GLP-1 RA Adverse Event Explorer

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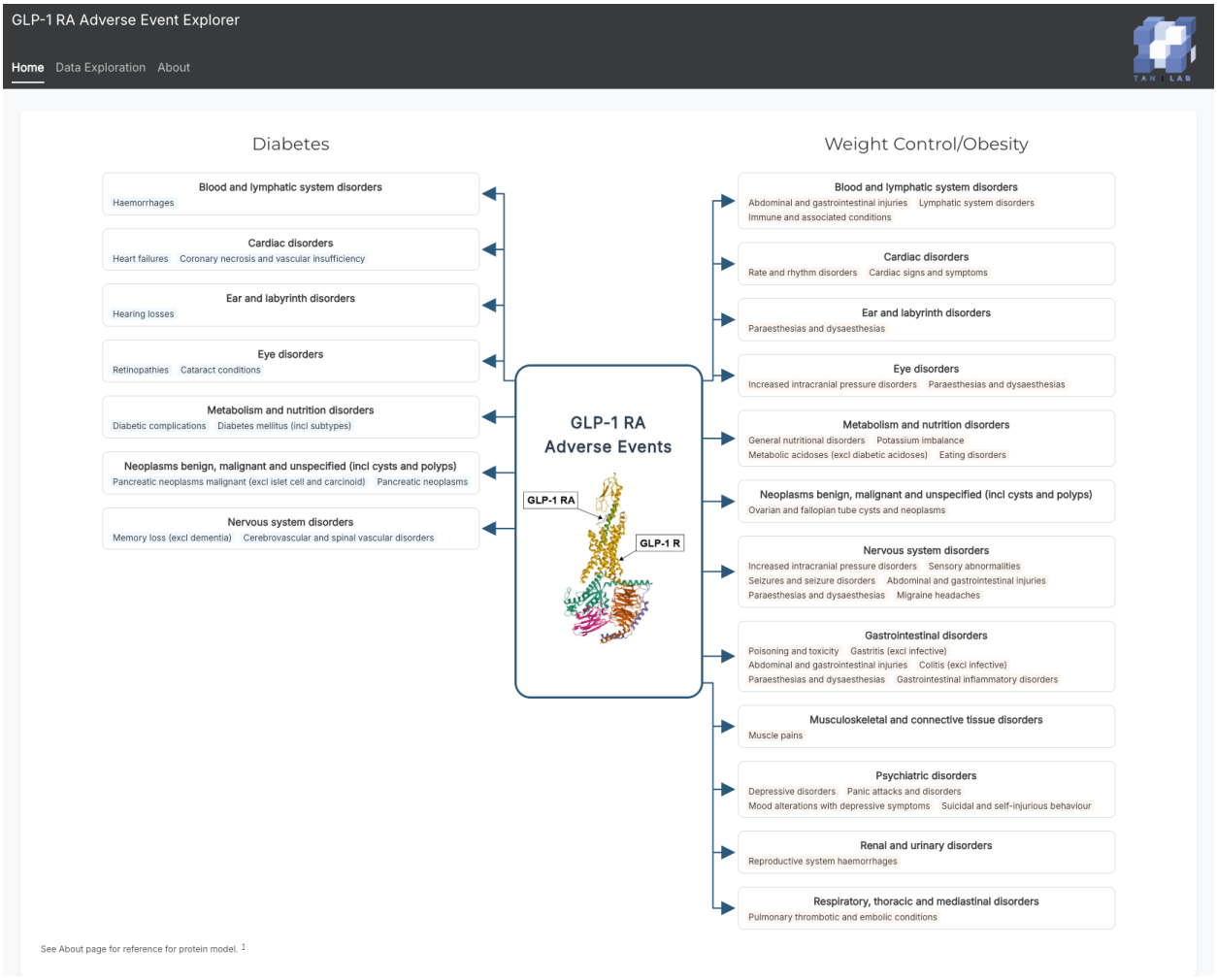
Online Resource User Manual



GLP-1 RA Adverse Event Explorer Webpage: https://glp1.tanlab.org/

Version: 1.0 (August 2025)

INTRODUCTION

GLP-1 RA Adverse Event Explorer is a resource for visualization of adverse event (AE) data from the FDA Adverse Event Reporting System (FAERS). We have cleaned the dataset and identified 151,572 cases treated with GLP-1 RA therapies.

DEVELOPMENT

GLP-1 RA Adverse Event Explorer is developed by the Tan Lab, Department of Oncological Data Science, Huntsman Cancer Institute, University of Utah.

AVAILABILITY

GLP-1 RA Adverse Event Explorer is freely accessible: https://glp1.tanlab.org/

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1. GETTING STARTED

Figure 1 shows the layout of the homepage. The top navigation menu allows to select the Home tab, About tab, or Data Exploration tab. The diagram illustrates AEs significant to the indication the GLP-1 RA was prescribed for.

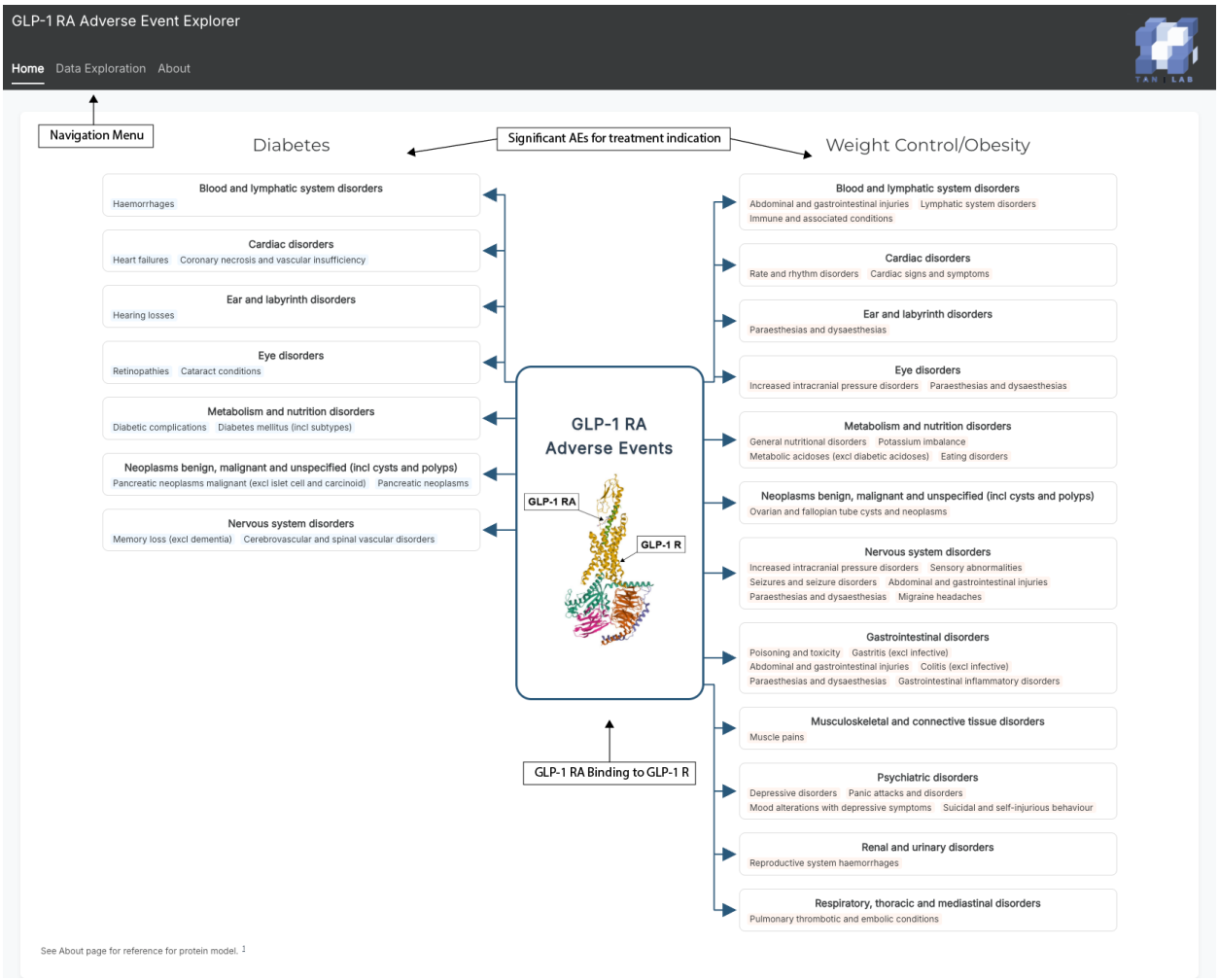

Figure 1: Anatomy of the homepage

2. ROR

Figure 2 shows the reporting odds ratios (ROR) or proportional reporting ratio (PRR) and adjusted p-values for pairs of AEs and a user-selected variable, visualized as a volcano plot. The plot highlights which characteristics are associated with increased or decreased risk of specific AEs. Only significant pairs display the number of cases, helping users assess statistical power based on case counts. The user also has the ability to select to view any of the subplots alone or in any combination with the 'Select Facets' option.

Figure 2: Volcano Plot

Figure 3 shows the table corresponding to the volcano plot. It shows the significant values with their 95% confidence intervals.

Significant Adverse Events

Search:

AE	Dulaglutide		Exenatide		Liraglutide		Semaglutide		Tirzepatide	
	ROR	95% CI	ROR	95% CI	ROR	95% CI	ROR	95% CI	ROR	95% CI
Dementia	2.68	(1.91 - 3.75)							0.20	(0.11 - 0.37)
Allergies to foods, food additives, drugs and other chemicals	2.21	(1.85 - 2.63)								
Death and sudden death	2.20	(1.92 - 2.52)							0.28	(0.22 - 0.34)
Mass conditions	0.48	(0.38 - 0.62)	10.55	(8.80 - 12.64)			0.46	(0.35 - 0.62)	0.16	(0.12 - 0.23)
Pancreatic neoplasms	0.47	(0.40 - 0.55)	2.39	(2.10 - 2.71)	4.98	(4.43 - 5.59)			0.12	(0.09 - 0.15)
Hepatobiliary function diagnostic procedures	0.47	(0.37 - 0.60)	0.28	(0.18 - 0.42)			2.09	(1.74 - 2.50)		
Pancreatic neoplasms malignant (excl islet cell and carcinoid)	0.46	(0.39 - 0.55)	2.57	(2.26 - 2.92)	4.91	(4.35 - 5.53)			0.11	(0.08 - 0.15)
Cardiac signs and symptoms	0.46	(0.37 - 0.58)	0.38	(0.27 - 0.53)			2.04	(1.72 - 2.41)		
Gastrointestinal stenosis and obstruction	0.45	(0.37 - 0.55)	0.13	(0.08 - 0.22)			5.47	(4.75 - 6.31)		
Immune and associated conditions	0.45	(0.31 - 0.64)								
Anaphylactic and anaphylactoid responses	0.44	(0.30 - 0.64)								
Alopecias	0.42	(0.36 - 0.49)	0.21	(0.15 - 0.28)						
Dermal and epidermal conditions	0.40	(0.33 - 0.49)					2.89	(2.53 - 3.30)		
Panic attacks and disorders	0.40	(0.28 - 0.57)								
Seizures and seizure disorders	0.37	(0.25 - 0.54)	0.26	(0.14 - 0.48)	2.59	(1.95 - 3.45)	3.45	(2.70 - 4.40)	0.43	(0.31 - 0.60)
Muscle pains	0.37	(0.29 - 0.47)								
Colitis (excl infective)	0.37	(0.23 - 0.58)	0.15	(0.06 - 0.41)			3.44	(2.55 - 4.63)		
Depressive disorders	0.36	(0.29 - 0.45)	0.25	(0.17 - 0.36)			3.47	(3.02 - 3.99)		
Mood alterations with depressive symptoms	0.36	(0.26 - 0.49)	0.30	(0.18 - 0.49)					2.40	(1.96 - 2.93)
Reproductive system haemorrhages	0.33	(0.22 - 0.49)	0.24	(0.12 - 0.47)						
Cholecystitis and cholelithiasis	0.33	(0.27 - 0.40)	0.18	(0.12 - 0.27)	2.37	(2.03 - 2.77)	2.76	(2.42 - 3.16)		
Gallbladder disorders	0.32	(0.22 - 0.47)					2.00	(1.57 - 2.55)		
Bile duct infections and inflammations	0.27	(0.16 - 0.46)	0.18	(0.07 - 0.44)			4.47	(3.34 - 5.98)		
Oncologic complications and emergencies	0.26	(0.15 - 0.46)			0.05	(0.01 - 0.39)	2.31	(1.66 - 3.21)	2.20	(1.60 - 3.02)
Peripheral embolism and thrombosis	0.24	(0.12 - 0.50)					2.80	(1.88 - 4.17)		

Showing 1 to 25 of 167 entries

Previous 1 2 3 4 5 6 7 Next

Download Table (CSV)

Includes AEs with adjusted p < 0.05 and |log2(ROR/PRR)| ≥ 1 in at least one facet.

Figure 3: Volcano Table

3. ONSET

Figure 4 shows the time from drug administration to onset of AEs, visualized as a density plot. The plot displays the distribution of onset times across the dataset, median, and number of cases and can be faceted by any variables selected from the dropdown menus, allowing comparison between different groups. Users can also subset the data by various columns to focus on specific subsets of interest. This interface enables flexible exploration of onset patterns for AEs.

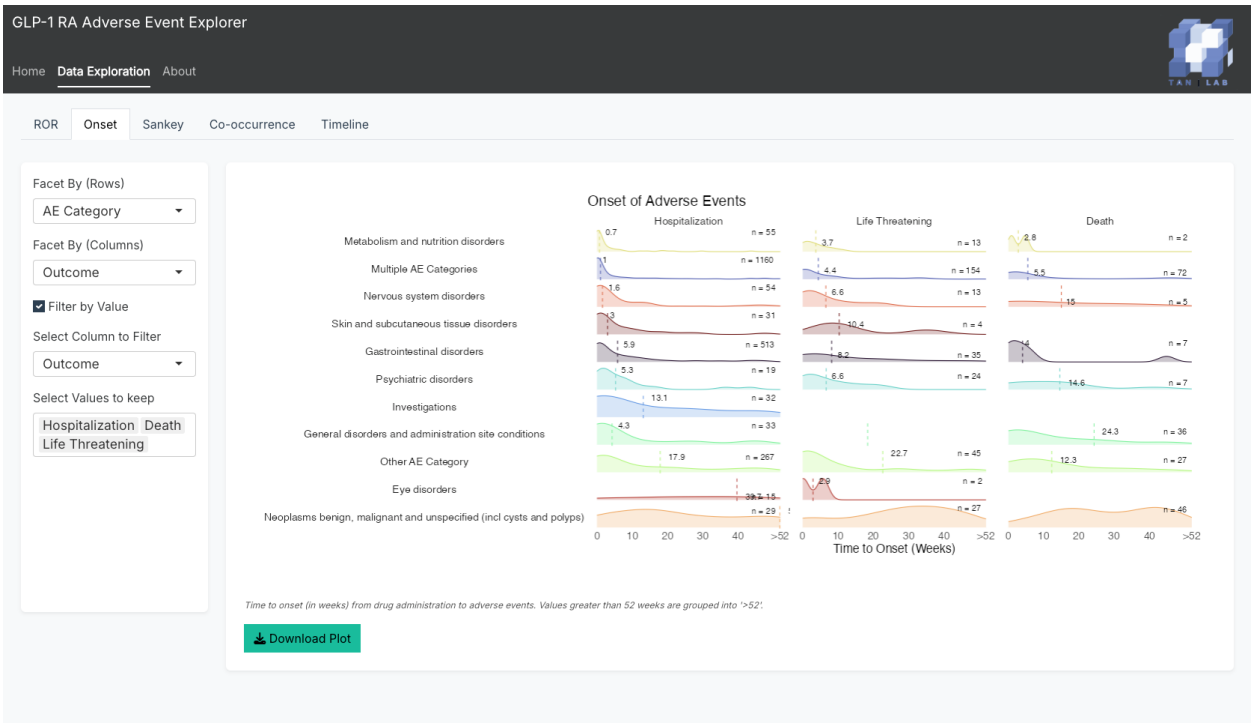

Figure 4: Onset Plot

4. SANKEY

Figure 5 shows the proportion of cases for selected variables in the data, visualized as a Sankey plot. Users can choose and order any available columns to define the flows in the plot, enabling flexible comparison across different groups. The plot is interactive—hovering over a section or flow reveals the number of cases. Data can also be subsetted by various columns to focus on specific subsets of interest. This interface supports customizable exploration of case distributions across multiple variables.

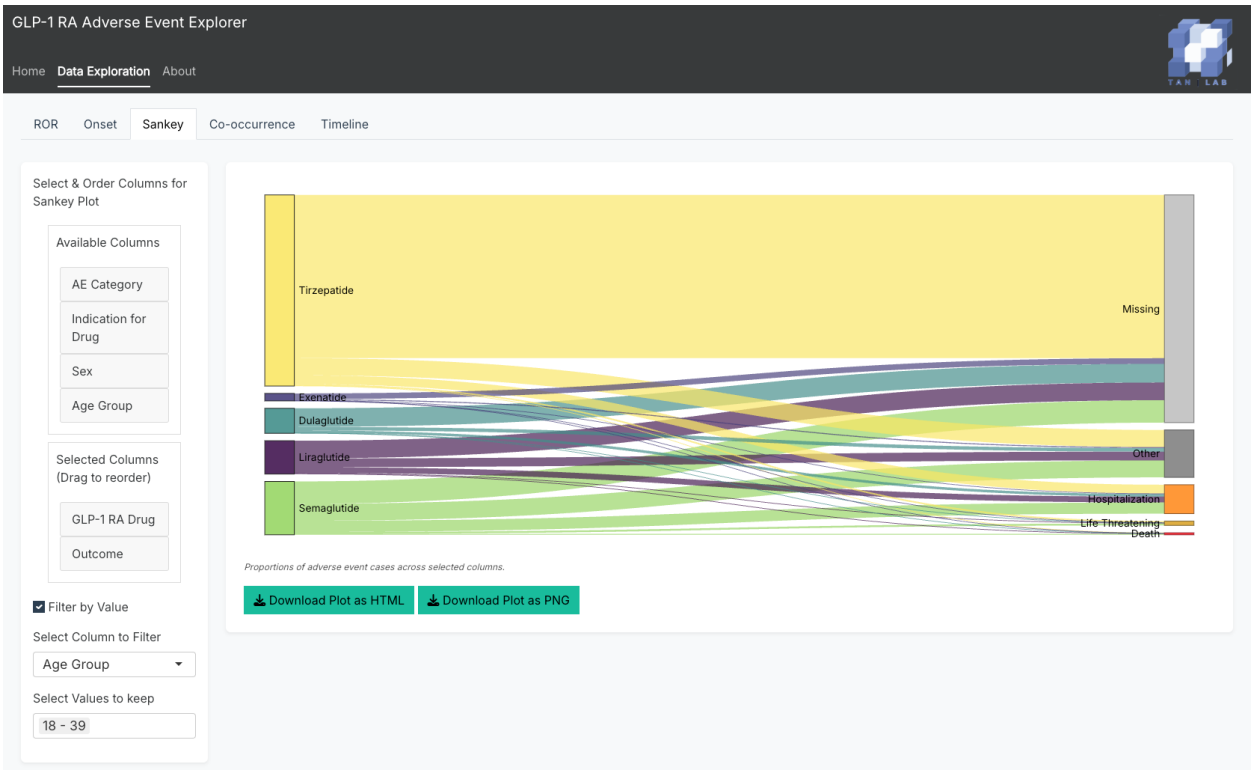

Figure 5: Sankey Plot

5. CO-OCCURRENCE

Figure 6 shows how often values in a user-selected column co-occur within the same patient, visualized as a chord diagram. The plot is interactive—hovering over a section reveals the frequency of co-occurrence.

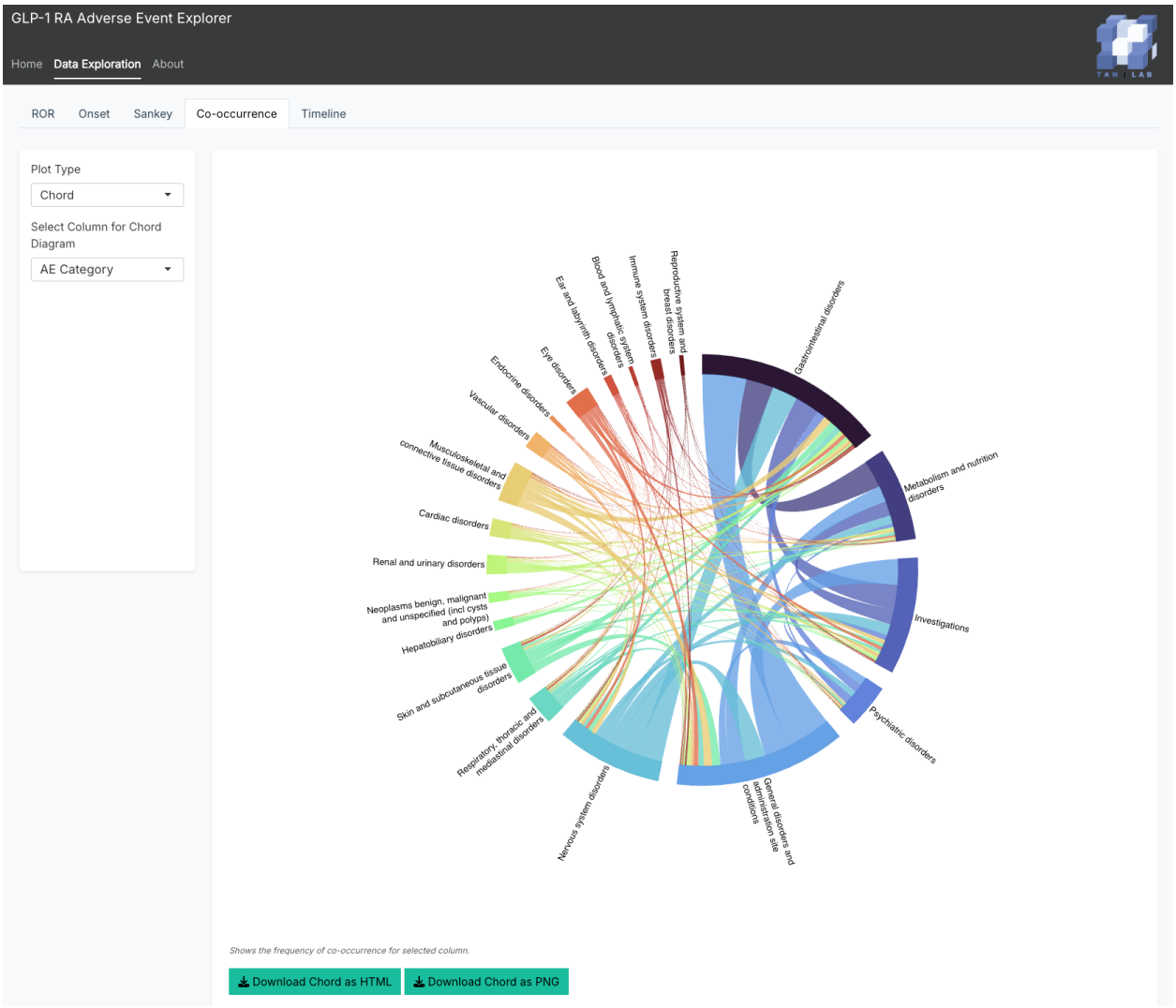

Figure 6: Chord Plot

Figure 7 shows the overlap coefficient for any user-selected column, visualized as a heatmap. The overlap coefficient (ranging from 0 for no overlap to 1 for complete overlap) quantifies how often pairs of values co-occur. The heatmap can be clustered to display related values together. The plot is interactive—hovering over a cell displays the overlap coefficient for a pair of values. The equation for overlap coefficient is $\text{overlap}(A, B) = \frac{|A \cap B|}{\min(|A|, |B|)}$.

Figure 7: Overlap Coefficient Plot

6. TIMELINE

Figure 8 shows the timeline of FDA approval of GLP-1 RA drugs and shows the proportion of a selected variable broken down by GLP-1 RA in that timeline order. Due to having many values in these columns, it can be difficult to fit them all on a chart and be able to read the chart still. We offer a few options to help with this problem that can be used alone or in combination, and we auto-select some recommended settings. First, you can filter the underlying data in the same way as in the Onset and Sankey plots. We add an additional option to this filtering section only when the AE column is selected to filter to our suggested AEs that we found interesting. Second, you can filter by variation. This takes the standard deviation of each value across the GLP-1 RAs, and filters the data to the top N most variable values. Third, we allow for grouping multiples. This means for example if a case had pancreatitis and nausea, instead of having another slice of the pie for the combination of those two AEs, that case will be grouped as Multiple AEs. This plot is interactive—hovering over a slice shows the proportion for that value.

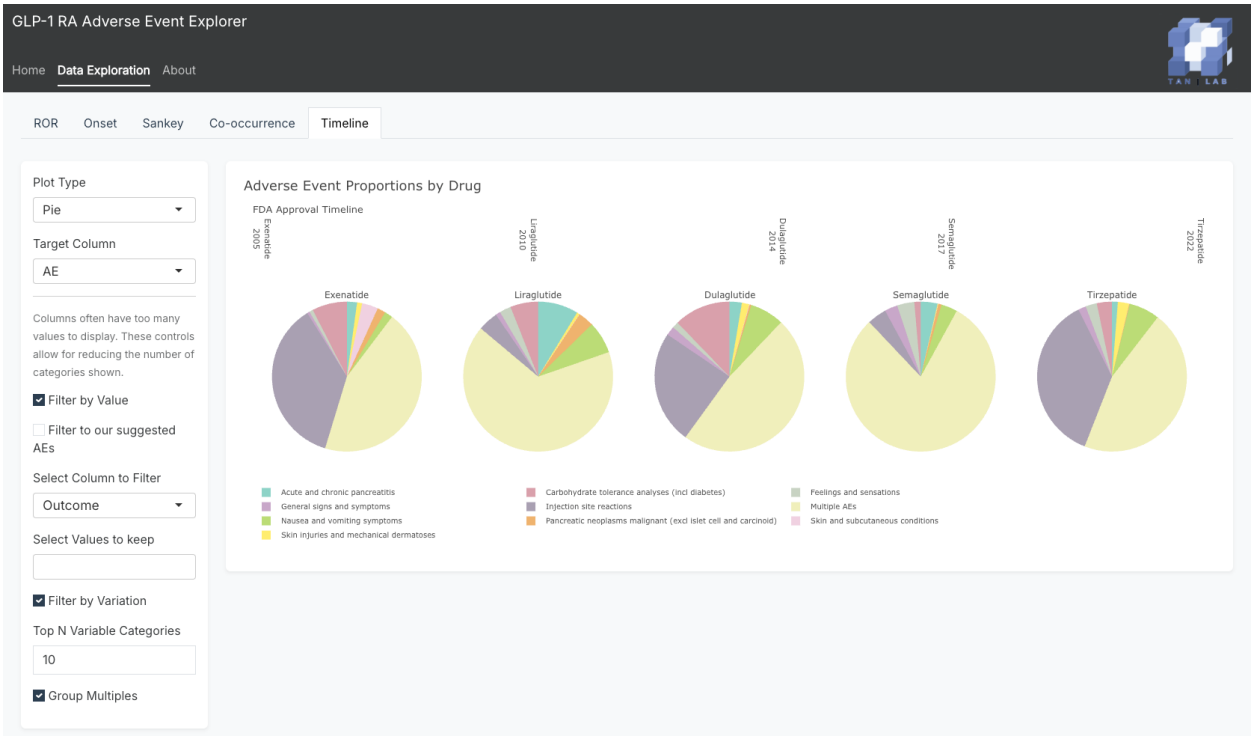

Figure 8: Pie Chart

Figure 9 shows that we allow making the same plot as the pie chart in bar chart form.

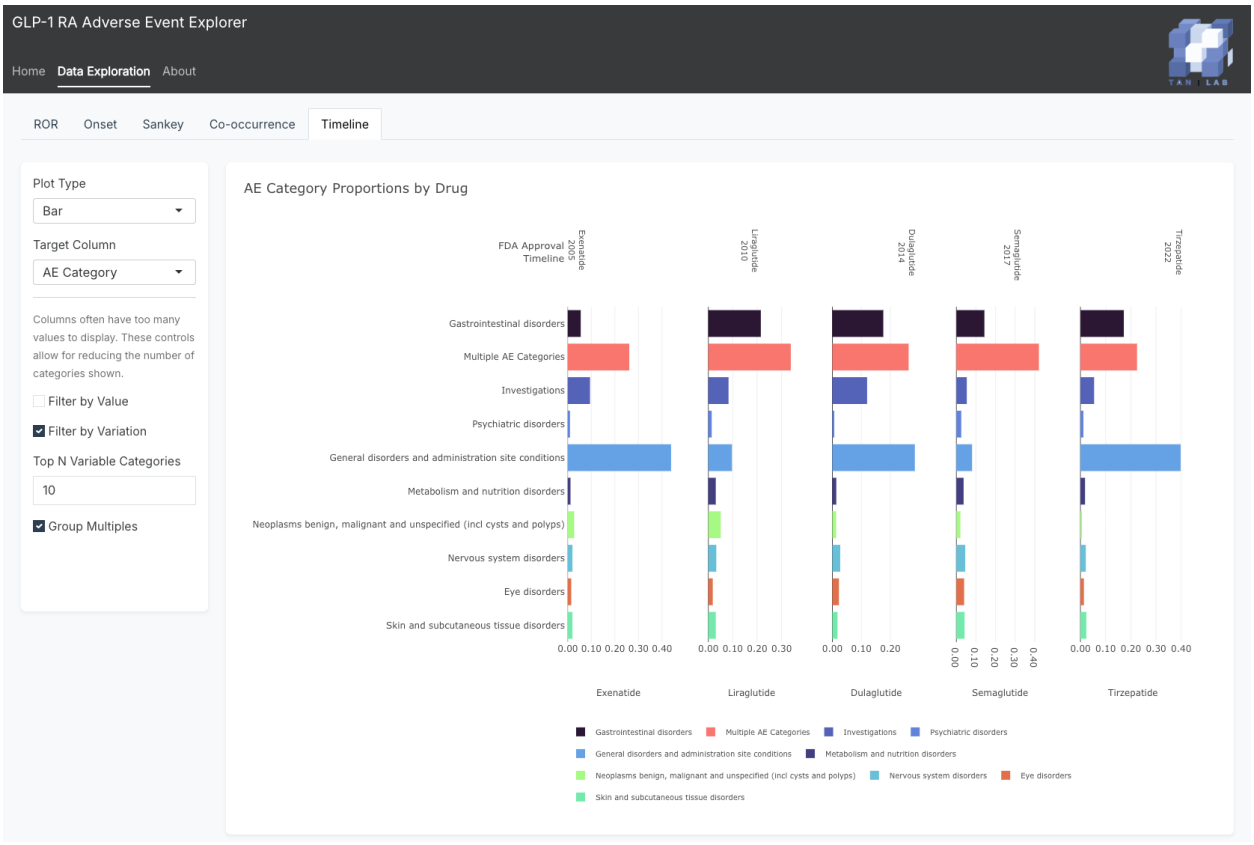

Figure 9: Bar Chart