



TxSTORM

Texas State Trend Over-Representation Model

TxSTORM Overview

Welcome to TxSTORM, the Texas State Trend Over-Representation Model. This model is sponsored by the Texas Traffic Records Coordination Committee and hosted by the Texas Transportation Institute, which is the technical advisor to the TRCC.

Texas is a large state with 254 counties of all sizes and demographics. Determining how to identify trends and allocate limited resources is always a challenge. Traditional methods for resource allocation focus on jurisdictions with highest total of a given variable like crashes or calls for trauma service. While certainly defensible, this method largely ignores smaller jurisdictions where a smaller number of cases could be having a much greater relative impact.

Unveiled for beta testing in August 2021, TxSTORM is intended to be used as a high-level filter to quickly identify trends and indicate where resources may be most urgently needed. To make this happen, TxSTORM is designed to integrate data from one or more critical traffic safety databases to provide a high-level perspective of various traffic-related trends by determining where certain elements are statistically over-represented.

TxSTORM uses aggregated jurisdictional data to blend trend over-representation to “flag” jurisdictions, and then help prioritize those jurisdictions with a Relative Impact Value (RIVAL) score based on projected net change in that variable. Higher RIVAL scores indicate a jurisdiction has a greater need for countermeasures and resources relative to other jurisdiction or the state overall.

Using RIVAL scores allows query results to be plotted on various maps and graphs. However, the data underlying TxSTORM computations are aggregated or “grouped” data. Users who want more granular data need to request the more granular data directly from the agency governing those specific data.

How TxSTORM identifies over-representation

TxSTORM’s model is based on comparing current data to three-year baseline averages, both at the jurisdictional and statewide level. For Fiscal-Year-to-Date (FYTD) comparisons, TxSTORM forecasts the end-of-year value for each variable by averaging the actual FYTD monthly average with the baseline monthly average to fill in remaining months. This method forces a conservative regression toward the baseline for future months remaining in the FY. Each value is recalculated each month as the YTD data is updated. Projected percent-change and projected net change between the forecast YTD total and the baseline total for each variable are calculated for the state and for each jurisdiction. The statewide percent change is subtracted from the jurisdictional percent change. The resulting net percentage is the basis for the flag, with positive results indicating over-representation.

Flags are determined using the following formula:

$$\text{Jurisdiction } [YTD \text{ total} + (\text{Average}(YTD \text{ total}/YTD \text{ months}, \text{Baseline total}/12)) * (12 - YTD \text{ months})] / \text{Baseline total}] - \\ \text{Statewide } [YTD \text{ total} + (\text{Average}(YTD \text{ total}/YTD \text{ months}, \text{Baseline total}/12)) * (12 - YTD \text{ months})] / \text{Baseline total}]$$

Relative Impact Value (RIVAL) score

Once a jurisdiction is flagged, its RIVAL score is calculated by multiplying the net percentage by the absolute value of the projected net change. **The larger the RIVAL score, the greater the relative impact of the activity represented by that**

variable is at the state and/or jurisdictional levels. RIVAL allows for jurisdictional and/or statewide comparisons on a month-to-month and year-over-year basis. When TxSTORM is used as a guide for the allocation of resources, tracking the change in RIVAL scores makes it possible to track pre- and post-treatment changes.

If you are curious, the RIVAL score is calculated using the following formula:

Jurisdiction Flag x Jurisdiction [ABS(YTD total + (Average(YTD total/YTD months, Baseline total/12))(12-YTD months) - Baseline total)]*

About the data

Data provided for comparison in TxSTORM comes in an aggregated format devoid of PII (Personal Identification Information), and with a county-level identifier. This allows data to be aggregated and compared by county. Data is largely provided on a monthly basis by the agencies governing the various databases, meaning the data is relatively current but the most recent contribution may not be completely up to date. Each contributing database is re-queried each month to ensure, to the extent possible, that the most recent data is included.

About the Texas TRCC

The Texas TRCC receives federal 405c funding from the National Highway Traffic Safety Administration to improve the state's various traffic records systems' critical databases, including crash, driver, vehicle, roadway, citation and adjudication, and trauma/EMS.

States also have to show quantifiable progress in improving their traffic records systems according to six specific measures:

- (i) accuracy;
- (ii) completeness;
- (iii) timeliness;
- (iv) uniformity;
- (v) accessibility; or
- (vi) integration of a core highway safety database

Access the TRCC website at <https://texastrcc.org>

Accessing and Using TxSTORM

The Texas State Trend Over-Representation Model (TxSTORM) is located on the TEXASTRCC.org website.

1. Click on the link to access the application. <https://texastrcc.org/txstorm/>



2. There are 12 interactive pages in the dashboard that show scores for jurisdictions (cities), counties and TxDOT districts. The following is a list of the pages
 - KA RIVAL Scores by Jurisdiction (fatal and suspected serious injury crashes only) for each crash type
 - KABCO RIVAL Scores by Jurisdiction (crashes of all severity) for each crash type
 - KA RIVAL Scores by TxDOT District and County (fatal and suspected serious injury crashes only) for each crash type
 - KABCO RIVAL Scores by TxDOT District and County (crashes of all severity) for each crash type
 - DUI (Impaired Driving) only RIVAL Scores – KA (fatal and suspected serious injury crashes only)
 - OP (Occupant Protection/Lack of restraint) only RIVAL Scores – KA (fatal and suspected serious injury crashes only)
 - SP (Speeding related) only RIVAL Scores – KA (fatal and suspected serious injury crashes only)
 - ITC (Intersection related) only RIVAL Scores – KA (fatal and suspected serious injury crashes only)
 - CMV (Large Truck) only RIVAL Scores – KA (fatal and suspected serious injury crashes only)
 - PED (Pedestrian involved) only RIVAL Scores – KA (fatal and suspected serious injury crashes only)
 - Total RIVAL SCORE – KA (fatal and suspected serious injury crashes only)
 - Crash rates per registered vehicle by TxDOT District and County (no RIVAL scores shown)

- Looking at the first page, on the left side of the page you can choose a TxDOT district.

Latest (FY 2022)

Past Data

TxSTORM - KA

TxDOT District

☐ Select all
 ☒ Abilene
 ☐ Amarillo
 ☐ Atlanta
 ☒ Austin
 ☐ Beaumont
 ☐ Brownwood
 ☐ Bryan
 ☐ Childress
 ☐ Corpus Christi
 ☐ Dallas
 ☐ El Paso
 ☐ Ft. Worth
 ☐ Houston
 ☐ Laredo
 ☐ Lubbock
 ☐ Lufkin
 ☐ Odessa
 ☐ Paris
 ☐ Pharr
 ☐ San Angelo
 ☐ San Antonio
 ☐ Tyler
 ☐ Waco
 ☐ Wichita Falls
 ☐ Yoakum

County

All

Number of FY Months

9

County	DUI flag RIVAL Score	OP flag RIVAL Score	SP flag RIVAL Score	ITC flag RIVAL Score	CMV flag RIVAL Score	PED flag RIVAL Score
STATEWIDE	-107.74	527.59	689.65	1,093.25	276.70	
Jurisdiction	DUI flag RIVAL Score	OP flag RIVAL Score	SP flag RIVAL Score	ITC flag RIVAL Score	CMV flag RIVAL Score	PED flag RIVAL Score
HOUSTON, Williamson	-11.56	9.64	17.76	0.00	-0.84	
HOUSTON, Williamson	-2.93	0.37	0.51	-2.01	-1.96	
GEORGETOWN, Williamson	8.91	18.11	-0.17	15.42	-2.37	
BASTROP, Bastrop	-0.59	-1.36	-2.35	5.99	2.45	
CEDAR PARK, Williamson	2.32	-0.39	0.02	8.70	-0.76	
GIDDINGS, Lee	0.00	0.00	2.00	2.41	-1.24	
HORSESHOE BAY, Llano	0.00	0.00	-0.74	-1.29	-1.24	
LAKEWAY, Travis	-1.07	0.00	-1.53	-1.44	0.00	
LIBERTY HILL, Williamson	-0.59	-0.77	-0.36	-0.05	-1.24	
MARBLE FALLS, Burnet	-0.59	1.00	-0.36	-0.42	-0.76	
OUTSIDE CITY LIMITS, Llano	-2.11	-0.83	-1.64	-0.05	-0.76	
OUTSIDE CITY LIMITS, Hays	-3.80	15.26	2.13	15.58	3.20	
ANDICE, Williamson	0.00	0.00	0.00	0.00	0.00	
ANTON, Travis	0.00	0.00	0.00	0.00	0.00	
AUSTIN, Hays	0.00	0.00	0.00	0.00	0.00	
BALCONES HEIGHTS, Travis	0.00	0.00	0.00	0.00	0.00	
BARTLETT, Williamson	0.00	0.00	0.00	0.00	0.00	
BEAR CREEK, Hays	0.00	0.00	0.00	0.00	0.00	
BERTRAM, Burnet	0.00	0.00	0.00	-0.80	0.00	
BLANCO, Blanco	1.00	1.00	-0.74	1.00	-1.24	
BLUFFTON, Llano	0.00	0.00	0.00	0.00	0.00	
Selected Area	-6.11	65.89	39.64	139.59	22.45	

Color Code: Red = Top 25 in State

Purple > Average

Yellow > Zero

Green < Zero

- Below the list of districts is a dropdown box that allows you to select individual counties within the selected districts. You can select multiple options by holding down the CTRL key while clicking additional categories.

Latest (FY 2022)

Past Data

TxSTORM - KA

TxDOT District

☐ Select all
 ☒ Austin

☒ Bastrop
 ☐ Blanco
 ☐ Burnet
 ☐ Caldwell
 ☐ Gillespie
 ☐ Hays
 ☐ Lee
 ☐ Llano
 ☐ Mason
 ☐ Travis
 ☐ Marble Falls

Bastrop

Number of FY Months

9

County	DUI flag RIVAL Score	OP flag RIVAL Score	SP flag RIVAL Score	ITC flag RIVAL Score	CMV flag RIVAL Score	PED flag RIVAL Score
STATEWIDE	-107.74	527.59	689.65	1,093.25	276.70	
Jurisdiction	DUI flag RIVAL Score	OP flag RIVAL Score	SP flag RIVAL Score	ITC flag RIVAL Score	CMV flag RIVAL Score	PED flag RIVAL Score
BASTROP, Bastrop	-0.59	-1.36	-2.35	5.99	2.45	
CEDAR CREEK, Bastrop	0.00	0.00	0.00	0.00	0.00	
DALE, Bastrop	0.00	0.00	0.00	0.00	0.00	
DEL VALLE, Bastrop	0.00	0.00	0.00	0.00	0.00	
MCDADE, Bastrop	0.00	0.00	0.00	0.00	0.00	
PAIGE, Bastrop	0.00	0.00	0.00	0.00	0.00	
RED ROCK, Bastrop	0.00	0.00	0.00	0.00	0.00	
SMITHVILLE, Bastrop	-1.07	0.00	-0.74	-1.39	-1.24	
ELGIN, Bastrop	-0.59	-1.25	-1.33	-1.93	0.00	
OUTSIDE CITY LIMITS, Bastrop	-3.95	1.42	1.79	8.27	-1.92	
Selected Area	-2.84	-1.43	-0.82	7.20	-0.52	

Color Code: Red = Top 25 in State

Purple > Average

Yellow > Zero

Green < Zero

5. Below the County Box you will see the number of months, from the current fiscal year, being used to calculate the scores. In this example, it is **9 months** from the beginning of the fiscal year.

Travis
Bastrop

Number of FY Months: 9

Color Code: Red = Top 25 in State Purple > Average Yellow > Zero Green < Zero

6. As you make selections the RIVAL scores will update based on the selections. If you would like to clear a selection, you can either unselect your choices, or use the clear selection icon. The icon will pop-up when your mouse hovers

Country

Bastrop

Number of FY Months

over the filter box.

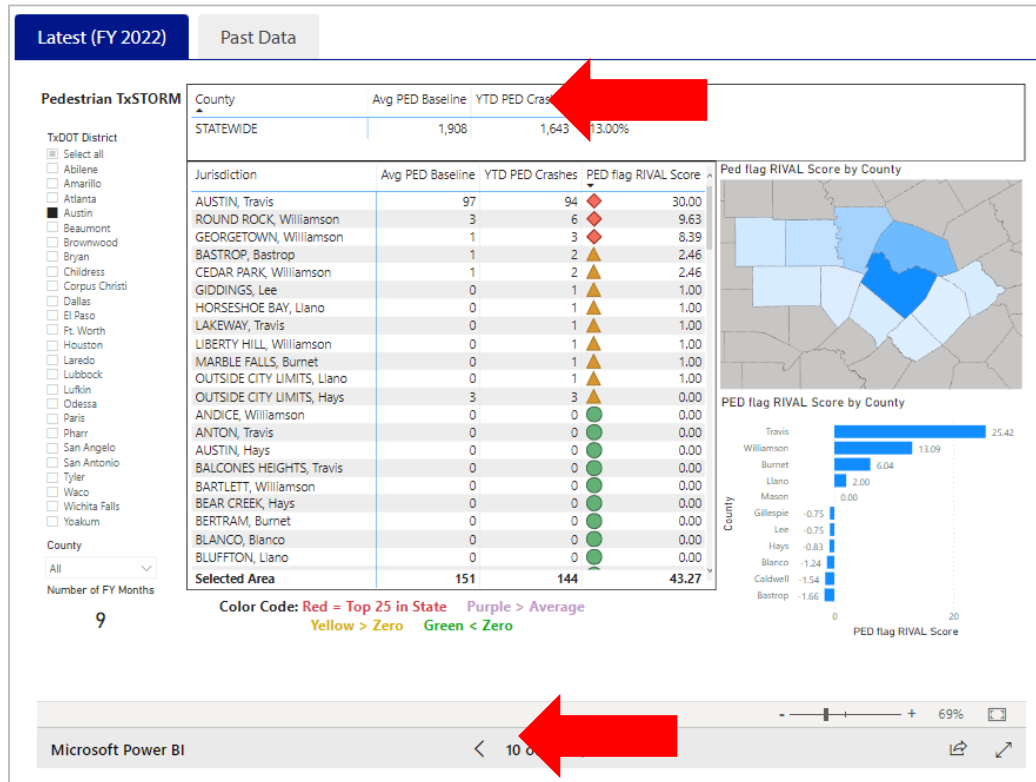
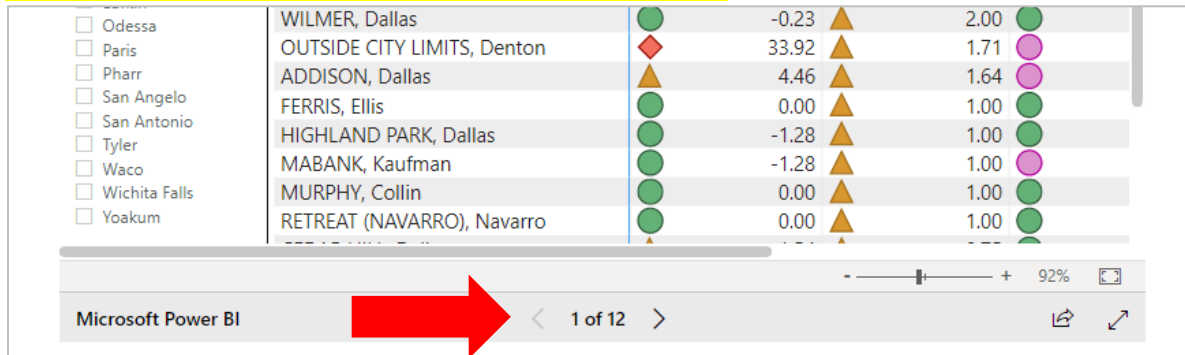
7. For each location in the table you will see several columns of scores. The following is the list of crash types:

- DUI – Impaired driving crashes
- OP – Occupant protection crashes (lack of seatbelt use)
- SP – Speed related crashes
- ITC – Intersection related crashes
- CMV – Large truck crashes
- **PED – Pedestrian involved crashes**
- Total – All crashes

8. When you hover your mouse over a column name you will see a black down arrow that allows you to sort the table by that column from largest to smallest or the reverse.

Jurisdiction	AL Score	SP flag RIVAL Score	ITC flag RIVAL Score	PED flag RIVAL Score	Total flag RIVAL Score
AUSTIN, Travis	9.64	17.76	0.00	-0.84	30.00
ROUND ROCK, Williamson	0.37	0.51	-2.01	-1.96	9.63
GEORGETOWN, Williamson	18.11	-0.17	15.42	-2.37	8.39
BASTROP, Bastrop	-1.36	-2.35	5.99	2.45	2.46
CEDAR PARK, Williamson	-0.39	0.02	8.70	-0.76	2.46
GIDDINGS, Lee	0.00	2.00	2.41	-1.24	1.00
HORSESHOE BAY, Llano	0.00	-0.74	-1.29	-1.24	1.00

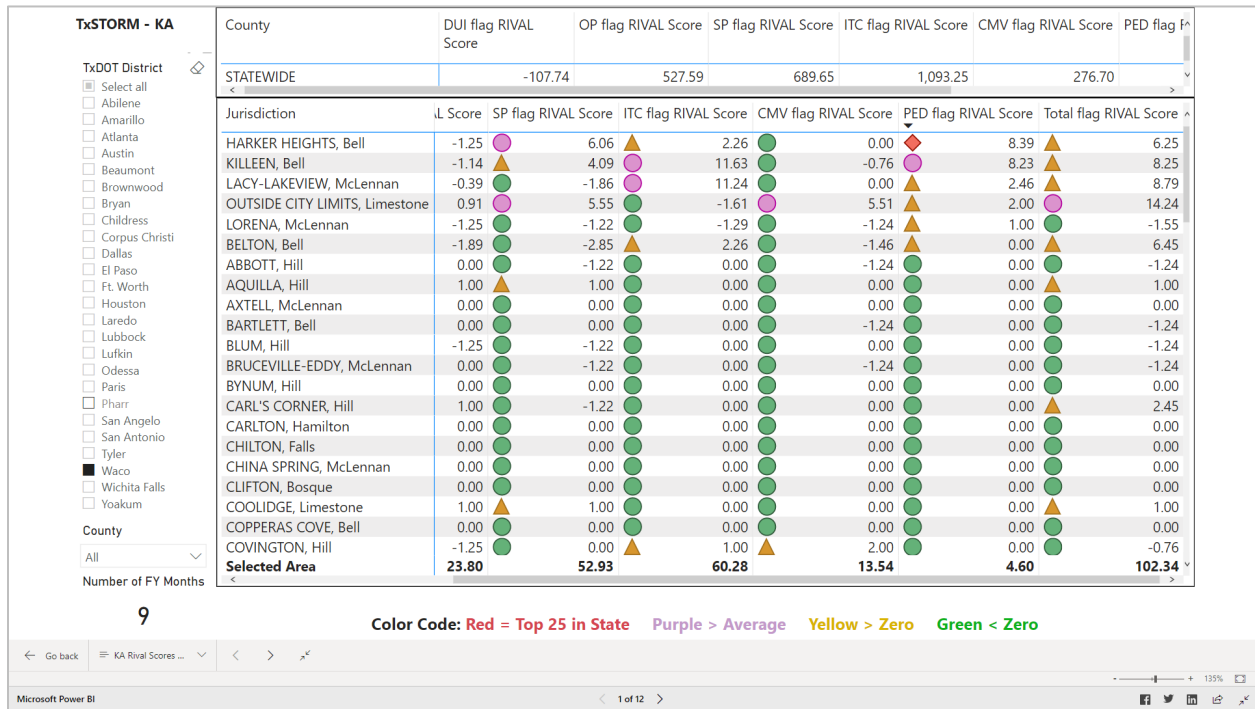
9. At the bottom of the screen are the navigation buttons to move through the other pages in the dashboard. The Pedestrian (KA fatal and suspected serious injury) page is 10.



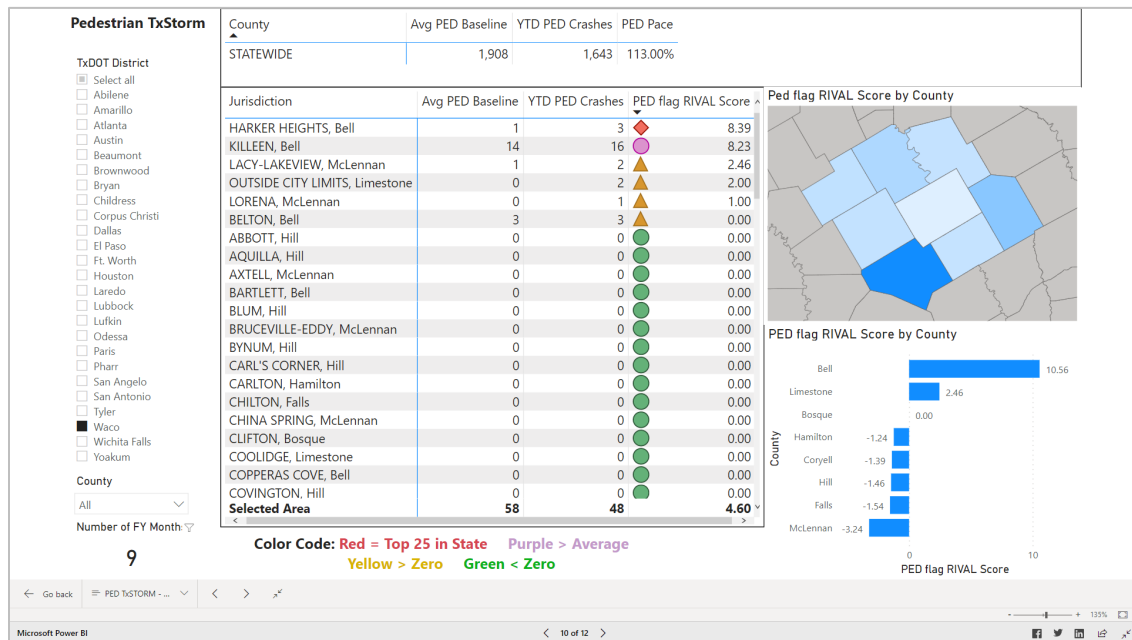
*NOTE: the RIVAL Score is to the right of the symbol, NOT THE LEFT.

Practice #1

1. Open the web page with the TxSTORM dashboard. <https://texastrcc.org/txstorm/>
2. On page 1 of 12, select Waco from the list of districts on the left side of the screen.
3. Use the slider at the bottom of the large table to make the PED flag RIVAL Score visible.



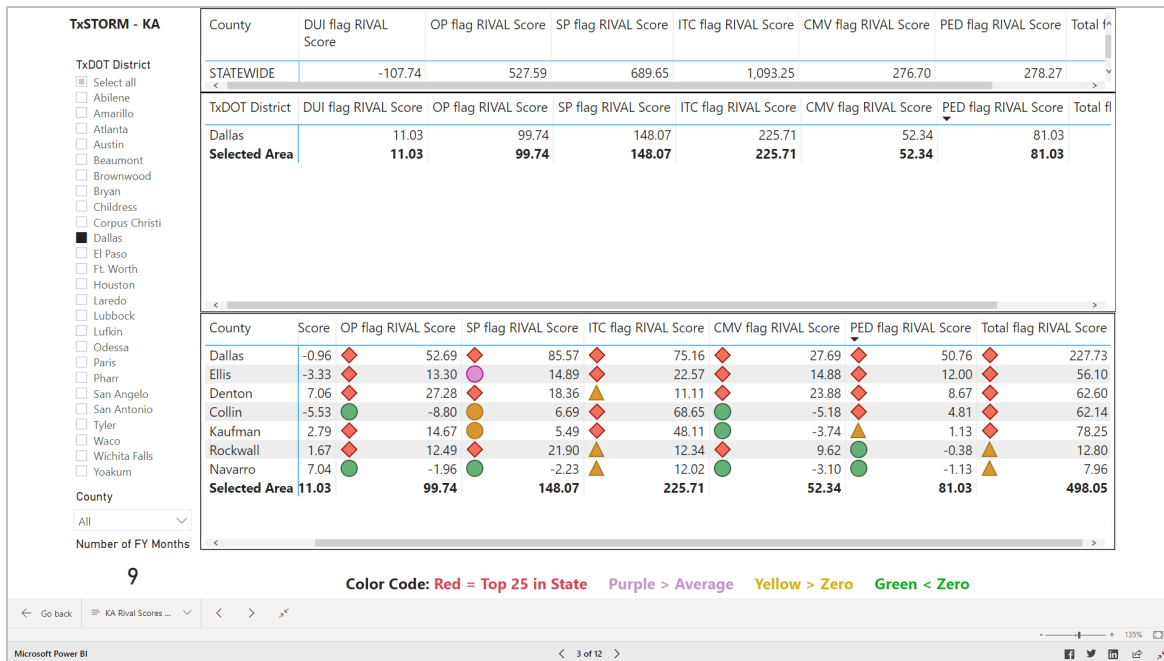
4. Sort the pedestrian column from greatest to least. Harker Heights in Bell County should be at the top of the list.
5. Using the navigation arrows at the bottom of the screen go to the 10th page of the dashboard. You should see a page dedicated to:



6. Here you can see that Harker Heights has had three times as many crashes as compared to the last three years average. The bar chart in the bottom left corner shows that Bell and Limestone County both have a RIVAL score greater than zero.

Practice #2

1. Use the navigation arrows at the bottom of the dashboard to get to the 3rd page of the screen, KA RIVAL Scores State District County.
2. Clear the TxDOT District filter on the left side of the screen.
3. Sort the middle table by the PED flag RIVAL Score from greatest to least. The Dallas district should be at the top of the list.
4. Select Dallas from the TxDOT filter on the left side of the screen.
5. Sort the bottom table by the PED flag RIVAL Score.



6. Navigate back to page 10 of the dashboard. The Dallas District should already be selected.
7. The City of Dallas has a lot of pedestrian crashes, as expected, but less than the previous three year average. The areas of Dallas in Collin County, Richardson, Mesquite and Garland are all showing having current years numbers that are well above the jurisdiction's three-year average.

