

# ICPI TABLEAU TRAINING

June 21, 2018

Welcome and Introductions – 9:30 – 9:40am

Overview & Introduction to Tableau – 9:40 – 10:00am

Demos and Practice—10:00am – 12:15pm

*Connecting, Organizing and Manipulating Data (10:00 – 10:30am)*

**Pause:** Are we all on the same page?

*Developing Tables and Visuals in Worksheets (10:30-11:45am)*

- Create a basic table (HTS Yield Trends)
- Visualize site-level data using a bubble plot (HTS Yield/Site)
- Using geography to create a map (Geo)

**Pause:** Are we all on the same page?

*Putting it All Together in a Dashboard (11:45am-12:15pm)*

Wrap-up (12:15-12:30pm)



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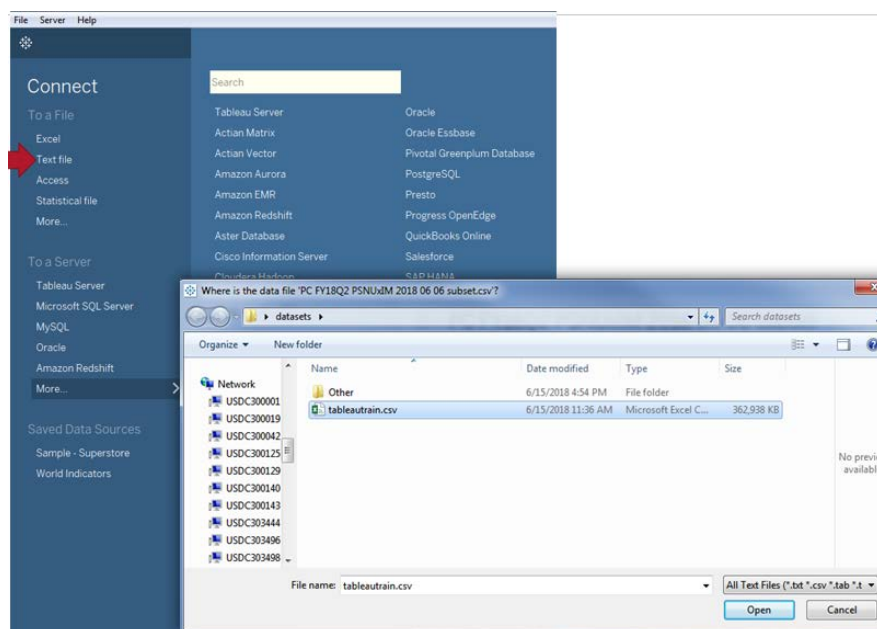


# I. Connecting, Organizing and Manipulating Data in Tableau



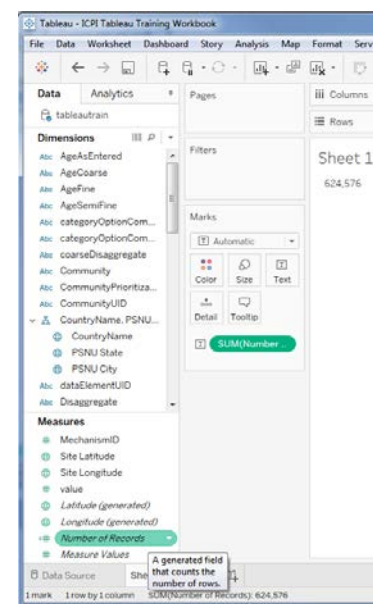
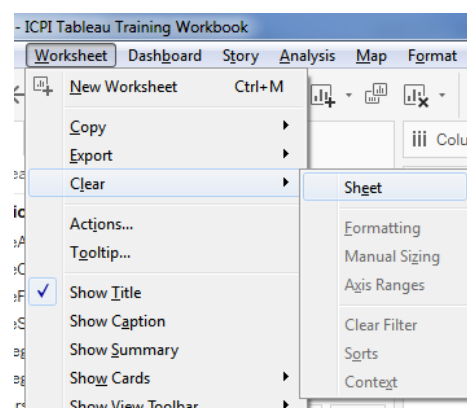
## Connect Data Source and Save Workbook

1. Open Tableau Desktop
2. Connect to **“text file”** since the Tableau training dataset is a csv file
3. Select your file and click open.
4. Click File, **“Save As”**
5. Save your file as a **.twbx** extension. This saves it as a packaged workbook, and will save the data within the workbook, so anyone who has Tableau Reader can open it without having to point to the original data source.



## Examine Data

1. Click on **Sheet 1** at the bottom of the screen
2. Drag **Number of Records** to Text
3. The number displayed indicates the number of rows that have been imported into Tableau. This should coincide with the number of rows in your external file.
4. Click **Worksheet → Clear → Sheet**

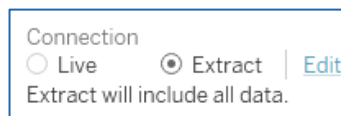
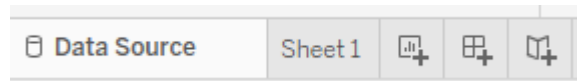




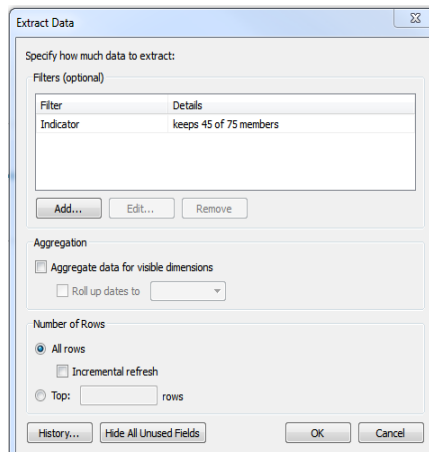
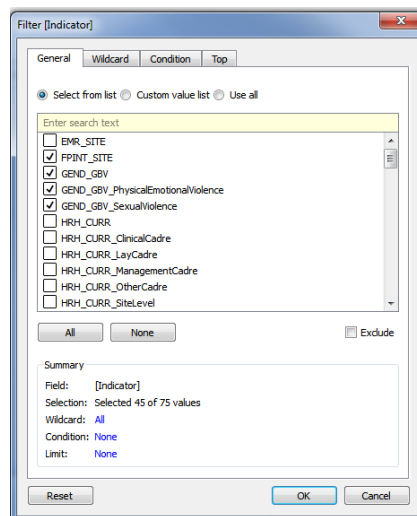
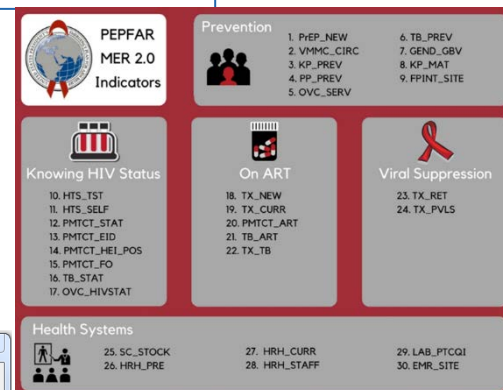
## Create a Tableau Extract

A Tableau extract of data will increase the speed with which visuals will update within Tableau. This is similar to subsetting your data in another software package (e.g. R, Stata, SAS, etc.).

1. On the **Data Source** tab, click on **Extract** and **Edit**.

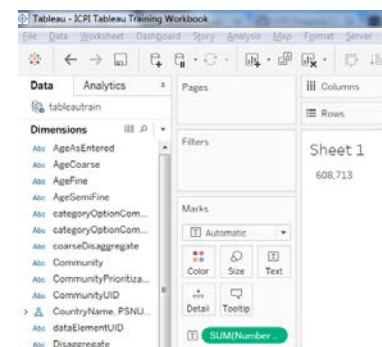


2. Click **"Add"**
3. Click **"Indicator"** as a filter
4. Select Indicators of interest to keep in the extract. We will keep all indicators except those under Health Systems for this exercise.
5. Click **"OK"**. You'll see that we're keeping 45 out of 75 possible indicators for this example.
6. Click **"OK"** again.



Check the Number of Rows left after the extract.

1. Go to **Sheet 1**
2. Click on **Sheet 1** at the bottom of the screen
3. Drag **Number of Records** to **Text**
4. The number displayed indicates the number of rows remaining in the Tableau extract.





## Orientation to the Worksheet interface

### Dimensions & Measures

- **Dimensions** contain qualitative values (such as names, dates, or geographical data). You can use dimensions to categorize, segment, and reveal the details in your data<sup>1</sup>.
- **Measures** contain numeric, quantitative values that you can measure. Measures can be aggregated.
- **Green measures** and **dimensions** are continuous, while **blue measures** and **dimensions** are discrete. These can be changed in the Data pane.

The screenshot shows the Tableau Worksheet interface with several annotations:

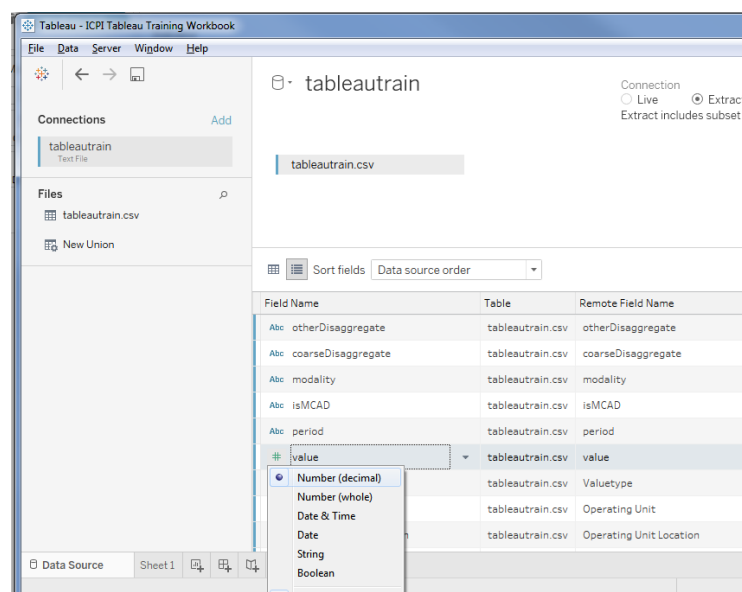
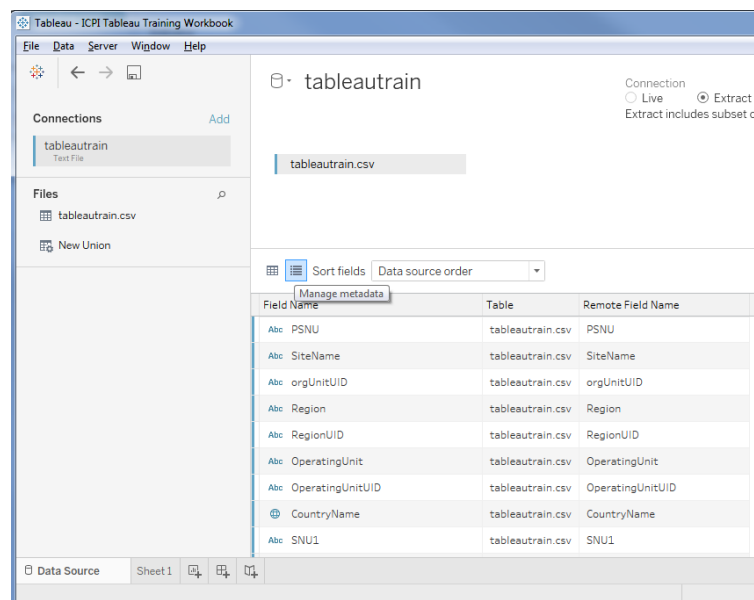
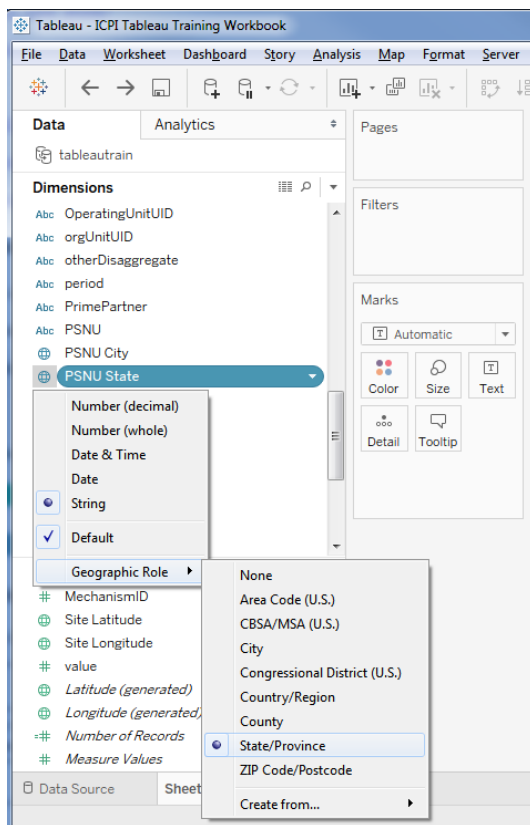
- Data pane**: Points to the left sidebar containing the Data source and Dimensions/Measures lists.
- Data source**: Points to the 'tableautrain' data source in the Data pane.
- Dimensions**: A blue bracket groups the list of dimension fields in the Data pane.
- Measures**: A green bracket groups the list of measure fields in the Data pane.
- Filters and Marks cards to customize visuals**: Points to the Filters and Marks cards in the center pane.
- Columns & rows – you can drag dimensions/measures here or in the field below**: Points to the Columns and Rows shelves in the center pane.
- Sample visuals. Hover over and see the tips on how to create this. Good place to start to explore data**: Points to the 'Show Me' button in the top right corner.

<sup>1</sup> More info: [https://onlinehelp.tableau.com/current/pro/desktop/en-us/datafields\\_typesandroles.html](https://onlinehelp.tableau.com/current/pro/desktop/en-us/datafields_typesandroles.html)



## Review Metadata

- Data fields are made from the columns in your data source and each field is automatically read in as a data type (integer, string, date, geography, etc.) and a role: Discrete Dimension or Continuous Measure (most commonly)
- The data type is indicated by **blue** or **green** text in the Data pane or on the Data Source tab.
- The data type can be edited by clicking on the data type icons.
- All the categorical data such as Disaggregate type, PSNU, etc. are imported as a **Discrete Dimension** and the numerical data (results and targets store as the “value” variable) are imported as a **Continuous Measure**.



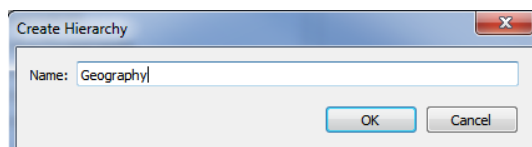




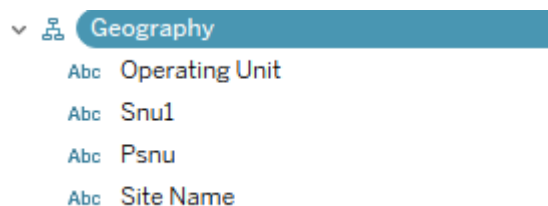
## Organize Data: Hierarchies



You can create hierarchies to organize your variables, and enable quick drill down of data. Let's create a hierarchy to be able to drill down geographically in our visuals later on.

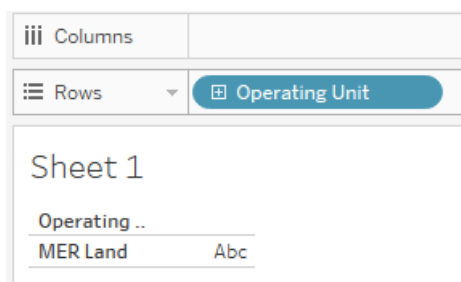
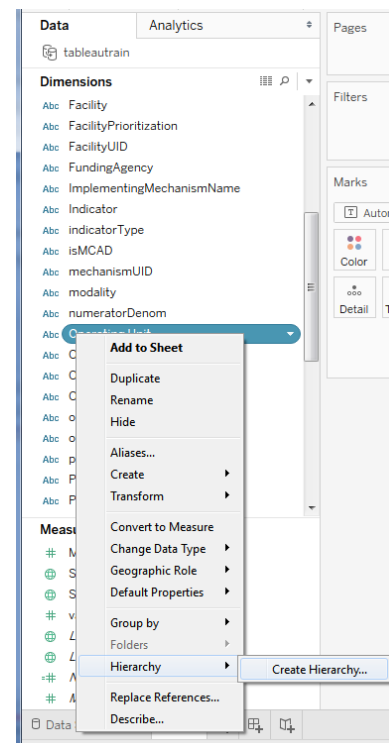
1. In the **Data pane**, right click on **Operating Unit**, and select **Hierarchy**, then **Create Hierarchy**
2. When prompted, enter a name for the hierarchy.



3. Drag the following additional fields into the newly created Hierarchy (in geographical order).



4. Drag **Geography** to **Rows**
5. Click the  or  to drill down or up in the hierarchy.



Columns			
Rows			
Operating Unit			
Snu1			
PSNU			
Operating ..	Snu1	PSNU	
MER Land	Essos	The Crownlands	Abc
		The Iron Islands	Abc
		The North	Abc
		The Riverlands	Abc
		The Vale of Arryn	Abc
		The Westerlands	Abc
		Beyond the Wall	Abc
Westeros		Braavos	Abc
		Dorne	Abc
		Lorath	Abc
		The Reach	Abc
		The Stormlands	Abc



## Manipulate Data: Creating Calculated Fields<sup>2</sup>

For today's exercise, we will create calculations to estimate Testing Yield. Please note, that given the structure of the dataset, these calculations may vary. We will create 4 calculations: HTS POS Yield, HTS TST, HTS TST NEG, and HTS TST POS.

1. On a new sheet, in the **Data** pane under **Measures**, right click on **#value**
2. Click **Create** → **Calculated Field**
3. In the calculation Editor, give this field a name.
4. Create calculated fields for each indicator below. Click **OK**.

calc. HTS TST

```
IF CONTAINS([Indicator], "HTS_TST") THEN [value]
END
```

The calculation is valid.

Apply OK

calc. HTS TST NEG

```
IF CONTAINS([Indicator], "HTS_TST_NEG") THEN [value]
END
```

The calculation is valid.

Apply OK

calc. HTS TST POS

```
IF CONTAINS([Indicator], "HTS_TST_POS") THEN [value]
END
```

The calculation is valid.

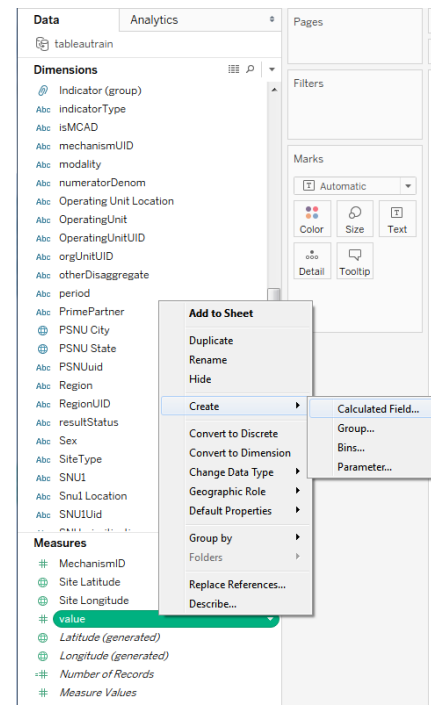
Sheets Affected Apply OK

calc. HTS POS Yield

```
SUM([calc. HTS TST POS])/SUM([calc. HTS TST])
```

The calculation is valid.

Apply OK



5. You'll notice that your calculated field now has a "Σ" in front of it under Measures.
6. You should have 4 new measures now.

### Measures

- Σ calc. HTS POS Yield
- Σ calc. HTS TST
- Σ calc. HTS TST NEG
- Σ calc. HTS TST POS

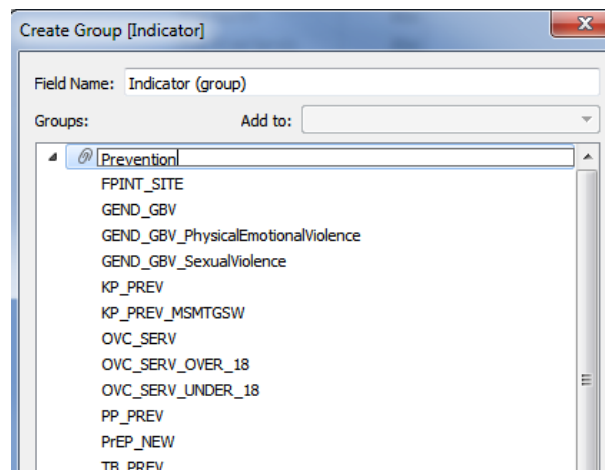
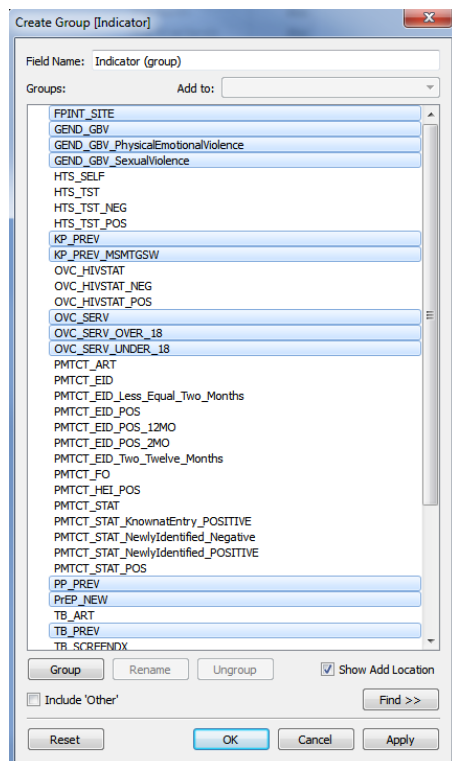
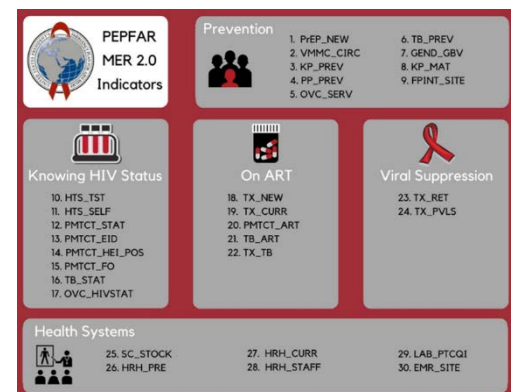
<sup>2</sup> More info: [https://onlinehelp.tableau.com/current/pro/desktop/en-us/calculations\\_calculatedfields\\_formulas.html](https://onlinehelp.tableau.com/current/pro/desktop/en-us/calculations_calculatedfields_formulas.html)



## Bonus: Organize Data in Groups<sup>3</sup>

You can create a group to combine related members in a variable. For example, you can organize the indicators into groups within an Indicator field.

1. Within the **Data** pane, right click on **Indicator**
2. Click **Create → Group**
3. Select the indicators you'd like to group by **CTRL + click**
4. Click **Group**
5. Give it a title next to the paper clip.
6. Click **OK** when done.
7. You can check your work by dragging **Indicator (group)** and **Indicator** to **Rows**.
8. You may do this for the remaining indicators, if you wish. However, it is not necessary for today's exercise.



Columns		
Rows	Indicator (group)	Indicator
Sheet 2		
Prevention	Indicator (g..	Indicator
	FPINT_SITE	Abc
	GEND_GBV	Abc
	GEND_GBV_PhysicalEmo...	Abc
	GEND_GBV_SexualViolen..	Abc
	KP_PREV	Abc
	KP_PREV_MSMTGSW	Abc
	OVC_SERV	Abc
	OVC_SERV_OVER_18	Abc
	OVC_SERV_UNDER_18	Abc
	PP_PREV	Abc
	PrEP_NEW	Abc
	TB_PREV	Abc
	TB_ART	Abc
Knowing HIV Status	HTS_SELF	Abc
	HTS_TST	Abc
	HTS_TST_NEG	Abc
	HTS_TST_POS	Abc

<sup>3</sup> More info: [https://onlinehelp.tableau.com/current/pro/desktop/en-us/sortgroup\\_groups\\_creating.html](https://onlinehelp.tableau.com/current/pro/desktop/en-us/sortgroup_groups_creating.html)

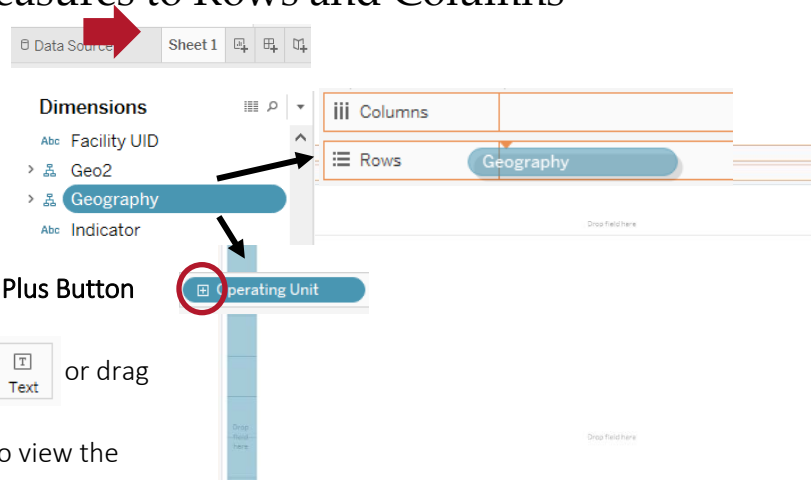


## II. Developing Tables and Visuals in Worksheets: Create a Basic Table



## Drag Dimensions and Measures to Rows and Columns

1. If not there already, select **Sheet 1**
2. From the **Data Pane**, grab the recently created hierarchical **Geography** dimensions pill and drag it to the **Rows** field or to the rows of the worksheet directly.
3. Drill down to the **PSNU** level by selecting **Plus Button**
4. Drag **Period** to columns.
5. Drag **calc.HTS POS Yield** and move it to **Text** or drag directly to the body of the table.
6. Right click **calc.HTS POS Yield** → **Format** to view the formatting pane and change to **Numbers** → **Percentage**.



Format AGG(calc.HTS PO... x

Columns: Period

Rows: Operating Unit

Operating Unit: MER

Sheet 1

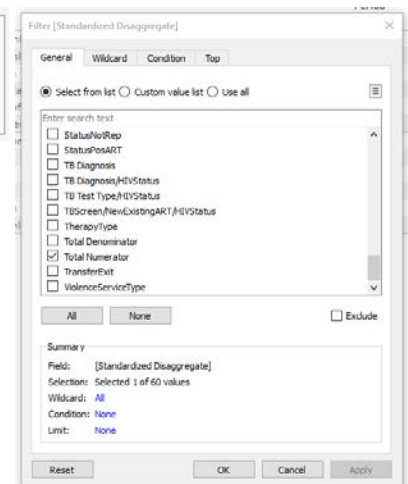
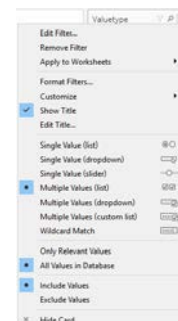
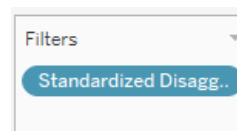
Operating Unit	Snu1	Psnu	FY2017_TA..	FY2017APR	FY2017Q1	FY2017Q2	FY2017Q3	FY2017Q4	FY2018_TA..	FY2018Q1	FY2018Q2
MER Land	Essos	The Crownlands	5.16%	0.84%	0.76%	0.56%	0.78%	1.28%	2.92%	1.43%	1.39%
		The Iron Islands	4.23%	1.68%	1.72%	1.71%	1.29%	2.02%	2.08%	1.69%	1.97%
		The North	4.33%	2.29%	2.19%	2.00%	2.05%	3.08%	1.55%	2.19%	2.19%
		The Riverlands	4.52%	2.94%	2.66%	3.54%	3.00%	2.63%	2.79%	2.42%	2.34%
		The Vale of Arryn	4.58%	1.38%	1.18%	1.33%	1.26%	1.86%	2.94%	1.37%	1.43%
		The Westerlands	4.39%	2.17%	1.90%	1.94%	1.89%	3.12%	1.87%	2.31%	1.62%
Westeros		Beyond the Wall	4.82%	2.71%	2.09%	2.65%	2.78%	3.41%	1.41%	2.70%	2.55%
		Braavos	4.59%	3.56%	3.48%	3.64%	3.97%	3.25%	3.28%	4.23%	3.19%
		Dorne	4.03%	0.66%	1.49%	0.48%	0.47%	0.67%	2.43%	0.59%	0.95%
		Lorath	4.13%	1.74%	1.77%	2.14%	1.42%	1.63%	1.80%	1.24%	2.24%
		The Reach	4.25%	0.88%	0.75%	1.00%	1.11%	0.75%	4.71%	0.67%	1.19%
		The Stormlands	4.31%	3.08%	2.74%	2.84%	3.87%	3.12%	2.89%	3.24%	3.47%

## Add Filters

1. Drag **StandardizedDisaggregate** to the **Filters** Card and select **Total Numerator**.

**Reminder:** When working with the MER Structured datasets, to avoid double counting all indicators must be filtered at minimum on the **Disaggregate** or **StandardizedDisaggregate** dimensions. Depending on the table structure, filtering by **Period** or **ValueType** may also be required.

2. Add another filter for **ValueType**. This time, create the filter by right-clicking **ValueType** → **Show Filter**. The **ValueType** Filter appears on the right hand side of the worksheet.
3. Change the **Filter Type**. Select the **ValueType** Filter Dropdown → **Single Value (dropdown)** option. We



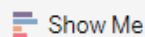


only want to display results, which is the default.

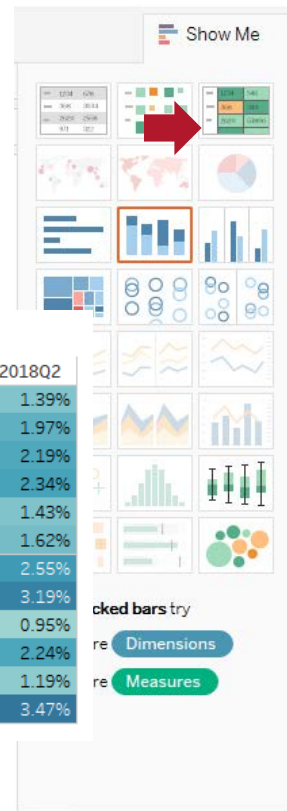
4. Add one more filter for **Period** to the **Filters Card** to remove **FY2017APR**, since we want to look at our testing yield by quarter only.

## Use 'Show Me' to Add Quick Table Visuals

1. Navigate to the menu bar and select:



2. Tableau suggest a number of different options that will work with your data. Select **Highlight Table** to quickly highlight cells with the highest and lowest yield across the 6 quarters.
3. Rename your worksheet to '**1. HTS Yield Trends**'



			Period					
Operating ..	Snu1	Psnu	FY2017Q1	FY2017Q2	FY2017Q3	FY2017Q4	FY2018Q1	FY2018Q2
MER Land	Essos	The Crownlands	0.76%	0.56%	0.78%	1.28%	1.43%	1.39%
		The Iron Islands	1.72%	1.71%	1.29%	2.02%	1.69%	1.97%
		The North	2.19%	2.00%	2.05%	3.08%	2.19%	2.19%
		The Riverlands	2.66%	3.54%	3.00%	2.63%	2.42%	2.34%
		The Vale of Arryn	1.18%	1.33%	1.26%	1.86%	1.37%	1.43%
		The Westerlands	1.90%	1.94%	1.89%	3.12%	2.31%	1.62%
	Westeros	Beyond the Wall	2.09%	2.65%	2.78%	3.41%	2.70%	2.55%
		Braavos	3.48%	3.64%	3.97%	3.25%	4.23%	3.19%
		Dorne	1.49%	0.48%	0.47%	0.67%	0.59%	0.95%
		Lorath	1.77%	2.14%	1.42%	1.63%	1.24%	2.24%
		The Reach	0.75%	1.00%	1.11%	0.75%	0.67%	1.19%
		The Stormlands	2.74%	2.84%	3.87%	3.12%	3.24%	3.47%



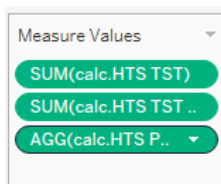
## Check Data and QC

Because we've structured our dataset in long format, it's a good idea to always check the data to confirm that you've applied filters correctly and calculated variables are summing correctly. Sometimes it's not easy to tell at first glance when there's a data error.

1. Drag the **Disaggregate** and **NumeratorDenom** dimensions to your table **Rows**. Looks like we're only looking at the numerator, as intended.

Operating ..	Snu1	Psnu	Disaggregate	Numerator..	Period					
					FY2017Q1	FY2017Q2	FY2017Q3	FY2017Q4	FY2018Q1	FY2018Q2
MER Land	Essos	The Crownlands	Total Numerator	N	0.76%	0.56%	0.78%	1.28%	1.43%	1.39%
		The Iron Islands	Total Numerator	N	1.72%	1.71%	1.29%	2.02%	1.69%	1.97%
		The North	Total Numerator	N	2.19%	2.00%	2.05%	3.08%	2.19%	2.19%
		The Riverlands	Total Numerator	N	2.66%	3.54%	3.00%	2.63%	2.42%	2.34%
		The Vale of Arryn	Total Numerator	N	1.18%	1.33%	1.26%	1.86%	1.37%	1.43%
	Westeros	The Westerlands	Total Numerator	N	1.90%	1.94%	1.89%	3.12%	2.31%	1.62%
		Beyond the Wall	Total Numerator	N	2.09%	2.65%	2.78%	3.41%	2.70%	2.55%
		Braavos	Total Numerator	N	3.48%	3.64%	3.97%	3.25%	4.23%	3.19%
		Dorne	Total Numerator	N	1.49%	0.48%	0.47%	0.67%	0.59%	0.95%
		Lorath	Total Numerator	N	1.77%	2.14%	1.42%	1.63%	1.24%	2.24%
		The Reach	Total Numerator	N	0.75%	1.00%	1.11%	0.75%	0.67%	1.19%
		The Stormlands	Total Numerator	N	2.74%	2.84%	3.87%	3.12%	3.24%	3.47%

2. Drag **calc.HTS TST** and **calc.HTS TST POS** to the table, and rearrange ordering on the **Measure Values Card**. We can quickly calculate to see that in **the Crownlands**, 71 Positives/9,336 Tested \*100 = 0.76%, which is correct.





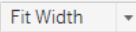
3. Remove the **Disaggregate**, **NumeratorDenom**, **calc.HTS TST**, and **calc.HTS TST POS** pills from the table.

**Note:** If using a real MER dataset, now would be a good time to check your table results against final.DATIM or Panorama.

## Swap Rows and Columns

Sometimes you'll find that the way you've set up your table doesn't allow easy interpretation of the data.

Rather than re-dragging **Dimensions** and **Measures** to the **Columns** and **Rows**, Tableau makes it easy to switch things around.

1. Navigate to the menu bar at the top of Tableau and select  (Swap Rows and Columns)
2. Wait a minute? That's it??? Yes, it's that easy. Now **Geography** is our column data and **Periods** comprise the **Row** data.
3. It's a little difficult to read the PSNU names this way, so navigate back to the menu bar and change  view to 
4. Select **Swap Rows and Columns** again to return back to the previous view.




### III. Developing Tables and Visuals in Worksheets: Visualizing Site Level Data with a Bubble Plot

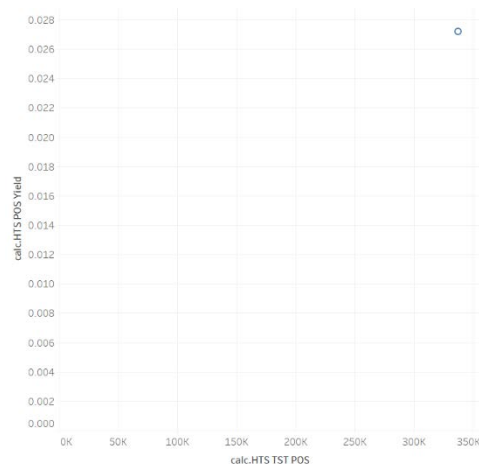




## Using Two (or More) Measures to Compare Data

Now that we know which PSNUs had the best and worst testing yield, we might want to drill down further to understand within PSNUs, which sites not only had a high testing yield—indicating successfully targeted testing—but also which sites identified the highest number of positives, as it is the intersection of these that is of greatest programmatic interest.

1. Click on **Worksheet** → **New Worksheet** or on the icon at the bottom of the screen to create a new worksheet.
2. Ctrl+Click on **calc.HTS POS Yield** and **calc.HTS TST POS** to select both, then select the **Show Me** dropdown at the top right of the screen.
3. Notice that Tableau suggests three different chart types; select **Scatterplot**.
4. Click  **Swap Rows and Columns** so that **calc.HTS POS Yield** appears on the x-axis and **calc.HTS TST POS** appears on the y-axis.
5. You should see one dot on a scatterplot. Not particularly interesting yet...



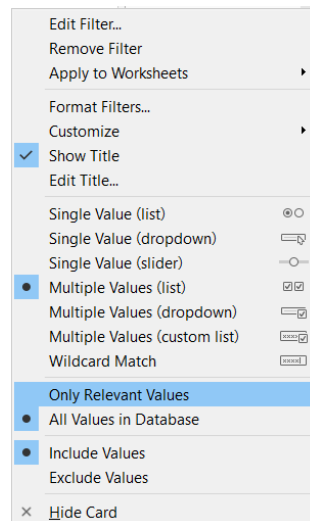
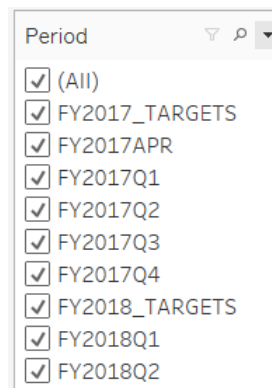
## Add Filters

**Reminder:** When working with the MER Structured datasets, to avoid double counting all indicators must be filtered, at minimum, on the **Disaggregate** or **StandardizedDisaggregate** dimensions. Depending on the table structure, filtering by **Period** or **ValueType** may also be required.

1. Drag **StandardizedDisaggregate** to the **Filters Card** and select **Total Numerator**.
2. Add another filter for **ValueType** by dragging the pill to the **Filters Card**, select **Results**.
3. Add one more filter for **Period**. This time, create the filter by right-clicking **Period** → Show Filter. The **Period** filter appears on the right-hand side of the worksheet.



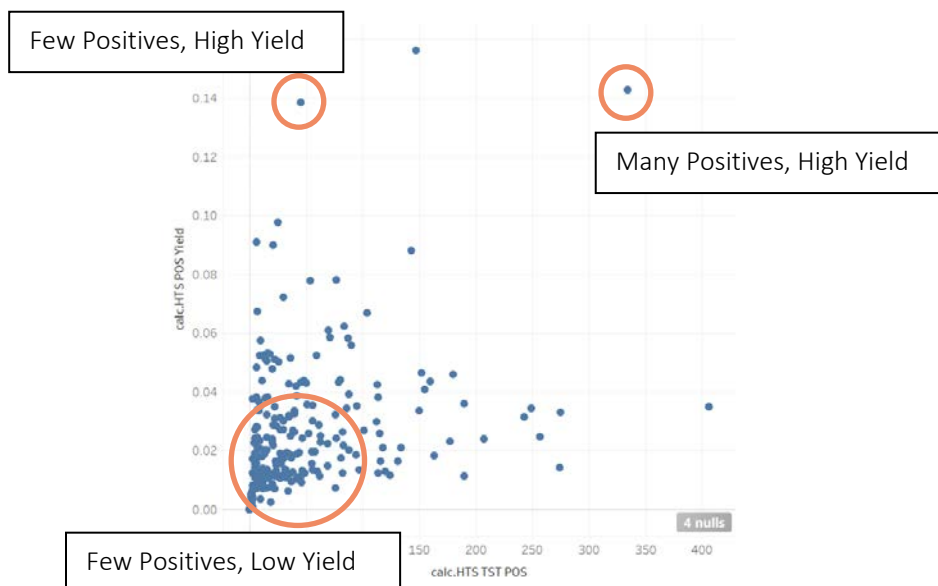
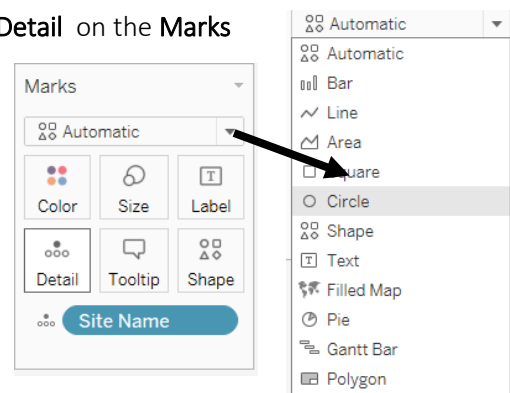
- You'll notice that the **Period** filter currently includes both results and targets, even though we've selected just results for this worksheet. Select the **Filter Dropdown** → **Only Relevant Values** to limit the filter options.
- Select **Filter Dropdown** → **Multiple Values** (dropdown) to change the filter type, and select both **FY2018Q1** and **FY2018 Q2**. By default, Tableau has added **Period** as a **Shape** on the **Marks Card**. We want to look at the sum of Q1+Q2, so drag **Period** back to **Dimensions** to remove it.



## Visualizing at the Site Level by Adding Details


We can see that so far in FY18, we identified 11,536 new positives, and yield was approximately 2.2%. Now we want to understand site-level variations.

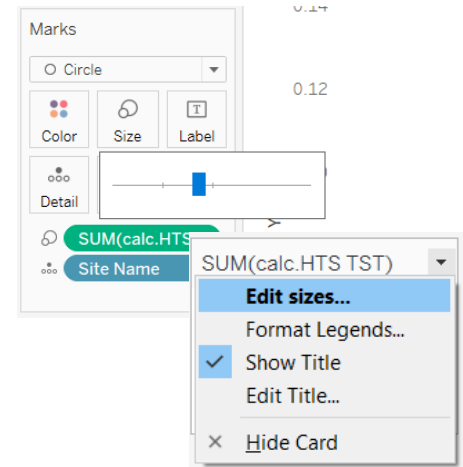
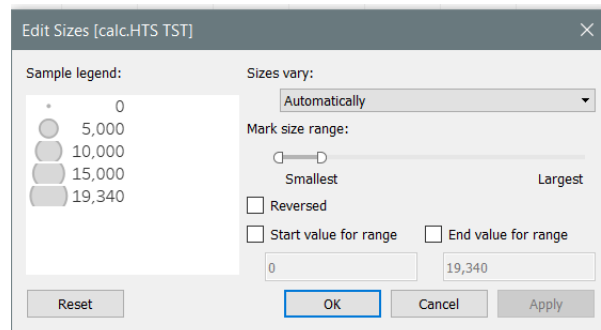
- Select **Site Name** from the **Geography** hierarchy and drag it to **Detail** on the **Marks Card**.
- Select the Marks **Dropdown** → **Circle**. Now we can see that there are a number of sites clustered together around the origin. These are sites identified a low number of positives (<100) and had low yield (<4%). We can also see those sites that identified few positives with very high yield, as well as those that identified a large number of positives while maintaining high yield.






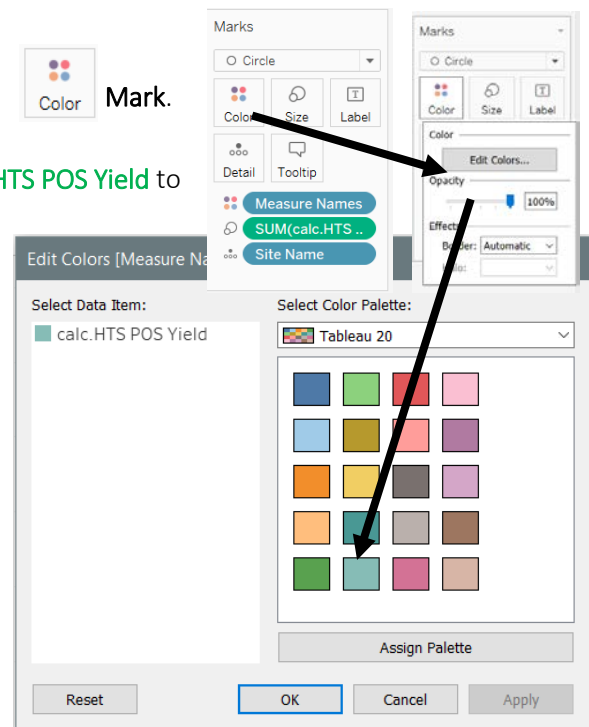
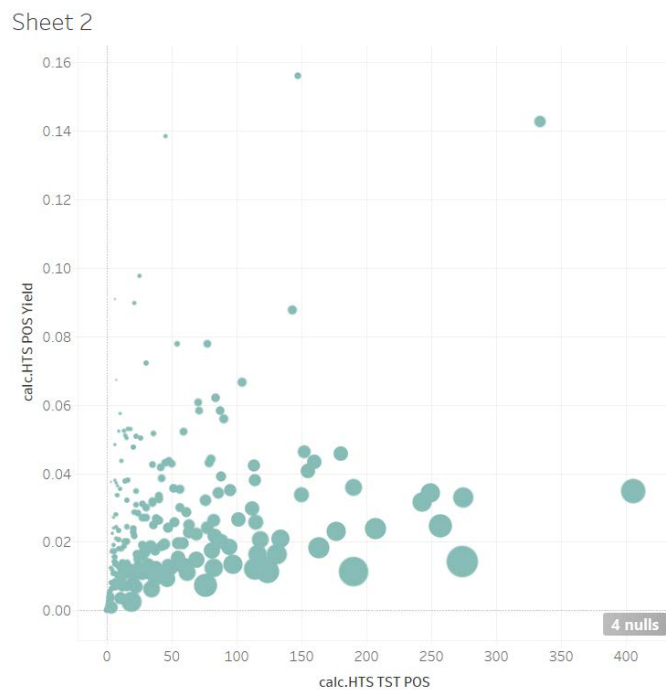
## Analyze a Third Variable by Adding Size

1. Select **calc.HTS TST** and drag it over **Size**  on the **Marks Card**.
2. Click the **Size Mark** to increase the size of the bubbles relative to testing volume. You can also select the **Size Legend Dropdown** → **Edit Sizes** to customize bubble size.



## Change the Measure Colors

1. Select **Measure Names**, drag and drop on the **Color**  **Mark**. The color automatically changes to red.
2. Select the **Color Mark** → **Edit Colors** to change **calc.HTS POS Yield** to **Light Teal**.

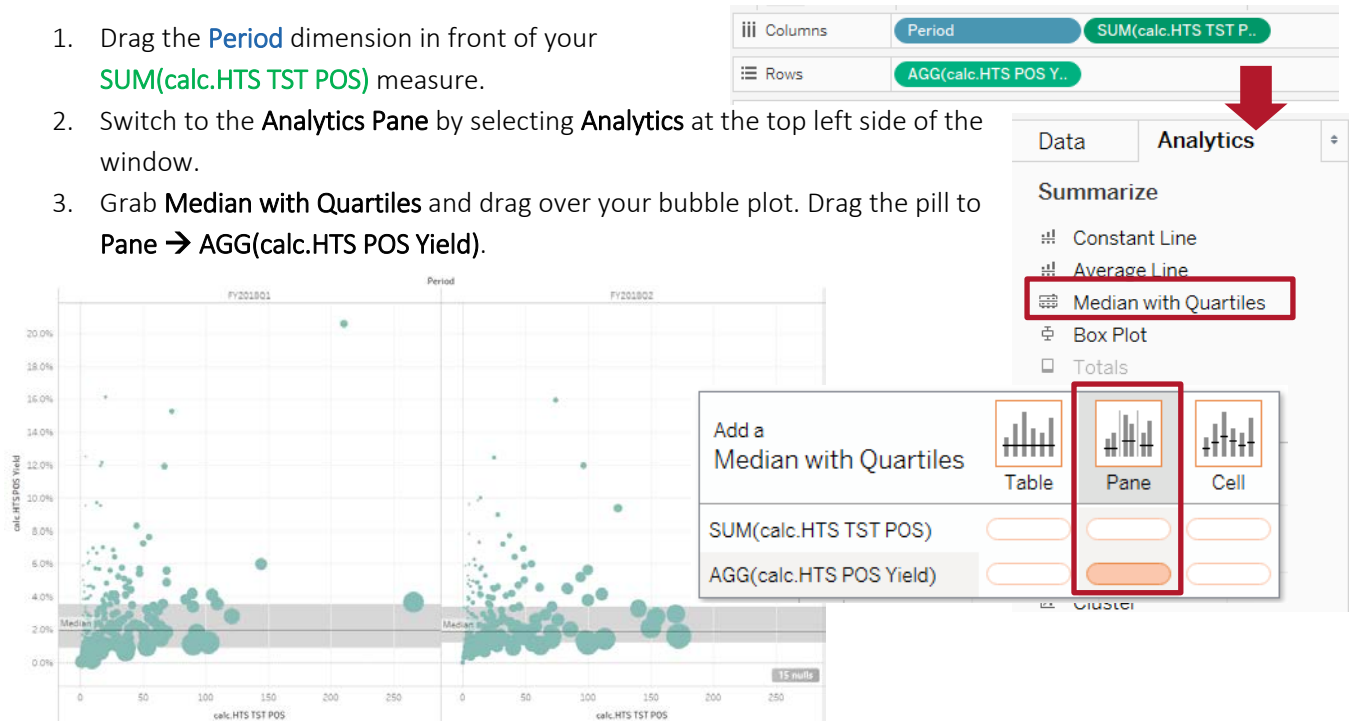




## Compare Quarters and Add Analytics

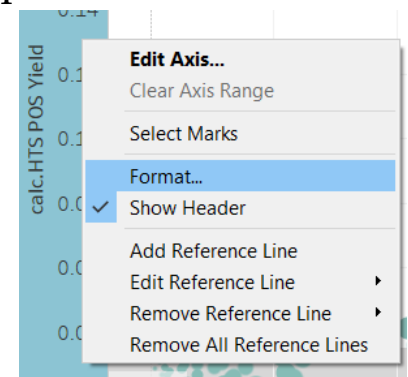
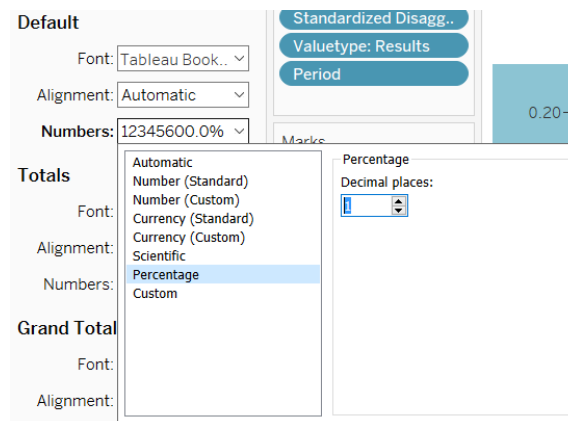
Instead of looking at Q1+Q2 combined, let's compare results between Q1 and Q2 of FY2018 to see if there are any differences in median yield.

1. Drag the **Period** dimension in front of your **SUM(calc.HTS TST POS)** measure.
2. Switch to the **Analytics** Pane by selecting **Analytics** at the top left side of the window.
3. Grab **Median with Quartiles** and drag over your bubble plot. Drag the pill to **Pane** → **AGG(calc.HTS POS Yield)**.




## Edit the Formatting and Add Tool Tips

1. Right click on the **y-axis** → **Format**.
2. In the **Axis Pane**, select **Scale** → **Percentage** and change the number of decimal places to **1**.
3. Right click on the **x-axis** → **Format**.
4. In the Axis Pane, select **Scale** → **Number (Custom)** and change the number of decimal places to **0**.





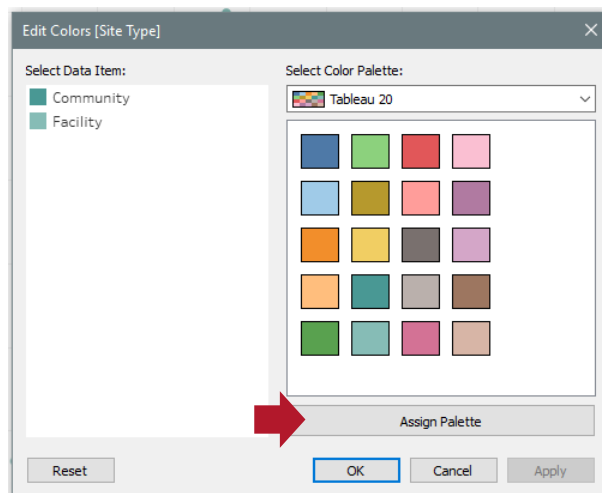
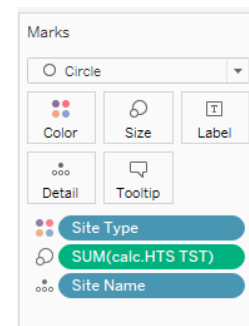
- Click on the **Tooltip Mark**  to customize the text that appears when hovering over each site.
- Change the tooltip to read: In <Period>, <Site Name> tested <SUM(calc.HTS TST)> individuals, of whom, <SUM(calc.HTS TST POS)> were HIV-positive. Yield was <AGG(calc.HTS POS Yield)>. Change all **Font** to **Dark Grey** and **Bold** only the **Measures**.
- Rename the worksheet **2a. HTS Yield/Site**.



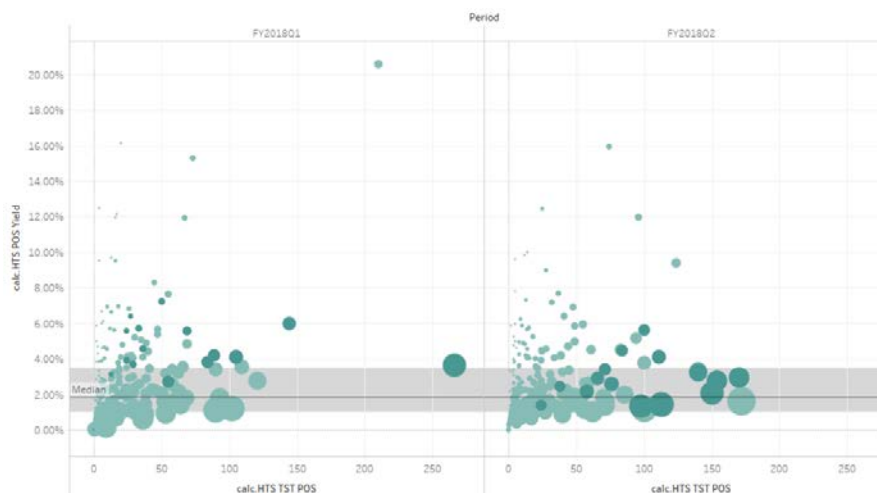


## Bonus: Compare Results by Site Type

1. Grab the Site Type dimension and drag to the **Color Mark**
2. Select the **Color Mark** → **Edit Colors** to change the colors for the community versus facility-based sites.
3. Change the **Color Palette** to **Tableau 20** and select **Assign Palette**.



4. Select **Community**, then select any color to assign a new color to community. Repeat for **Facility**.



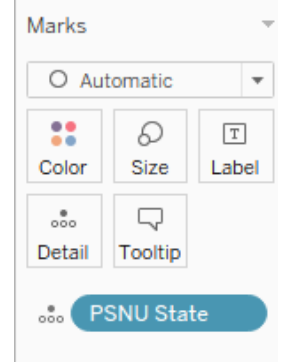
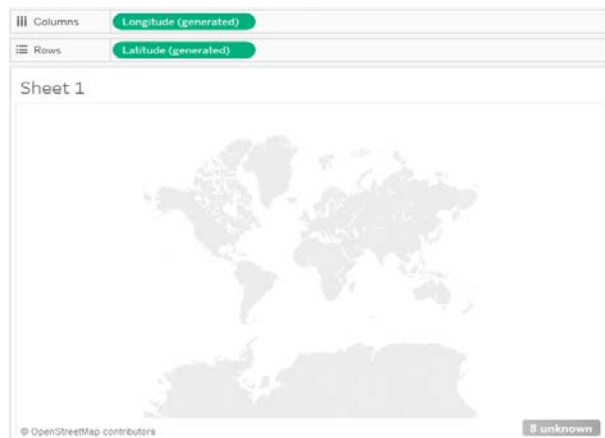
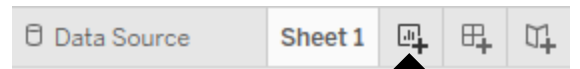


## IV. Developing Tables and Visuals in Worksheets: Using Geography to Create a Map

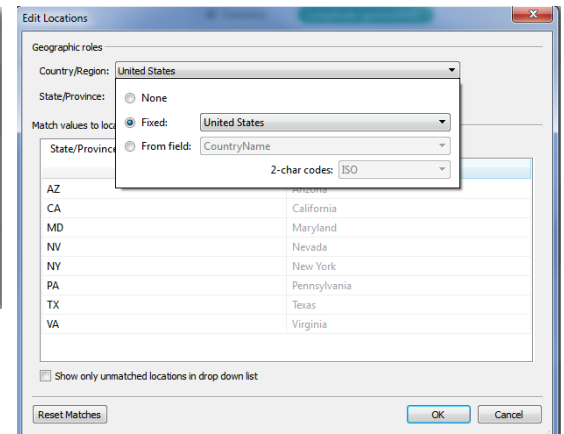
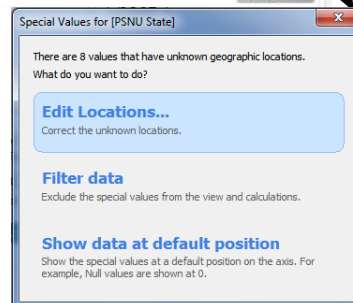


## Add Geographic Dimensions to the View

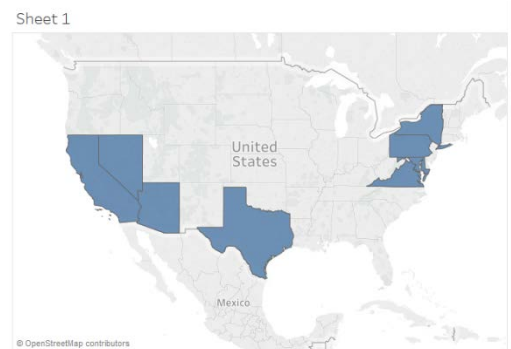
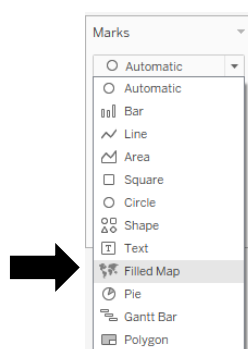
1. Create a new Sheet by clicking on **Worksheet** → **New Worksheet** or click on the button below.
2. From the Data pane, drag **PSNU State** to **Detail** under the Marks Card
3. You should now see a map display under the Sheet 1 Title, with an auto-generated Longitude and Latitude.
4. At the bottom right of the screen, a grey notification indicates there are 8 unknowns on this sheet. Click on **8 unknown** to resolve this issue.



5. Click **Edit Locations** in the window that opens.
6. Change the **Country/Region** to **Fixed: United States** and click **OK**



7. You should now see the below visual on your Sheet.
8. In the **Marks** card, click on the drop-down and select **Filled Map**. This will change your visual to a filled map of the locations within the PSNU State variable.



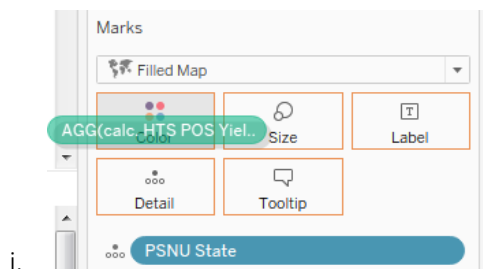
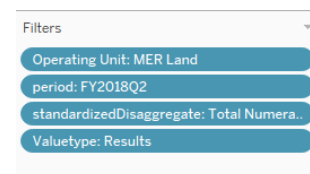




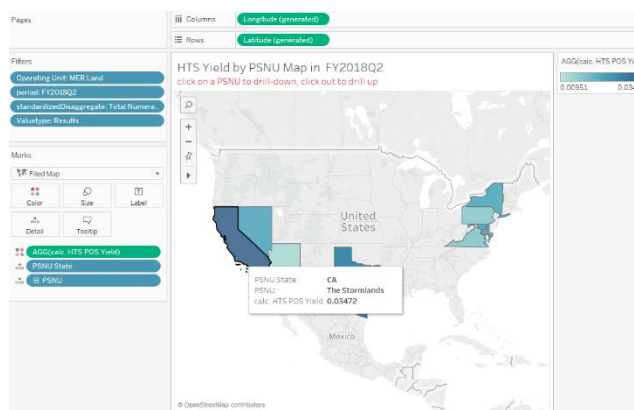
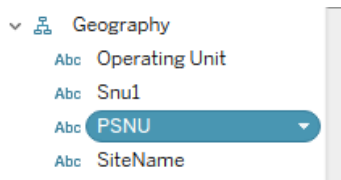
## Apply HTS POS Yield to the Map

Let's look at HTS POS Yield across MER Land for FY2018 Q2 Results at the Total Numerator level.

1. Filter for MER Land:
  - a. From the Dimensions pane, drag **Operating Unit** (under the Geography Hierarchy) to the **Filters** card
  - b. Select **MER Land**, click **OK**
2. Filter for FY2018 Q2:
  - a. From the Dimensions pane, drag **Period** to the **Filters** card
  - b. Select **FY2018Q2**, click **OK**
3. Filter for Total Numerator:
  - a. From the Dimensions pane, drag **Standardized Disaggregate** to the **Filters** card
  - b. Select **Total Numerator**, click **OK**
4. Filter for Results (note: given the structure of the dataset, this value was created in R previously)
  - a. From the Dimensions pane, drag **Valuetype** to the **Filters** card
  - b. Select **Results**, click **OK**
  - c. Your filters card should now look like the figure to the right.
5. Drop in HTS POS Yield onto the map.
  - a. Drag the calculated field created previously "**calc. HTS POS Yield**", on to **Color** under the **Marks** card.



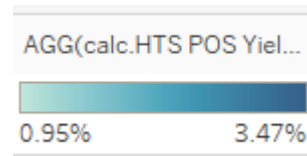
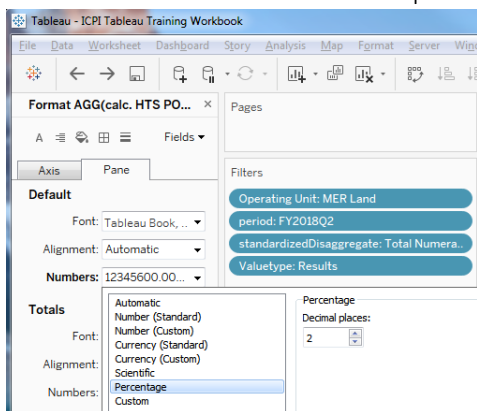
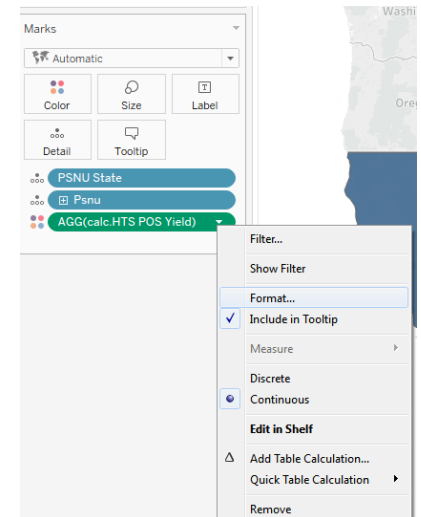
- i. This will add a color scale to the PSNU States for the range of values for HTS POS Yield.
6. Add **PSNU** to **Details** under the Marks Card from the Geography Hierarchy created previously. This will show up in tool-tips upon hovering over each PSNU State as in the below visual.





## Formatting Numbers and Percentages

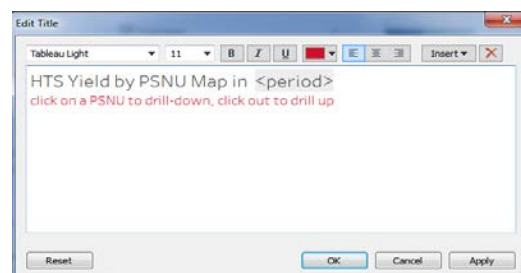
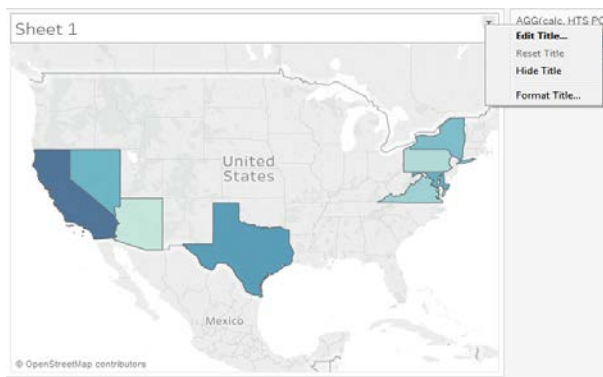
1. You'll notice that HTS POS Yield is a decimal. Let's turn into a percentage.
2. Right click on the calculated measure under the **Marks** card and click on **Format**
3. Double check that the title after format corresponds to the variable you clicked on to format.
4. Click on **Pane**
5. Under Default, click on **Numbers** and select **Percentage**. You can modify the number of decimals places as you wish.
6. HTS POS Yield should now show up as a percentage.



## Add a Title

You can title this Sheet with hard-coded text, or you can have it update based on the Filters applied on this Sheet.

1. **Double click on "Sheet 1"** at the top of the map or click on the down arrow, then click **Edit Title**
2. To apply a Period Filter:
  - a. Click on **Insert** → **Period**
3. Add any other detailed text/instructions to the title and click **OK**



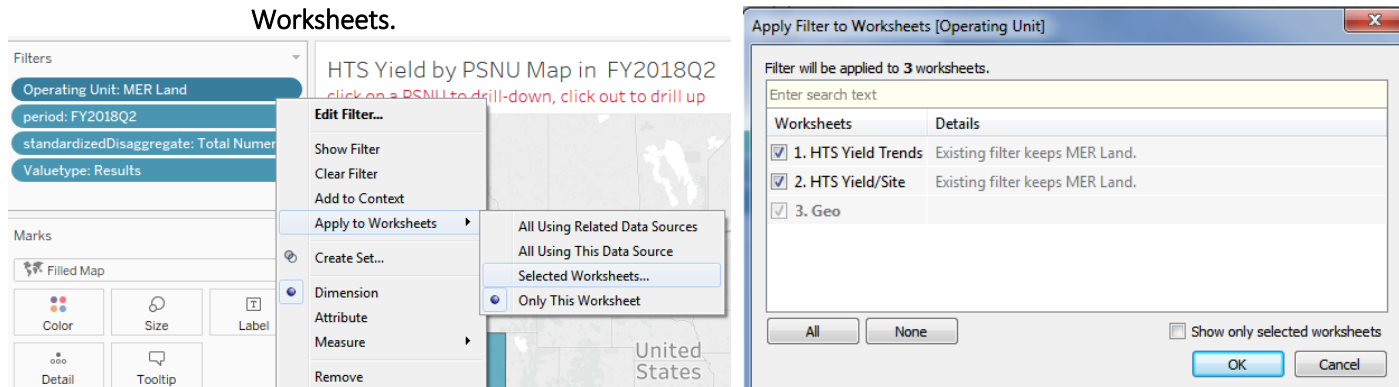


## Apply and Connect Filters to Multiple Worksheets

To connect filters across more than one sheet (similar to selecting Filter Connections with Pivot Tables in Excel).

### 1. Apply Operating Unit filter

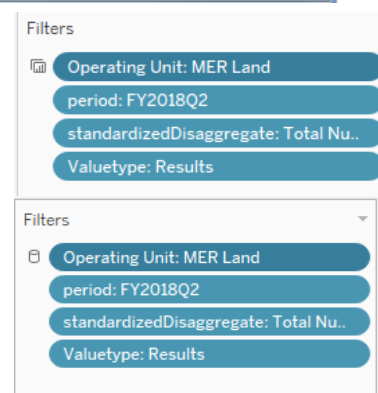
- Under the Filters card, right click on **Operating Unit** → **Apply to Worksheets** → **Selected Worksheets**.



- Select all sheets since this is an Operating Unit filter and click **OK**. A worksheets icon will appear next to this filter.
- FYI: We can also apply this filter to all worksheets that are using this data source. To do this, select **All Using This Data Source**. Either option will work for this exercise. If you use this option, a cylinder icon representing data source will appear next to this filter.

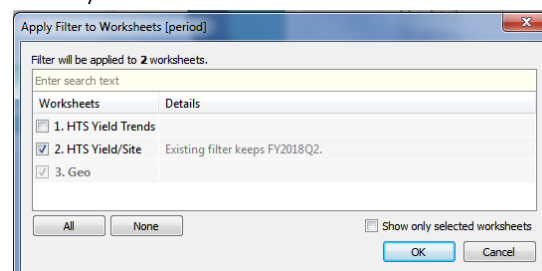
### 2. Apply the Period filter

- Under the filters card, right click on **Period** → **Apply to Worksheets** → **Selected Worksheets**.
- Select only the **HTS Yield/Site** worksheet since the HTS Yield by Trends visual is intended to show data over time, so we wouldn't want to reduce the number of periods on that visual. Click **OK**.



### 3. Apply the Standardized Disaggregate Filter

- Under the filters card, right click on **Standardized Disaggregate** → **Apply to Worksheets** → **Selected Worksheets**.
- Select the appropriate worksheets (**HTS Yield Trends** and **HTS Yield/Site**). Click **OK**.



### 4. Apply the Results Filter

- Under the filters card, right click on **Valuetype** → **Apply to Worksheets** → **Selected Worksheets**.
- Select the appropriate worksheets (**HTS Yield Trends** and **HTS Yield/Site**). Click **OK**.

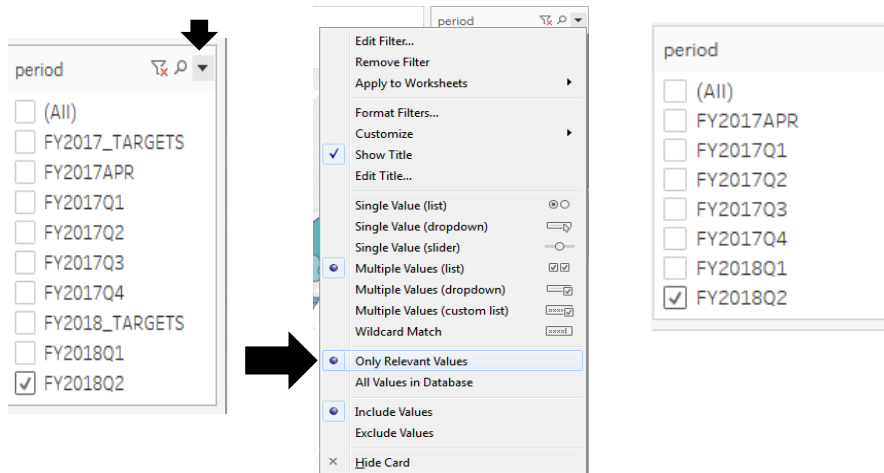


## Show Filters on the Visual for Dynamic Visuals

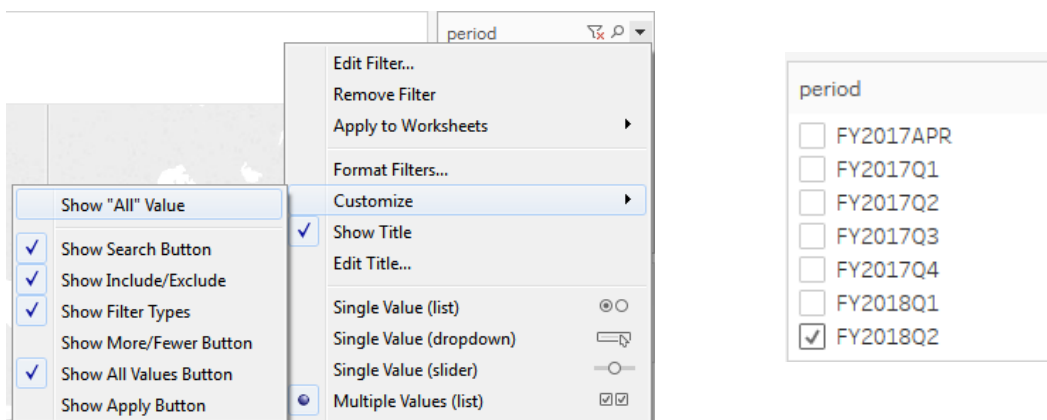
1. Under the Filters card, right click on **Period** → **Show Filter**

That's strange...we filtered the value type to Results...so why are Targets showing in our filter?

2. Click on the drop down arrow, make sure that **Only Relevant Values** is selected. This will show only the relevant data that has been filter previously in the visual.
3. Much better!



4. You can also change the display of this filter on the Sheet – single value, multiple values, list, drop down, slider, etc.
5. It's also important to note that given the data structure, it would not be appropriate to select (All) periods for this visual.
6. Click on the filter arrow and **un-check Show "All" Value**.



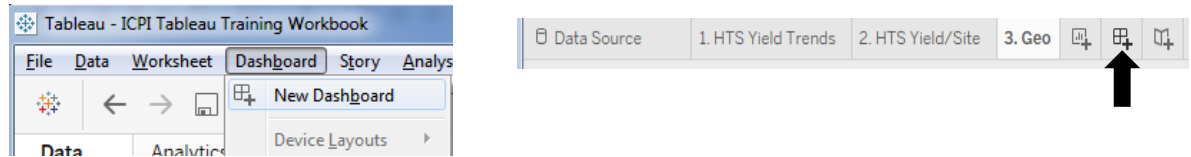


## V. Putting it All Together in a Dashboard

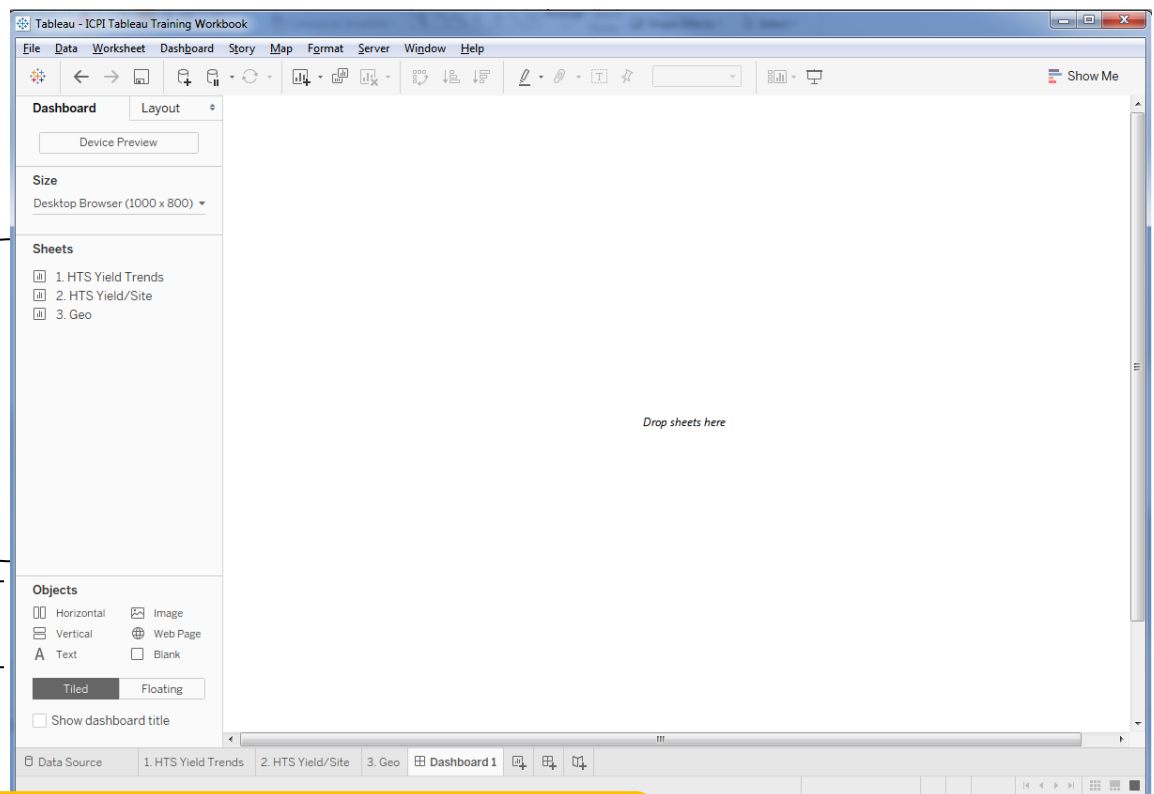


## Create a Dashboard

1. Click on **Dashboard** → **New Dashboard** or on the Dashboard icon at the bottom of the window.



### Orientation to Dashboard interface



Adjust size based  
on screen

Worksheets created  
by you, that you can  
drag into the view

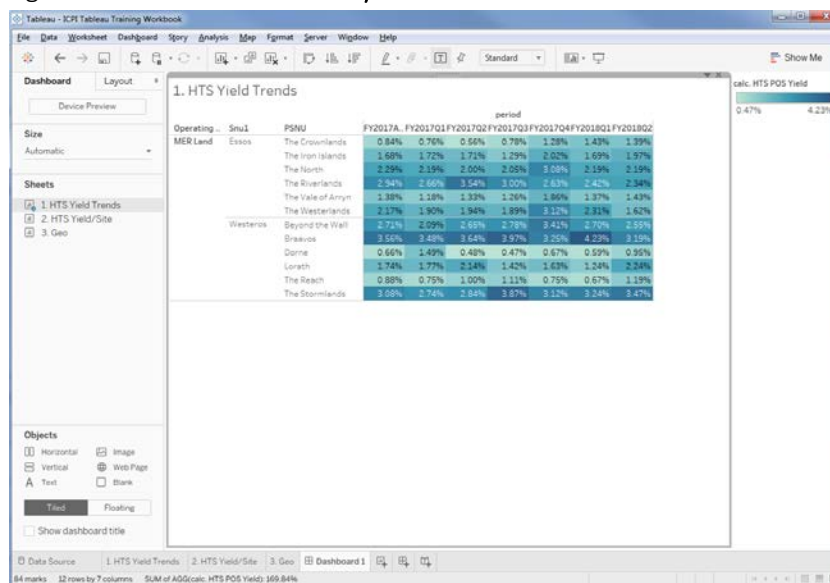
Add Objects, like  
logos, blank  
spaces for  
formatting, Text,  
etc.



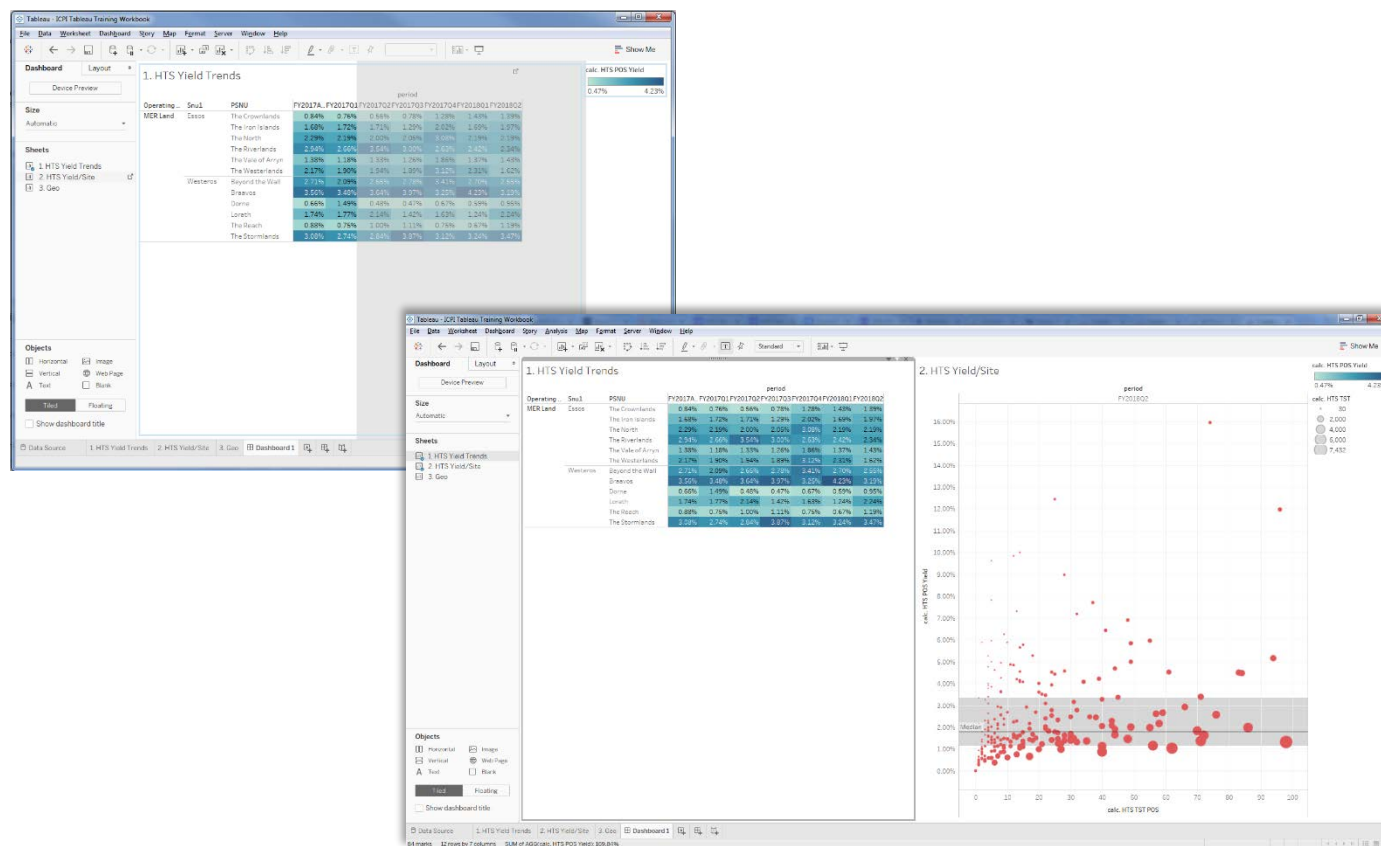
Setting size to “Automatic” will adjust the dashboard size based on the screen you are on, and the screen of your end user.



2. After you have a dashboard sheet, click the views you built (listed under **Sheets** on the left) and drag them to your dashboard sheet.
3. Drag **HTS Yield Trends** to the *Drop sheets here* area
- 4.



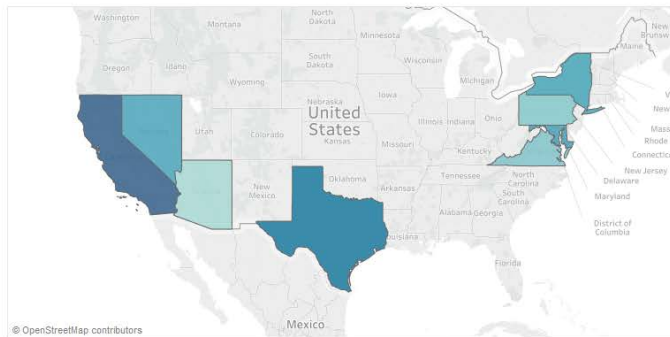
5. Drag **HTS Yield/Site** to the view. You'll see a grey shaded box show, and you can place the visual in any desired location.





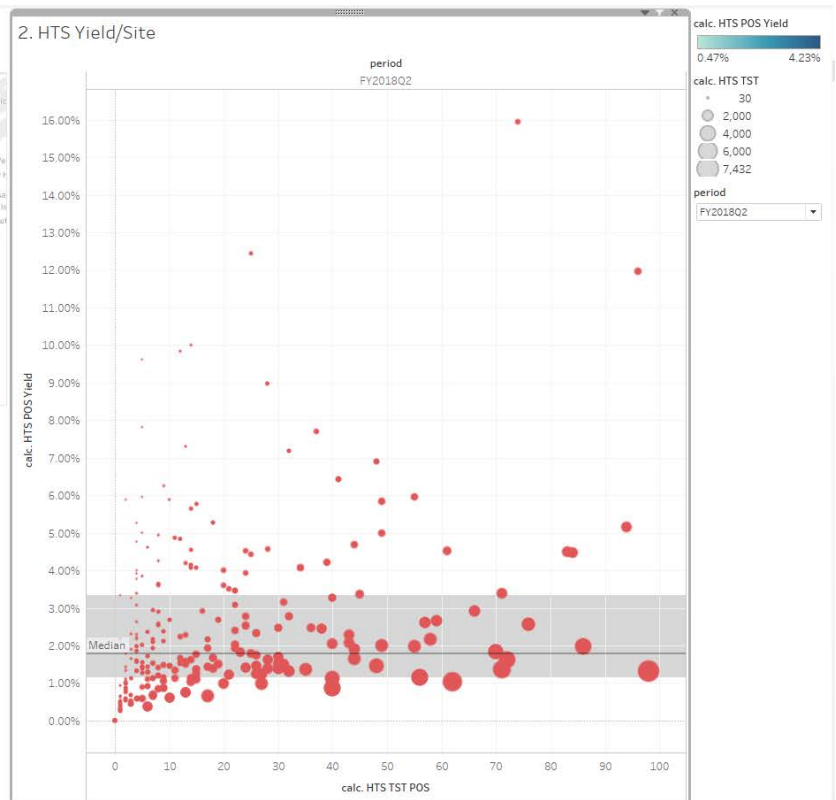
6. Drag your map visual, here titled **Geo** to the view. You'll see a grey shaded box again, and that's where the visual will drop in. I want the map to go in the top left corner, so I'm going to drag it there.
7. Great job!!

HTS Yield by PSNU Map in FY2018Q2  
click on a PSNU to drill-down, click out to drill up



#### 1. HTS Yield Trends

		period							
Operating	Snu1	PSNU	FY2017A	FY2017Q1	FY2017Q2	FY2017Q3	FY2017Q4	FY2018Q1	FY2018Q2
MER Land	Essos	The Crownlands	0.84%	0.76%	0.56%	0.78%	1.28%	1.43%	1.39%
		The Iron Islands	1.68%	1.72%	1.71%	1.29%	2.02%	1.69%	1.97%
		The North	2.29%	2.19%	2.00%	2.09%	3.08%	2.19%	2.19%
		The Riverlands	2.94%	2.66%	3.54%	3.00%	2.63%	2.42%	2.34%
		The Vale of Arryn	1.38%	1.18%	1.33%	1.26%	1.86%	1.37%	1.43%
	Westeros	The Westerlands	2.17%	1.90%	1.94%	1.89%	3.12%	2.31%	1.62%
		Beyond the Wall	2.71%	2.09%	2.65%	2.78%	3.41%	2.70%	2.55%
		Braavos	3.56%	3.48%	3.64%	3.97%	3.25%	4.23%	3.19%
		Dorne	0.66%	1.49%	0.48%	0.47%	0.67%	0.59%	0.95%
		Lorath	1.74%	1.77%	2.14%	1.42%	1.63%	1.24%	2.24%
		The Reach	0.88%	0.75%	1.00%	1.11%	0.75%	0.67%	1.19%
		The Stormlands	3.08%	2.74%	2.84%	3.87%	3.12%	3.24%	3.47%



nds 2. HTS Yield/Site 3. Geo Dashboard 1

calc. HTS TST POS: 4,571.00



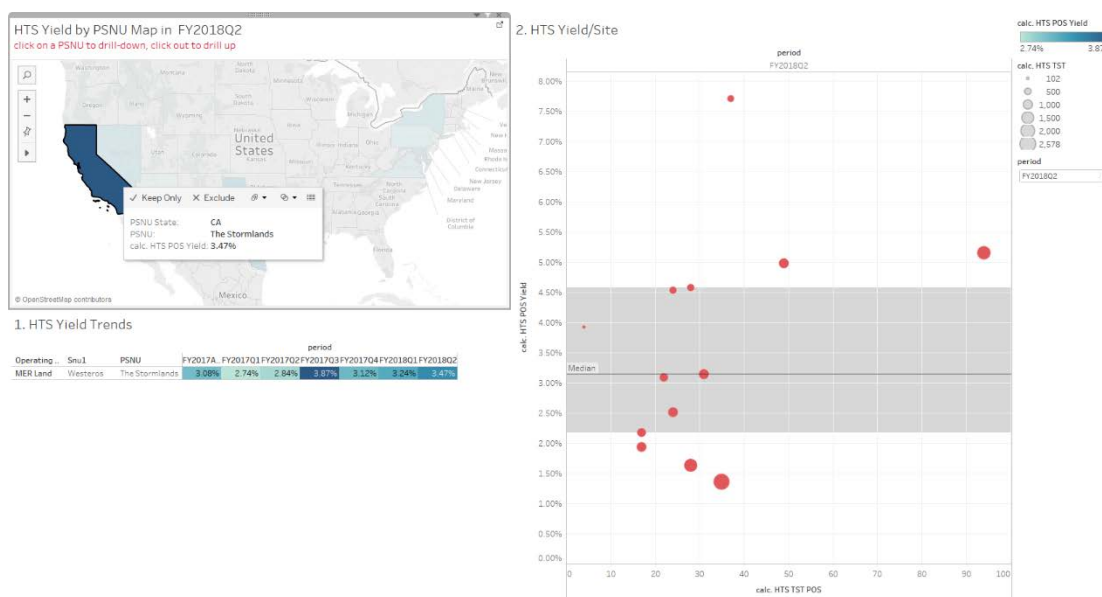
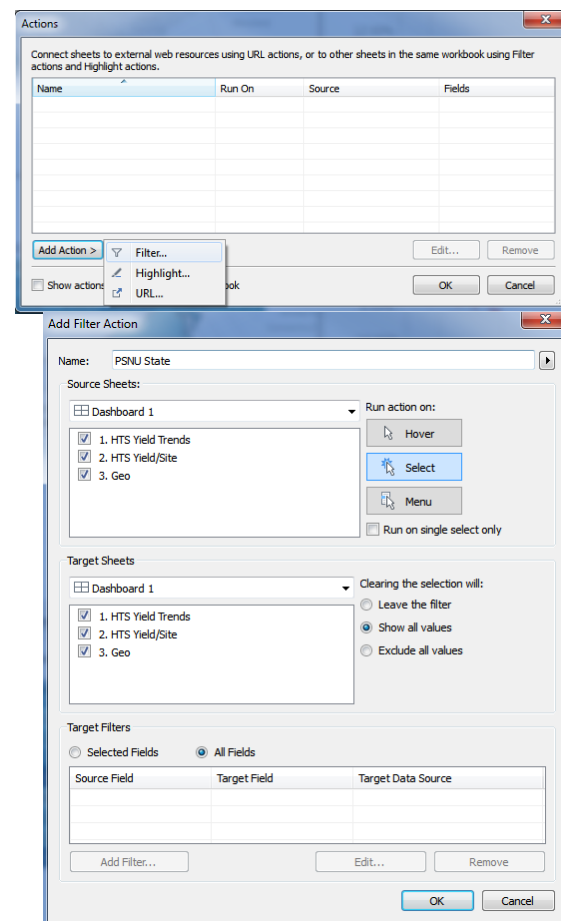


# Make it Dynamic!

## Add a Dashboard Action: Filter

Let's add in a filter based on the map. We want to be able to click on a PSNU State and then have the rest of the visuals drill down to the data within that PSNU State.

1. Click on **Dashboard** → **Actions**
2. Click on **Add Action** → **Filter**
3. Give your filter a **Name**
4. Because we want the filter to work when click on a PSNU state, make sure that **Select** is blue under **Source Sheets**, **Run Action on**.
5. Note: Selecting All Source Sheets and All Target Sheets allows the filter to be run from any of the sheets, not just the map.
6. Click **OK**
7. Test your filter action by clicking on a state in the PSNU Map and see if it applies to the rest of your visuals.





## Add a Dashboard Action: Highlight

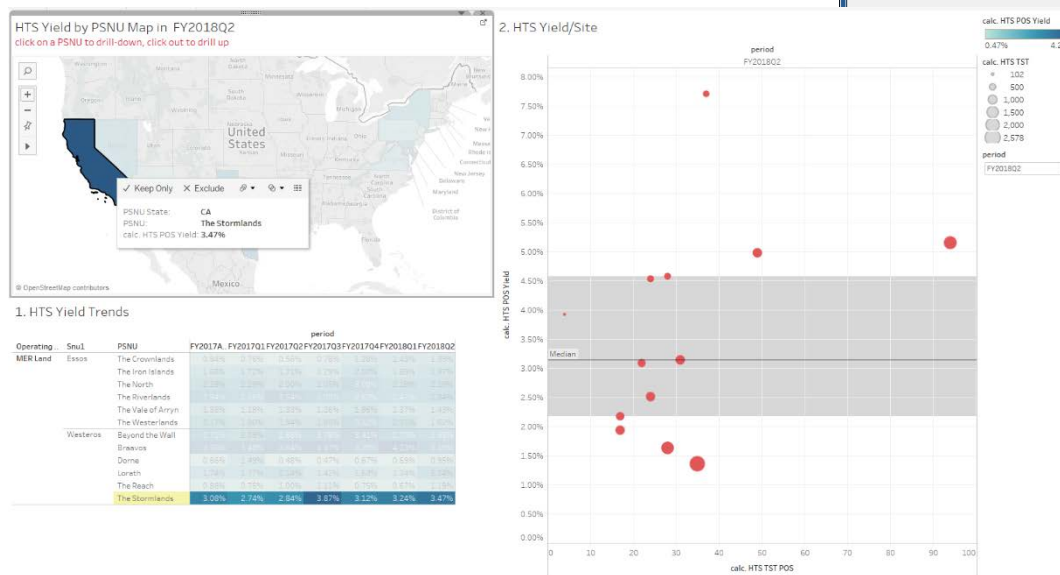
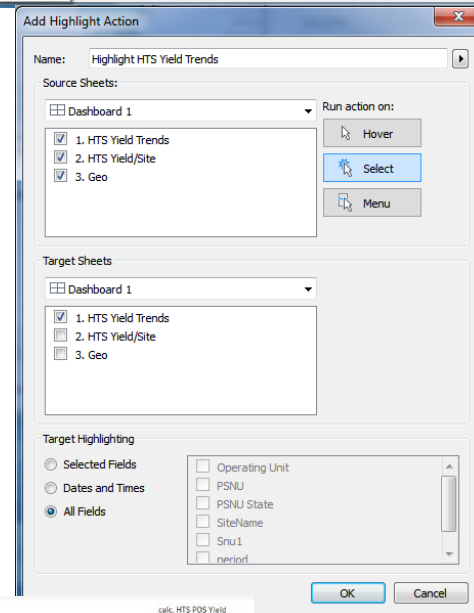
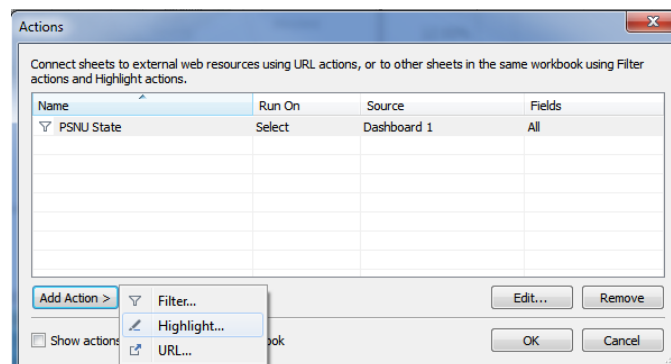
Looks like it worked, but our HTS Yield Trends graph doesn't look so great with everything gone but the one row. Let's make that look a little nicer by highlighting the PSNU row instead.

1. Click on **Dashboard → Actions**
2. Click on your PSNU State Action, and click **Edit**
3. Under the Target Sheets, **uncheck the HTS Yield Trends**. Click **OK**
4. Click on **Add Action → Highlight**
5. Give your Highlight Action a **name**.

Note: Since we have applied the filter action on the HTS Yield/Site and Map visual, we don't need to highlight those.

We only want the Target Sheet for the Highlighter to apply to the HTS Yield Trends.

6. Check **HTS Yield Trends** under **Target Sheets** and make sure the Highlight runs on **"Select"** from the Source Sheets.
7. Click **OK** twice.
8. Test your highlight action by clicking on a state in the PSNU Map and see if it highlights HTS Yield Trends, but filters the other 2 visuals.
9. Looks like that worked! Great job!





## Check your data

It's important to remember to QC your data using another platform, analyst, etc. depending on your team's SOP for confirming the accuracy of data presentation and visualization.

Let's examine our dashboard for any outliers to start with.

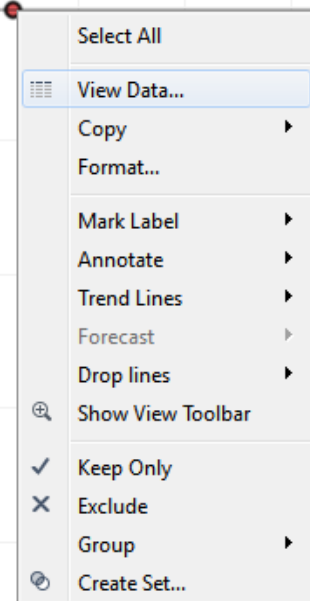
1. Right click on any data point.
2. Click on **View data**.
3. This shows us the data points that are pulled together to display this circle on the visual.

View Data: 2. HTS Yield/Site

☒ Show aliases Copy Export All

period	SiteName	calc. HTS POS Yield	calc. HTS TST POS	calc. HTS TST
FY2018Q2	Site 282	0.159483	74.0000	464.000

Summary Full Data 1 rows



4. To see the full dataset though, we must click on the **Full Data** tab.
5. We can see that this specific site, Site 282, has 5 rows of data in the dataset and this could include additional information about what this site reported, but is not displayed in the visual.
6. You can Export this to a CSV file by clicking **Export All** or you can copy selected rows, by **selecting rows** and then clicking **Copy**.

View Data: 2. HTS Yield/Site

5 rows ☒ Show aliases ☒ Show all fields Copy Export All

Region	RegionUID	resultStatus	Sex	SiteName	SiteType	SNU1	Snu1	Snu1 Location	SNU1uid	SNUprioritization	standardizedDisaggregate
The Known World	KSkooYTy8FB	N/A	N/A	Site 282	Facility	Westeros	Westeros	South West	ouvLM5ibp2U	1 - Scale-Up: Saturation	Total Numerator
The Known World	KSkooYTy8FB	N/A	N/A	Site 282	Facility	Westeros	Westeros	South West	ouvLM5ibp2U	1 - Scale-Up: Saturation	Total Numerator
The Known World	KSkooYTy8FB	Positive	N/A	Site 282	Facility	Westeros	Westeros	South West	ouvLM5ibp2U	1 - Scale-Up: Saturation	Total Numerator
The Known World	KSkooYTy8FB	Positive	N/A	Site 282	Facility	Westeros	Westeros	South West	ouvLM5ibp2U	1 - Scale-Up: Saturation	Total Numerator
The Known World	KSkooYTy8FB	Positive	N/A	Site 282	Facility	Westeros	Westeros	South West	ouvLM5ibp2U	1 - Scale-Up: Saturation	Total Numerator

Summary Full Data 5 rows

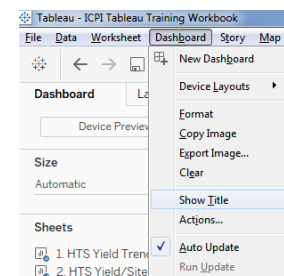


## Clean it up!

Now that we have a working dashboard, it's important to clean it up and make it more understandable.

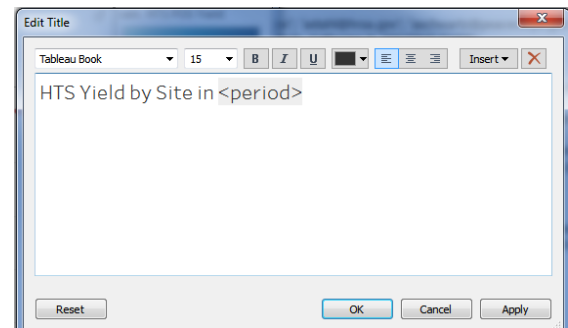
### Add a Dashboard title

1. Click **Dashboard** → **Show Title**
2. Double click "Dashboard 1" and rename your Dashboard
3. Click **OK**



### Create a dynamic title

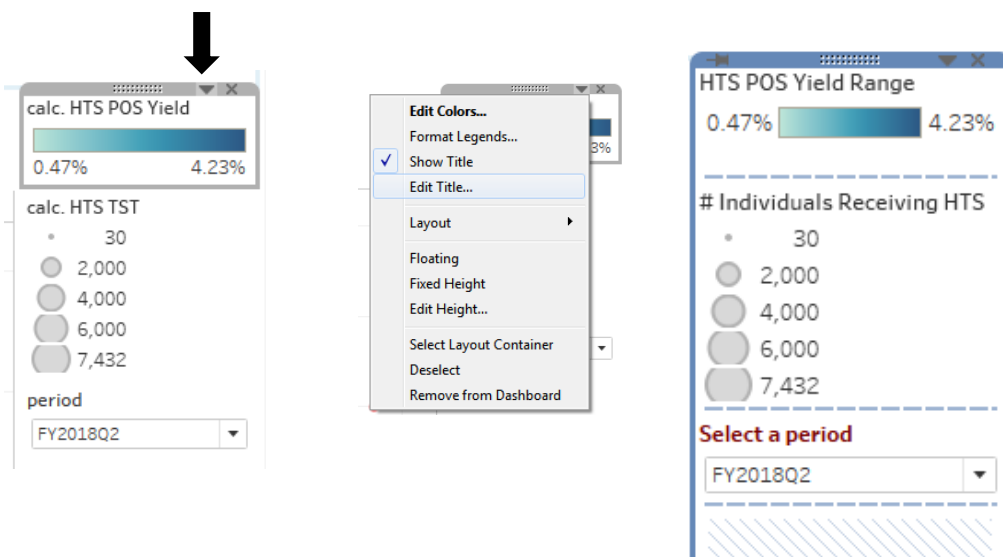
1. Let's add the period to the title, so it changes with the selected period in the filter.
2. Double click on "HTS Yield/Site" title.
3. Click on **Insert** → **Period**
4. You can also add a dynamic title for the Operating Unit, PSNU, or any other filters that have been applied to that specific worksheet.



### Edit Legends

In the top right corner, we see that our calculated field names are displaying in the legend. We understand what this is, but perhaps others who are viewing the dashboard may need more clarification. You can also edit the filter legend to provide a bit more instruction on what to do with it.

1. Click on the drop down arrow
2. Click on **Edit Title**, revise the title and click **OK**.

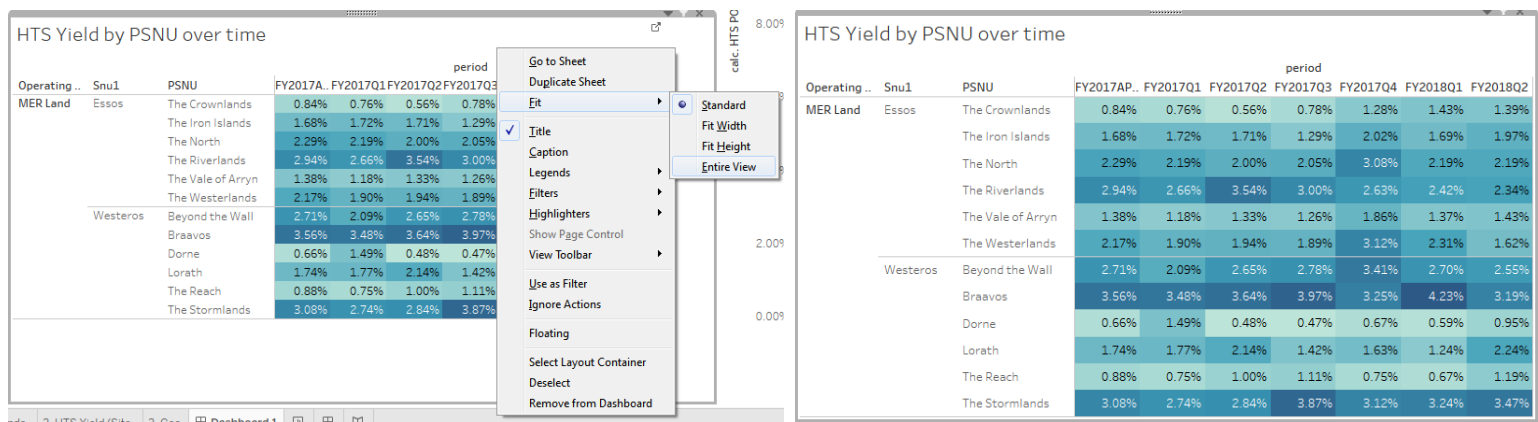




## Adjust Spacing within visuals

Looking at the dashboard, there is a lot of unused white space. Especially at the bottom of the HTS Yield by PSNU over time visual. Let's adjust this.

1. Right click on visual where you want to adjust spacing
2. Click on **Fit** → **Entire View**

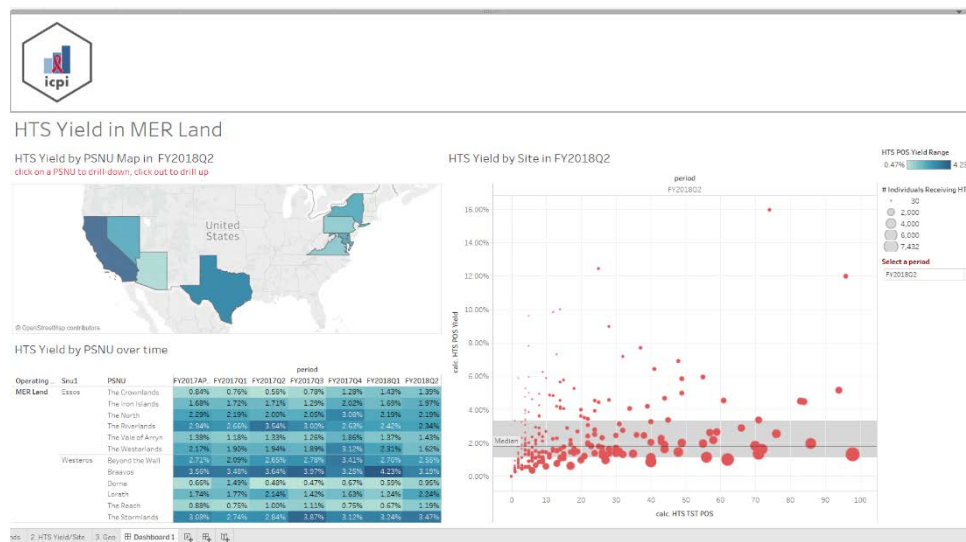


## Insert Objects: images, text, etc.

Sometimes, we need to add logos or objects to the dashboard, like instructional text or what the data source is.

Let's add the PEPFAR and ICPI logos

1. Under the **Objects** pane in the left side, click and drag **Image** to where you want to place a logo.



2. Add the PEPFAR logo now by repeating step 1.



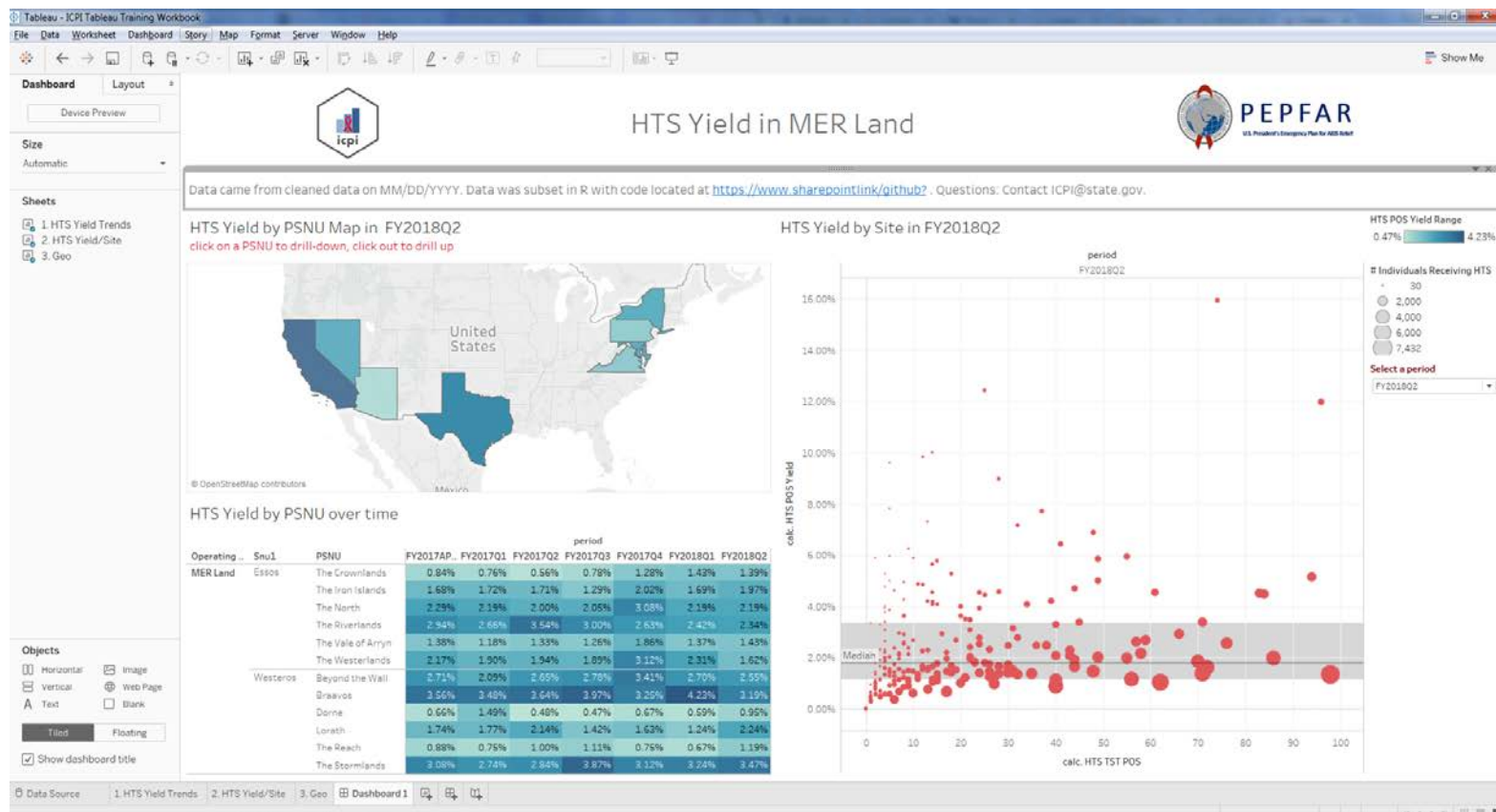
3. Resize the Dashboard title and Images by clicking and dragging the tiles to the desired location! A grey box will appear to where you're moving the tile. It works best to move the Dashboard Title and Logos to the very top of the Dashboard.
4. Right click on the image and make sure to select **Fit image** and **Center image** for both logos.







You can continue to move the tiles, add blanks spaces, etc. to adjust the dashboard to your liking.





## Share and Export Visuals

There are several options for sharing your workbook, and it depends on if you need to share an interactive or static version of your dashboard/worksheets.

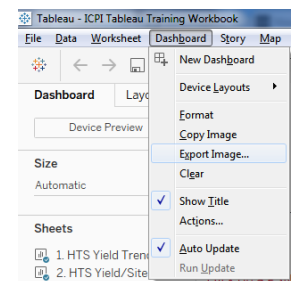
### To share an interactive workbook:

1. Click on **File** → **Export packaged workbook** and **Save** in a location. You may now share this file with any user who has Tableau Desktop or Tableau Reader (at or above the same version as you; e.g. if I have Tableau 10.0, I can share my workbook with anyone who has Tableau 10.0 or above and they can open it easily with Tableau Desktop/Reader).

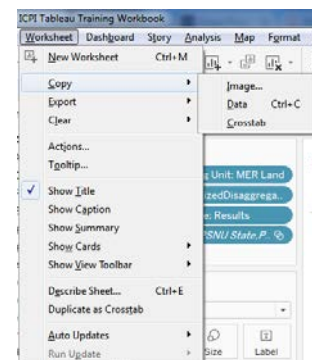
Note on versions when using Tableau: If you need to open a workbook that has been created with a higher version of Tableau than which you have on your computer, you can use a web-based conversion tool to convert the file to the version of Tableau that you have. Please be cautious and aware of any data sensitivities if using this: <https://www.tableau.com/about/blog/2016/6/converting-tableau-files-new-conversion-tool-55326>

### To share static visuals

1. From a **Dashboard** screen, there are a few options for sharing images:
  - a. Click on **Dashboard** → **Copy Image** and **Paste** in a location.
  - b. Alternatively, you may also click on **Dashboard** → **Export Image** and **Save** in a location.
2. From a **Worksheet** screen, there are also a few options for sharing images:
  - a. Click on **Worksheet** → **Copy** → **Image** and **Paste** in a location.
  - b. Alternatively, you may click on **Worksheet** → **Export** → **Image** and **Save** on your computer. This may provide a better quality image than copying the image.



Other options in copying/exporting visuals are to copy or export the data behind the visual or a crosstab of the worksheet. You'll see these options under the **Worksheet** menu, too.



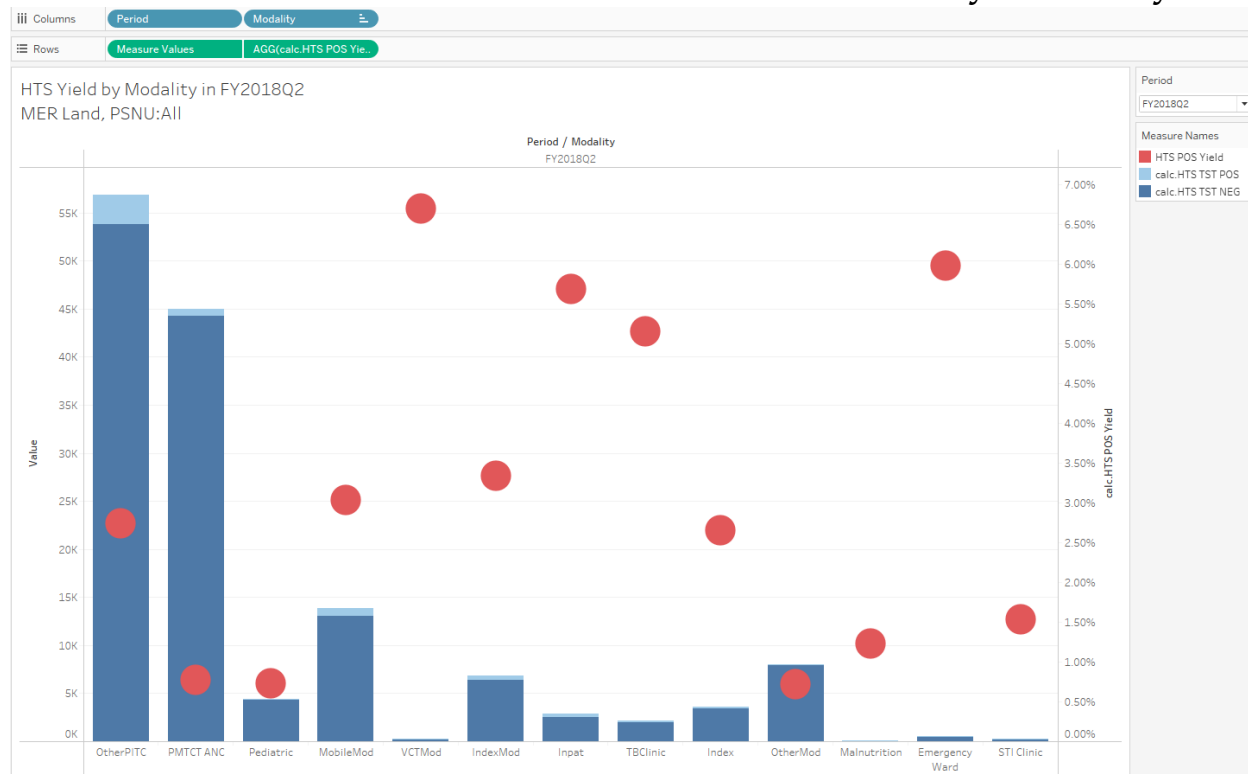




## VI. Bonus! Create Combined Charts

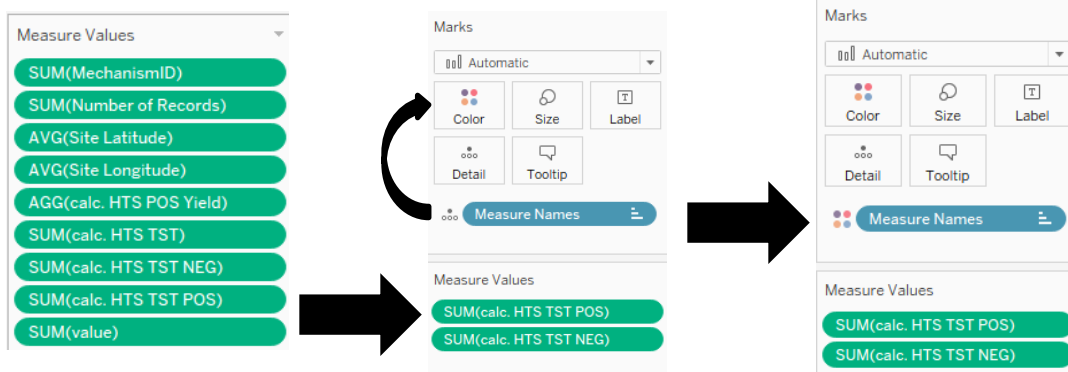


## Goal: Create a Custom Chart for HTS Yield by Modality



## Drag Dimensions and Measures to Rows and Columns

1. Create a new Sheet
2. From the **Data pane**, drag **Modality** to **Columns**.
3. Drag **Measure Values** to **Rows**
  - a. This adds all the measure values to the view. Drag out to the Data pane to remove all Measure Values *except* for **HTS TST NEG** and **HTS TST POS**.
4. Drag Measure Names to the Color box. This will color code the two indicators (measure values) in the graph.

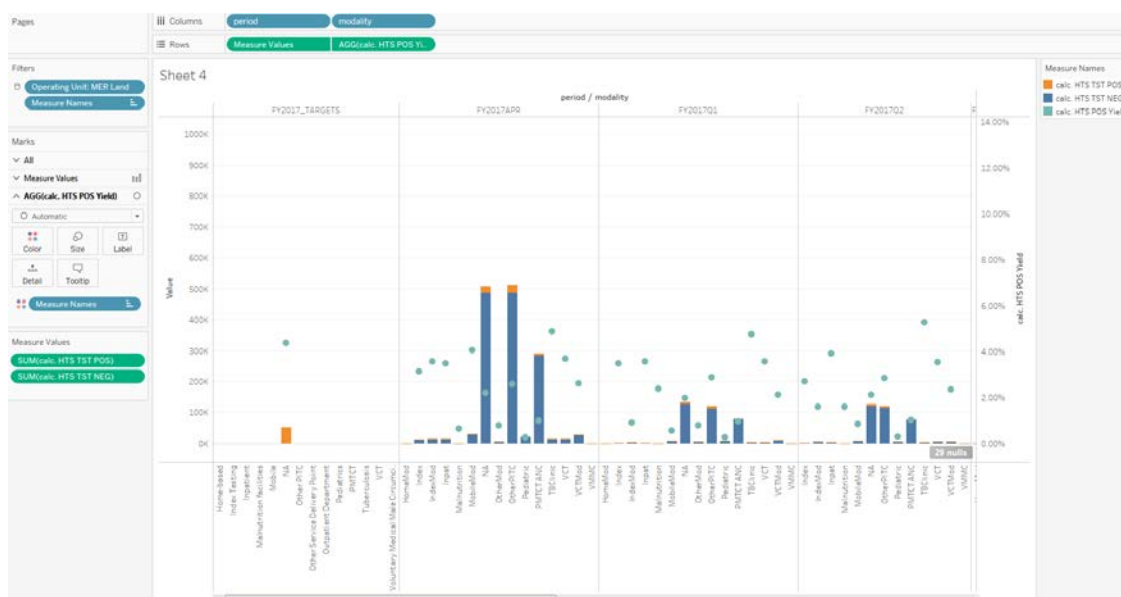
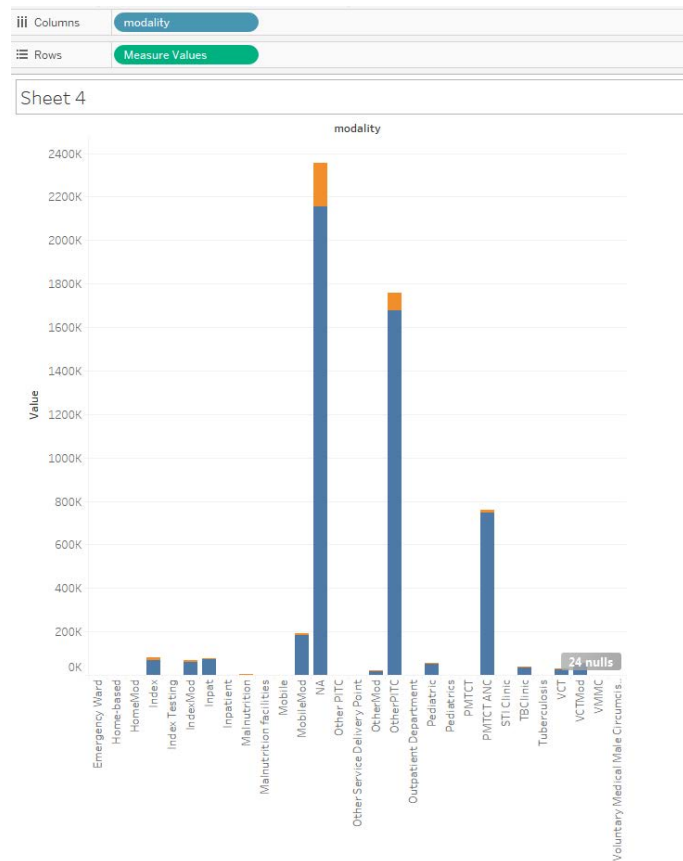
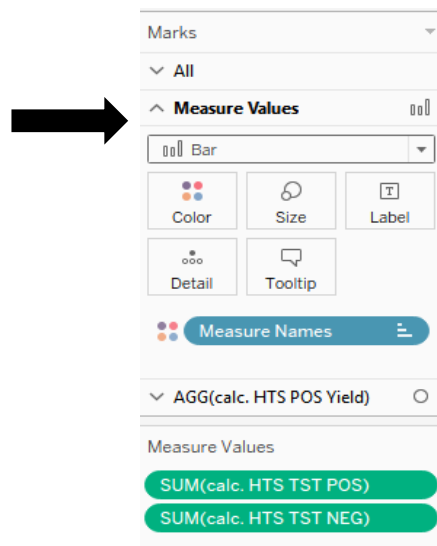




You should now have the visual displayed on the right: HTS POS and HTS TST NEG as a stacked bar chart.

Let's add HTS Yield for a combination chart.

5. Drag **Period** to **Columns**.
6. Drag **calc.HTS POS Yield** to **Rows**.
7. Right click **calc.HTS POS Yield** → **Format** to view the formatting pane and change to **Numbers** → **Percentage**.
8. In the rows shelf, Right click on **AGG(calc. HTS POS Yl..)**
9. Click **Dual Axis**.
10. On the Marks Card, click on **Measure values** and change the visual type in the drop-down menu to: **Bar**





## Add Filters

- From the **Data pane**:
  - Drag **StandardizedDisaggregate** to the **Filters Card** and select **Modality/Age/Sex/Result**.
  - Drag **Valuetype** to the **Filters Card** and select **Results**.
- In the Columns shelf, right click on **Period** → **Show Filter**.
  - This creates a filter for the Period. Strangely, we see Results and Targets even though we selected Results under the Valuetype filter. Let's remove Targets from the Filter showing.
  - Click on the drop down arrow, select **Only Relevant Values**. This will show only the relevant data that has been filter previously in the visual.

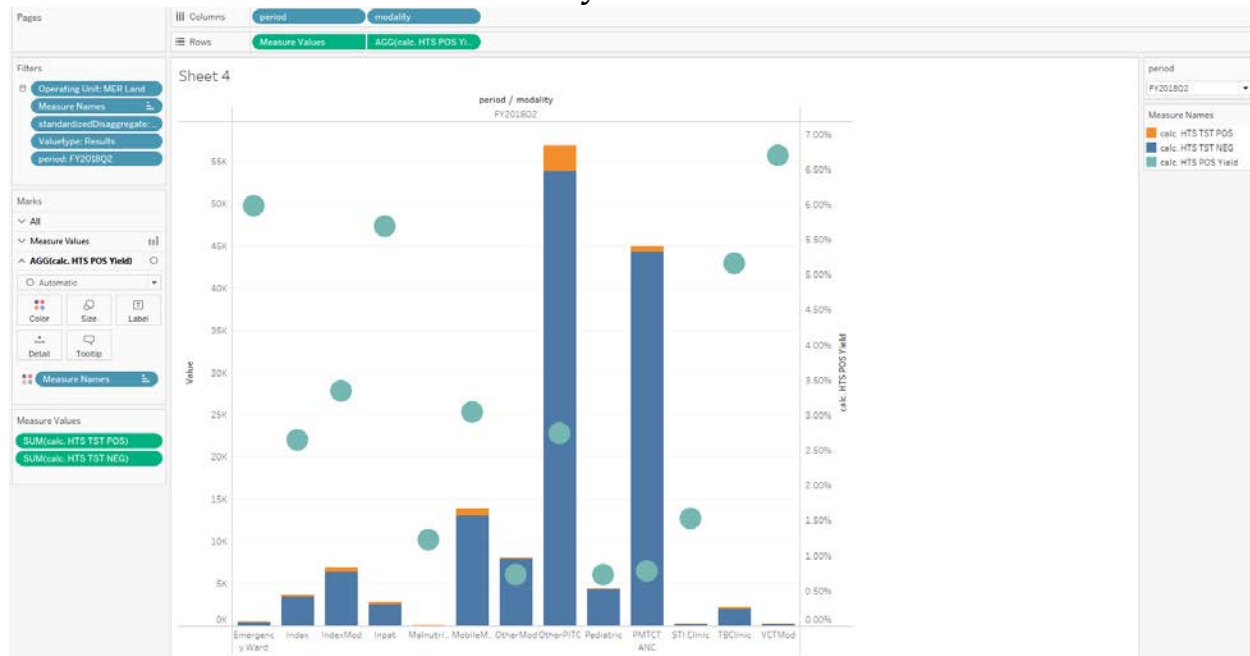
The screenshot shows the Tableau interface with a bar chart on 'Sheet 4'. The Columns shelf contains 'period' and 'modality'. The Rows shelf contains 'AGG(calc. HTS POS Y)'. A right-click context menu is open over the 'period' pill, with 'Show Filter' selected. This opens a filter card for 'period' with a list of values: (All), FY2017\_TARGETS, FY2017APR, FY2017Q1, FY2017Q2, FY2017Q3, FY2017Q4, FY2018\_TARGETS, FY2018Q1, and FY2018Q2. A dropdown arrow is visible next to the filter card. An arrow points from the dropdown arrow to a configuration menu. The configuration menu has several sections: 'Edit Filter...', 'Remove Filter', 'Apply to Worksheets', 'Format Filters...', 'Customize', 'Show Title', 'Edit Title...', 'Single Value (list)', 'Single Value (dropdown)', 'Single Value (slider)', 'Multiple Values (list)', 'Multiple Values (dropdown)', 'Multiple Values (custom list)', 'Wildcard Match', 'Only Relevant Values' (selected), 'All Values in Database', 'Include Values', 'Exclude Values', and 'Hide Card'.

- You can also change the display of this filter on the Sheet – single value, multiple values, list, drop down, slider, etc.
- It's also important to note that given the data structure, it would not be appropriate to select (All) periods for this visual.
- Click on the filter arrow and **un-check Show "All" Value**.
- Select one period, with this example we'll use **FY2018Q2**.

The screenshot shows the Tableau interface with a bar chart on 'Sheet 4'. The Columns shelf contains 'period' and 'modality'. The Rows shelf contains 'AGG(calc. HTS POS Y)'. A right-click context menu is open over the 'period' pill, with 'Show Filter' selected. This opens a filter card for 'period' with a list of values: FY2017APR, FY2017Q1, FY2017Q2, FY2017Q3, FY2017Q4, FY2018Q1, and FY2018Q2. A dropdown arrow is visible next to the filter card. An arrow points from the dropdown arrow to a configuration menu. The configuration menu has several sections: 'Edit Filter...', 'Remove Filter', 'Apply to Worksheets', 'Format Filters...', 'Customize', 'Show Title', 'Edit Title...', 'Single Value (list)', 'Single Value (dropdown)', 'Single Value (slider)', 'Multiple Values (list)', 'Multiple Values (dropdown)', 'Multiple Values (custom list)', 'Wildcard Match', 'Only Relevant Values' (selected), 'All Values in Database', 'Include Values', 'Exclude Values', and 'Hide Card'.



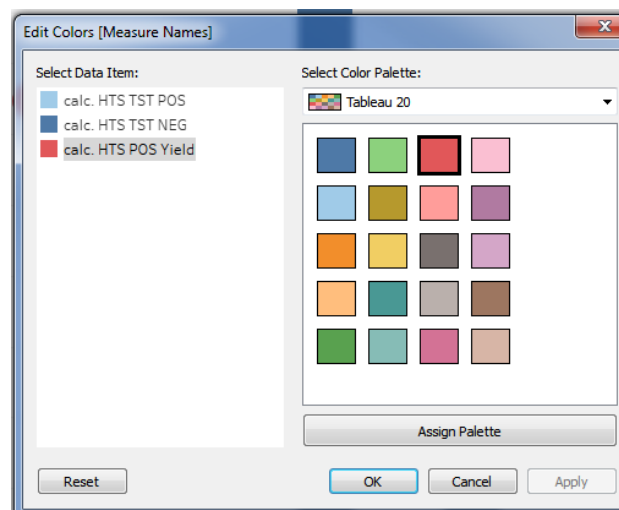
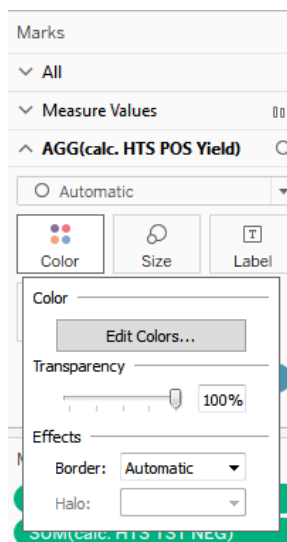
## Check your visual



## Formatting

### Customize Colors

1. Click on **Color** under the Marks Card.
2. Click **Edit Colors**
3. Change the **Color Palette** to **Tableau 20**.
4. Click on each data item and select a color for that item, or click **Assign Palette** to auto-assign colors. Click **Apply** to preview and **OK** to accept the colors.



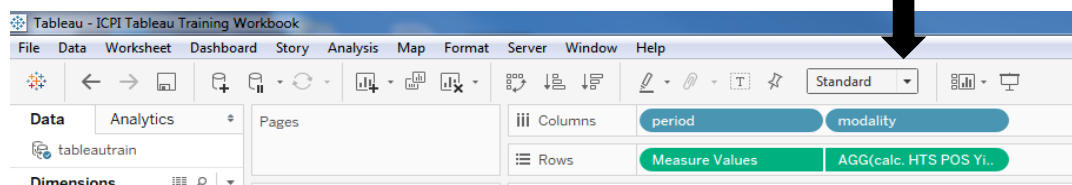
Maximize  
screen  
space

1. Click on the

drop-down arrow next to Standard



2. Select **Entire View**. This will maximize screen space and reduce white space in your visual.



**BEFORE:**

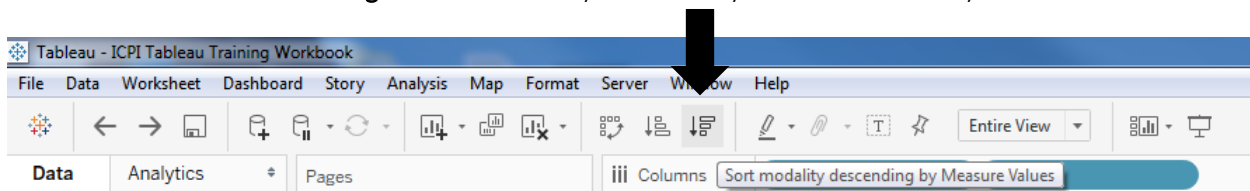


**AFTER:**



## Sorting

1. Click on the **descending bar chart** to sort your visual by the dimensions in your visual.



## Add a title

1. Double click on Sheet 4
2. Add a descriptive title.



3. Create a dynamic title by clicking **Insert** and selecting the filters you'd like to be dynamic. Here we chose **<Period>**, **<Operating Unit>**, and **<PSNU>**

