recorded values for a numeric filter.
Deviation	The standard deviation of the recorded values for a numeric filter.
Variance	The deviation squared, which is also equal to the total difference between each patient's most recent value and the average value of a numeric filter.
Percentile	The value for which a specified percentage of records matching the other criteria is below.
Distinct count	This is the default measure for every data model. As the default measure, only distinct records are returned. Distinct count can also be configured on some criteria – in that case, it returns the number of unique values for that filter recorded in the date range. For example, a distinct count of Department would count the unique number of departments recorded on associated records in the session.
Risk ratio	The relative change in risk of an outcome event when comparing an exposure group to a reference group. The risk of an event is calculated as the total number experiencing the event divided by the total number in the group.
Odds ratio	The relative change in odds of an outcome event when comparing an exposure group to a reference group. The odds of an event is calculated as the total number experiencing the event divided by the total number not experiencing the event.
Custom formula	Formulas can be used to combine multiple measures into an overall calculation. Measures should be referenced by their tags and can be used with the following operators: +, -, *, /, and ().

3. Hover over results on the graph to view values for any measures you've added.

Add Goals and Thresholds to Your Measures

Thresholds and goals make it easier to home in on important data and parse large amounts of data at a glance.

We recommend using thresholds or goals for SlicerDicer sessions with measures that have a specific target value or range. Thresholds allow users to set a color for any slices that fall within a range of values. Goals allow them to set a color for any slices that exceed a specific value and also appear as a horizontal dotted line on the graph.

To configure goals and/or thresholds for your measures:

- Click the measure you want to modify in the Measures section.
- Use the Add Goal or Add Threshold buttons to add your goals or thresholds.
- You can modify the specific values the goals or thresholds use to make them more meaningful.



Goals and thresholds don't appear in all graph types. They also appear only when the graph shows a single measure.

By default, goals appear as lines on your graph. You can hover over a goal line on the graph to view the definition. On the line graph, you can also choose to display the goals as a colored region instead of a line by modifying the Goal Style:



Since some values might be better when low, you can choose to display goal colors above the line using the **Lower is Better** checkbox on the measure.

Analyze the Variability of Your Data with Confidence Intervals

You can add confidence intervals to average measures to quickly understand the variability of the data underlying the measure's value. This is useful since the amount and distribution of values can vary across different subsets of a population. For example, an average age at first diagnosis of 14 years could represent a group of teenagers or patients of all ages and might be based on 500 patients or 100,000 patients.

SlicerDicer uses the Normal Approximation Method to calculate binomial confidence intervals of percentage measures. Statisticians sometimes refer to these as Wald confidence intervals.

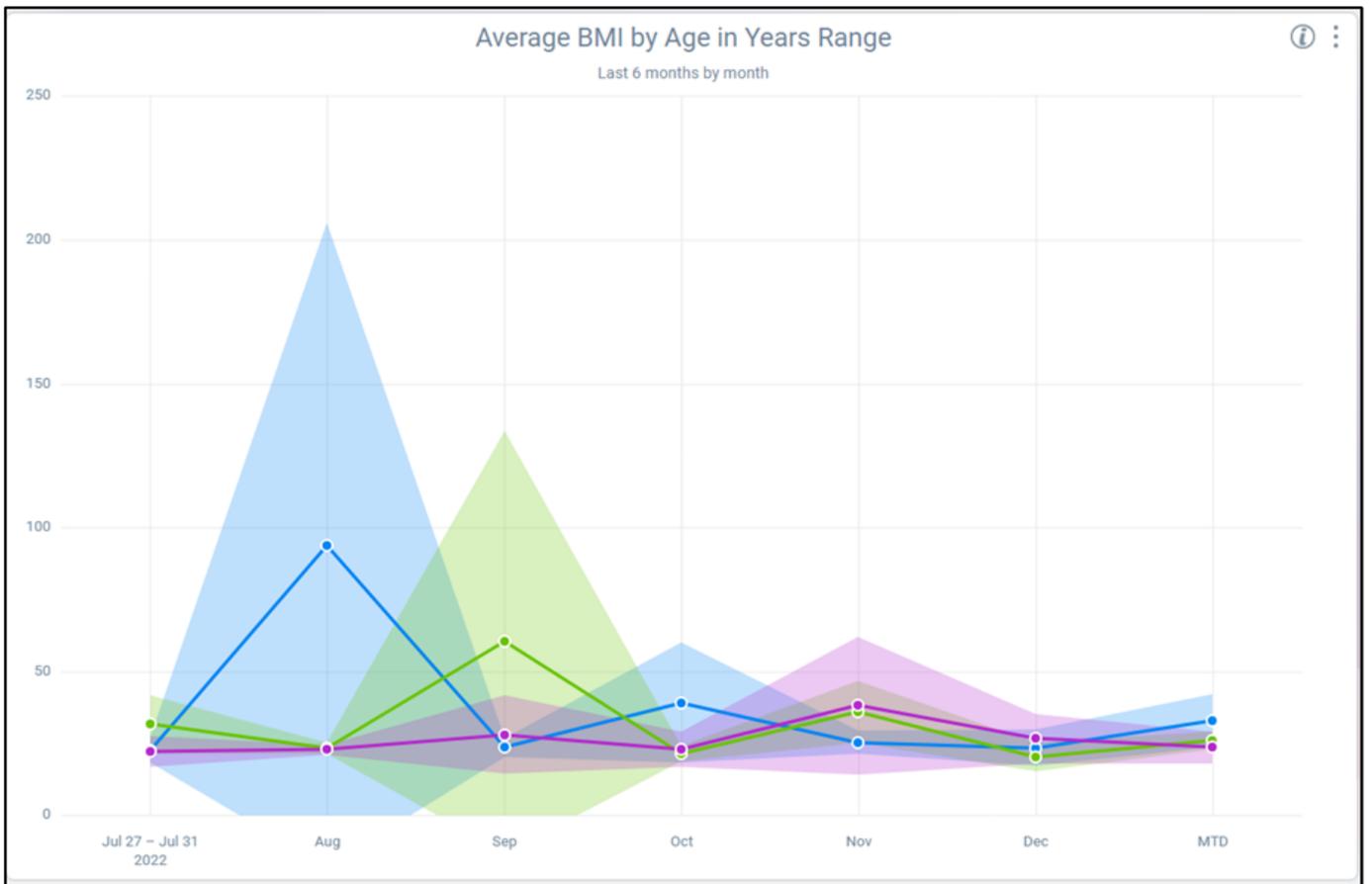
To add a confidence interval:

- Click an Average measure in the Measures section. Only Averages are supported currently.
- Select the Add Error Bars: 95% Confidence Interval checkbox.

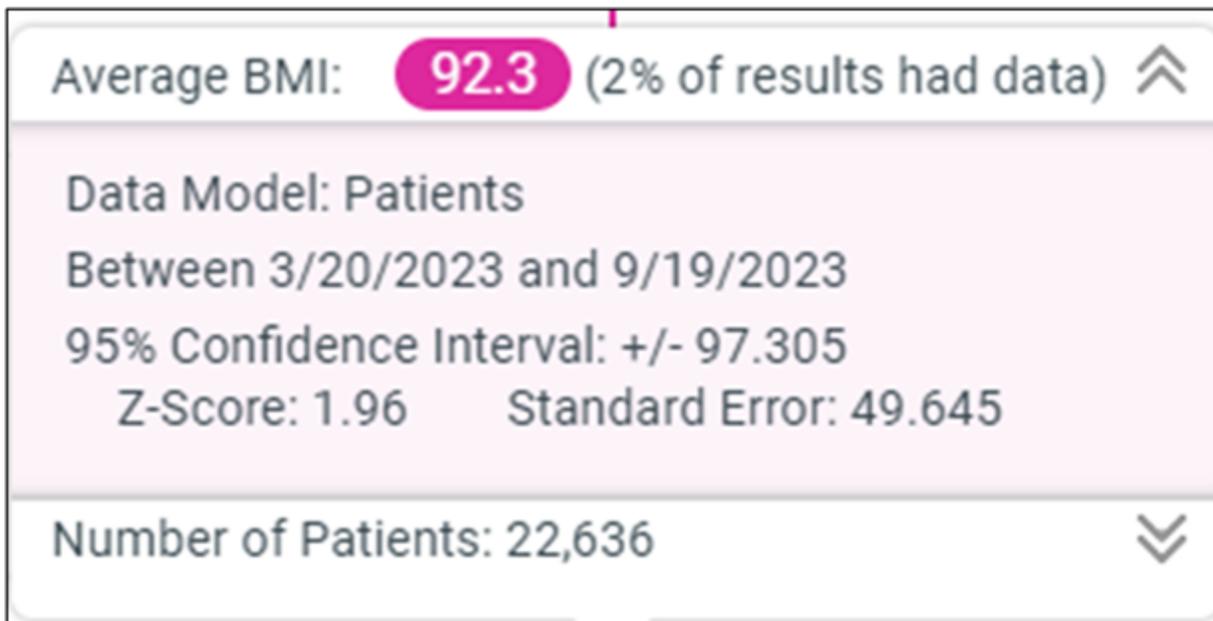
Confidence intervals appear on vertical and horizontal bar graphs as error bars:



Or in the line graph, they appear as error regions:



You can also hover over a data point on any graph type to view the confidence interval and standard error.



Create Custom Measures

Custom measures make it possible to group multiple measures together into a single concept. This allows for custom logic to be configured within individual measures. Within these custom measures, you can decide what advanced logic (such as AND, OR, or NOT) connects the filters, similar to what can be done with population criteria. This feature is available for filter records where you can choose non-numeric values, such as diagnoses and encounter types.

Custom measures are only available for Percentage of Sum measures.

1. Click in the **Measures** card.
2. Select the **Percentage with Selected Value** measure type.
3. Choose your desired filter.
4. Click **Browse** in the measure card to search for a criteria to add to the measure.
5. Select your desired criterion. You now have a session with a custom measure.

Change visualization options

Visual Options control how your data is represented. Change elements like the graph type, measures, or colors to aid your analysis of the data.

Pick the right visualization for your analysis

You can change the graph type to better suit your data visualization. For example, click to view a line graph. Available graphs are listed under Visual Options.

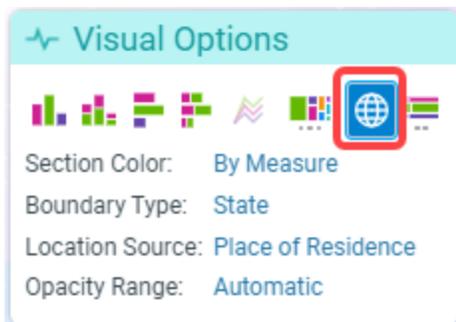
If you're not sure which graph type is best for your data, use this section as a quick reference:

- Vertical bar graph
 - Compare different values and see differences at a glance.
 - Bar values are labeled.

- Horizontal bar graph 
 - Shows the same information as the vertical bar graph.
 - Shows crowded axis labels more clearly.
- Stacked bar graphs 
 - See multiple slices together to group related concepts.
 - Hover over a bar to view specific values.
 - See both the sum of all slices and their individual values.
- Line graph 
 - See how results change over time. This visualization is not available if the session date range is All Time.
 - You can change the date summary level by clicking the Dates section.
 - You can modify how the line graph displays unavailable data, add line labels, and modify how goals are displayed in the line graph in the Visual Options section.
- Tree map 
 - Group hierarchical data together.
 - Use the whole area of the graph to show shapes more clearly than bar graphs, such as when you have multiple levels of slices.
 - Note that it's harder to compare area than it is to compare height and length, so it can be more difficult to spot differences between two values than when using a bar graph.
- Map visualization 
 - See if geographic area is correlated with your results.
 - Note that maps aren't available for every data model or at every organization.
- Detail table 
 - View summarized details about your results.
 - View line-level details for records to which you have access.
 - Export results to Excel for further analysis. You can choose to export line-level data (all data in the table) or summary data (only slice and date group data).
 - In some data models, you can launch an activity, like opening a patient chart or surgery preference card.
 - You can add, remove, or rearrange columns by hovering, right-clicking, or dragging the column header bar.
- Cross Tab 
 - View relationships between slices by grouping them across columns and rows.
 - Similar to a pivot table or heatmap.
 - Supports multi-column sorting, collapsing and expanding slices, and drilling down to line-level details.

Geographic Visualization

Click the Map Visualization option to view the patient population divided by state, county, or postal code.



Click the Visual Options header to view Map Visualization options on the right.

- The **Section Color**, or shading, of the map represents one of the measures added to your population.
 - Only one measure may be selected at a time when using the Map Visualization option.
- The **Boundary Type** can be State, County, or Postal Code.
 - Think of this as a slice.
 - Zooming in or out of the map will automatically change the Boundary Type.
- The **Location Source** will be the patient's place of residence.
 - State, County, and Postal Code each reference the current address of the patient as collected during registration.

Counts, Percentages, and Prevalence

The Map Visualization, like all Visual Options, works closely with the Measures applied to your population. Modify the Section Opacity to view the data set you are interested in. Although Section Opacity only represents a single measure, all measures are visible by hovering over parts of the map.

Section Opacity	Interpretation
Number of Patients	The darker the region, the higher the count of patients who reside in the region.
Percentage of Patients	The darker the region, the greater the percentage of patients in the total population who reside in the region.
Percentage of Has COPD?	The darker the region, the greater the prevalence of a specific condition in the region.

Criteria, Slices, and Measures

Use the State, County, or Postal Code criteria to limit the population to specific regions.

Example

- Select the State criteria
- Select a state
- Under Visual Options, click the Map Visualization

- Choose a Boundary Type of County

Use Slices to compare and contrast different geographic regions.

Example

- Click +Slice
- Search for and add State
- Enter values of Texas, New York, and California

Each measure added to the population becomes a selection option for the Section Opacity of the Map Visualization.

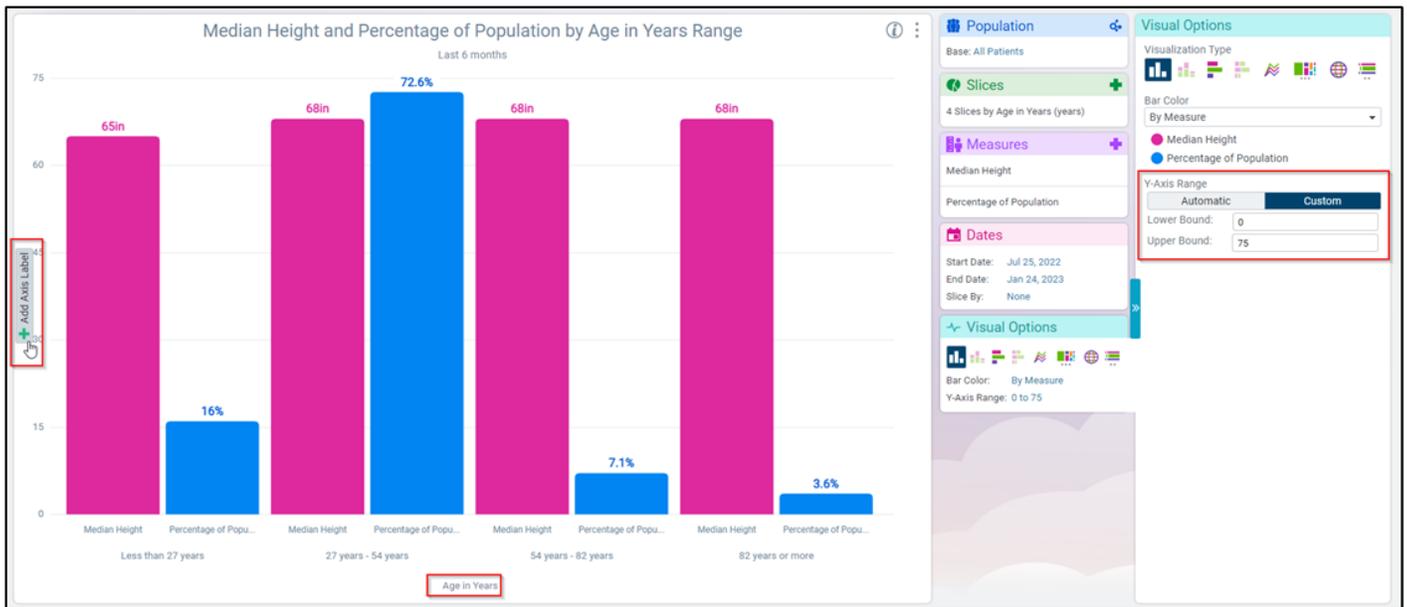
Example

- Click +Measure
 - Click Percentage
 - Click Registries
 - Click Has Type II Diabetes?
- Click Map Visualization
 - Choose a Section Opacity of Has Type II Diabetes?

Modify the Graph's Axis Definitions

SlicerDicer automatically calculates the Y axis of the graph based on the values of the measures returned in your session. Sometimes, you might want to use a different axis scale to view your data. Or you might want a label to describe what each axis represents. You might want to do this if you have multiple measures with large differences in scale. It is also useful if you share the session with other users.

1. To change your Y axis scale, click the **Visual Options** section or click the link after the Y-Axis Range header.
 - a. Switch the axis from Automatic to Custom.
 - b. Add new custom upper and lower bounds.
2. To add axis labels:
 - a. Hover over the graph near the bottom center (X axis) or left center (Y axis).
 - b. Click the Add Axis Label button and enter your description.

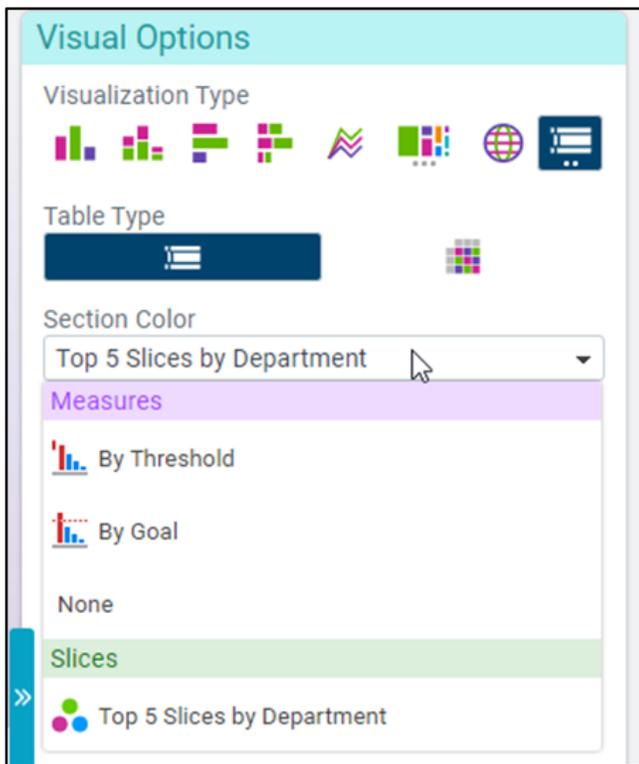


Customize Your Graph Colors

You can customize the colors for slices and measures. You can also choose what the graph is using as a color. Any given slice or measure in your session is available to color the graph, even when hidden.

To customize individual colors for slices, click a colored circle. You can choose from a preset list of standard colors or choose a custom color using the Advanced Configuration tool.

You can color your graph by slice, measure, goal, or threshold, depending on what you have configured in your session. To change the current graph color, click the Visual Options header or click the Color link. If you have multiple measures, coloring by one measure allows you to save space on the graph, since the Color By measure does not need to add bars or lines to the graph to be displayed.



Save and share populations

You can save a session if you use it frequently and might want to revisit it later.

1. On the toolbar, click  **Save As** and give the session a name.
2. Review and change additional information as needed, such as the date range, and click **Create Session**. You can add the session to a group to organize your Load screen.

See and edit saved populations

1. From the Analytics Catalog, search for your session and launch it.
2. Alternatively, within SlicerDicer, click **Load**  on the toolbar and select the desired session. You can create, rename, and reorder groups for your saved sessions on the Load screen or when saving a session. You can have four (4) custom groups. The Shared and Published groups appear for all users.
3. Modify the session as needed and save changes.

Share a population

1. On the toolbar, click  **Share**. Note that sharing automatically saves your session if you had not saved it previously. Sharing an existing session creates a new copy of the session.
2. Enter a name and select how you want to share the session and with whom. If you choose to share with specific people, enter each user you want to give access to the session. Options for sharing include:
 - a. Grant Access. You can share a session with specific users. Search by user name or ID. Some users can also publish sessions (share with everyone).
 - b. Secure Chat. You can send a direct link to the session to specific users over Secure Chat.

Dates in Cosmos SlicerDicer

By default, SlicerDicer in Cosmos looks at All Time for sessions that only use current criteria, and the last several

years for sessions that use time-sensitive criteria. There are many options for changing the dates your SlicerDicer session uses.

Overall report date range

Editing the date range of your session searches for all patients with the time-sensitive criterion you have selected documented during the date range.

Suppose you want to find all patients with a certain condition on an encounter or problem list in the last five years.

1. Add a criterion for Diagnosis with the specified condition.
2. Click the Start Date on the Dates section.
3. Remove the existing start date and replace it with y-5.

You can add more time-related requirements with the following options:

- Specify date range
- Sequential criteria
- Overlapping criteria
- Patient age filtering

Specify a date range for one criterion

If you need one criterion to adhere to a specific date range that is different from the overall report date range, you can use the **Specify Date Range** option.

Example

Suppose you need to find patients with office visits in the last 5 years and a diagnosis of essential hypertension in the last 3 months.

1. Add a criterion for encounter type of office visit.
2. Add a criterion for a diagnosis of essential hypertension.
3. Unlink the two criteria so they do not use the same date range.
4. Set the overall report date range to be the last five years.
5. Right click the diagnosis criterion and select Specify Date Range > Other Date Range. Select Last 3 months.

Add sequential criteria

Suppose you're investigating root causes of opioid addictions and wondering whether having surgery within the last year could be a factor. SlicerDicer can show you the patients who had a surgery and were subsequently diagnosed with opioid dependence.

1. Add a criterion for the event that occurred first. In this example, filter results by an encounter type of surgery.
2. Right-click the criterion and select **Add Sequential Criterion > Add New Criteria**.
3. Select the criterion for the event that occurred second. In this example, select the **Diagnosis** criterion and enter opioid dependence.

4. Update the Within field for your use case. In this example, enter 12 months.

If you want to see sequential rates, the workflow for adding the criteria is slightly different than adding sequential criteria in your main population. For example, suppose you want to see the percentage of patients who were diagnosed with influenza within four months of receiving an influenza vaccine.

1. Add a criterion for the event that occurred first. In this example, add the Immunization criterion and select at least one influenza immunization, such as Influenza (IM) Preservative Free.
2. Add a measure for the event you want to see the rate of and verify the Percentage calculation is selected. In this example, add a Percentage of Diagnosis measure and select Influenza.
3. In the right pane, click **Make Rate Sequential**.
4. In the First section, choose the event that occurred first, which is the Influenza Immunization criterion in this example.
5. In the And Then section, update the Within options to match the time frame for your use case. In this example, you would enter 4 and select Months.

Not all criteria track data over time. If a criterion has (Current) at the end of its name, that means it uses only the most recent value. This has the following implications for SlicerDicer:

- The query date range doesn't apply to these criteria. For example, suppose your session includes only the Surgical History (Current) criterion. If you try to use the line graph to see how the number of patients who have ever had an appendectomy has changed over time, the line will always be flat because SlicerDicer uses only patients' current surgical history. In fact, the line graph is not a selectable option in this case.
- Specifying sequential or overlapping criteria doesn't apply to these criteria.
- Using a different date range than the range on the graph doesn't apply to these criteria.

Overlapping criteria

Overlapping criteria requires that the two criteria have occurred or were active at the same time.

Some events take place at one point in time (like an office visit) or were active during a period of time (like a problem on a problem list). As long as the two criteria are active at the same time at some point in their time range, the two criteria are overlapping. For a patient to be included in the results, both criteria have to be active at the same time and be active during the date range of the report.

Add overlapping criteria by adding the first criterion, then right click on the criterion and choose **Add overlapping criterion > Add new criteria** and select the criterion.

Example

Suppose you want to find patients who were taking statins and vitamin E at the same time.

1. Add a criterion for statins medication
2. Add overlapping criterion for vitamin E medications

A patient needs to have both medications at the same time during the overall report time range to be included

Patient Age

There are two different ways to filter for patients of a specific age in Cosmos:

- Current age
- Age at the time of the encounter

Age in years (current)

The Age In Years (current) filter searches for patients currently of that age with the specified criteria in their chart. This age does **not** check how old the patient was at the time of the event.

Example

Suppose you want to find all 5-year-old patients who have had a chicken pox vaccine.

1. Add the filter for immunizations of chicken pox.
2. Add the filter for Age In Years (current) = 5.

Age at time of event

If you would like to filter for the age of patients at the time of the event, you need to add a special Patient Age Range parameter on the event in question.

Example

Suppose you want to find all patients who were 5 years old when they received a chicken pox vaccine (varicella).

1. Add the filter for immunizations of varicella.
2. Right click the filter and select Specify Patient Age range.
3. Set both sides of the date range to 5.

Focus on recent data

Suppose you want to find patients who were diagnosed with a condition for the first time in the last year. You can't simply add a diagnosis criterion and change the date range to be the last year, because that population would include any patients who had the diagnosis in the last year, regardless of when they were first diagnosed.

To create a report like this one, use a sequential criterion with Not Preceded By logic.

These steps describe this setup in more detail:

1. Open SlicerDicer and select the Patients data model.
2. Add the Diagnosis criterion and select the condition you're interested in.
3. In the Dates section, change the start date to y-1.
4. Right-click the diagnosis criterion and choose  **Add Sequential** criterion.
5. Select another diagnosis criterion with the same option you selected in step 2.
6. Click the Followed By or Preceded By banner between the criteria. Change the logic to use **Not Preceded By**.

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