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Single Day Event

Powering clinical trials with intuitive analytics and dynamic data visualization

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If the information is important, it deserves to be communicated well.

- Stephen Few

Everybody wants a dashboard!

Most dashboards fail to communicate efficiently and effectively!

Why?

Gauges, meters and traffic lights- The past

Gauges, meters and traffic lights- Today

Definition

A dashboard is a visual display of the most important information needed to achieve one or more objectives that have been consolidated on a single computer screen so it can be monitored at a glance.

Monitoring process

Primary stages of monitoring information:

- Keep up to date on high-level situational awareness
- Identify and focus on particular items that need attention
- Determine whether an action is required
- If action is required, access additional information that is needed
- Take action

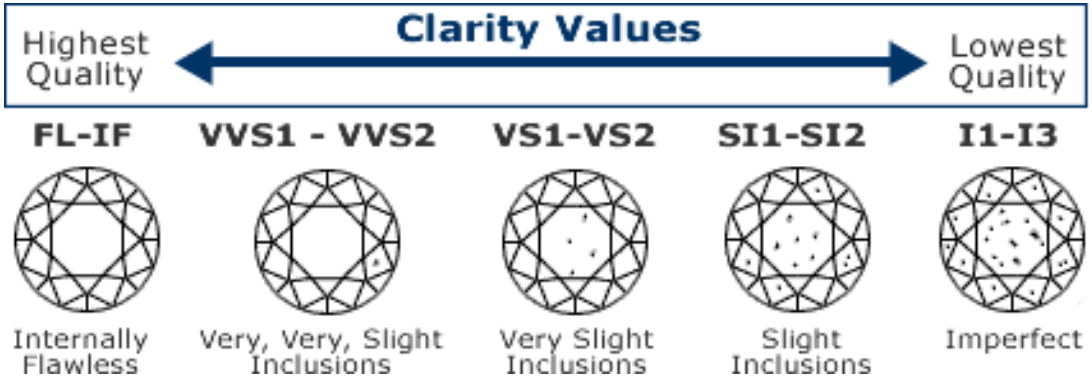
Asking the 8 Right questions!

- Have we identified the information that really matters?
- How frequently should the information be updated?
- Who will use the dashboard?
- What information will the dashboard be used to monitor?
- What questions should the dashboard answer?
- What actions will be taken in response to these answers?
- What level of summary or detail is needed?
- What are the useful comparisons that will allow you to see the information in a meaningful context?

Mispriced diamonds

Mispriced diamonds - Example

Carat	Clarity	Price
0.23	SI2	326
0.21	SI1	326
0.23	VS1	327
0.29	VS2	334
0.31	SI2	335
0.24	VVS2	336
0.24	VVS1	336
0.26	SI1	337
0.22	VS2	337
0.23	VS1	338
0.3	SI1	339
0.23	VS1	340
0.22	SI1	342
0.31	SI2	344
0.2	SI2	345
0.32	I1	345
0.3	SI2	348
0.3	SI1	351
0.3	SI1	351
0.3	SI1	351



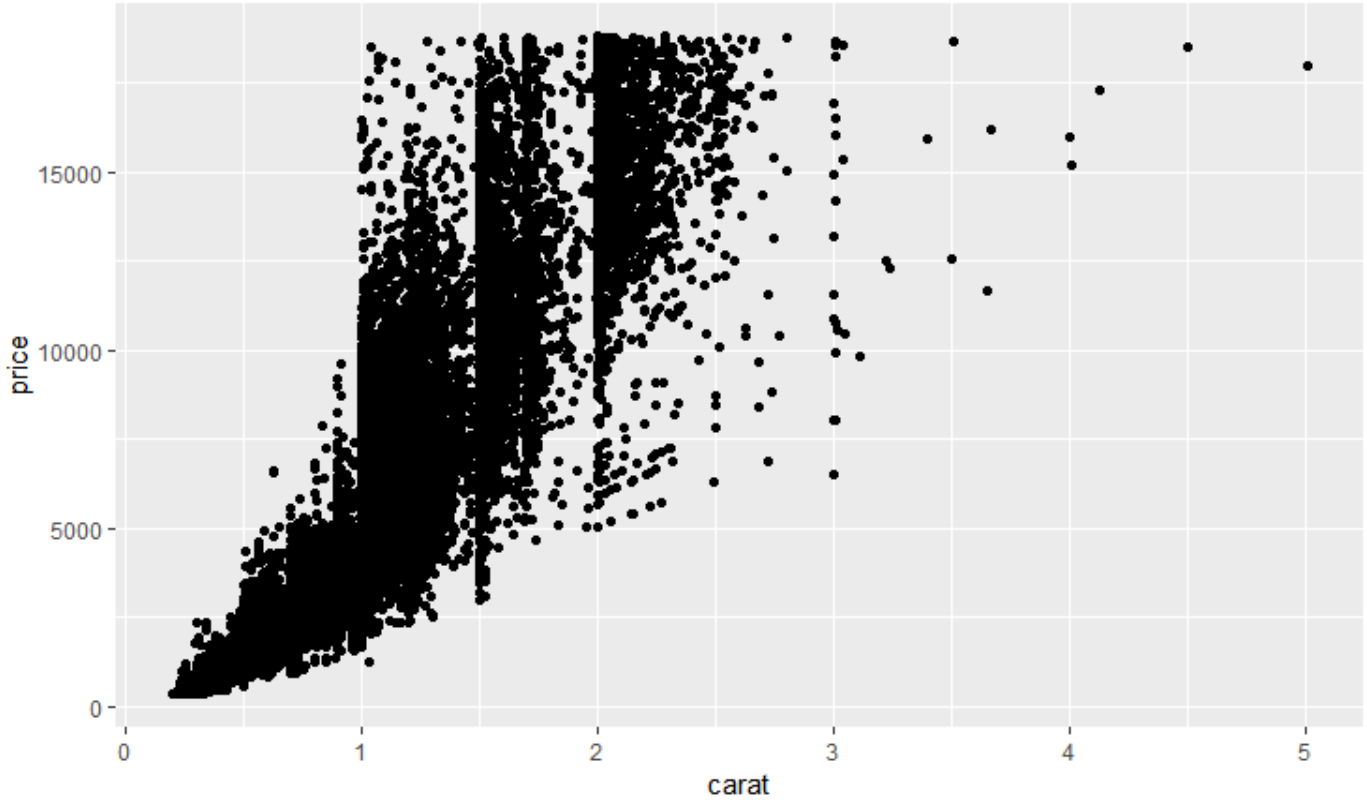
Asking the right question?

1. What is the relationship between carat and price?

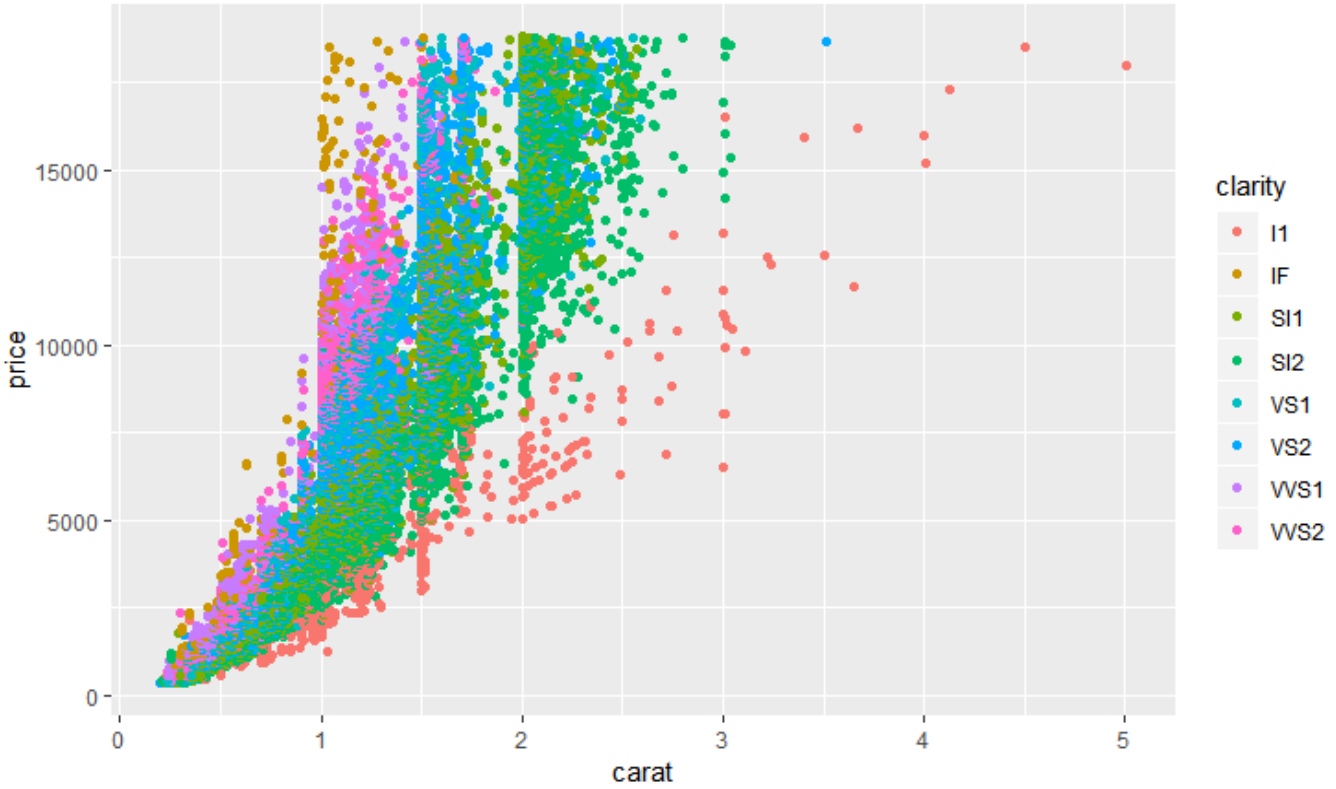
2. How much weightage the clarity have on price?

3. Where do you see common purchase trends?

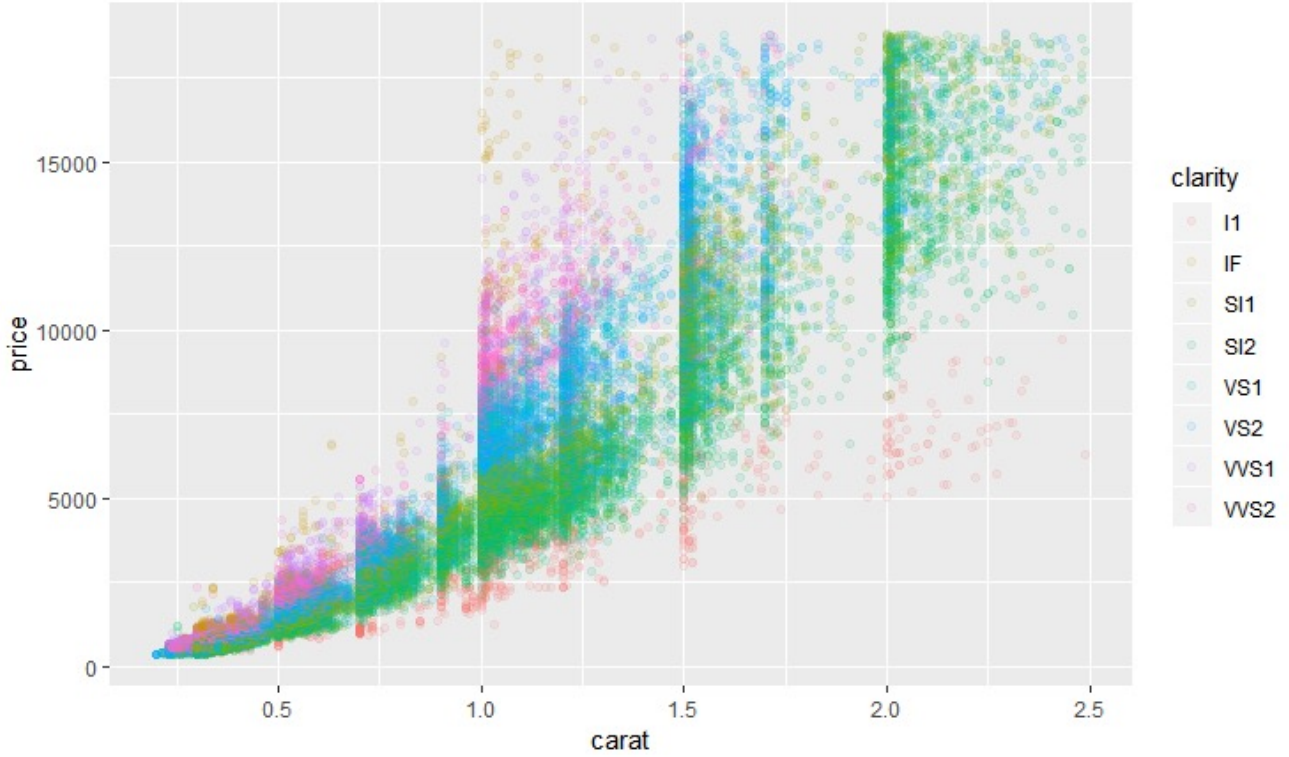
Relationship between carat & price



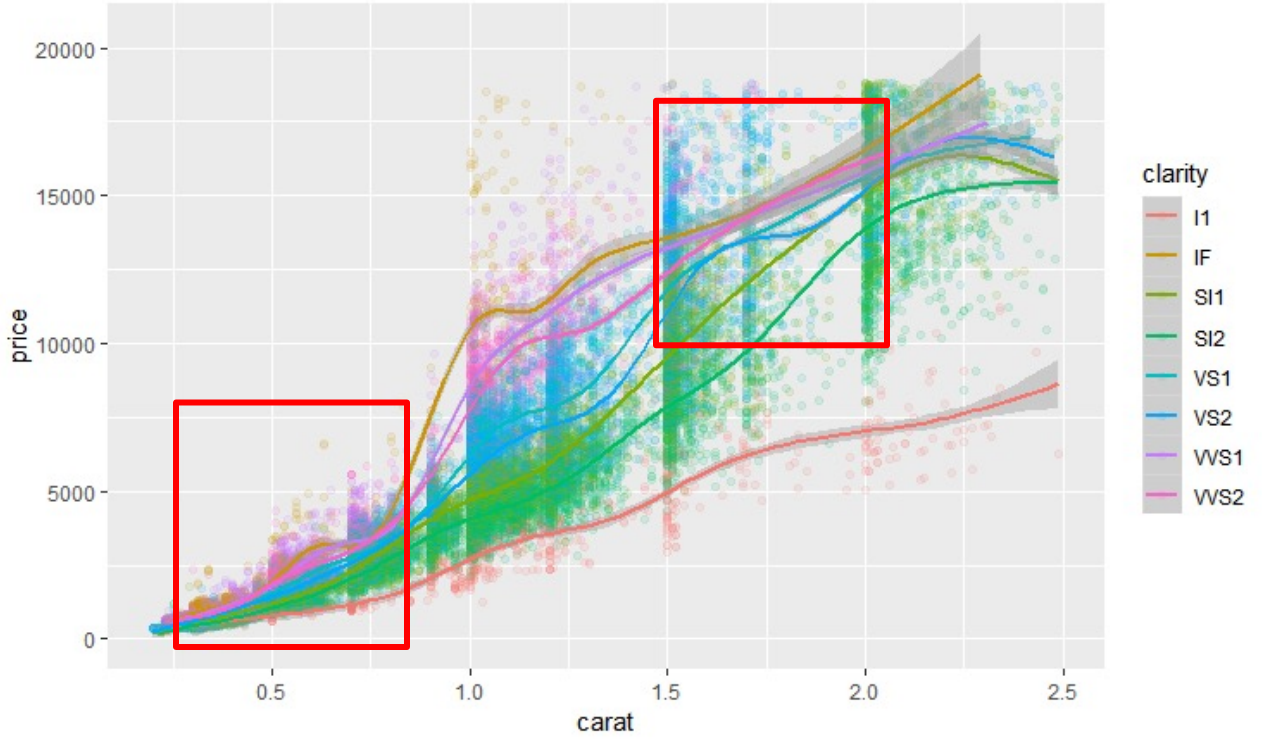
Differentiated by clarity

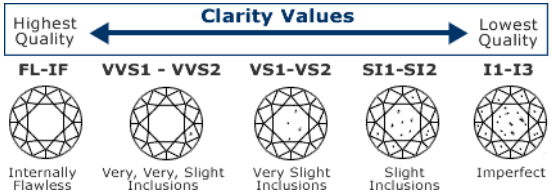


Focus on information that really matters



Does clarity make a difference between 1.5 and 2?





Quantitative relationships

"When you display quantitative information, whether you use a table or graph, the specific type of table or graph you use depends primarily on your story. Quantitative stories are always about relationships. Numbers, in and of themselves, are of no use unless they measure something that's important."

Quantitative relationships involve two types

1. **Relationship within categories**
    - Count of SAE by severity (Ordinal)
    - Count of patients recruited by site, country, region (Hierarchical)
2. **Relationship within quantities**
    - Top five sites with high SAE count (Ranking)
    - Adverse event ratio by site (Ratio)
    - Number of dropout patients vs SAE in site (Correlation)

The shift from tables & listings

Tables

Tables excel as a way to display simple relationships between quantitative values and the categorical items to which they are related.

Summary details			
SubjectID	Start Date	End Date	Event days
SDC-1001-1007	26 Jul 2012 12:00:00 AM	31 Jul 2012 12:00:00 AM	6
	02 Aug 2012 12:00:00 AM	07 Aug 2012 12:00:00 AM	6
	15 Aug 2012 12:00:00 AM	05 Sep 2012 12:00:00 AM	22
SDC-1004-1003	20 Jul 2012 12:00:00 AM	21 Jul 2012 12:00:00 AM	2
SDC-1007-1011	01 Feb 2013 12:00:00 AM	09 Feb 2013 12:00:00 AM	9
SDC-1010-1003	30 Aug 2012 12:00:00 AM	06 Sep 2012 12:00:00 AM	8
SDC-1010-1009	09 Feb 2013 12:00:00 AM	12 Feb 2013 12:00:00 AM	4
SDC-1017-1001	17 Sep 2012 12:00:00 AM	22 Sep 2012 12:00:00 AM	6
SDC-1017-1004	09 Aug 2012 12:00:00 AM	20 Aug 2012 12:00:00 AM	12
	21 Sep 2012 12:00:00 AM	27 Sep 2012 12:00:00 AM	7

Always stick to table when

- You need to look up individual values
- Comparing individual value to one another
- Precise values are required
- Both summary and detail are included.

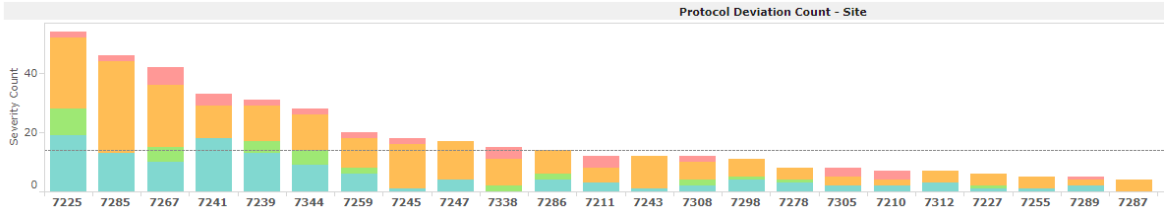
Bar | Pie | Donuts
Which is the right one for you?

The science behind data visualization

How to select the best charts for the type of data you're analyzing and the questions you want to answer?

What are the best practice recommendations for when to create these types of visualizations?

Identifying the right representation

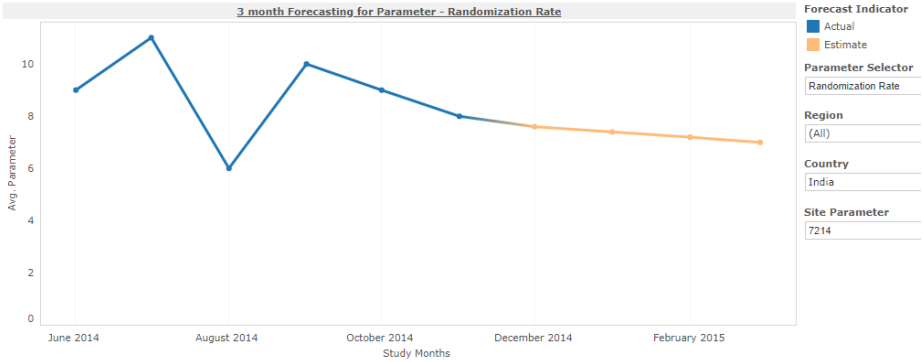


Bar charts:
Comparing data across categories

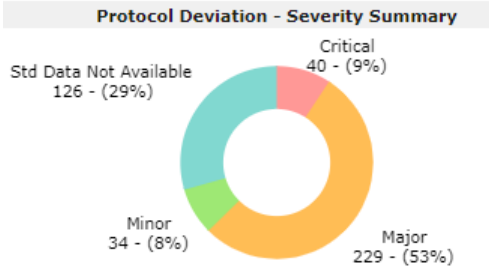
Bar charts are especially effective when you have numerical data that splits nicely into different categories, so you can quickly see trends within your data.

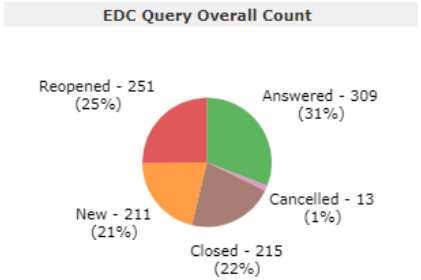
Line charts:
Viewing trends in data over time

Line charts connect individual numeric data points. Their primary use is to display trends over a period of time.



Identifying the right representation



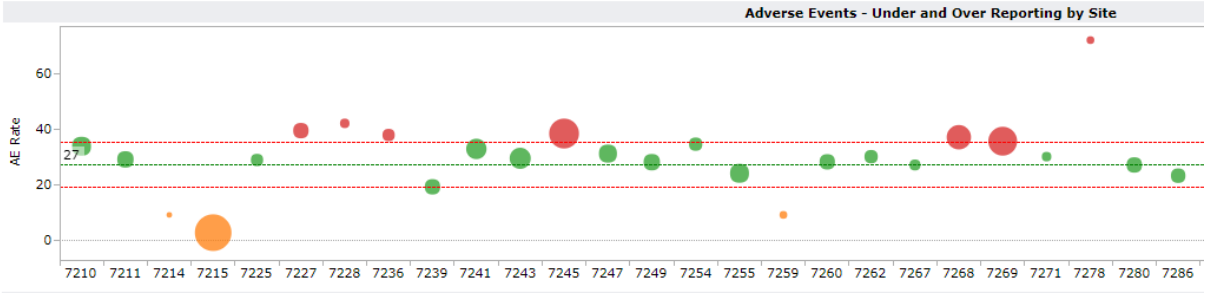


Pie and donut charts
Showing proportions

Pie charts are used to show relative proportions; however, they are the most commonly mis-used chart type.

Bubble charts
Showing the concentration of data along two axes

Bubbles are not their own type of visualization but instead should be viewed as a technique to accentuate data on scatter plots or maps.

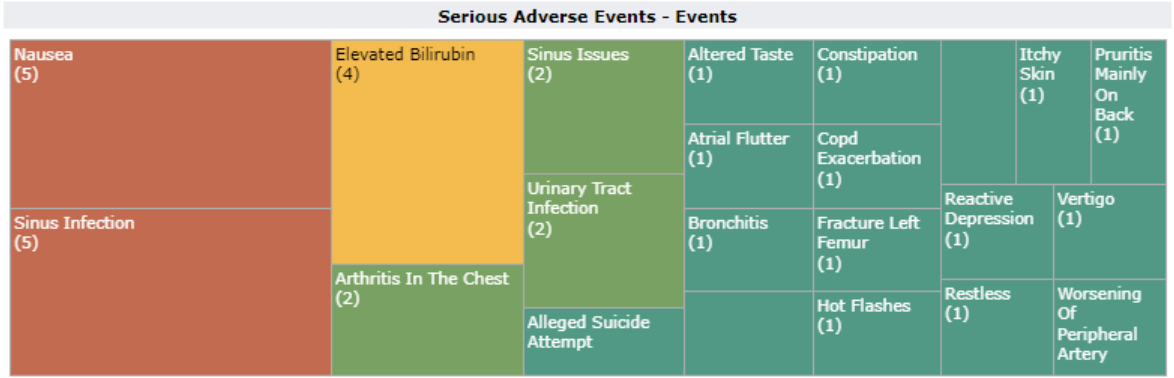


Identifying the right representation

Tree maps:

Showing hierarchical data as a proportion of a whole

These charts use a series of rectangles, nested within other rectangles, to show hierarchical data as a proportion to the whole. Through each rectangle's size and color, you can often see patterns across parts of your data, such as whether an item is relevant, even across categories.



Integrating tables and graphs- Best practices

Data communication design

As creators of visualizations and dashboards, we use all these design principles to communicate the stories

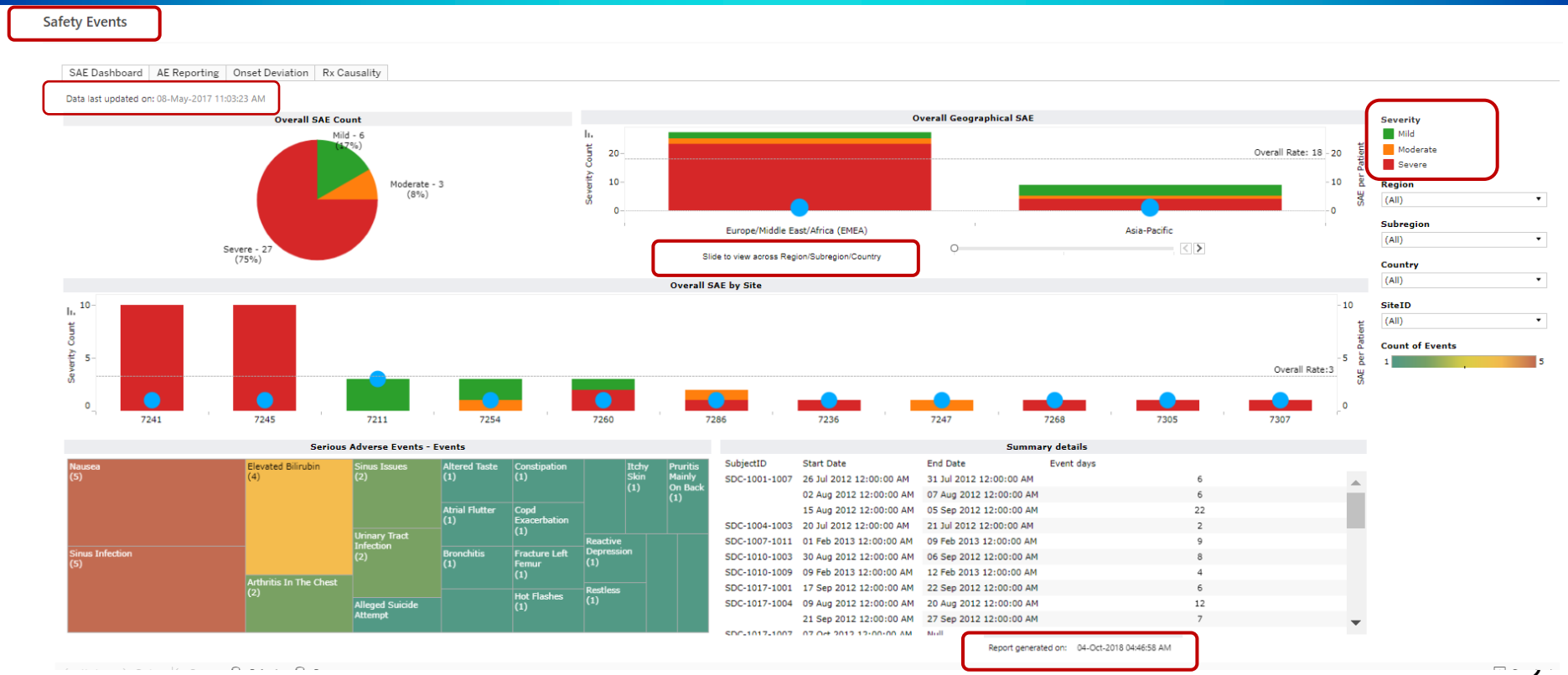
When integrating tables and graphs together, we apply two general practices of communication-oriented design to provide guided analytics:

1. **Highlight (Size, width & intensity)**
2. **Organize (Group, prioritize & sequence)**

Role of text

- To complement or enhance tables and graphs, text can
- Label
- Introduce
- Explain
- Recommend
- Highlight

Safety events dashboard



Pain points with in-house development of dashboard

Resources

- Need internal champions to drive in both business and IT fronts
- **Validation**
- Attrition in large companies also impacts the champions

Timelines

- Roughly 8 – 12 months in defining scope, assembling team, purchasing software/ infrastructure & building phase
- Roughly another 12 months in tweaking Phase 1, orienting internal users, and building phase 2

Scalability

- All investments do not scale if old source systems are changed or new source systems are added
- IT development solutions may not be aligned with Business users adoption. (Communication vs Requirements mismatch)
- Pilot teams might embrace change, but wider team implementation requires more orientation or training

Cost vs Return on investment

- Estimated internal IT Cost (Could be in $MM)
- Estimated internal resources Cost (Continuous cost until product goes live and then absorbed under projects)

Thank you!

The Global Healthcare Data Science Community

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