

SlicerDicer for Pathologists

I. Introduction



SlicerDicer is a self-service reporting tool that provides users with intuitive and customizable data exploration abilities. Using SlicerDicer, users can find the data they need to investigate, and then refine their searches on the fly to better understand the data they work with. Right in Hyperspace, they can examine trends, drill down to line-level details, and jump to related records to follow up.

Note: SlicerDicer is a great tool but is not the best choice for all reporting needs. SlicerDicer draws from data that is at least a day old, so you can't use it for real-time reporting, such as acute care monitoring. In addition, most of the time SlicerDicer can search only discrete data. For example, SlicerDicer doesn't know a patient has a particular diagnosis if the only place the diagnosis is documented is in a free text note. As always, handle patient data with care.

This tutorial will guide you through the basics of case searching in SlicerDicer with a few specific examples of more advanced searches.

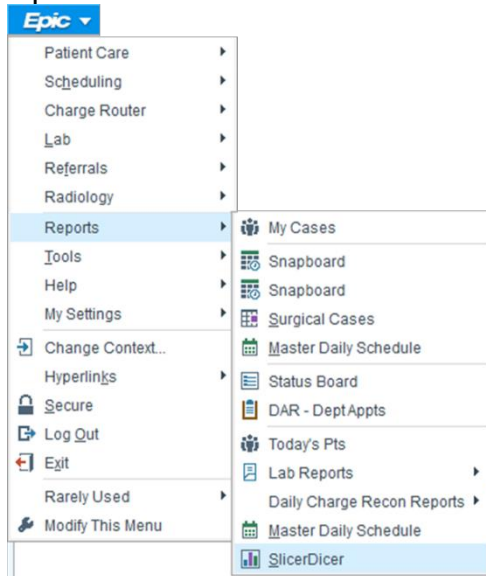
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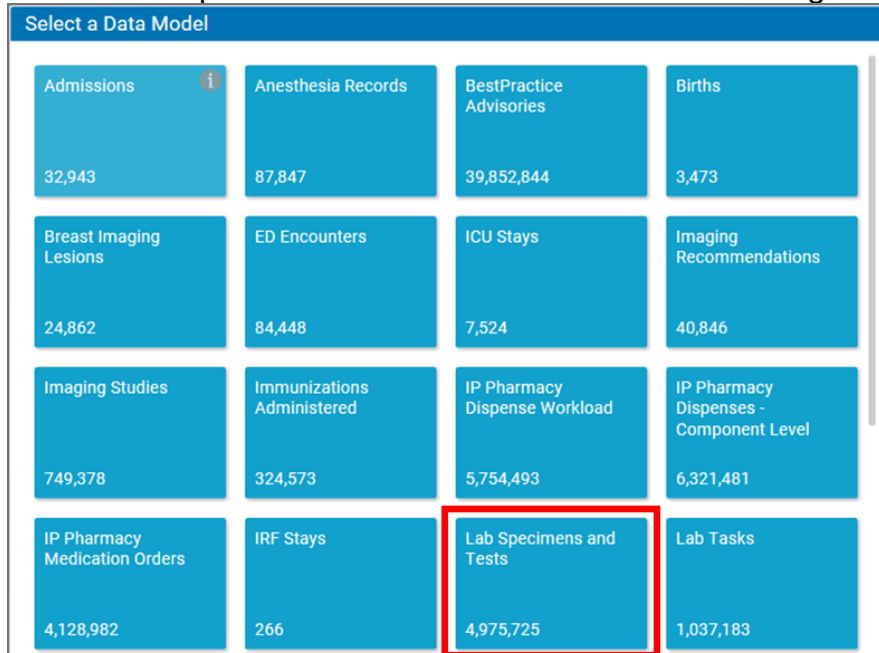
III. Basic Case Search

1. Open SlicerDicer

Open SlicerDicer from the EPIC menu



Select "Lab Specimens and Tests" model and click through the tutorials if it's your first time



2. Set Search Criteria

Click on "Dates" to select a date range for your search

Population
Base: All Lab Specimens and Tests

Slices
No Slices

Measures
Number of Lab Specimens and Tests

Dates
Start Date: Aug 4, 2021
End Date: Feb 3, 2022
Slice By: None
Based On: Collection (Best Available)

Dates
Start Date: 8/4/2021
End Date: 2/3/2022
Slice By: None
Year
Quarter
Month
Week
Day
Based On: Collection (Best Available)

Click population to create criteria for your search

Population
Base: All Lab Specimens and Tests

Slices
No Slices

All Lab Specimens and Tests
Base: All Lab Specimens and Tests
Search for criteria
Browse

There are many components you can search for in the “Search for criteria” field

i. Text Search

To search the text of a pathology report, start typing “component result text” and select

All Lab Specimens and Tests
Base: All Lab Specimens and Tests
component result
Component Result Text
Non-Component Result Text
Search for criteria
Browse

Component Result Text
"renal cell carcinoma"
Criterion is inactive until a selection is made.

Type in the field under “component result text” for text search. Use “” for exact phrases

You may specify which field of the report you want to search. The most commonly used is “SP diagnosis”, which searches the diagnosis field, interpretation field (cytology) and all addenda of a report. You may also search other fields such as “gross examination”, “microscopic examination”, etc. If you do not specify, it will search everywhere in the report.

Component Result Text
"renal cell carcinoma"
Component: sp diagnosis
SP DIAGNOSIS
SP DIAGNOSIS ADDENDUM 21 (BKR)
2 results, no more results
Accept


You may add another text search by typing in the field under “component result text” again. You can click on the “OR” or “AND” to change the logic operator.

ii. Other Component Search

You may add other search criteria by typing in the “search for criteria” field or clicking on the “Browse” button to browse available criteria. Commonly used components are “Type of Case”, “Specimen Source”, “Specimen Protocol”, “Pathologist”, etc. See specific examples section for sample demonstrations.

Note: A complete list of components can be found in the excel file “List of Components”. Cases before Beaker is used (in 2014) are legacy cases, and you can only do text search (“component result text”) on them.

3. Generate and Export Case List

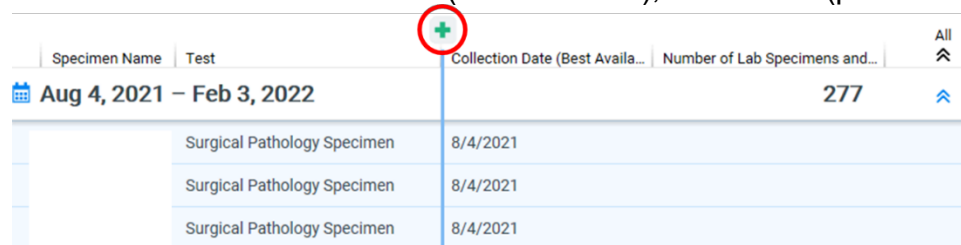
To see the detailed list of cases, click on  under “Visual Options”

Click on the blue downward arrow and “load all” to expand the list

Number of Lab Specimens and Tests	
Last 6 months	
Aug 4, 2021 – Feb 3, 20...	277

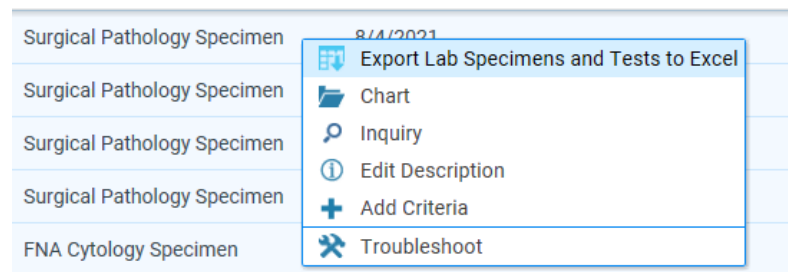


You may add columns by clicking on the “+” button in between columns. Commonly used columns include: “case name” (case number), “lab MRN” (patient’s MRN), “pathologist”, etc.



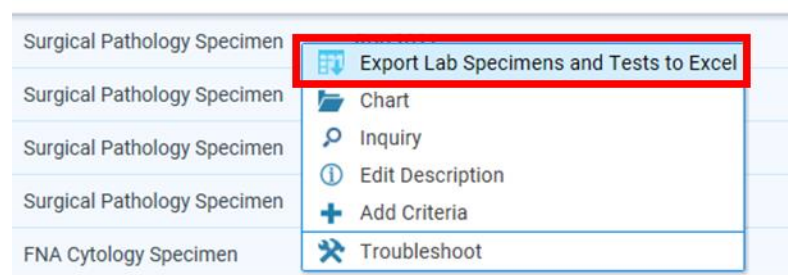
Specimen Name	Test	Collection Date (Best Availa...	Number of Lab Specimens and...	All
Aug 4, 2021 – Feb 3, 2022			277	
	Surgical Pathology Specimen	8/4/2021		
	Surgical Pathology Specimen	8/4/2021		
	Surgical Pathology Specimen	8/4/2021		

You may open a case by right clicking on it and selecting “Chart” to open patient’s chart or “Inquiry” to open case inquiry.



Surgical Pathology Specimen	8/4/2021	Export Lab Specimens and Tests to Excel
Surgical Pathology Specimen		Chart
Surgical Pathology Specimen		Inquiry
Surgical Pathology Specimen		Edit Description
Surgical Pathology Specimen		Add Criteria
FNA Cytology Specimen		Troubleshoot

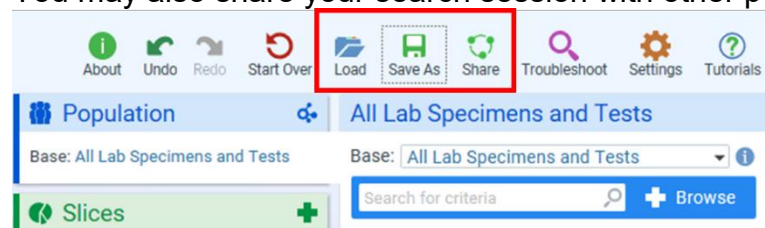
You may export the list of cases to an Excel file by right clicking any case and selecting “Export Lab Specimens and Tests to Excel”. You will need to add a password to the export file. The best place to save the file seems to be your “U:” drive.



Surgical Pathology Specimen		Export Lab Specimens and Tests to Excel
Surgical Pathology Specimen		Chart
Surgical Pathology Specimen		Inquiry
Surgical Pathology Specimen		Edit Description
Surgical Pathology Specimen		Add Criteria
FNA Cytology Specimen		Troubleshoot

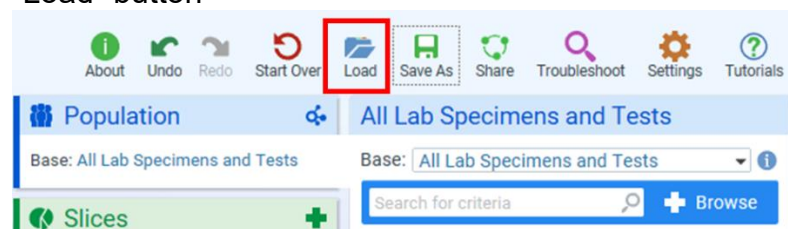
4. Save/Load/Share Search Sessions

You may save your search session by clicking on “Save As” button and reload it on another day by clicking the “Load” button. It will save all your criteria and all the columns you added. You may also share your search session with other people by clicking the “Share” button.



5. Shared Search Templates (optional)

There are a few published search templates that may be helpful for you. To access them, click “Load” button



You will see the search sessions that are published, shared with you, or saved by yourself. It is a good idea to make your own template for frequently used criteria, visual options, dates, and report columns. The criteria components can be left blank. Here is an example:

The screenshot shows a search criteria interface with the following sections:

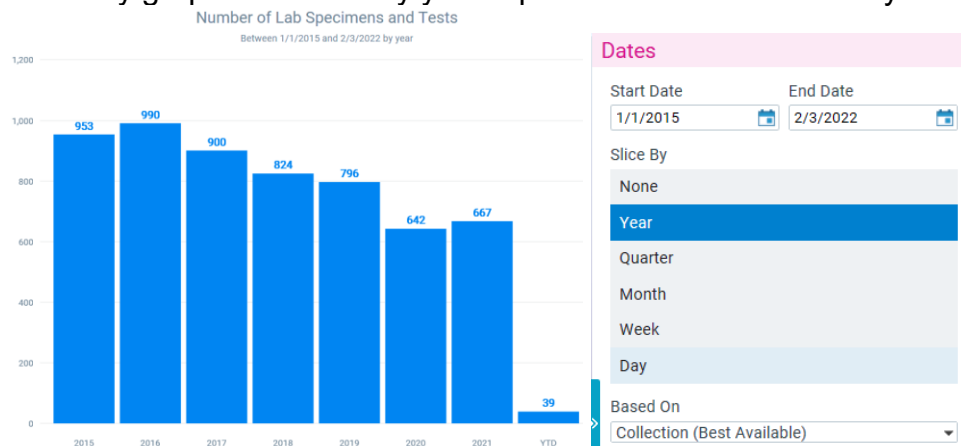
- Population:** Base: All Lab Specimens and Tests, Type of Case: Surgical Pathology
- Surgical Pathology:** Base: All Lab Specimens and Tests, Search for criteria, + Browse
- Slices:** No Slices
- Measures:** Number of Lab Specimens and Tests
- Dates:** Start Date: Aug 4, 2021, End Date: Feb 3, 2022, Slice By: None, Based On: Collection (Best Availa...)
- Visual Options:** Section Color: None

On the right, there are criteria components for Specimen Source, Type of Case, Pathologist, and Component Result Text, each with a search field and a note: "Criterion is inactive until a selection is made."

6. Visualize Data (optional)

After you generate a list of cases that satisfy your search criteria, you may “slice” your data in a variety of ways.

You may graph the cases by years/quarters/months/weeks/days under “Dates” tab:

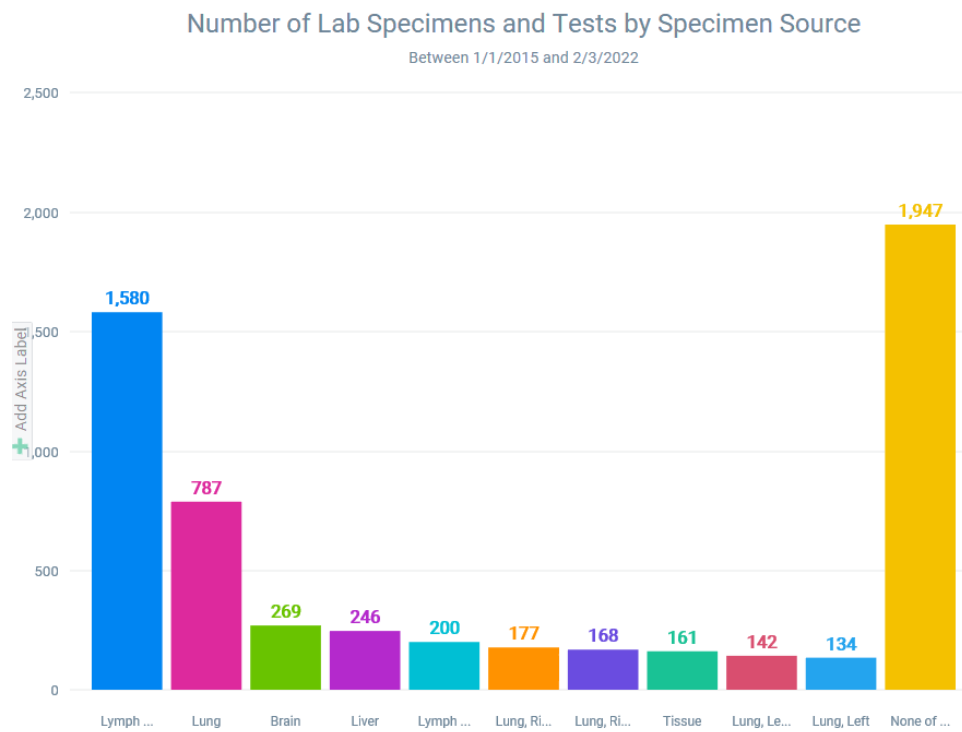


You may “slice” the cases by different ways by clicking the “+” button on the “Slices” tab.

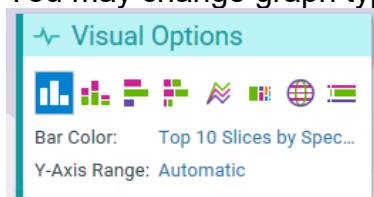
The screenshot shows the "Slices" tab with a plus button to add a new slice.

Here’s an example that “slices” the cases by specimen source by selecting “specimen source” and click “Grab top 10”.

The screenshot shows the "Slices" tab with a slice by specimen source. The "Grab top 10" button is highlighted with a red box. The slice is titled "Slice by Specimen Source".



You may change graph types by clicking different graph icons under “Visual Options” tab.



IV. Other SlicerDicer Models

The “Lab Specimens and Tests” model is the SlicerDicer model that is most applicable to pathologists. However, other models may also help with research especially when clinical correlations are useful.

1. Lab Tasks Model

Select a Data Model			
Admissions 32,943	Anesthesia Records 87,847	BestPractice Advisories 39,852,844	Births 3,473
Breast Imaging Lesions 24,862	ED Encounters 84,448	ICU Stays 7,524	Imaging Recommendations 40,846
Imaging Studies 749,378	Immunizations Administered 324,573	IP Pharmacy Dispense Workload 5,754,493	IP Pharmacy Dispenses - Component Level 6,321,481
IP Pharmacy Medication Orders 4,128,982	IRF Stays 266	Lab Specimens and Tests 4,975,725	Lab Tasks 1,037,183

The “Lab Tasks” model is very similar to the “Lab Specimens and Tests” model. However, their returned search results are different. In “Lab Specimens and Tests”, each line of results is a case/block. In “Lab Tasks”, each line is a completed lab task such as block creation, slide creation, media plate creation, aliquot creation, etc. It is useful for investigation on the completion of each task including details about the workload and quality of particular lab sections and specific users (lab technologists, residents, PAs, etc.)


An example is shown here on the frozen section task:


Task Container Name	Task	Task Completion Date	Task Completion User	Task Completion Lab
Aug 4, 2021 – Feb 3, 2022				
	FS H&E slide	8/4/2021 09:13		DUH SURGICAL PATHOLOGY A
	FS H&E slide	8/4/2021 09:26		DUH SURGICAL PATHOLOGY A
	FS H&E slide	8/4/2021 17:50		DUH SURGICAL PATHOLOGY A
	FS H&E slide	8/4/2021 08:08		DUH SURGICAL PATHOLOGY A
	FS H&E slide	8/4/2021 08:08		DUH SURGICAL PATHOLOGY A
	FS H&E slide	8/4/2021 08:08		DUH SURGICAL PATHOLOGY A

2. Patients Model and Linking to Pathology Cases

Select a Data Model			
745,376	324,373	3,734,453	6,321,161
IP Pharmacy Medication Orders	IRF Stays	Lab Specimens and Tests	Lab Tasks
4,128,982	266	4,975,725	1,037,183
Medication Administrations	Opioid Outpatient Prescriptions	Outpatient Prescriptions	Patient Infections
6,808,657	120,172	1,864,535	159,516
Patients	Patients with Cancer	Procedure Orders	Referrals
5,055,434	149,794	9,925,078	966,770
Research Studies	Research Study Patient Associations	Surgeries and Invasive Procedures	Visits
7,158	1,942,230	71,105	4,575,216

The “Patients” model mainly contains patients’ information including diagnoses, chief complaints, family history, immunizations, medications, etc. Each search result is an individual patient. This model can become very useful when you link patients to pathology cases.

To do this, after searching patients with certain criteria, click the “link”  button on the right side of “Population” tab.



Population

LYMPHOMAS

Base: All Patients
Diagnosis: LYMPHOMAS

Slices
No Slices


Measures
Number of Patients

Dates

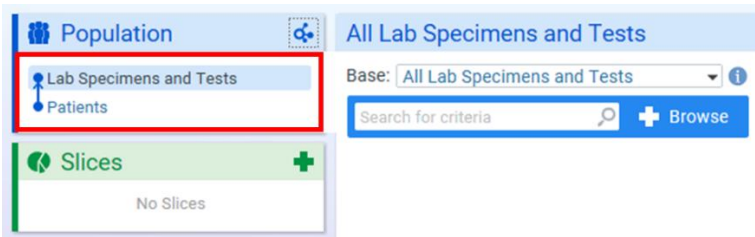
Base: All Patients
Search for criteria   Browse
Diagnosis

LYMPHOMAS
Chronic? Yes No Any
ED Diagnosis? Yes No Any
Type Any

Select “Lab Specimens and Tests” model

Link to 			
Admissions	Anesthesia Records	BestPractice Advisories	Births
Breast Imaging Lesions	ED Encounters	ICU Stays	IP Pharmacy Dispense Workload
IP Pharmacy Medication Orders	IRF Stays	Imaging Recommendations	Imaging Studies
Immunizations Administered	Lab Specimens and Tests	Lab Tasks	Medication Administrations

Then you can perform your regular case searches only in those patients you specified in the “Patients” model.

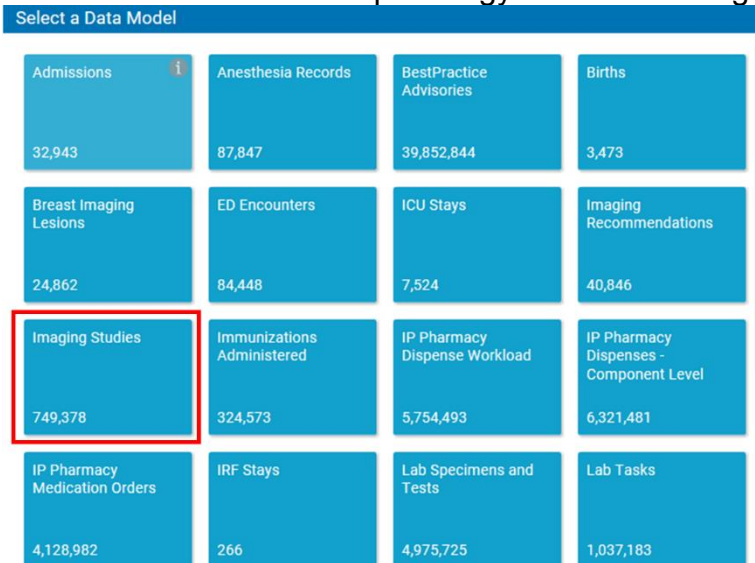


A sample application of this function is included in the “Specific Examples” section.

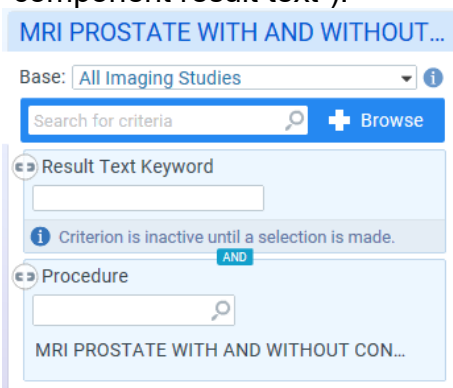
Note: If you open up “Lab Specimens and Tests” model first and then link to the “Patients” model, the results you get will be a list of patients rather than a list of pathology cases/lab tests.

3. Imaging Model

Another model that may be useful for pathologists is the “Imaging Studies” model when you would like to correlate the pathology cases with imaging findings.



The two most useful criteria components are “procedure” and “result text keyword” (NOT “component result text”).



Unfortunately, this “Imaging Studies” model can only be linked the “Patients” model but not the “Lab Specimens and Tests” model. If you would like to correlate the pathology cases with

imaging findings, you may have to export both the imaging case list and pathology case list to Excel and match the patient's MRN and test dates.

V. Specific Examples

In this section, a few sample searches for specific situations are provided.

1. Synoptic Report Search

To search the results within synoptic results, you need to know the name of the synoptic component you are interested in. You may find that in a synoptic report of any of your patients.

Here is an example of breast cancer resection synoptic search for cases with grade 3 DCIS present in the resection specimen.

After setting the date range, start typing “invasive carcinoma DCIS grade” in the “Search for criteria” field and select the right component.

All Lab Specimens and Tests

Base: All Lab Specimens and Tests

invasive carcinoma dcis grade

INVASIVE CARCINOMA OF THE BREAST:
Resection > TUMOR > Ductal Carcinoma In Situ (DCIS) > Present > Nuclear Grade (Component)

INVASIVE CARCINOMA OF THE BREAST:
Resection > MARGINS > DCIS Margins (Component)

INVASIVE CARCINOMA OF THE BREAST:
Resection > TUMOR > Tumor Extent > Nipple DCIS (Component)

INVASIVE CARCINOMA OF THE BREAST:
Resection > TUMOR > Histologic Grade (Nottingham Histologic Score) (Component)

INVASIVE CARCINOMA OF THE BREAST:
Resection > MARGINS > DCIS Margins > Positive for DCIS > Positive Margin (s) (Component)

INVASIVE CARCINOMA OF THE BREAST:
Resection > MARGINS > DCIS Margins >

10 results, more matches exist

Type “III” in the Value/Comment field. Note it’s “III” not “3” because that’s the option in the synoptic template.

INVASIVE CARCINOMA OF THE BREAST...

Base: All Lab Specimens and Tests

Search for criteria

Component

INVASIVE CARCINOMA OF THE BREAST: ...

Abnormal Yes No Any

Final Yes No Any

Reportable Yes No Any

Value/Comment III

III

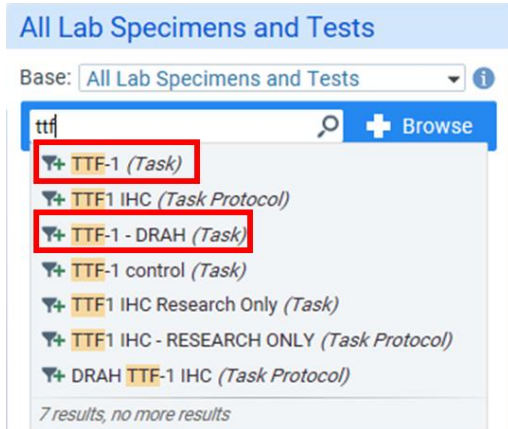
This will generate a list of cases with synoptic reports that have grade 3 DCIS.

2. IHC Search

The easiest way to search for cases where certain IHC stains were ordered is to search the IHC task.

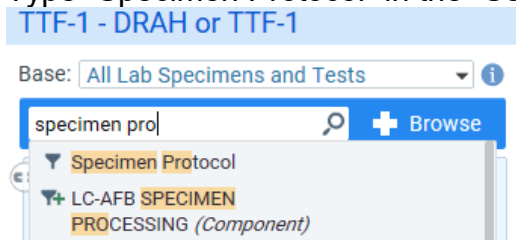
Here is an example to search for lung transbronchial biopsy cases where TTF-1 IHC stain was ordered.

Type “TTF” in the “Search for criteria” field and select the components. Note that “TTF-1 – DRAH” is the TTF-1 IHC task used at Duke Raleigh. We may include it if needed.

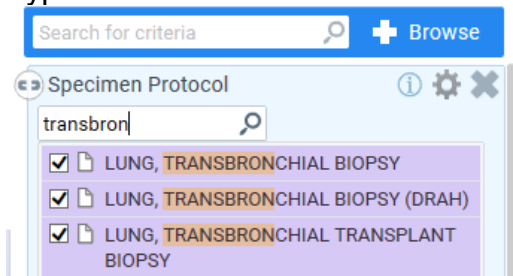


The best way to find transbronchial biopsy cases is to use “Specimen Protocol”. “Specimen Source” may not be helpful because it will include large resection cases as well.

Type “Specimen Protocol” in the “Search for criteria” field and select “Specimen Protocol”.



Type “transbronchial” in the field under “Specimen Protocol” and select the ones we want.



Now we have generated a list of transbronchial biopsy cases where TTF-1 was ordered.

Unfortunately, because there are no discrete components that report IHC staining results (unlike synoptic reports) and that stain results are reported in different ways in the report, we generally cannot directly search for cases that are positive for an IHC stain. We have to open each report to find out the reported staining result.

3. Using Logic Operators in Search Criteria

SlicerDicer supports basic logic operators in search criteria. For example, we want to look for adenocarcinomas and squamous cell carcinomas of the lung where TTF-1 but not CK7 stains were performed.

We can type “squamous cell carcinoma” in the “Component Result Text” field and press enter. Type again “adenocarcinoma” in the “Component Result Text” field and press enter. By default, SlicerDicer will add “OR” between the two.

The screenshot shows the SlicerDicer search criteria interface. At the top, there is a dropdown menu for 'Base' set to 'All Lab Specimens and Tests'. Below it is a search bar with the placeholder text 'Search for criteria' and a magnifying glass icon, followed by a '+ Browse' button. The main area contains two criteria, each with a 'Component Result Text' field. The first criterion has the text '"squamous cell carcinoma"' in its field. Below the field is a 'Component' dropdown menu set to 'Any'. The second criterion has the text 'adenocarcinoma' in its field, also with a 'Component' dropdown menu set to 'Any'. An 'OR' operator is displayed between the two criteria.

Suppose we want to include metastatic cases and not just search the primary lung cases. We can add another “Component Result Text” criterion by selecting “component result text” again in the “Search for criteria” field.


This screenshot shows the search bar with the text 'component result text' entered. A dropdown menu is open below the search bar, showing three options: 'Component Result Text', 'Non-Component Result Text', and 'Component'. The 'Component Result Text' option is highlighted.

Then we can enter “lung” in the new “Component Result Text” field. By default, SlicerDicer will use “AND” logic operator between the two “Component Result Text” criteria.

The screenshot shows the SlicerDicer search criteria interface with two criteria. The first criterion has the text 'lung' in its 'Component Result Text' field, with a 'Component' dropdown menu set to 'Any'. The second criterion has the text '"squamous cell carcinoma"' in its 'Component Result Text' field, with a 'Component' dropdown menu set to 'Any'. Below the second criterion's field, the text 'adenocarcinoma' is visible. An 'AND' operator is displayed between the two criteria. The search bar at the top shows the text 'lung & "squamous cell carcinoma" or...'. The 'Base' dropdown menu is set to 'All Lab Specimens and Tests'.

Next, we can add TTF-1 stain by typing “TTF” in the “Search for criteria” field and select “TTF-1 (task)”. To exclude cases with CK7 stain, we need to first add “CK7 (task)” criterion by typing “CK7” in the “Search for criteria” field.

The left screenshot shows a search interface with the title "TTF-1 & lung & 'squamous cell carcin...". The base is set to "All Lab Specimens and Tests". The search criteria are: Task (TTF-1), Component Result Text (lung), and Component Result Text ("squamous cell carcinoma"). The right screenshot shows a search interface with the title "CK7 & TTF-1 & lung & 'squamous cell...". The base is set to "All Lab Specimens and Tests". The search criteria are: Task (CK7), Task (TTF-1), Component Result Text (lung), and Component Result Text ("squamous cell carcinoma").

To exclude cases with CK7 stain, we need to click the gear icon  and select “Exclude”. The excluded criteria will turn red.

The left screenshot shows the search interface with the title "CK7 & TTF-1 & lung & 'squamous cell...". The base is set to "All Lab Specimens and Tests". The search criteria are: Task (CK7), Task (TTF-1), Component Result Text (lung), and Component Result Text ("squamous cell carcinoma"). A red box highlights the "Exclude" button. The right screenshot shows the search interface with the title "CK7 & TTF-1 & lung & 'squamous cell...". The base is set to "All Lab Specimens and Tests". The search criteria are: Task (CK7), Task (TTF-1), Component Result Text (lung), and Component Result Text ("squamous cell carcinoma"). The CK7 criterion is now red, indicating it is excluded.

Now, we finally have the list of cases we wanted.

We can also click on the “Advanced Logic” button to manually edit the logic operators. We can use “AND”, “OR”, or parentheses. However, each criterion may only be used once. For example, we CANNOT use “(1 AND NOT 2) OR (NOT 1 AND 2)”.

The left screenshot shows the search interface with the title "adenocarcinoma". The base is set to "All Lab Specimens and Tests". The search criteria are: Component (adenocarcinoma) and Component (adenocarcinoma). A red box highlights the "Advanced Logic" button. The right screenshot shows the search interface with the title "adenocarcinoma". The base is set to "All Lab Specimens and Tests". The search criteria are: Component (adenocarcinoma) and Component (adenocarcinoma). A red box highlights the "Logic" field with the text "NOT 4 AND 3 AND 2 AND 1".

4. Linking Lab Tests/Pathology Cases with Patients' Data

Suppose we would like to study the effect of anti-SARS-CoV-2 monoclonal antibody treatment on serum immunofixation test results. We need to find immunofixation cases where the patients are taking or have taken bamlanivimab, etesevimab, casirivimab, and imdevimab.

We first open up the “Patients” model in SlicerDicer.

Select a Data Model			
74,370	324,373	3,734,430	3,321,401
IP Pharmacy Medication Orders	IRF Stays	Lab Specimens and Tests	Lab Tasks
4,128,982	266	4,975,725	1,037,183
Medication Administrations	Opioid Outpatient Prescriptions	Outpatient Prescriptions	Patient Infections
6,808,657	120,172	1,864,535	159,516
Patients	Patients with Cancer	Procedure Orders	Referrals
5,055,434	149,794	9,925,078	966,770
Research Studies	Research Study Patient Associations	Surgeries and Invasive Procedures	Visits
7,158	1,942,230	71,105	4,575,216

Type “medications” in the “Search for criteria” field and select “Medications”

All Patients

Base: All Patients

medications

+ Browse

- Medications
- Medications Restricted to Outpatient Use at DRAH (Medications)
- Medications Restricted to Outpatient Use at DRAH (Hospital or Clinic-Administered)

Under “Medications” component, search for the names of medications. Note that now we may specify a date range when the medications were administered.

Population

Base: All Patients

Any of Medications: bamlanivimab, etesevimab, casirivimab, casirivimab/imdevimab, imdevimab

Slices

No Slices

Measures

Number of Patients

Dates

Start Date: Aug 4, 2021

End Date: Feb 3, 2022

Slice By: None

Base: All Patients

Search for criteria

+ Browse

Medications


bamlanivimab

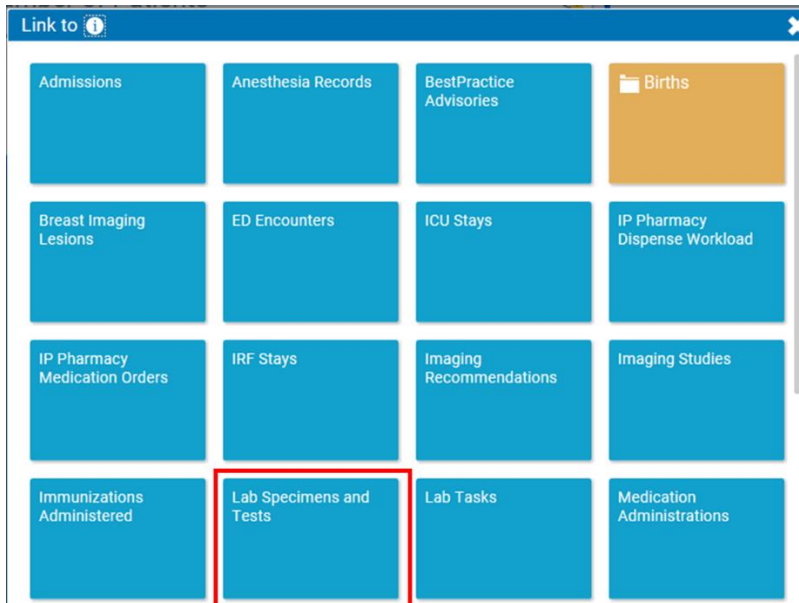
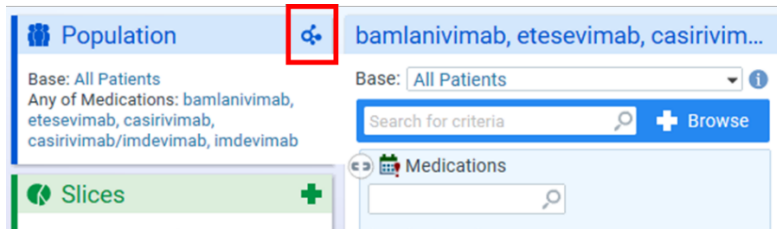
etesevimab

casirivimab

casirivimab/imdevimab

imdevimab

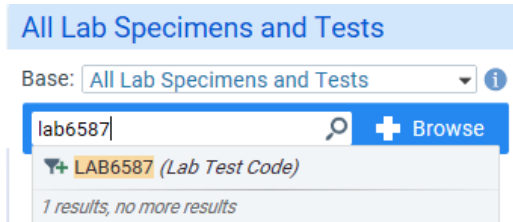
Click the “link”  button on the right side of “Population” tab and select “Lab Specimens and Tests” model.



If we type “immunofixation” in the “Search for criteria” field, it may be difficult to know which test is the correct one. We may try each or all of them; however, another way to do this is to find a patient who had the test done and find the “lab number” in the chart as shown below:

Immunofixation Electrophoresis (IFE), Serum [LAB6587]

In this case, the number we want is “LAB6587”. Type “LAB6587” in the “Search for criteria” field and select the test.



Remember that we may specify the date range when the test was performed.

Now we have generated a list of serum IFE tests whose patients have received anti-SARS-CoV-2 monoclonal antibody treatment.

If we start out with the “Lab Specimens and Tests” model first and link it to the “Patients” model, we will have a list of patients who have taken anti-SARS-CoV-2 monoclonal antibody and have undergone serum IFE testing.

VI. List of Commonly Used Components

The names of all the different components can sometimes be confusing. A few commonly used components are listed here for your convenience.

Name	Explanation	Examples
Component result text	Free text search	In this field: <input type="text" value="Component"/> <input type="button" value="Any"/> you can further specify what field to search for. Examples: <ul style="list-style-type: none"> • SP diagnosis (includes Diagnosis, Addendums, Interpretation, Findings) • Clinical History, Clinical Information • Gross Examination • Microscopic Examination • Procedure Notes • Immediate Assessment
Test	Case type	<ul style="list-style-type: none"> • Surgical pathology specimen (inside cases); • Surgical pathology – slide consult (outside cases); • FNA cytology specimen (FNA cases) • General cytology specimen (Non-GYN cytology cases) • GYN cytology specimen (GYN cytology cases)
Task	Task ordered/ performed	<ul style="list-style-type: none"> • CK7, CK20, panCK (IHCs) • Recut H&E • Unstained slide
Task protocol	Protocol used to accession case	<ul style="list-style-type: none"> • GI Biopsy protocol • LUNG-TOTAL/LOBE/SEGMENT RESECTION • BREAST BIOPSY NCB
Specimen source	Specimen source	
Pathologist	Responsible pathologist	

VII. Limitations of SlicerDicer

SlicerDicer is a very powerful search tool for pathologists. However, it has also its limitations.

1. Data are at least three days old. Therefore, it's not for real-time reporting.
2. It is difficult to distinguish positive and negative results in free text searches (e.g. positive for rejection, positive EBER, or excluding a diagnosis e.g. not IBD).
3. For cases before 6/2021 (legacy data), cannot search or only a limited number of components work.
4. The "Lab Specimens and Tests" model does searches in each block. Therefore, we will have repeated results for the same case if it has multiple blocks.
5. We cannot search for cases that have scanned whole slide images (as far as I know).
6. There may be multiple entries for the same code/search, may make search more difficult.

VIII. Contact Information

Please feel free to contact the following people if you have any questions or suggestions regarding SlicerDicer or other search tools.

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