Design Decisions for Survey Monitoring: From Tables to Dashboards

Joe Murphy
RTI International

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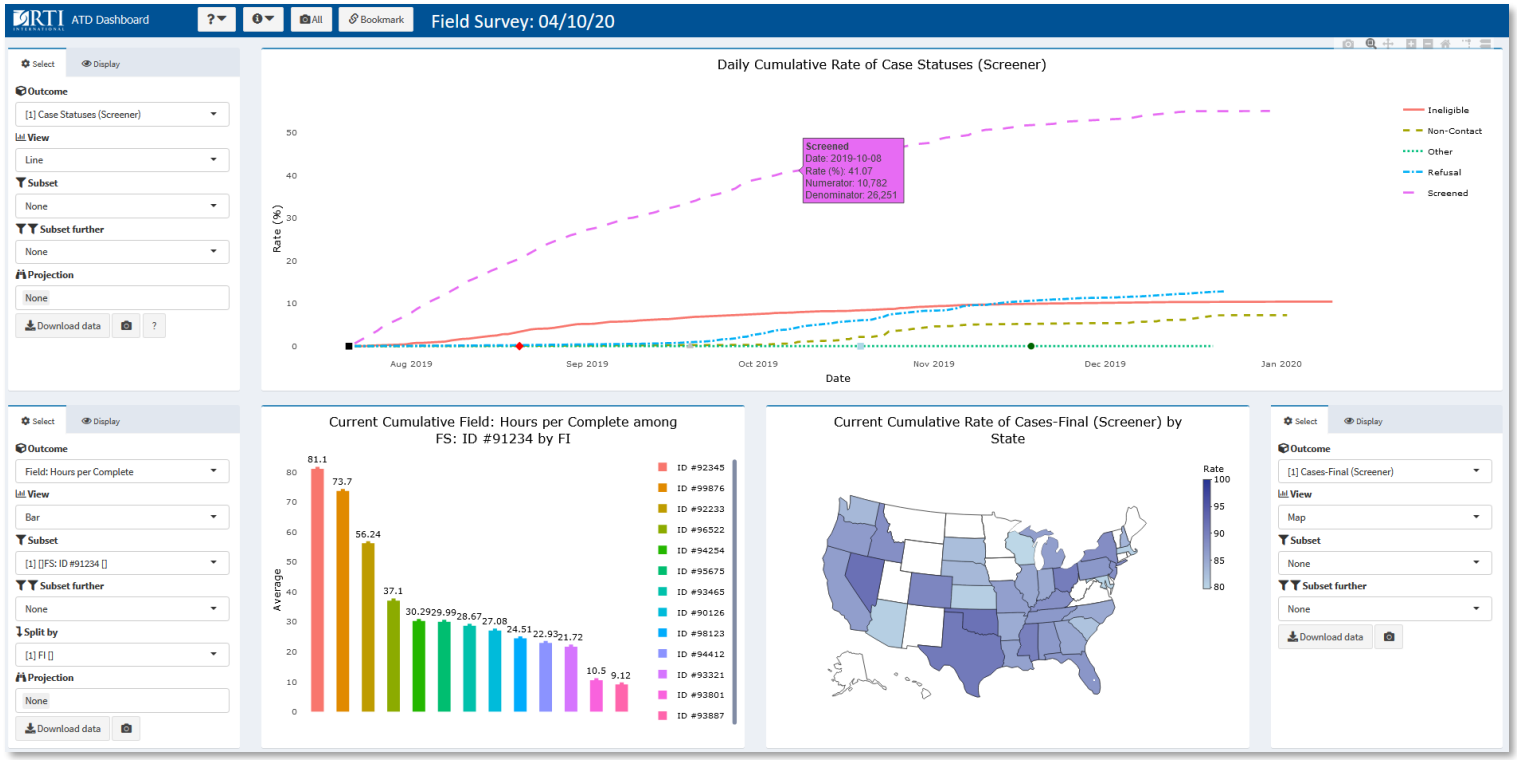

Why a dashboard?

https://www.pexels.com/photo/black-vehicle-instrument-panel-cluster-110990/

Provides key information that's:

- Quick
- Clear
- Actionable

Why a *survey* dashboard?

- Confirm expectations **during data collection**
- Suggest **intervention** if things are going off course
- Leverage experiment to **maximize quality or minimize cost**

What we'll cover today

- The importance of monitoring survey progress during data collection
- The benefits of data visualization and interactivity
- Questions to consider when developing your own monitoring solution

What we *won't* cover

- Detailed features of specific software packages
- Endorsements for any single solution
- Dashboards designed for anything but survey monitoring, i.e., case updates, analysis dashboards

Survey monitoring basics

- Regardless of mode or design, most surveys are interested in tracking responses during data collection
- Some response rate calculations can be nuanced and impractical to calculate during data collection
- Even defining a “complete” can be complicated

For example, the following are standards that surveys might adopt to determine whether a case is a complete interview, partial interview, or break-off:

a. Less than 50% of all applicable questions answered (with other than refusal or no answer) equals break-off, 50%-80% equals partial, and more that 80% equals complete, or

b. Less than 50% of all applicable questions asked equals break-off, 50-80% equals partial, and more than 80% equals complete, or

c. Less than 50% of all essential or crucial questions answered (with other than a refusal or no answer) equals a break-off, 50-99% equals partial, and 100% equals complete, or

d. The above three could be used in combination. For example, one might require 100% of crucial questions and 80% of other questions being answered to count as a complete case.

https://www.aapor.org/AAPOR_Main/media/publications/Standard-Definitions20169theditionfinal.pdf

Survey monitoring basics

- For monitoring, we typically operationalize response rate as a simple “completion” or “submission” rate such as
  - RR1: completes / all cases

$$RR1 = \frac{I}{(I + P) + (R + NC + O) + (UH + UO)}$$

  - RR2: completes + partials / all cases

$$RR2 = \frac{(I + P)}{(I + P) + (R + NC + O) + (UH + UO)}$$

I	=	Complete interview (1.1)
P	=	Partial interview (1.2)
R	=	Refusal and break-off (2.10)
NC	=	Non-contact (2.20)
O	=	Other (2.30)
UH	=	Unknown if household/occupied HU (3.10)
UO	=	Unknown, other (3.20, 3.30, 3.40, 3.90)

https://www.aapor.org/AAPOR_Main/media/publications/Standard-Definitions20169theditionfinal.pdf

Why not just monitor with tables?

Why not just monitor with tables?

	A	B
1	**Completes by Day**	
2	**Date**	**Total**
3	1/2/2022	0
4	1/3/2022	82
5	1/4/2022	74
6	1/5/2022	311
7	1/6/2022	1314
8	1/7/2022	1320
9	1/8/2022	951
10	1/9/2022	686
11	1/10/2022	580
12	1/11/2022	449
13	1/12/2022	683
14	1/13/2022	988
15	1/14/2022	600
16	1/15/2022	718
17	1/16/2022	658
18	1/17/2022	221
19	1/18/2022	227
20	1/19/2022	353
21	1/20/2022	1152
22	1/21/2022	243
23	1/22/2022	176
24	1/23/2022	199
25	1/24/2022	105
26	1/25/2022	125
27	1/26/2022	559
28	1/27/2022	545
29	1/28/2022	282
30	1/29/2022	230
31	1/30/2022	175
32	1/31/2022	133

Why not just monitor with tables?

	A	B	C
1	**Completes by Day - Cumulative**		
2	**Date**	**Total - Cumulative**	
3	1/2/2022	0	
4	1/3/2022	82	
5	1/4/2022	156	
6	1/5/2022	467	
7	1/6/2022	1781	
8	1/7/2022	3101	
9	1/8/2022	4052	
10	1/9/2022	4738	
11	1/10/2022	5318	
12	1/11/2022	5767	
13	1/12/2022	6450	
14	1/13/2022	7438	
15	1/14/2022	8038	
16	1/15/2022	8756	
17	1/16/2022	9414	
18	1/17/2022	9635	
19	1/18/2022	9862	
20	1/19/2022	10215	
21	1/20/2022	11367	
22	1/21/2022	11610	
23	1/22/2022	11786	
24	1/23/2022	11985	
25	1/24/2022	12090	
26	1/25/2022	12215	
27	1/26/2022	12774	
28	1/27/2022	13319	
29	1/28/2022	13601	
30	1/29/2022	13831	
31	1/30/2022	14006	
32	1/31/2022	14139	

Why not just monitor with tables?

	A	B	C	D
1	Completion Rate by Day - Cumulative (%)			
2	Date	Total - Cumulative		
3	1/2/2022	0		
4	1/3/2022	0.16		
5	1/4/2022	0.3		
6	1/5/2022	0.9		
7	1/6/2022	3.42		
8	1/7/2022	5.96		
9	1/8/2022	7.78		
10	1/9/2022	9.1		
11	1/10/2022	10.21		
12	1/11/2022	11.08		
13	1/12/2022	12.39		
14	1/13/2022	14.28		
15	1/14/2022	15.44		
16	1/15/2022	16.82		
17	1/16/2022	18.08		
18	1/17/2022	18.5		
19	1/18/2022	18.94		
20	1/19/2022	19.62		
21	1/20/2022	21.83		
22	1/21/2022	22.3		
23	1/22/2022	22.63		
24	1/23/2022	23.02		
25	1/24/2022	23.22		
26	1/25/2022	23.46		
27	1/26/2022	24.53		
28	1/27/2022	25.58		
29	1/28/2022	26.12		
30	1/29/2022	26.56		
31	1/30/2022	26.9		
32	1/31/2022	27.15		

Why not just monitor with tables?

	A	B	C	D	E
1	**Completion Rate by Day - Cumulative (%)**				
2	**Date**	**Midwest**	**Northeast**	**South**	**West**
3	1/2/2022	0	0	0	0
4	1/3/2022	0.11	0.3	0.2	0
5	1/4/2022	0.23	0.64	0.32	0
6	1/5/2022	0.81	1.42	0.92	0.44
7	1/6/2022	3.64	3.81	3.35	2.99
8	1/7/2022	6.23	6.08	5.63	6.13
9	1/8/2022	8.11	7.56	7.37	8.37
10	1/9/2022	9.41	8.7	8.73	9.8
11	1/10/2022	10.68	9.75	9.7	11.07
12	1/11/2022	11.74	10.54	10.49	11.96
13	1/12/2022	13.35	11.49	11.81	13.36
14	1/13/2022	15.6	13	13.53	15.6
15	1/14/2022	17.02	14	14.46	17.03
16	1/15/2022	18.44	15.08	15.98	18.44
17	1/16/2022	19.81	16.51	17.18	19.57
18	1/17/2022	20.3	16.81	17.58	20.09
19	1/18/2022	20.75	17.21	18.07	20.46
20	1/19/2022	21.39	17.93	18.64	21.29
21	1/20/2022	23.99	20.11	20.81	23.3
22	1/21/2022	24.65	20.51	21.24	23.73
23	1/22/2022	24.99	20.83	21.59	24.06
24	1/23/2022	25.47	21.15	21.98	24.41
25	1/24/2022	25.63	21.51	22.17	24.52
26	1/25/2022	25.85	21.81	22.39	24.75
27	1/26/2022	27.17	22.8	23.42	25.77
28	1/27/2022	28.36	23.72	24.39	26.94
29	1/28/2022	28.94	24.26	24.86	27.56
30	1/29/2022	29.51	24.64	25.22	28.09
31	1/30/2022	29.89	24.88	25.59	28.42
32	1/31/2022	30.23	25.02	25.87	28.69

Why not just monitor with tables?

	A	B	C	D	E	F	G	H	I
1	**Completion Rate by Day - Cumulative (%)**								
2		Urban				Rural			
3	Date	Midwest	Northeast	South	West	Midwest	Northeast	South	West
4	1/2/2022	0	0	0	0	0	0	0	0
5	1/3/2022	0.12	0.25	0.19	0	0.13	0.5	0.15	0
6	1/4/2022	0.25	0.51	0.29	0	0.22	1.05	0.32	0
7	1/5/2022	0.82	1.2	0.94	0.48	0.82	2.01	0.83	0.18
8	1/6/2022	3.42	3.56	3.58	3.14	3.8	4.36	2.98	2.16
9	1/7/2022	6.04	5.71	5.82	6.29	6.43	7.12	5.31	5.34
10	1/8/2022	7.95	7.07	7.53	8.51	8.15	9.03	7.12	8.1
11	1/9/2022	9.22	8.13	9.01	9.94	9.62	10.28	8.21	9.9
12	1/10/2022	10.6	9.19	10.08	11.28	10.87	11.23	9.15	10.86
13	1/11/2022	11.64	10.06	10.95	12.2	12.25	11.69	9.76	11.52
14	1/12/2022	13.1	11.05	12.32	13.62	13.98	12.64	11	13.02
15	1/13/2022	14.99	12.34	13.97	15.84	16.91	14.99	12.92	15.42
16	1/14/2022	16.42	13.22	14.83	17.25	18.33	16.65	13.9	16.86
17	1/15/2022	17.78	14.25	16.2	18.67	19.76	17.85	15.77	18.18
18	1/16/2022	18.88	15.41	17.35	19.79	21.74	20.26	17.08	19.26
19	1/17/2022	19.47	15.71	17.76	20.32	22	20.61	17.4	19.74
20	1/18/2022	19.86	16.11	18.33	20.7	22.52	21.06	17.78	20.04
21	1/19/2022	20.41	16.72	18.83	21.45	23.55	22.27	18.48	21.18
22	1/20/2022	22.87	18.53	20.55	23.39	26.62	25.68	21.68	23.34
23	1/21/2022	23.44	18.96	20.97	23.75	27.26	26.03	22.15	24
24	1/22/2022	23.73	19.24	21.39	24.07	27.61	26.48	22.47	24.36
25	1/23/2022	24.1	19.59	21.8	24.43	28.47	26.68	22.77	24.54
26	1/24/2022	24.27	20	22	24.52	28.65	26.88	22.94	24.72
27	1/25/2022	24.53	20.31	22.2	24.79	28.82	27.18	23.24	24.96
28	1/26/2022	25.83	21.2	23.14	25.75	30.16	28.54	24.54	26.15
29	1/27/2022	27.02	22.03	24	26.89	31.28	29.94	25.79	27.29
30	1/28/2022	27.5	22.54	24.53	27.54	32.01	30.64	26.16	27.83
31	1/29/2022	27.91	22.94	24.92	28.04	32.83	30.99	26.45	28.19
32	1/30/2022	28.32	23.14	25.24	28.39	33.18	31.39	27.03	28.43
33	1/31/2022	28.58	23.32	25.54	28.68	33.65	31.39	27.33	28.67

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2		Urban				Rural			
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4	1/2/2022	9.22	8.13	9.01	9.94	9.62	10.28	8.21	9.9
5	1/3/2022	0.12	0.25	0.19	0	0.13	0.5	0.15	0
6	1/4/2022	0.25	0.51	0.29	0	0.22	1.05	0.32	0
7	1/5/2022	0.82	1.2	0.94	0.48	0.82	2.01	0.83	0.18
8	1/6/2022	3.42	3.56	3.58	3.14	3.8	4.36	2.98	2.16
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12	1/10/2022	10.6	9.19	10.08	11.28	10.87	11.23	9.15	10.86
13	1/11/2022	11.64	10.06	10.95	12.2	12.25	11.69	9.76	11.52
14	1/12/2022	13.1	11.05	12.32	13.62	13.98	12.64	11	13.02
15	1/13/2022	14.99	12.34	13.97	15.84	16.91	14.99	12.92	15.42
16	1/14/2022	16.42	13.22	14.83	17.25	18.33	16.65	13.9	16.86
17	1/15/2022	17.78	14.25	16.2	18.67	19.76	17.85	15.77	18.18
18	1/16/2022	18.88	15.41	17.35	19.79	21.74	20.26	17.08	19.26
19	1/17/2022	19.47	15.71	17.76	20.32	22	20.61	17.4	19.74
20	1/18/2022	19.86	16.11	18.33	20.7	22.52	21.06	17.78	20.04
21	1/19/2022	20.41	16.72	18.83	21.45	23.55	22.27	18.48	21.18
22	1/20/2022	22.87	18.53	20.55	23.39	26.62	25.68	21.68	23.34
23	1/21/2022	23.44	18.96	20.97	23.75	27.26	26.03	22.15	24
24	1/22/2022	23.73	19.24	21.39	24.07	27.61	26.48	22.47	24.36
25	1/23/2022	24.1	19.59	21.8	24.43	28.47	26.68	22.77	24.54
26	1/24/2022	24.27	20	22	24.52	28.65	26.88	22.94	24.72
27	1/25/2022	24.53	20.31	22.2	24.79	28.82	27.18	23.24	24.96
28	1/26/2022	25.83	21.2	23.14	25.75	30.16	28.54	24.54	26.15
29	1/27/2022	27.02	22.03	24	26.89	31.28	29.94	25.79	27.29
30	1/28/2022	27.5	22.54	24.53	27.54	32.01	30.64	26.16	27.83
31	1/29/2022	27.91	22.94	24.92	28.04	32.83	30.99	26.45	28.19
32	1/30/2022	28.32	23.14	25.24	28.39	33.18	31.39	27.03	28.43
33	1/31/2022	28.58	23.32	25.54	28.68	33.65	31.39	27.33	28.67

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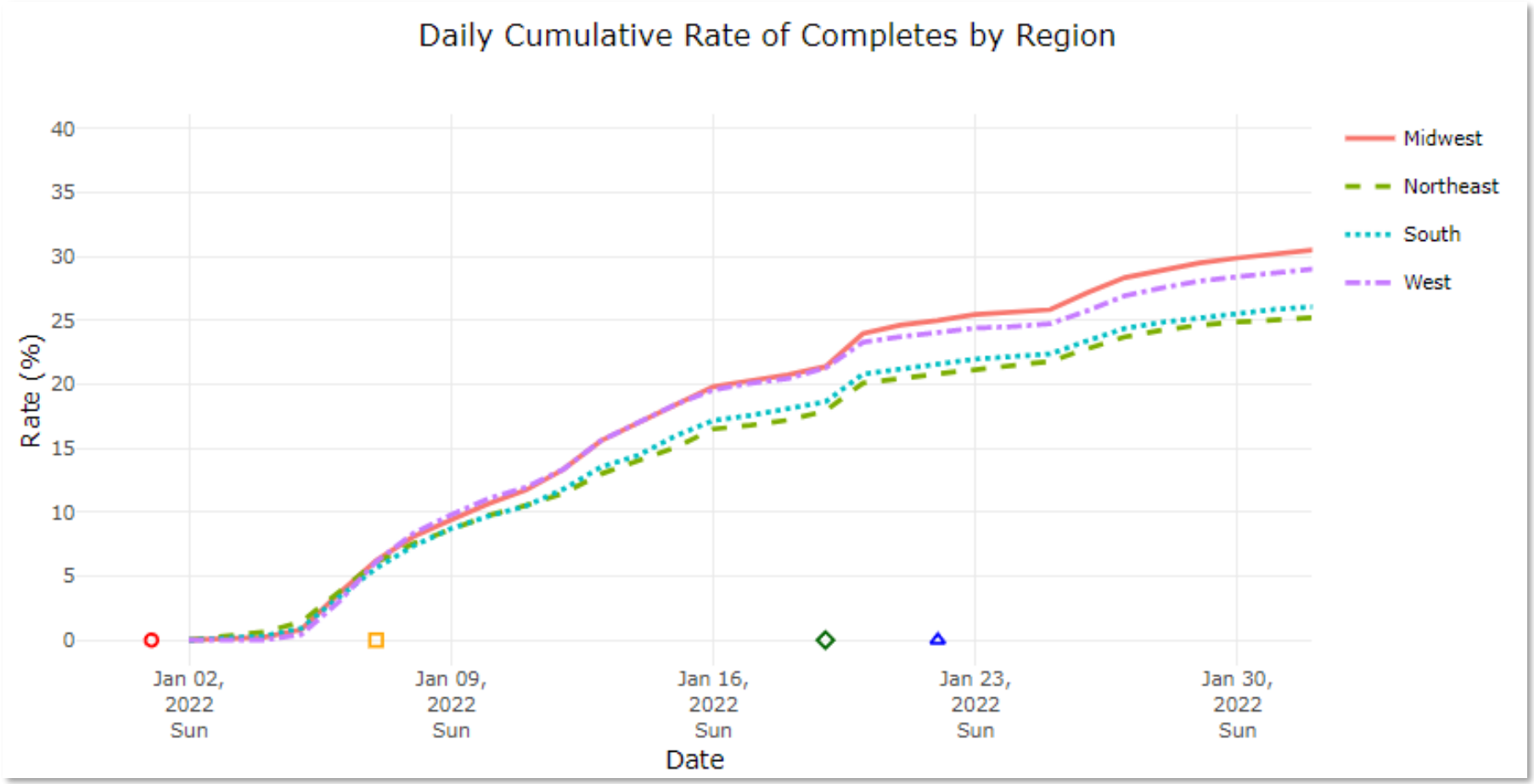
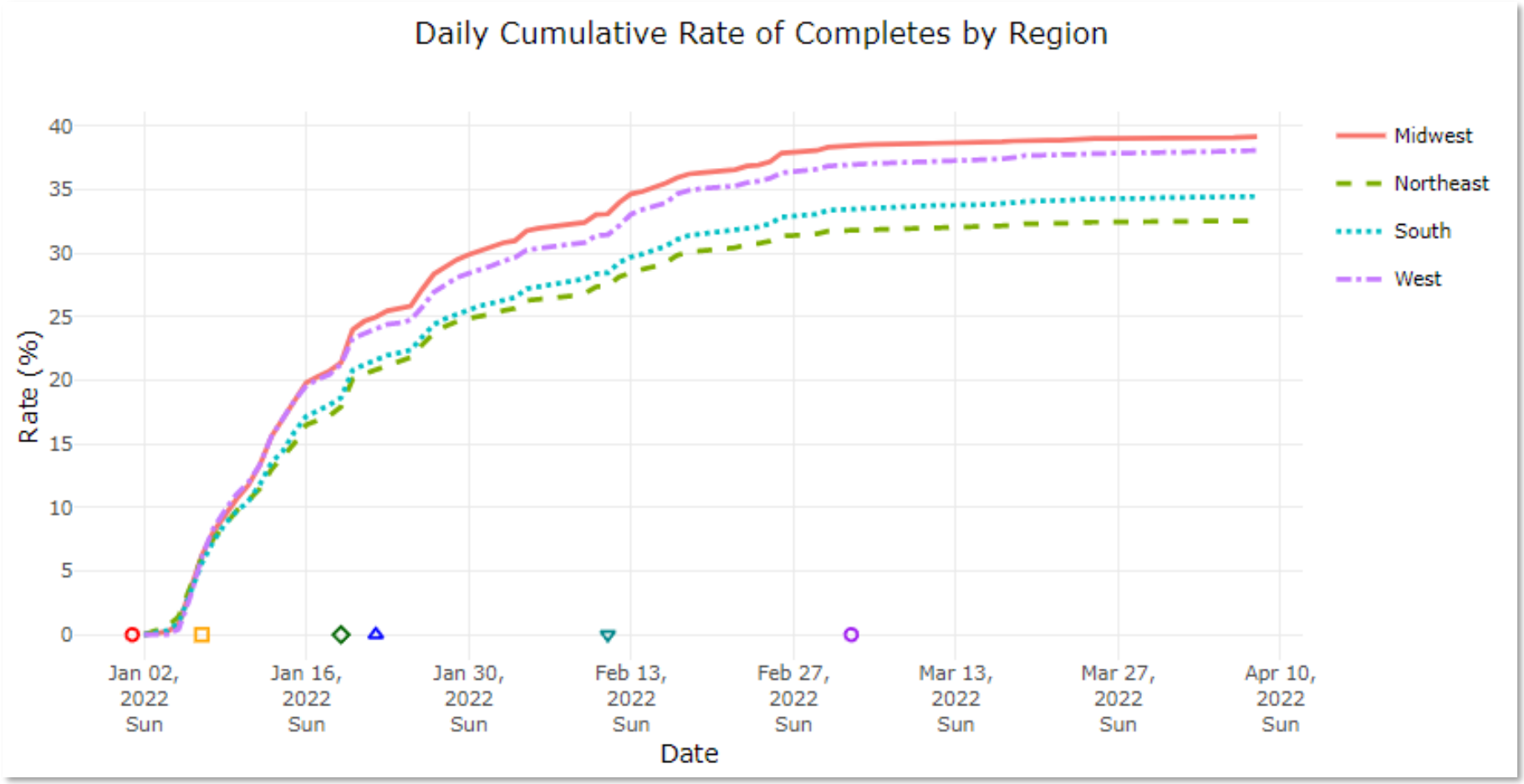
5	1/3/2022	0.12	0.25	0.19	0	0.13	0.5	0.15	0	
6	1/4/2022	0.25	0.51	0.29	0	0.22	1.05	0.32	0	
7	1/5/2022	0.82	1.2	0.94	0.48	0.82	2.01	0.83	0.18	
8	1/6/2022	3.42	3.56	3.58	3.14	3.8	4.36	2.98	2.16	
9	1/7/2022	6.04	5.71	5.82	6.29	6.43	7.12	5.31	5.34	postcard
10	1/8/2022	7.95	7.07	7.53	8.51	8.15	9.03	7.12	8.1	
11	1/9/2022	9.22	8.13	9.01	9.94	9.62	10.28	8.21	9.9	
12	1/10/2022	10.6	9.19	10.08	11.28	10.87	11.23	9.15	10.86	
13	1/11/2022	11.64	10.06	10.95	12.2	12.25	11.69	9.76	11.52	
14	1/12/2022	13.1	11.05	12.32	13.62	13.98	12.64	11	13.02	
15	1/13/2022	14.99	12.34	13.97	15.84	16.91	14.99	12.92	15.42	
16	1/14/2022	16.42	13.22	14.83	17.25	18.33	16.65	13.9	16.86	
17	1/15/2022	17.78	14.25	16.2	18.67	19.76	17.85	15.77	18.18	
18	1/16/2022	18.88	15.41	17.35	19.79	21.74	20.26	17.08	19.26	
19	1/17/2022	19.47	15.71	17.76	20.32	22	20.61	17.4	19.74	
20	1/18/2022	19.86	16.11	18.33	20.7	22.52	21.06	17.78	20.04	
21	1/19/2022	20.41	16.72	18.83	21.45	23.55	22.27	18.48	21.18	mailing
22	1/20/2022	22.87	18.53	20.55	23.39	26.62	25.68	21.68	23.34	
23	1/21/2022	23.44	18.96	20.97	23.75	27.26	26.03	22.15	24	
24	1/22/2022	23.73	19.24	21.39	24.07	27.61	26.48	22.47	24.36	postcard
25	1/23/2022	24.1	19.59	21.8	24.43	28.47	26.68	22.77	24.54	
26	1/24/2022	24.27	20	22	24.52	28.65	26.88	22.94	24.72	
27	1/25/2022	24.53	20.31	22.2	24.79	28.82	27.18	23.24	24.96	
28	1/26/2022	25.83	21.2	23.14	25.75	30.16	28.54	24.54	26.15	
29	1/27/2022	27.02	22.03	24	26.89	31.28	29.94	25.79	27.29	
30	1/28/2022	27.5	22.54	24.53	27.54	32.01	30.64	26.16	27.83	
31	1/29/2022	27.91	22.94	24.92	28.04	32.83	30.99	26.45	28.19	
32	1/30/2022	28.32	23.14	25.24	28.39	33.18	31.39	27.03	28.43	
33	1/31/2022	28.58	23.32	25.54	28.68	33.65	31.39	27.33	28.67	

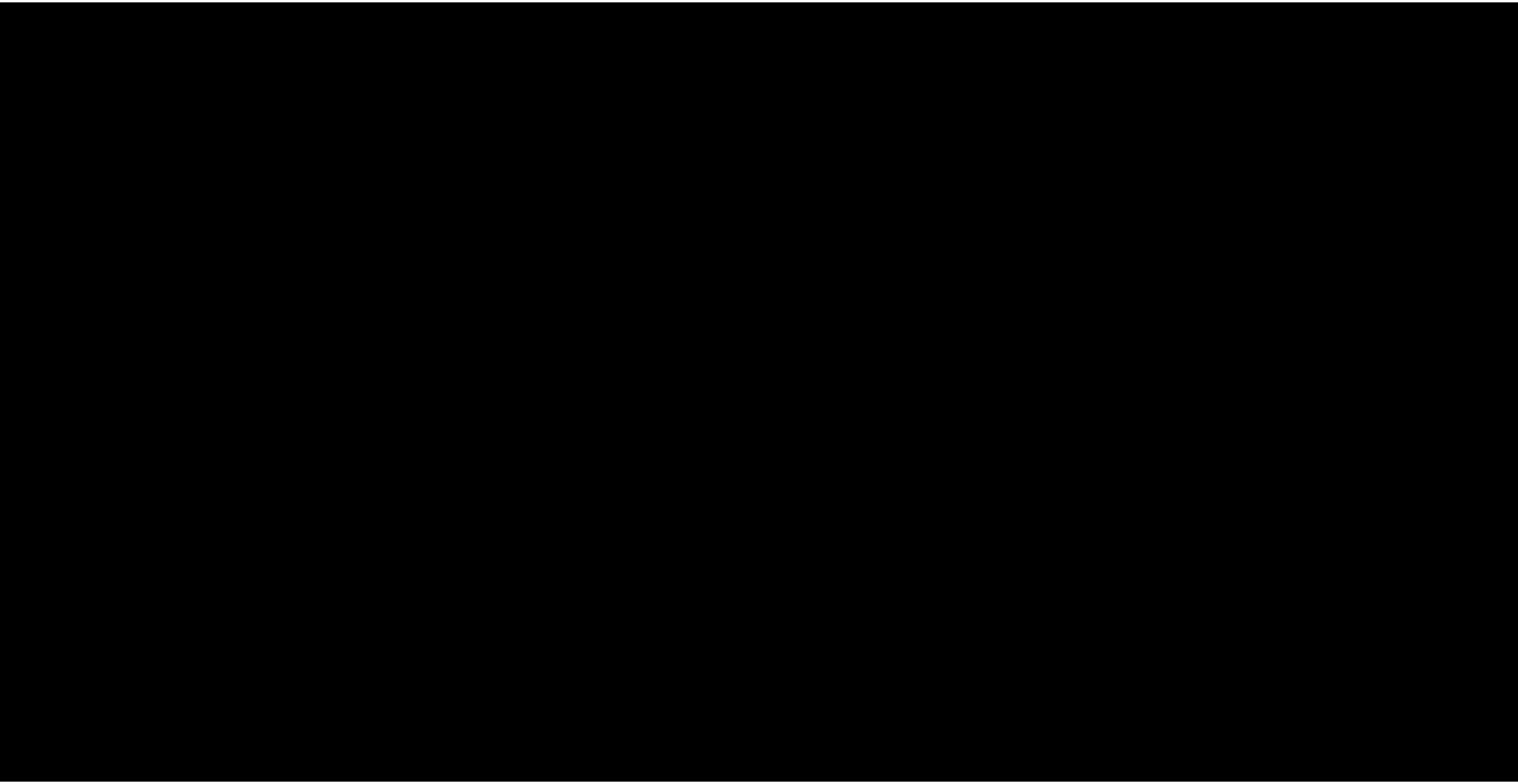
The same data in a chart



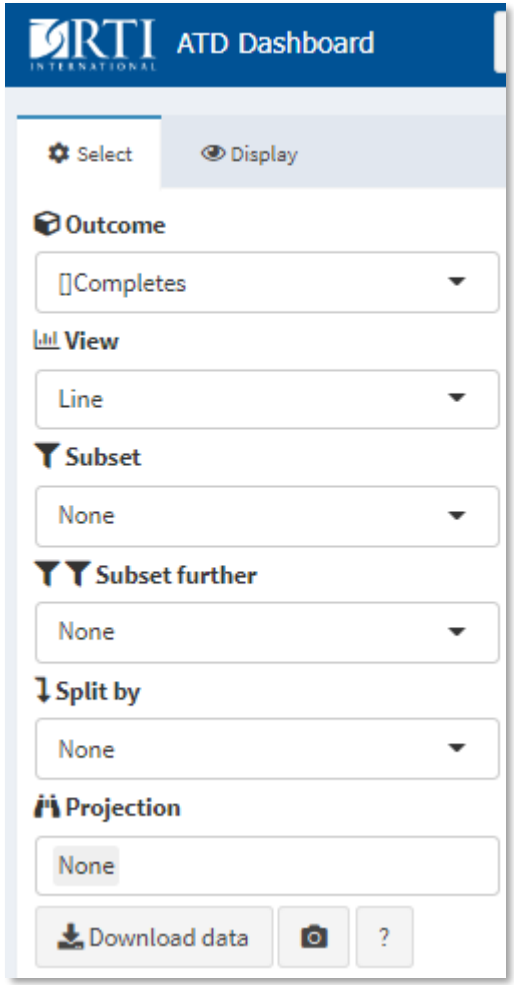
Extending the end date



Leveraging interactivity

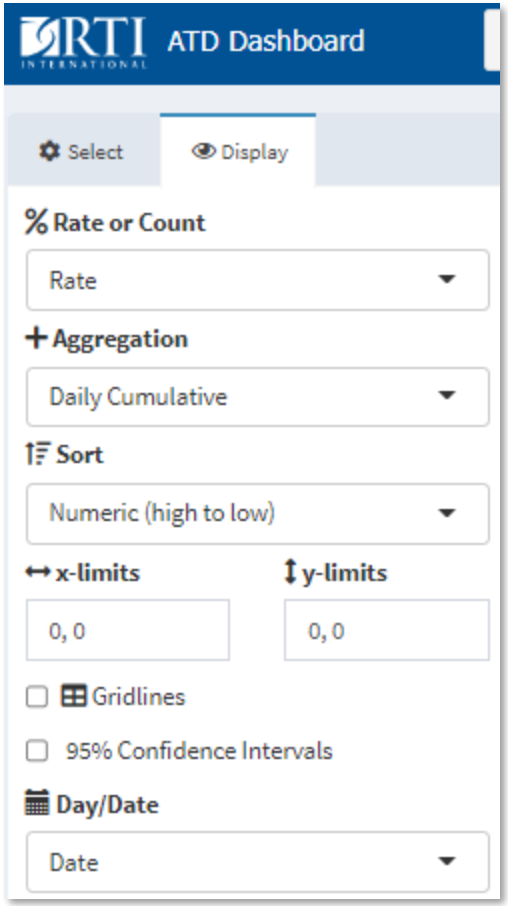


Interactivity allows for custom views



- Select outcome of interest
- Choose between line, bar, scatter, map, table
- Narrow down the results
- Split the results by another variable
- Layer a projection line, target, or prior round actuals on top
- Download data for other use / take a screenshot

Interactivity allows for custom views



- Display a rate vs. a count (completion rate, or completes)
- Show cumulative, noncumulative, daily, weekly, 7-day avg.
- Sort numerically, alphabetically, ascending/descending
- Set exact limits for axis
- Layer gridlines on chart
- Display confidence intervals / error bars
- Switch between displaying date and day of data collection

Before you build…

The biggest challenges

- Determine what outcomes are important
- Identify metrics to evaluate progress
- Know your data
- Know your users
- Find a sustainable solution
  - For the project
  - Across projects
- Deal with customization vs. standardization

Determine what outcomes are important

- Depends on the definition of success for the project and what is meaningful to consider while the survey is still being completed
- Typically, measures of response, data quality, representativity, and cost
- AAPOR Standard Definitions are a good place to start https://www.aapor.org/AAPOR_Main/media/publications/Standard-Definitions20169theditionfinal.pdf

Determine what outcomes are important

- Example standard outcomes from AAPOR Standard Definitions:
  - Response rate
  - Contact rate
  - Cooperation rate
  - Refusal rate

Determine what outcomes are important

AAPOR Standard Definitions

1. Interview
   - Complete
   - Partial

2. Eligible, Non-Interview
   - Refusal and break-offs.
   - Refusals
   - Household-level refusal
   - Known respondent refusal
   - Break-off
   - Non-contact
   - Unable to enter building/reach housing unit
   - No one at residence
   - Respondent away/unavailable
   - Other
   - Dead
   - Physically or mentally unable/incompetent
   - Language
   - Household-level language problem
   - Respondent language problem
   - No interviewer available for needed language
   - Miscellaneous

3. Unknown eligibility, non-interview
   - Unknown if housing unit
   - Not attempted or worked
   - Unable to reach/unsafe area
   - Unable to locate address
   - Housing unit/Unknown if eligible respondent
   - No screener completed
   - Other

4. Not Eligible
   - Out of sample
   - Not a housing unit
   - Business, government office, other organization
   - Institution
   - Group quarters
   - Vacant housing unit
   - Regular, Vacant residences
   - Seasonal/Vacation/Temporary residence
   - Other
   - No eligible respondent
   - Quota filled
   - Other

https://www.aapor.org/AAPOR_Main/media/publications/Standard-Definitions20169theditionfinal.pdf

Identify metrics to evaluate progress

Beyond Standard Definitions, examples of “core” metrics

Outcomes	Splits
Survey Submissions	Survey Frame Variables
Survey Duration	Region / Division / State
Response Mode	Data Collection Phase
Device Type	Experimental Groups
Survey Language	Interviewer / Supervisor
Response to Survey Items	
Breakoffs	**Comparisons**
Ineligibles	Prior Round Response Rates
Undeliverables	Expected Response by Geography
Cost per Case	External Source Distributions
Hours per Complete	Day / Hour
Miles per Complete	Interviewer Shift

Know your data

- Where do your raw survey data and paradata reside?
- Do you have access to these systems?
- Are there different systems for different modes of data collection?
- Do you have the software to wrangle the data?
- Are there security considerations for accessing survey microdata?
- What other sources need to be queried? (financial, case management systems, external benchmarks, etc.)

Know your users

- Who will be using the dashboard and for what purposes?
  - Project directors?
  - Data collection task leaders?
  - Field/phone supervisors?
  - Clients?
- Can they access your dashboard?
- Do they need any special skills to navigate it?
- How many users and often will they access it?
- How current do the data need to be?

Find a sustainable solution

- How much maintenance will the dashboard require?
- Will projects need changes to contents or definitions during data collection?
- Will the same dashboard need to accommodate multiple projects?
- How easy will it be to roll out new enhancements?
- How will changes in software or systems impact the ability to continue populating the dashboard in the future?

Deal with customization vs. standardization

- For organizations running multiple surveys, there ideally would be a one-size-fits-all solution

- But surveys can be very unique and there are many design variations
  - Mix of modes / inclusion of interviewers
  - Baseline vs. Longitudinal
  - Sample type (RDD, ABS, listed, convenience, etc.)
  - Single vs. multi-stage (screener, main interview, etc.)

- Identify what is universal to the surveys you conduct (for maximum efficiency)

- Design a process to allow for custom additions (for maximum flexibility)

Considerations adapted from “Finding the Perfect Dashboard”

- **Ease of Use**
  - simple interface to create and manage dashboards
  - doesn’t require an understanding of code to use
- **Customization**
  - different sizes, arrangements, and types of tools on their dashboards
  - easily customized to fit the requirements of the user
- **Scalability**
  - needs to scale to match the growth of the project
  - provide tools that can accommodate the growth
- **Integration**
  - Ability to work with other tools and databases used on the project

https://www.metricfire.com/blog/top-8-open-source-dashboards/#Finding-the-perfect-Dashboard

Considerations adapted from “Finding the Perfect Dashboard”

- **Extendability**
  - Able to incorporate new requirements of a project
- **Modularity**
  - different parts of the dashboard function independently for efficiency and ease of use
- **Security Management**
  - If there is sensitive or private data, tool should make the data secure
- **Exporting Options**
  - Ability to take the dashboard data to use it elsewhere

https://www.metricfire.com/blog/top-8-open-source-dashboards/#Finding-the-perfect-Dashboard

Off the shelf solutions

- Pros:
  - Professional-level graphics
  - Use across projects
  - Often require little programming

- Cons:
  - Can be expensive
  - Not necessarily designed for surveys
  - May have steep learning curves, setup challenges

Tableau

tableau.com/trial/dashboards

Tableau is business intelligence software that helps people see and understand their data.

Fast Analytics

Connect and visualize your data in minutes. Tableau is 10 to 100x faster than existing solutions.

Ease of Use

Anyone can analyze data with intuitive drag & drop products. No programming, just insight.

Big Data, Any Data

From spreadsheets to databases to Haadoop to cloud services, explore any data.

Smart Dashboards

Combine multiple views of data to get richer insight. Best practices of data visualization are baked right in.

Update Automatically

Get the freshest data with a live connection to your data or get automatic updates on a schedule you define.

Share in Seconds

Publish a dashboard with a few clicks to share it live on the web and on mobile
devices.

Power BI

powerbi.microsoft.com/en-us/

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Create a data-driven culture with business intelligence for all

Enable everyone at every level of your organization to make confident decisions using up-to-the-minute analytics.

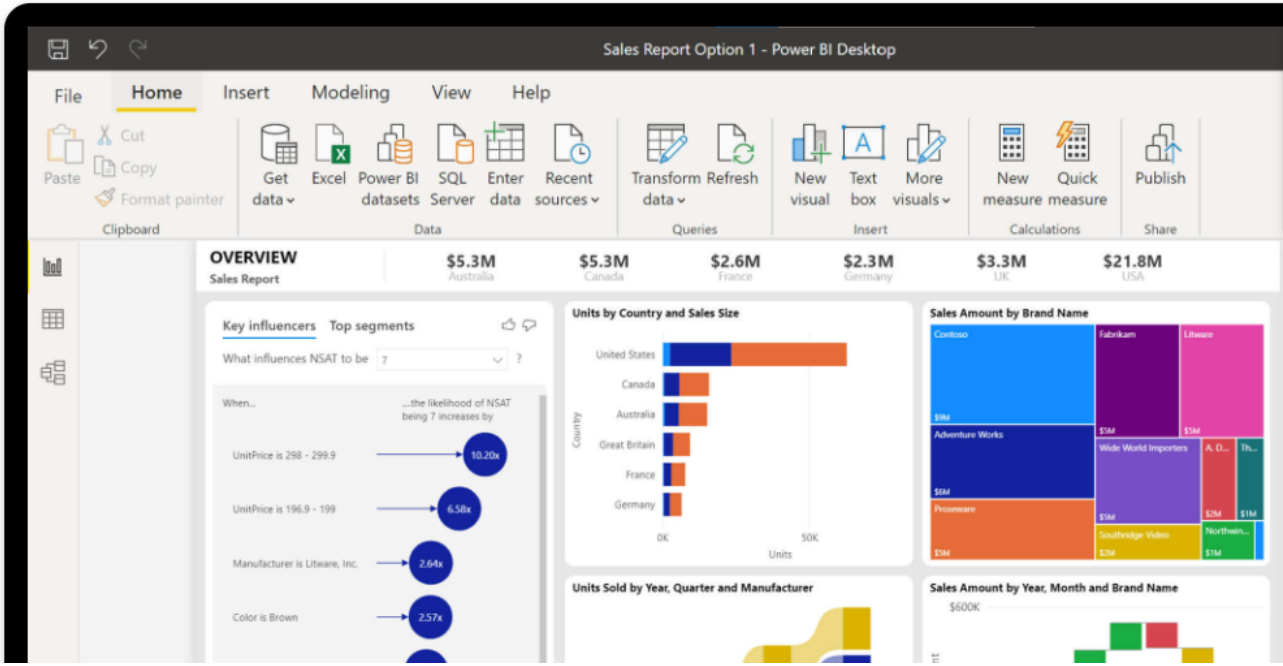
Get self-service analytics at enterprise scale

Reduce the added cost, complexity, and security risks of multiple solutions with an analytics platform that scales from individuals to the organization as a whole.

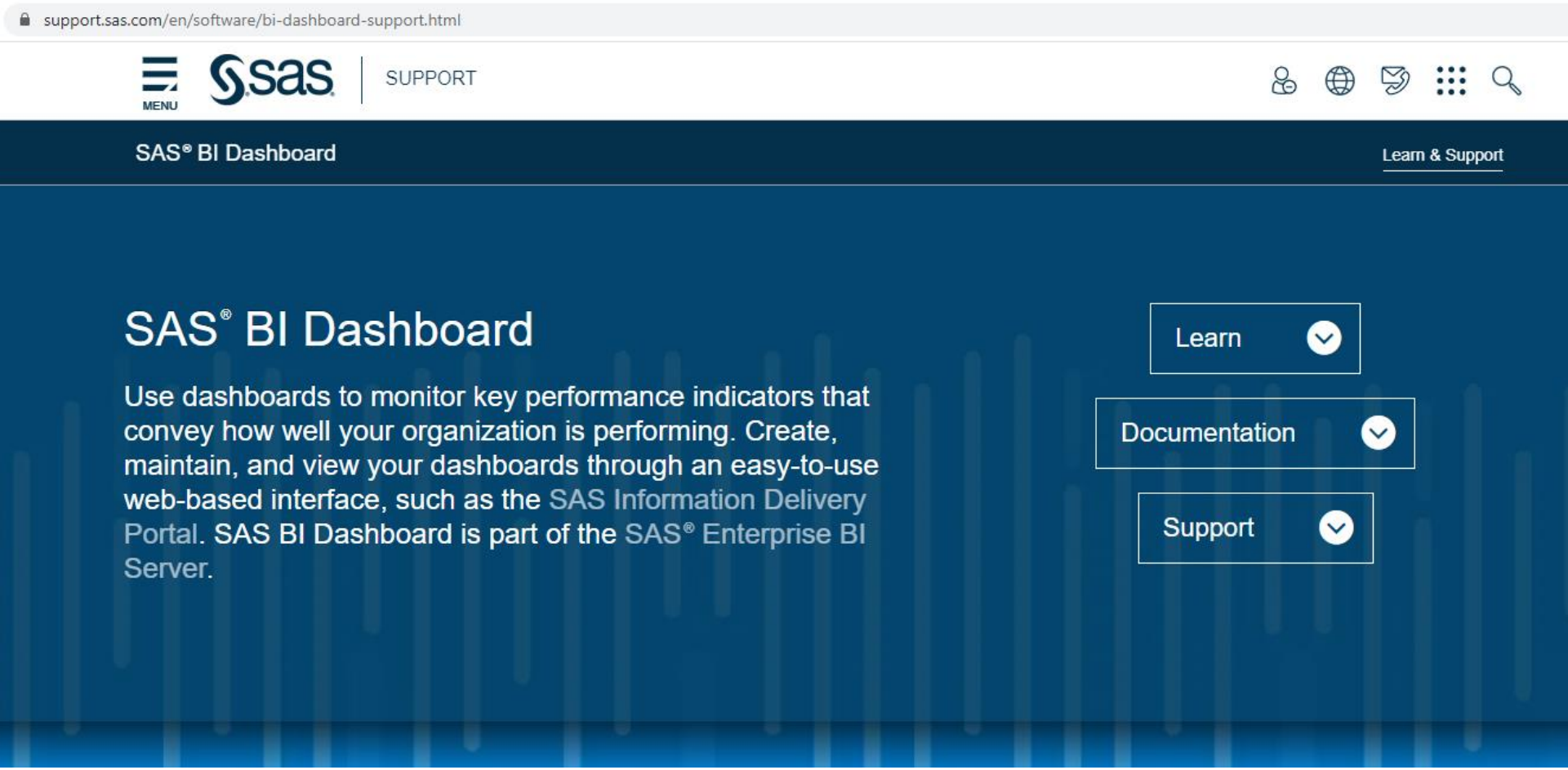
Use smart tools for strong results

Find and share meaningful insights with hundreds of data visualizations, built-in AI capabilities, tight Excel integration, and pre-built and custom data connectors.

Help protect your analytics data



SAS BI


support.sas.com/en/software/bi-dashboard-support.html
MENU
SUPPORT
SAS® BI Dashboard
Learn & Support
SAS® BI Dashboard
Use dashboards to monitor key performance indicators that convey how well your organization is performing. Create, maintain, and view your dashboards through an easy-to-use web-based interface, such as the SAS Information Delivery Portal. SAS BI Dashboard is part of the SAS® Enterprise BI Server.
Learn
Documentation
Support

Home-grown solutions

- Pros:
  - Extensive open-source libraries available
  - High level of control over content and format
  - Can be inexpensive (or free)

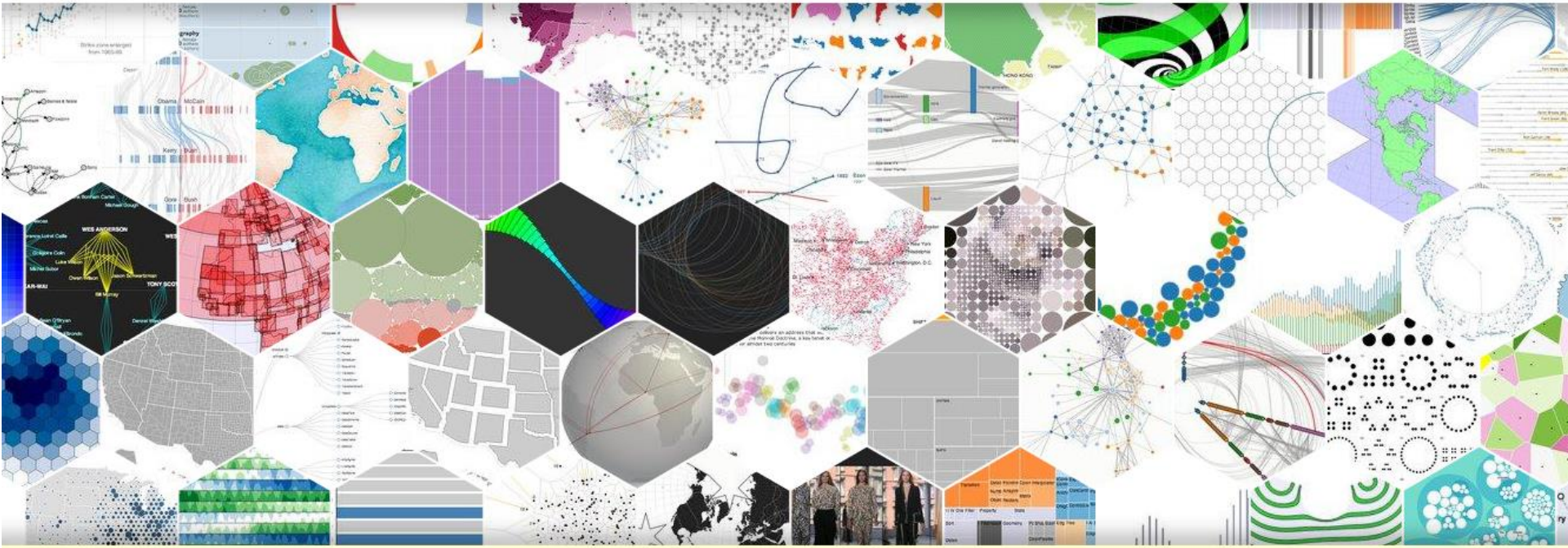
- Cons:
  - Requires programming knowledge to set up
  - Need to determine how to share / server infrastructure
  - May result in more “hands-on” time to maintain

D3

d3js.org

Overview Examples Documentation API Source

Data-Driven Documents



Like visualization and creative coding? Try interactive JavaScript notebooks in **Observable!**

D3.js is a JavaScript library for manipulating documents based on data. **D3** helps you bring data to life using HTML, SVG, and CSS. D3's emphasis on web standards gives you the full capabilities of modern browsers without tying yourself to a proprietary framework, combining powerful visualization components and a data-driven approach to DOM manipulation.

- See more examples
- Chat with the community
- Follow announcements
- Report a bug

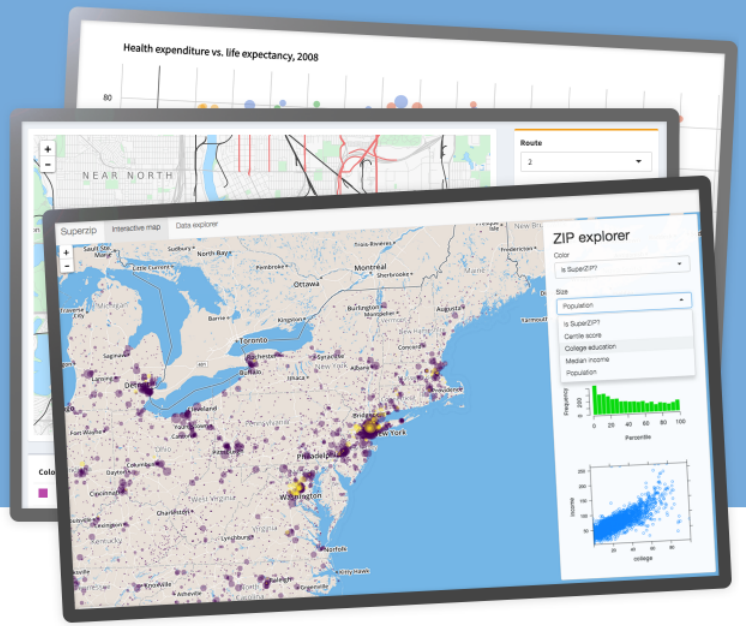
R Shiny

shiny.rstudio.com

Shiny for Python is in alpha! Learn more

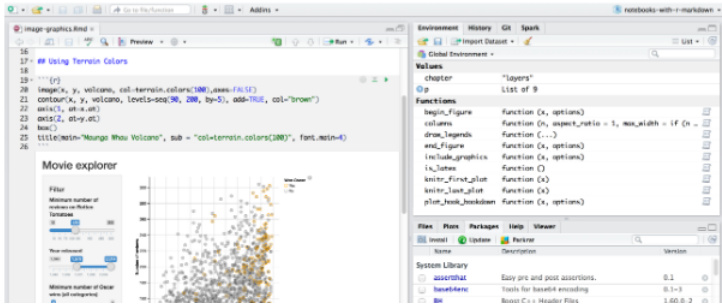
Shiny from RStudio

Get Started Gallery Articles App Stories Reference Deploy Help Contribute



Interact. Analyze. Communicate.

Take a fresh, interactive approach to telling your data story with Shiny. Let users interact with your data and your analysis. And do it all with R.



Shiny is an R package that makes it easy to build interactive web apps straight from R. You can host standalone apps on a webpage or embed them in R Markdown documents or build dashboards. You can also extend your Shiny apps

Excel

support.microsoft.com/en-us/office/create-and-share-a-dashboard-with-excel-and-microsoft-groups-ad92a34d-38d0-4fdd-b8b1-58379aae746e

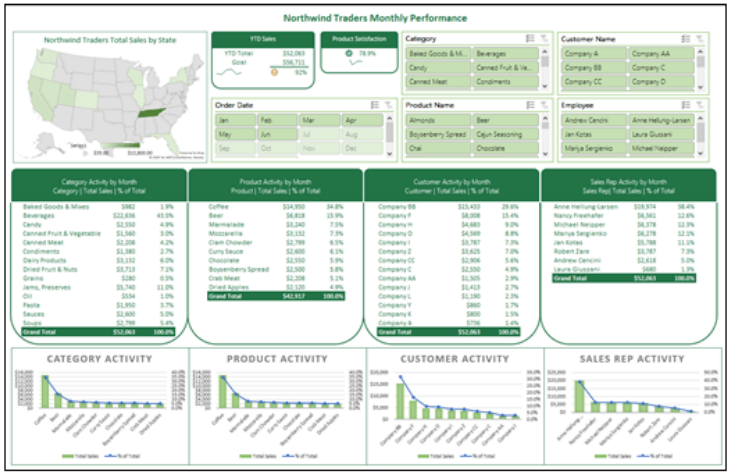
Microsoft | Support Microsoft 365 Office Windows Surface Xbox Deals All Microsoft Search

Office support Products Devices What's new Install Office Account & billing Templates More support

Create and share a Dashboard with Excel and Microsoft Groups

Excel for Microsoft 365, Excel 2021, Excel 2019, Excel 2016, Excel 2013

A dashboard is a visual representation of key metrics that allow you to quickly view and analyze your data in one place. Dashboards not only provide consolidated data views, but a self-service business intelligence opportunity, where users are able to filter the data to display just what's important to them. In the past, Excel reporting often required you to generate multiple reports for different people or departments depending on their needs.



Design considerations

Home-grown solutions

- Similarity
  - Group similar elements together by color, shape, size or orientation

- Proximity □□□ ○○○
  - Placing elements closer together shows they are related

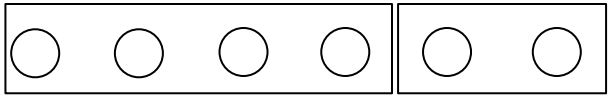
- **Emphasis**
  - Highlighting features will make them stand out

Gestalt principles of visual perception

- Continuity

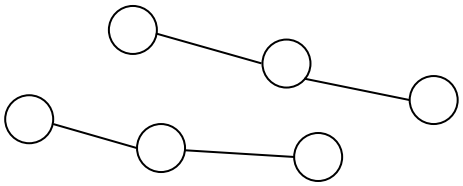
The	brain	perceives	objects	arranged
along	continuous	lines	as	connected

- Common region



  - Elements in a common regions appear to belong together

- Connection

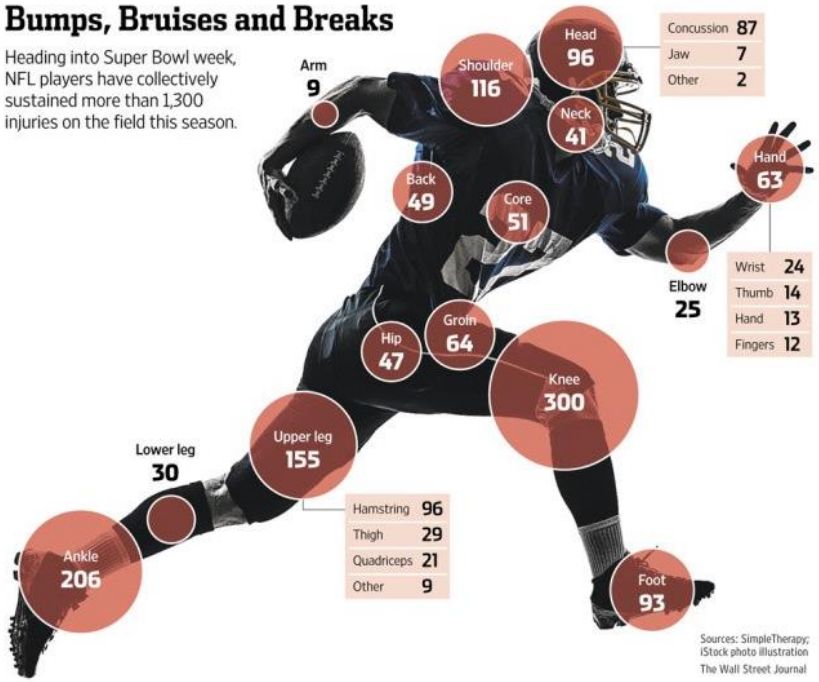


  - Connected elements appear to be a single entity

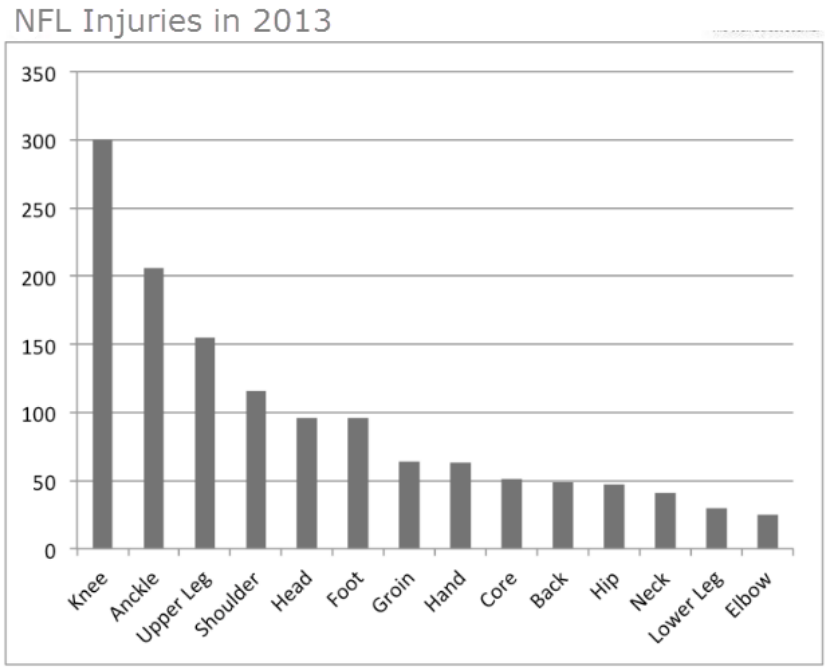
Tufte's data-ink ratio

- Ink used for data / total ink
- Remove "chart junk" and any that doesn't add information

Before

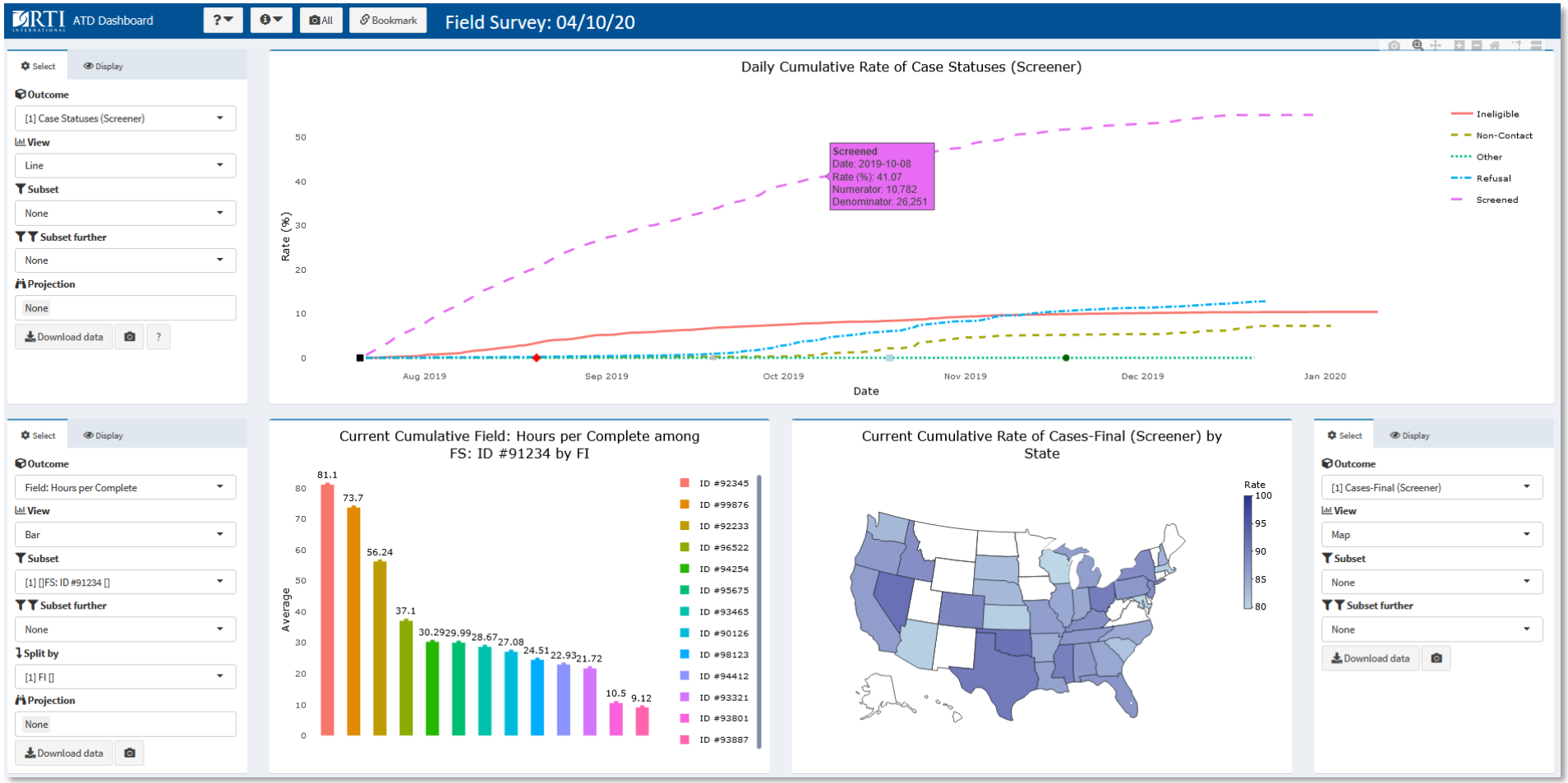


After

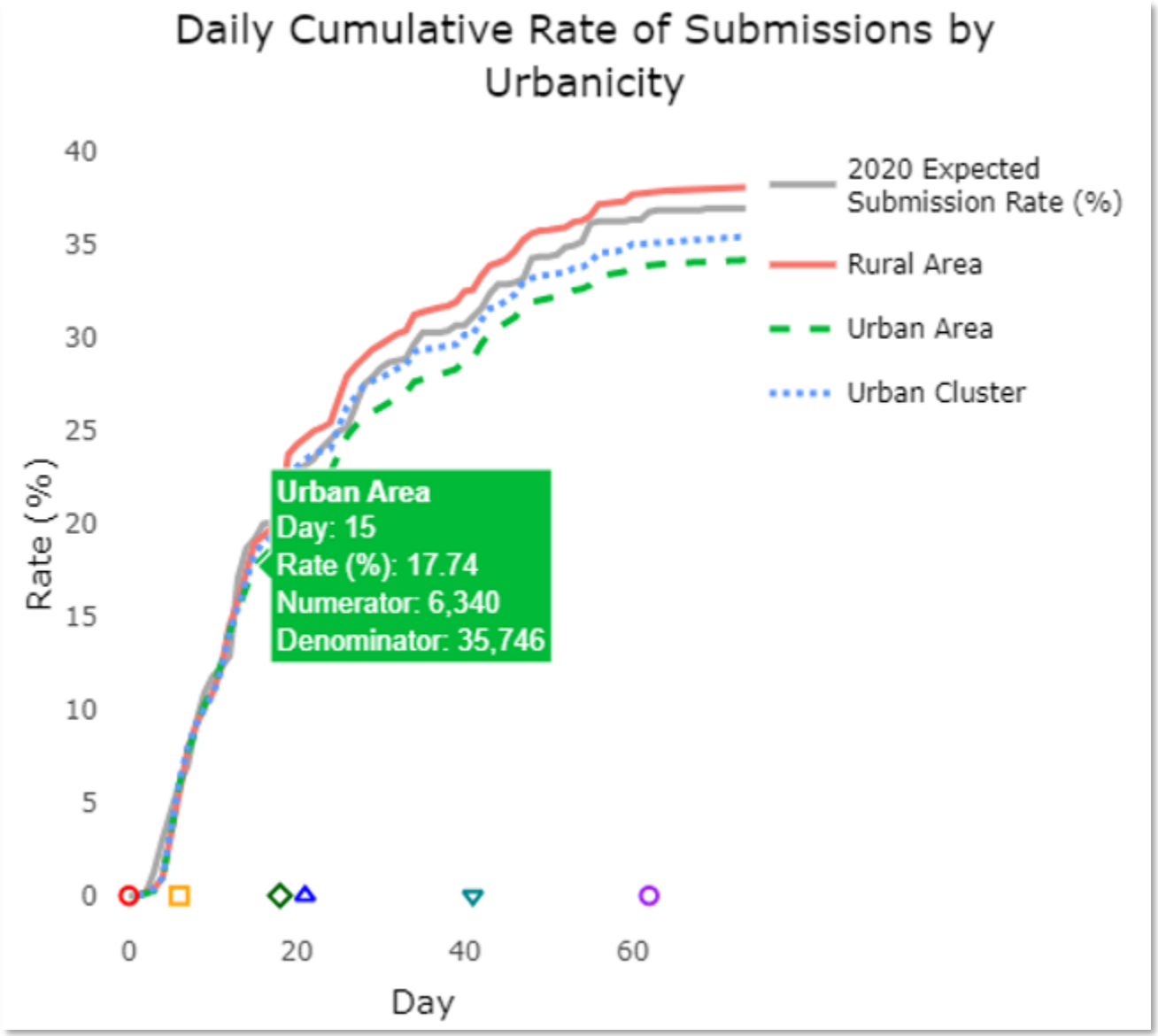


https://medium.com/@LauraHKahn/data-visualization-design-part-4-removing-chart-junk-28b3bdd0faa1

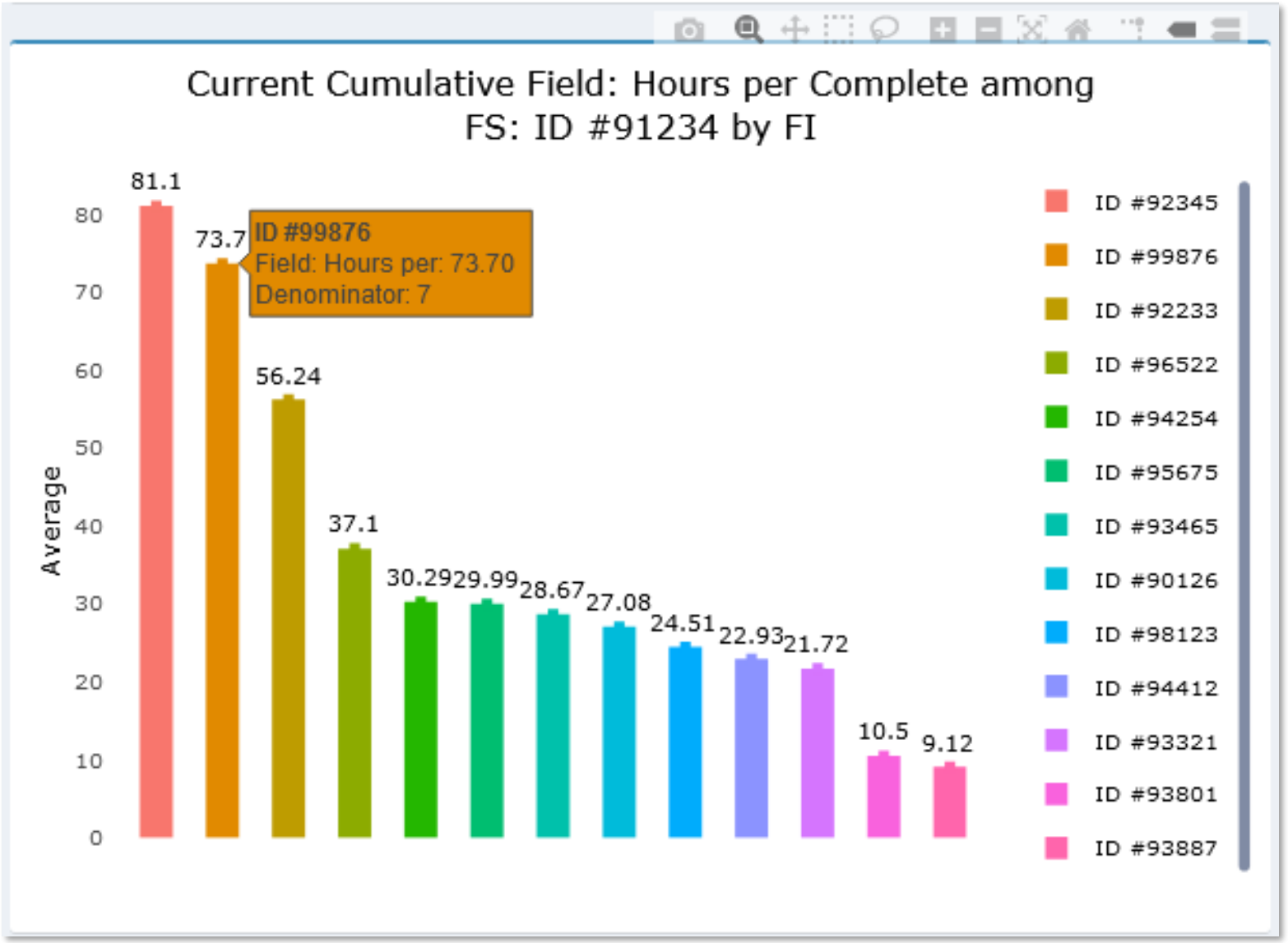
Adaptive Total Design (ATD) Dashboard Examples



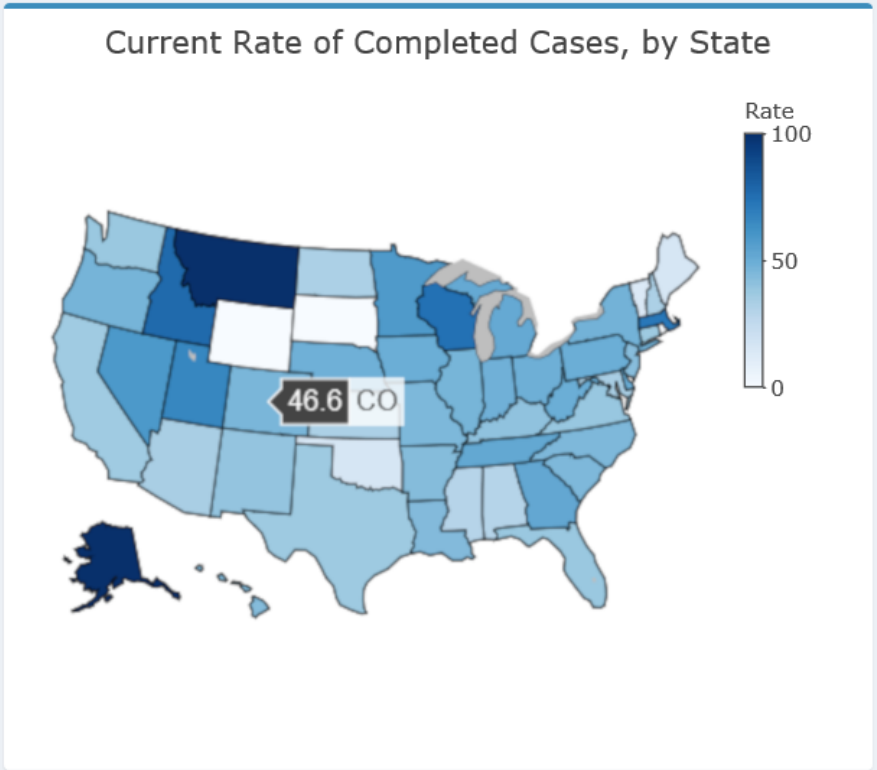
ATD Dashboard: Line view

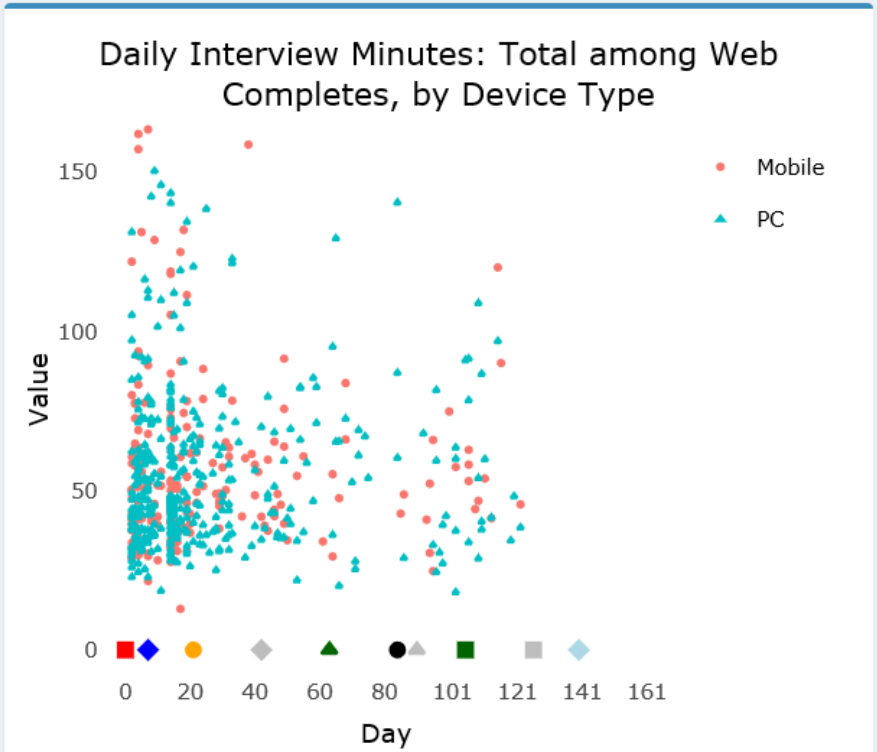


ATD Dashboard: Bar view



ATD Dashboard: Map and scatterplot views





ATD Dashboard: Table view

Daily Cumulative Rate of Cases-Final (Screener) by State

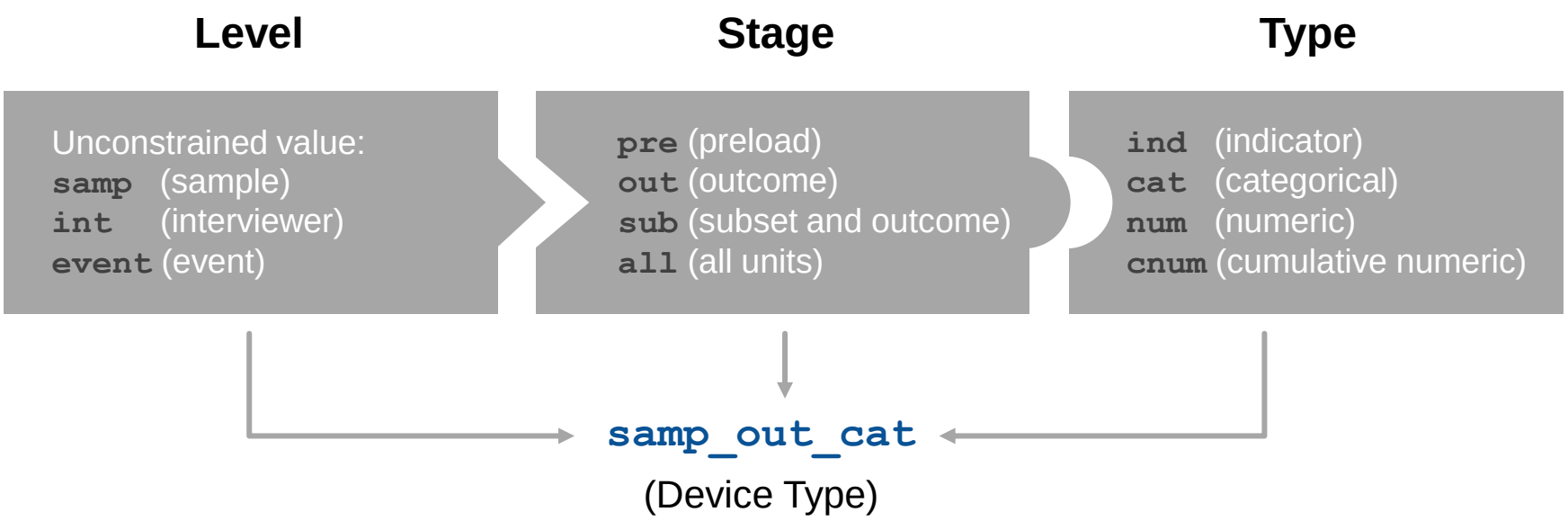
Date	Rate (%)	State
2019-07-22	1.76	AL
2019-07-23	3.04	AL
2019-07-24	4.81	AL
2019-07-25	6.25	AL
2019-07-26	7.69	AL
2019-07-27	10.10	AL
2019-07-28	10.58	AL
2019-07-29	11.06	AL
2019-07-30	12.18	AL
2019-07-31	13.14	AL
2019-08-01	15.22	AL
2019-08-02	16.99	AL
2019-08-03	19.07	AL

Assigning roles to variables

Data taxonomy

- Provides **compact attribute vocabulary**, easy to input into flat file
- Provides mechanism to limit UI selection options to **only logical combinations**
  and invoke **variable mathematical operations**
- **Mapped** to data in csv file

Type-class system



User options

Data taxonomy

UI drop-down options reactively updated to allow logical combinations, conditioned on prior selections

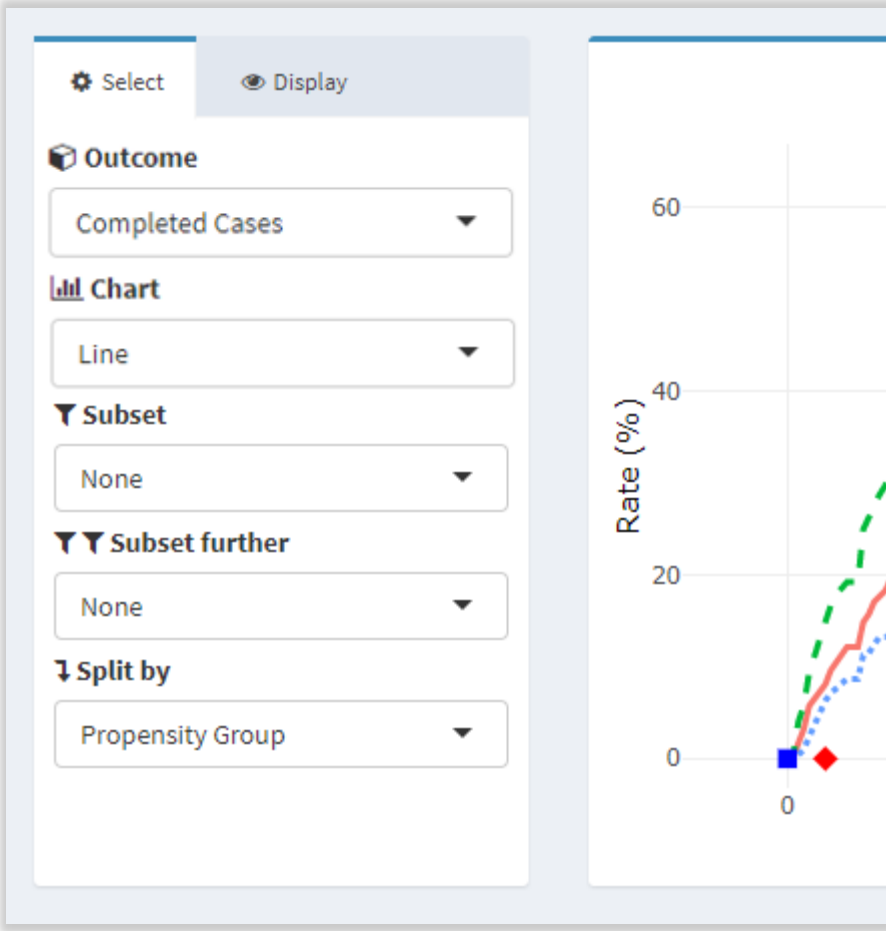
Select primary **outcome of interest** `samp_out_cat`

Choose **plot type**

Filter to **subset** (e.g., `samp_sub_ind`)

Filter to (second) **subset**

Separate outcome into categories `samp_out_cat`



Generating and automating

- Set up the folder structure for logs and output
- Generate entries for outcomes, titles, categories, etc. and store in SQL Server database
- Scheduled SAS programs aggregate and generate input file for each project daily
- Linux server copies input file to setup the visualization
- Server runs R Shiny and served using R Shiny Server & NGINX
- All dashboards run off the same version of codebase
- Customization determined through input file content
- Only RTI employees can access internal dashboards
- Secure client dashboards hosted on externally-facing web server

Summary and future directions

- The ATD Dashboard has allowed us to monitor important survey trends and make decisions to optimize later data collection periods.
- It represents a vast improvement over producing and reviewing pages of static tables where important information may go undetected.
- We hope to expand the utility of the dashboard by building in automatic alerts for the users signifying when actuals may be deviating from expectation and intervention is needed.
- We are looking to leverage the extensive R libraries available to introduce other functionality, such as county level and other maps.
- We are also enabling more frequent updates to bring the dashboard even closer to a real-time reflection of data collection progress.

Further webinaring…

- Data Visualization for Active Monitoring
  - Brad Edwards, Victoria Vignare
- I Spot a Cool Plot: A Nearly Syntax-Free Introduction to Advance Data Visualization in R for Survey Researchers and Social Scientists
  - Trent Buskirk
- Analyzing/Presenting Data/Information
  - Edward Tufte

Thank you!

Contact

Joe Murphy
jmurphy@rti.org