April 25, 2019

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MY PRIOR **PROFESSIONAL** EXPERIENCE

ACS NSQIP
NRH Northeast Rehabilitation Hospital Network
BlueCross BlueShield
MGH Massachusetts General Hospital
Anesthesia Associates, PA
New London Hospital — A Dartmouth-Hitchcock Affiliate

MY FORMAL **EDUCATION**

Dartmouth Geisel School of Medicine
University of New Hampshire
Colby-Sawyer College

MY **HOME** TEAM

Click on icon to connect!

DATA VISUALIZATION HELPS US TO SEE AND LEARN.

Done well, it's a revelation of the stories and opportunities we need to understand in order that we may improve our health and healthcare systems—and that's something I care deeply about.

HealthDataViz
See how you're doing

MY **FAVORITE** DISPLAY DEVICES

#1 | BAR CHART

What's not to love about a bar? **Bars allow us to compare values directly**, see the distribution and shape of data, easily rank results, and of course, they are always preferable to pies charts! ANYTHING you can do with a pie, you can do better with a bar. Full stop.

#2 | DEVIATION CHART

I love the simplicity of a deviation graph to **clearly convey the relative difference between values**, such as actual versus budget or goal. And they are especially helpful on summary overview dashboards.

#3 | BULLET CHART

Created by my good friend and mentor, Steve Few, Bullet Charts pack a powerful punch. They allow us to **display performance on a measure along with multiple contextual values** – all while taking up very little space. They are my kind of graph – simple and effective.

#4 | CHOROPLETH MAP

The Choropleth maps in the Dartmouth Atlas were a total game changer for my career. The **use of varying degrees of color saturation** on these types of maps make it easy to see high and low values, and consider geographic differences.

Click on **ICONS** for more information!

Books I've Co-authored

Health & Healthcare **Data** Unleashed

Ever since 2010 I have published a **free monthly guide** to understanding, presenting, and using health and healthcare data, information and evidence. Check it out and **sign up today!**

HDVizCast

Need a quick **lesson in the best practices of data visualization?** Check out my new offering "HDVizCast" a short (under 2 minutes!) video to help you up your game.

Thanks to Our Webinar Sponsor

Housekeeping

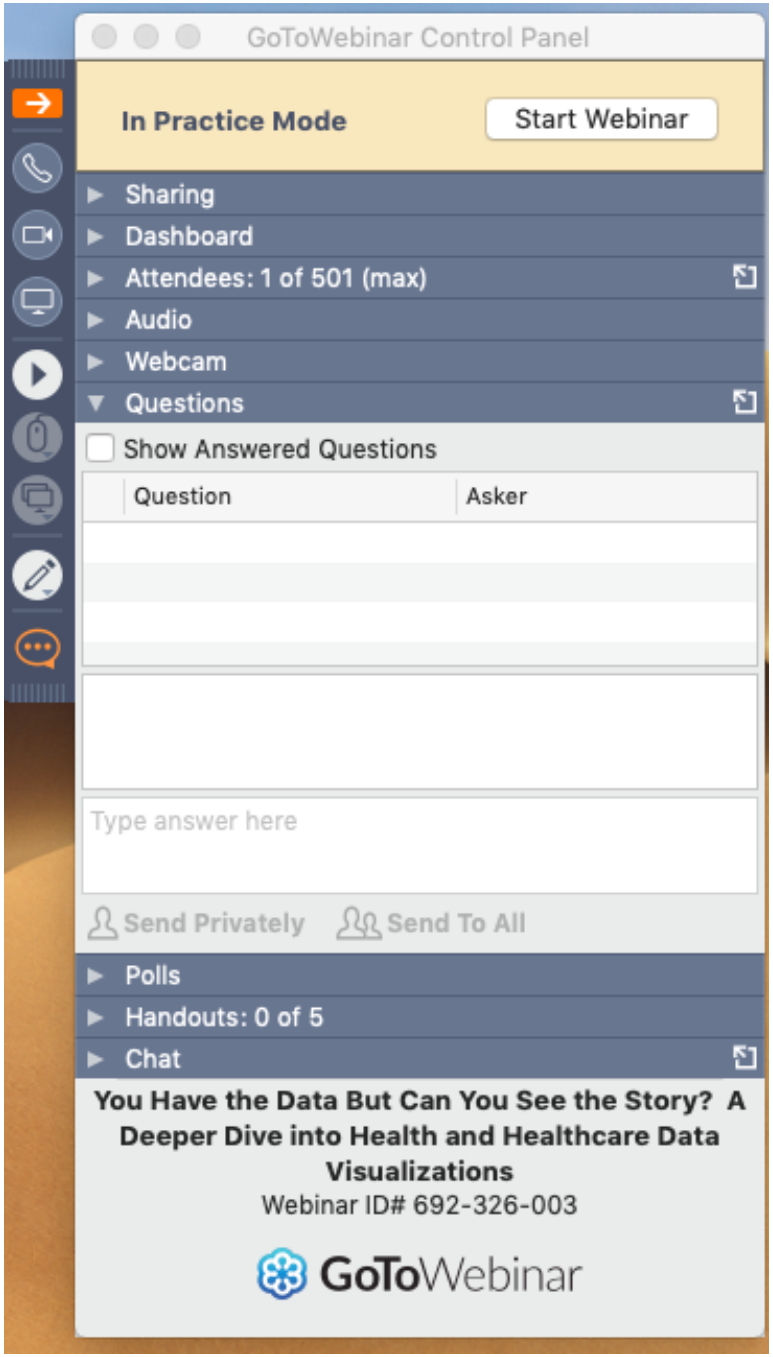
All participants will be muted during the webinar.

If you wish to ask a question, simply type it in the bottom box and hit SEND!

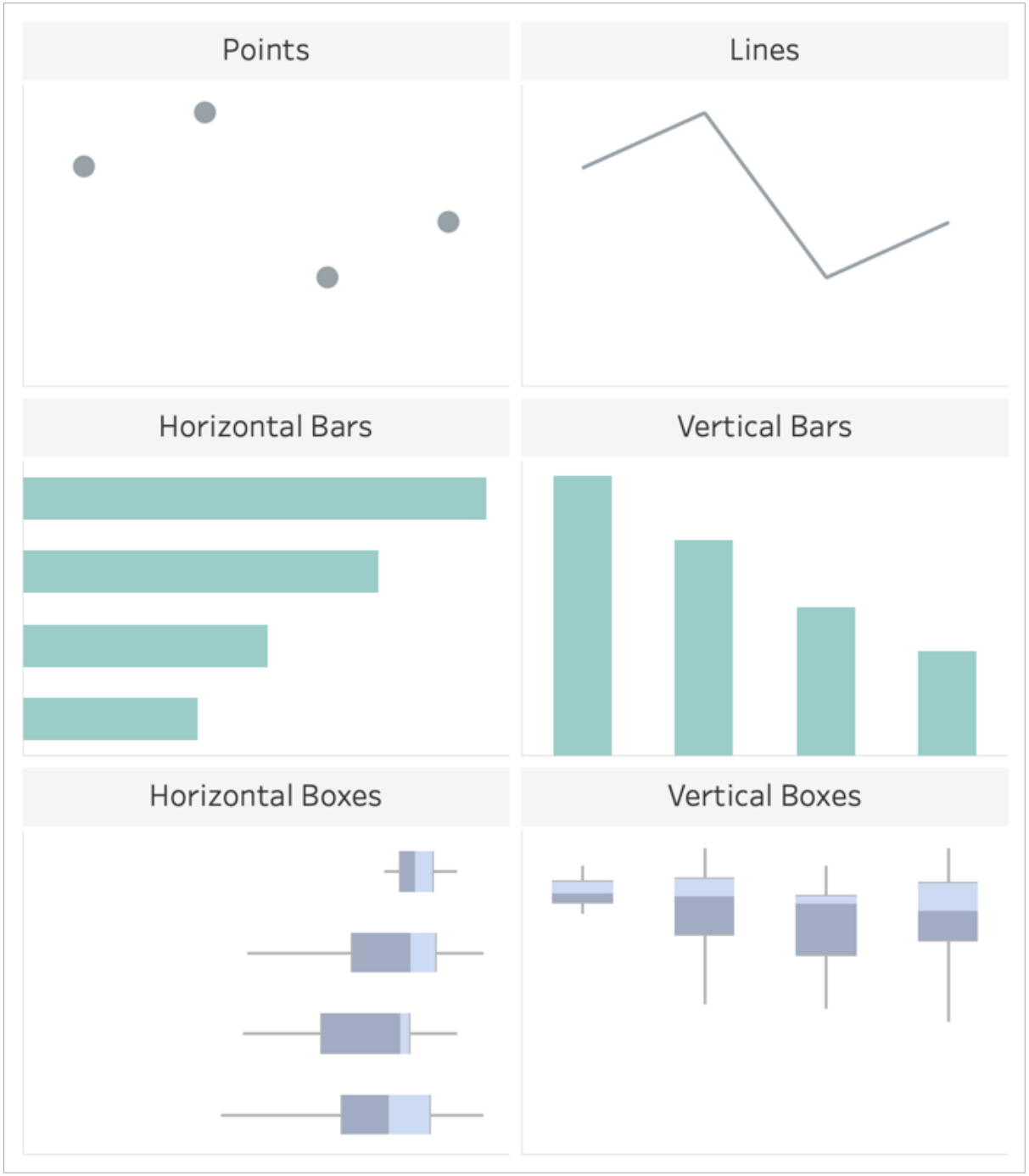
During the last 15 minutes of the Webinar we will read and answer .

At the end of this Webinar a brief survey will be launched. We value your feedback and welcome any comments you may have to help us improve future Webinars.

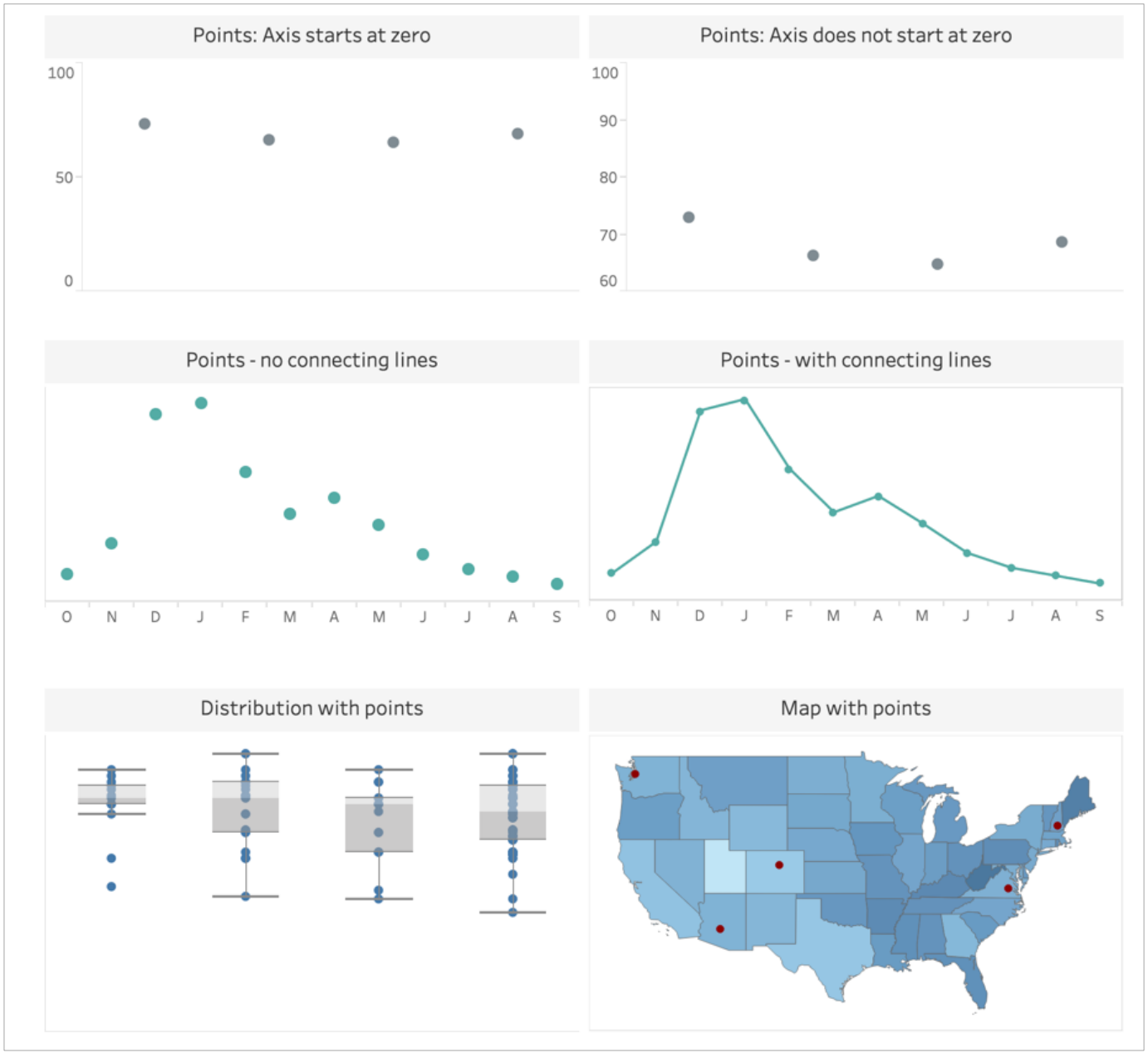
Thank you!!



Methods of Encoding Data



Points Help Us To: See and compare unique values in data



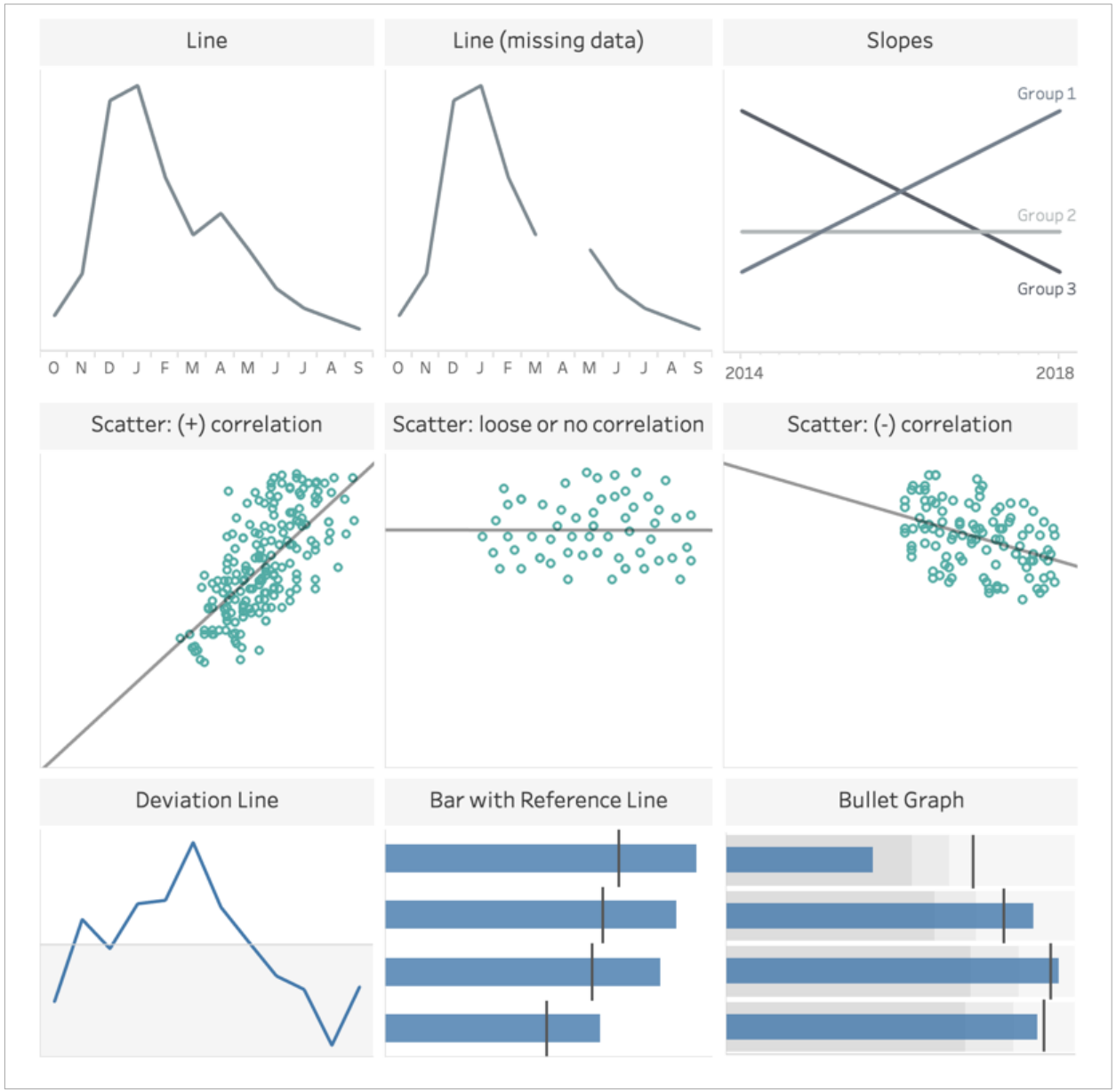
Lines Help Us To:

See changes and trends over time and gaps in data

Better see and consider possible relationships in our data, such as correlations

See relative change from a comparison over time.

Add reference values to our visualizations

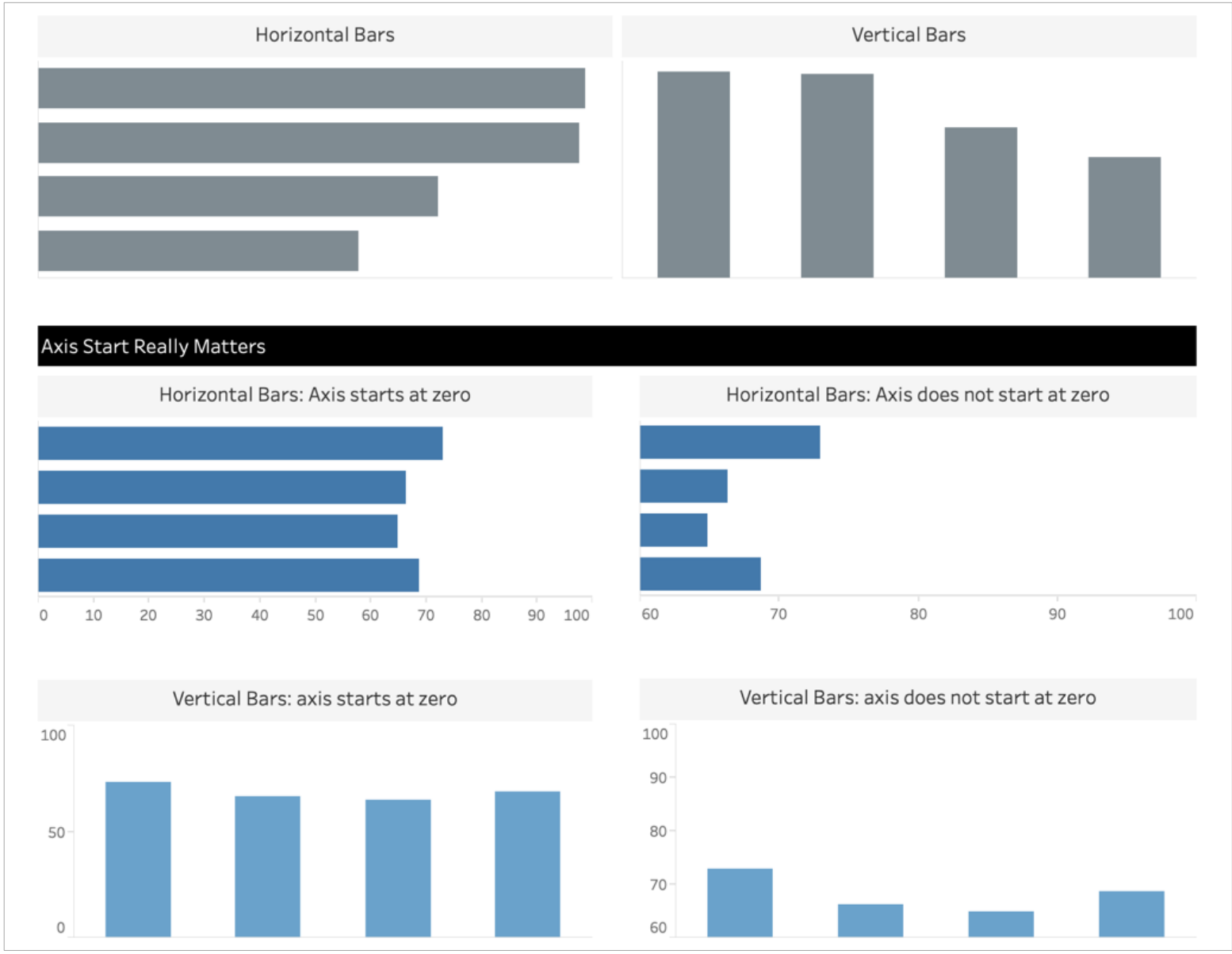


Bars:

Help us to compare values and order data, for example -- ranking

Are versatile and may be arranged either horizontally or vertically based on the overall layout of your visualization and labeling requirements

Must start at zero to correctly show how big one value is compared to another



Bars Also Help Us See:

Trends over time

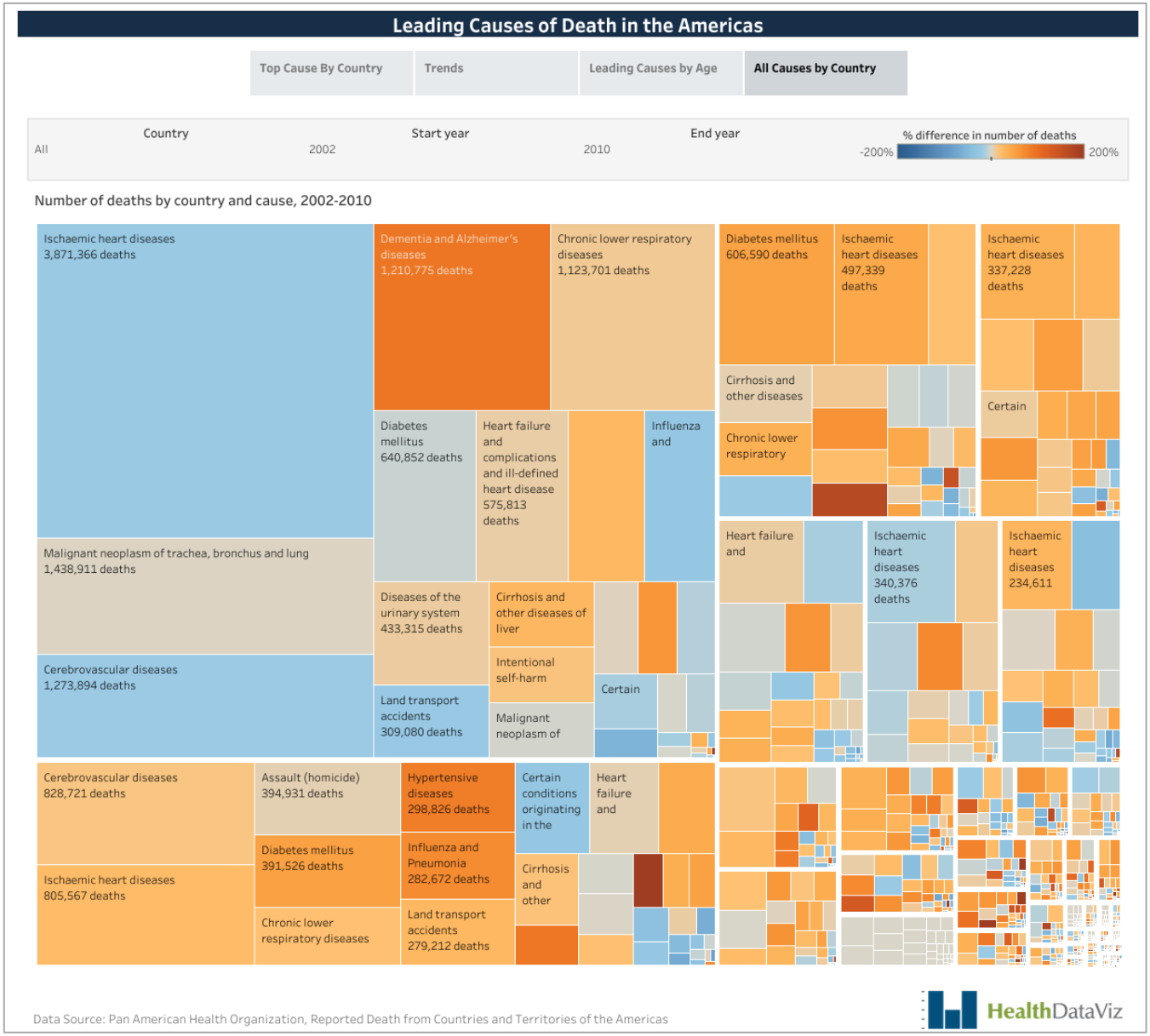
Distributions

Complex Comparisons and relative difference from a comparison

Boxes Help Us See: the distribution of data by quartiles

Boxes and Color Help Us Display:

Complex Hierarchical Data



Boxes and Color Help Us See:

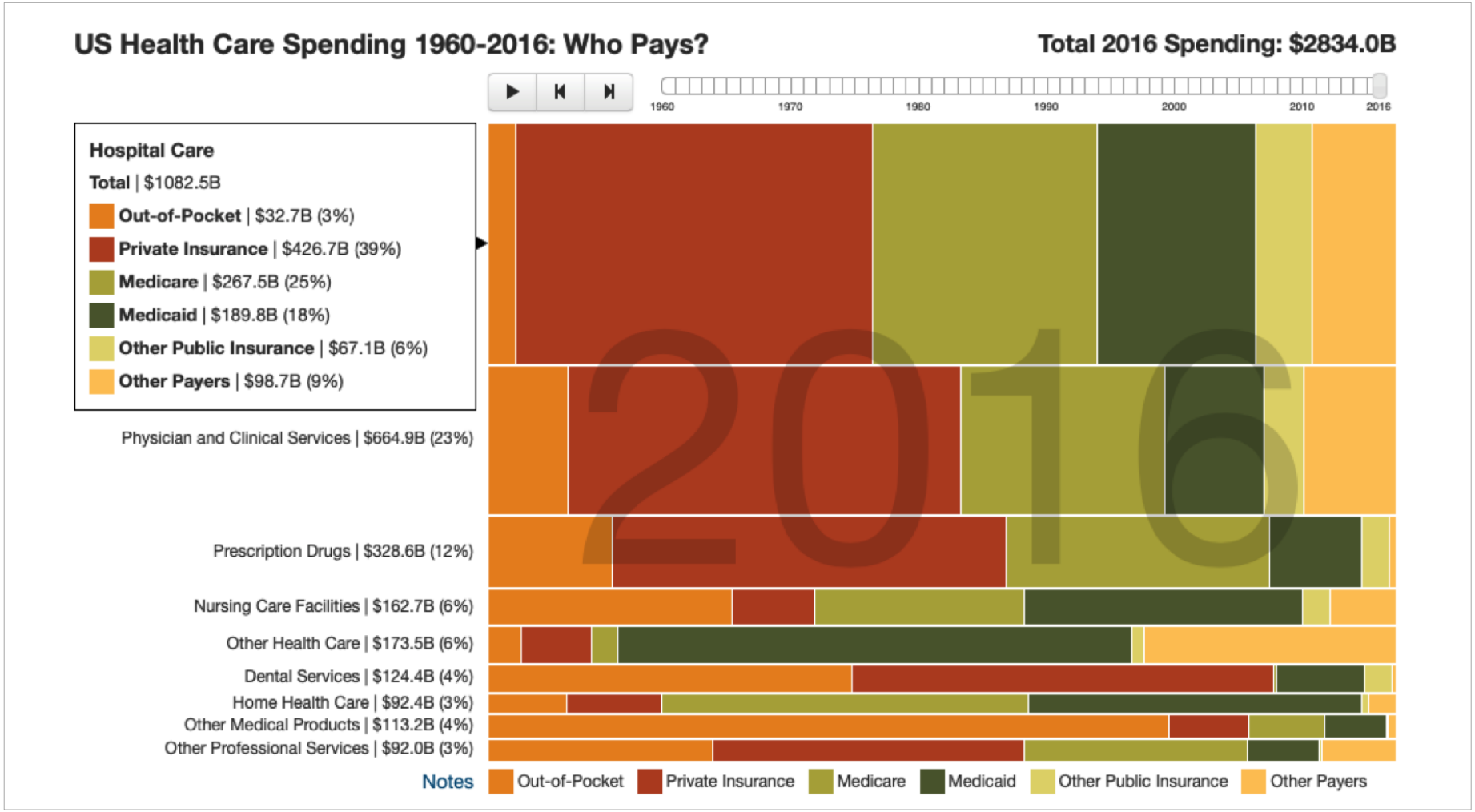
Patterns in multivariate data that can't be easily shown using bars

Select Year to Compare to 2017
2011

	Medicaid	Medicare	Other Health Insurance Programs	Other Third Party Payers	Out of Pocket	Private Health Insurance	Grand Total
Hospital Care	$193.9	$282.9	$69.6	$106.9	$33.9	$455.3	$1,142.5
Physician and Clinical Services	$75.3	$159.0	$32.3	$66.7	$60.1	$300.9	$694.3
Prescription Drugs	$33.0	$100.9	$11.0	$1.8	$46.7	$140.1	$333.5
Other Health Care	$105.9	$5.0	$2.5	$49.6	$6.5	$13.6	$183.1
Nursing Care Facilities	$50.2	$37.7	$5.4	$12.1	$44.3	$16.6	$166.3
Dental Services	$12.5	$0.9	$4.0	$0.5	$53.0	$58.2	$129.1
Other Medical	$7.9	$10.1	$0.2	$0.9	$88.1	$11.4	$118.6
Home Health	$35.0	$38.8	$0.7	$2.7	$9.0	$10.8	$97.0
Other Professional Services	$7.5	$24.7	$0.4	$7.2	$23.9	$33.0	$96.7
Grand Total	$521.2	$660.0	$126.1	$248.4	$365.5	$1,039.9	$2,961.1

What We May Like
(it looks cool so it must be good)
v.
What We Can
Understand & Explain

What we may like (and it is cool looking)..



What we can understand and explain…

2017 U.S. Healthcare Expenditures by Type and Payor

in billions

by the numbers

The U.S. spent almost $3 trillion in 2017 on healthcare. Spending on healthcare services has increased 30% over the past 6 years from 2011 to 2017.

The largest expenditure change by payor during this time period was paid by Medicaid, with an increase of 39%. In 2017, Medicaid paid $521 billion in healthcare costs.

In 2017, expenditures for Other Health Care services was $183 billion, which represents a 39% increase from 2011 to 2017.

Select Year to Compare to 2017
2011

	Medicaid	Medicare	Other Health Insurance Programs	Other Third Party Payers	Out of Pocket	Private Health Insurance	Grand Total	Percent of all 2017 Expenditures by Service Type	% Change from 2011 to 2017
Hospital Care	$193.9	$282.9	$69.6	$106.9	$33.9	$455.3	$1,142.5	38.6%	34.1%
Physician and Clinical Services	$75.3	$159.0	$32.3	$66.7	$60.1	$300.9	$694.3	23.4%	29.6%
Prescription Drugs	$33.0	$100.9	$11.0	$1.8	$46.7	$140.1	$333.5	11.3%	28.8%
Other Health Care	$105.9	$5.0	$2.5	$49.6	$6.5	$13.6	$183.1	6.2%	• **39.0%**
Nursing Care Facilities	$50.2	$37.7	$5.4	$12.1	$44.3	$16.6	$166.3	5.6%	14.4%
Dental Services	$12.5	$0.9	$4.0	$0.5	$53.0	$58.2	$129.1	4.4%	19.5%
Other Medical	$7.9	$10.1	$0.2	$0.9	$88.1	$11.4	$118.6	4.0%	24.5%
Home Health	$35.0	$38.8	$0.7	$2.7	$9.0	$10.8	$97.0	3.3%	30.0%
Other Professional Services	$7.5	$24.7	$0.4	$7.2	$23.9	$33.0	$96.7	3.3%	32.7%
Grand Total	$521.2	$660.0	$126.1	$248.4	$365.5	$1,039.9	$2,961.1		
Percent of all 2017 Expenditures by Payor Type	17.6%	22.3%	4.3%	8.4%	12.3%	35.1%			
% Change from 2011 to 2017	• **39.4%**	28.9%	33.3%	26.4%	17.9%	32.1%			

% of Total 2017 Expense
0.0% 15.4%

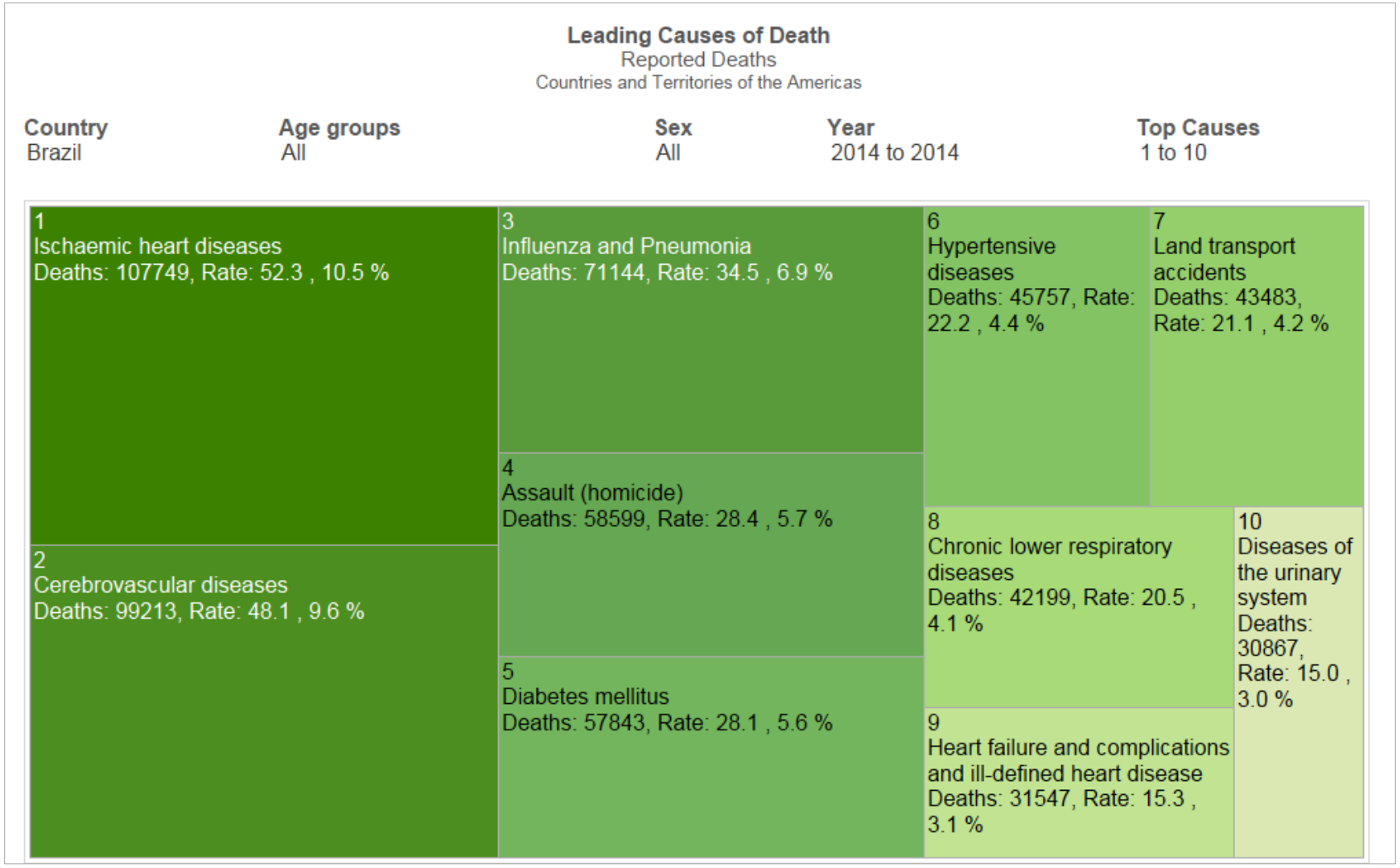
Data from CMS.gov

HealthDataViz

Understanding ***WHY***
a complex chart type was conceived
and, ***what problem it aims to solve,***
is essential to using it correctly.

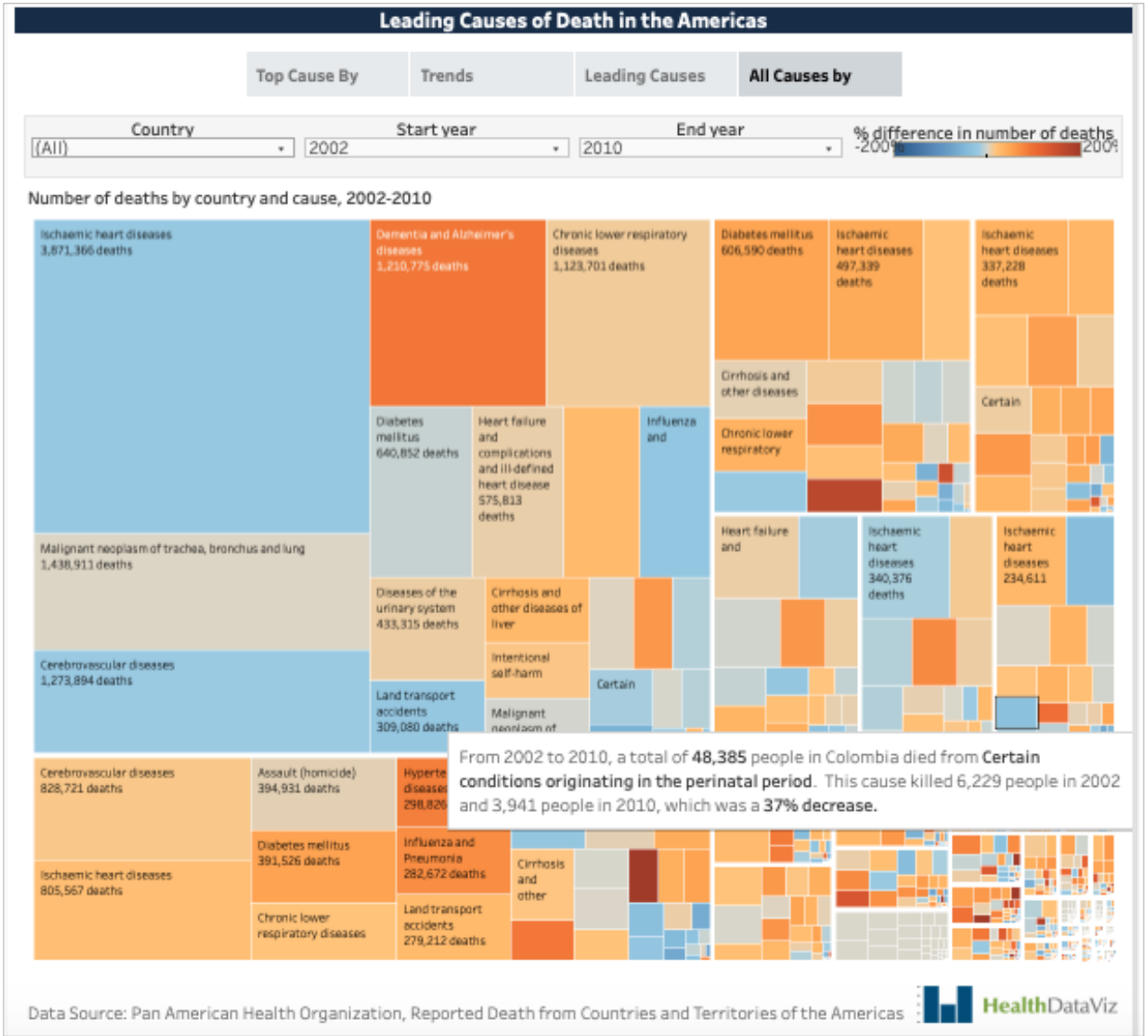
TREEMAPS (don't do this!)

Were conceived by Ben Shneiderman at the U of MD, to help display complex hierarchies of data. Not simple categorical data, such as Leading Causes of Death, displayed below, that could be displayed, and more easily understood and compared, in a bar graph.



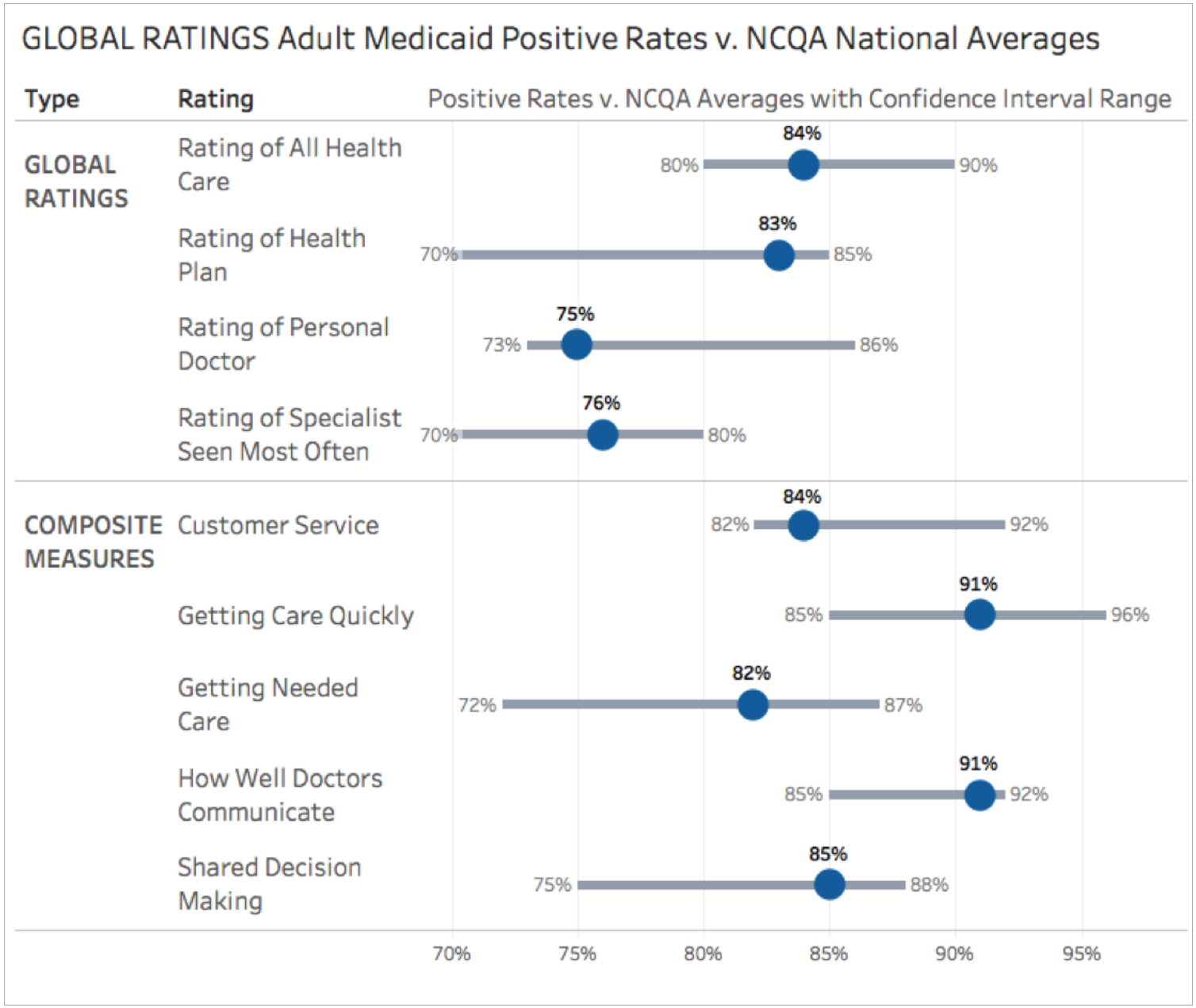
TREEMAPS (do this)

Used correctly this graph type allow us to display complex hierarchal data like that in this example. Data by country (largest boxes outlined in white, causes of death (smaller boxes) and changes in the rate per cause from one time period to another (colors and saturation).



Simple and Elegant Ways to Display Survey Results and Contextual Data

Survey Results and Confidence Intervals

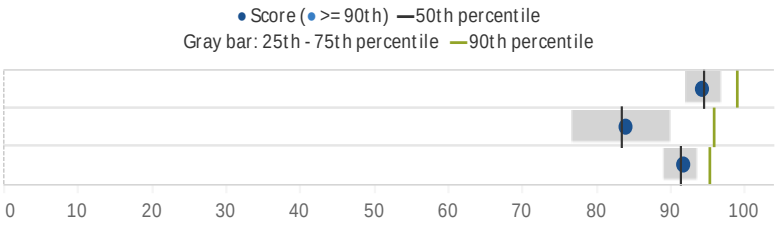


Survey Results and Comparisons

Composite results, # surveys respondents, response results (score of "Yes" answers), 25th – 75th Percentile result, groups score, 50th and 90th percentile results

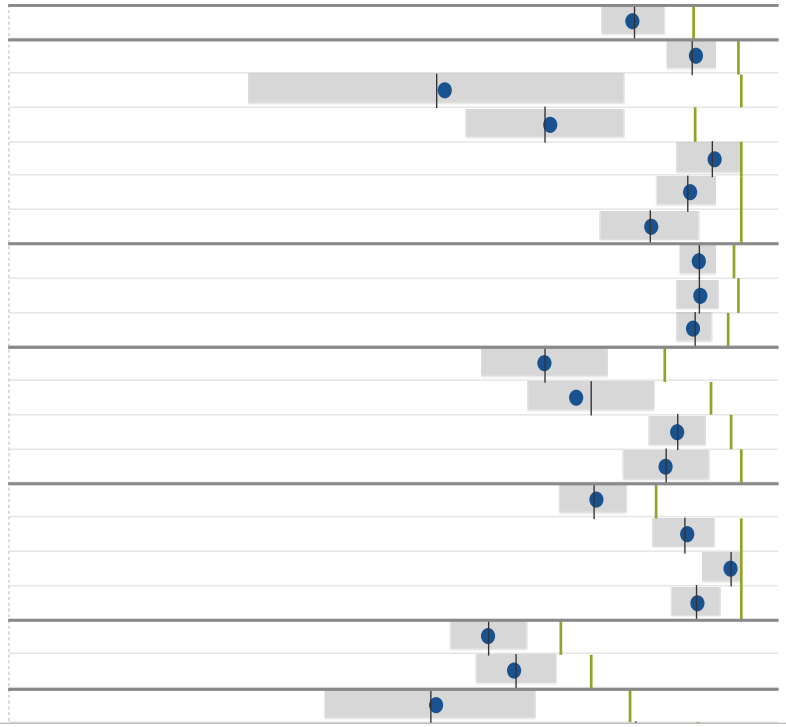
Composite Scores for All Data | weighted average of all scores (= <5 responses)

		Responses	Score
Collaborate	Response to ALL 3 questions	1,907	94
Infection Control	Response to any question	2,407	84
Integrate	Response to ALL 4 questions	1,929	92



Item Scores for All Data | weighted average of all scores (= <5 responses)

			Responses	Score
Timely Care	Q2	Response Same Day-12m	2,389	85
Infection Control	Q3	Mask Available	2,353	94
	Q4	Directed Away	2,320	60
	Q5	6 Ft from Others w/ Clean	2,349	74
	Q6	Environment- Team Wear	2,337	96
	Q7	Gown/Gloves- Techs Wear	2,321	93
	Q8	Gown/Gloves	1,968	88
Collaborate	Q9	Help Understand	1,988	94
	Q10	Listen	2,079	95
	Q11	Include You	2,068	94
Health Care Team	Q12 (a)	Ask About Mental Health	1,571	73
	Q12 (b)	Ask About Mental Health-12 Yrs Plus	1,053	77
	Q13	Seen by Team Help w/Concern	1,581	91
	Q18	Rating Overall Care	1,536	90
Integrate	Q14	Share Information	2,104	80
	Q15	Consistent Information	2,081	93
	Q16	Get Along	2,118	99
	Q17	Clear Role	2,079	94
Health Status	Q22	Overall Health	1,714	65
	Q23	Overall Mental Health	1,741	69
Treatment Benefit	Q24	Mental Health Treatment	607	58



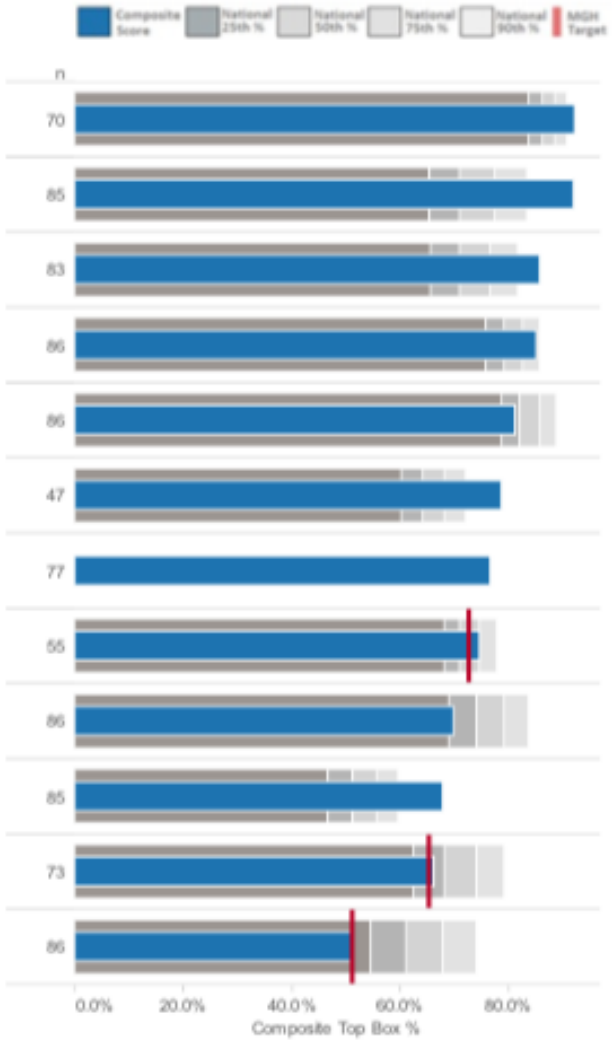
Survey Results, Comparisons and Changes Over Time

In this view we used bullet graphs to display results compared to national results by percentiles, to target for the group and a heat map to show how the survey results have changed over time.

HCAHPS Composite Top Box %

	CY 2014	YTD 2015	MGH Target	Difference to Target
Discharge Information	91.7%	92.0%		
Recommend Hospital	89.9%	91.8%		
Overall Hospital Rating	80.0%	85.5%		
Nurse Communication	82.1%	84.9%		
Doctor Communication	81.7%	81.2%		
Medication Communication	66.0%	78.4%		
MGH Rounding Question	77.1%	76.6%		
Pain Management	71.8%	74.5%	72.5%	2.0%
Room Cleanliness	72.1%	69.8%		
Care Transitions	59.9%	67.7%		
Staff Response	64.0%	66.1%	65.2%	0.9%
Quiet at Night	49.6%	51.2%	51.2%	0.0%

HCAHPS CYTD vs. Target and National %



Top Box % Quarter to Quarter Change

	Q2 2013	Q3 2013	Q4 2013	Q1 2014	Q2 2014	Q3 2014	Q4 2014	Q1 2015
Discharge Information	92.5%	91.2%	92.9%	92.4%	91.7%	91.1%	91.4%	92.0%
Recommend Hospital	91.1%	90.5%	90.3%	90.5%	89.5%	89.7%	89.7%	91.8%
Overall Hospital Rating	80.3%	82.0%	82.2%	80.7%	80.1%	79.7%	79.4%	85.5%
Nurse Communication	81.2%	83.4%	82.8%	82.3%	83.3%	81.4%	81.4%	84.9%
Doctor Communication	82.8%	82.4%	83.5%	81.8%	82.5%	81.3%	81.0%	81.2%
Medication Communication	65.9%	65.8%	66.8%	66.8%	67.7%	65.5%	63.3%	78.4%
MGH Rounding Question							77.1%	76.6%
Pain Management	72.9%	72.3%	73.4%	73.3%	72.8%	70.4%	70.3%	74.5%
Room Cleanliness	74.7%	75.5%	74.5%	72.5%	74.5%	72.1%	69.1%	69.8%
Care Transitions	63.0%	61.2%	61.7%	59.5%	60.5%	60.4%	58.8%	67.7%
Staff Response	65.8%	64.5%	65.9%	63.1%	65.0%	63.9%	63.8%	66.1%
Quiet at Night	51.1%	51.2%	49.7%	49.2%	49.8%	49.1%	50.5%	51.2%

Change from previous quarter

-2.9% 15.0%

Meet the viewer where they are

Action & Impact Level			Question	Top Box % FYTD vs. ____ Target	Difference to Target	Top Box % Rolling 8 Completed Quarter (16 Q3, 16 Q4, 17 Q1, 17 Q2, 17 Q3, 17 Q4, 18 Q1, 18 Q2)
OVERALL			**Using any number from 0 to 10, where 0 is the worst provider possible and 10 is the best provider possible, what number would you use to rate this provider?**	87.8%	0.1%	86.0% … 88.3%
				vs. Overall 75th Percentile		
FOCUS ON IMPROVING	HIGH IMPACT	!	Did this provider give you easy to understand information about these health questions or concerns?	94.4%	-2.0%	92.8% … 94.7%
		!	Did this provider seem to know the important information about your medical history?	87.0%	-3.6%	87.4% … 87.3%
		!	Did this provider spend enough time with you?	92.3%	-3.5%	90.5% … 92.8%
	MEDIUM IMPACT	!	Did this provider explain things in a way that was easy to understand?	94.1%	-2.0%	92.3% … 94.4%
		!	Did this provider listen carefully to you?	94.7%	-2.0%	93.1% … 95.1%
	LOW IMPACT	!	Did this provider show respect for what you had to say?	95.3%	-2.1%	94.5% … 95.7%
			Would you recommend this provider's office to your family and friends?	92.8%	-2.5%	91.3% … 92.8%

FOCUS ON IMPROVING indicates areas that affect our Goal for Overall Rating of Provider where improvement is needed to meet our benchmark.

KEEP DOING indicates areas that affect our Goal for Overall Rating of Provider where our benchmarks were met.

Dashboards Defined

A dashboard is a visual display

of

the most important information needed to achieve one or more objectives

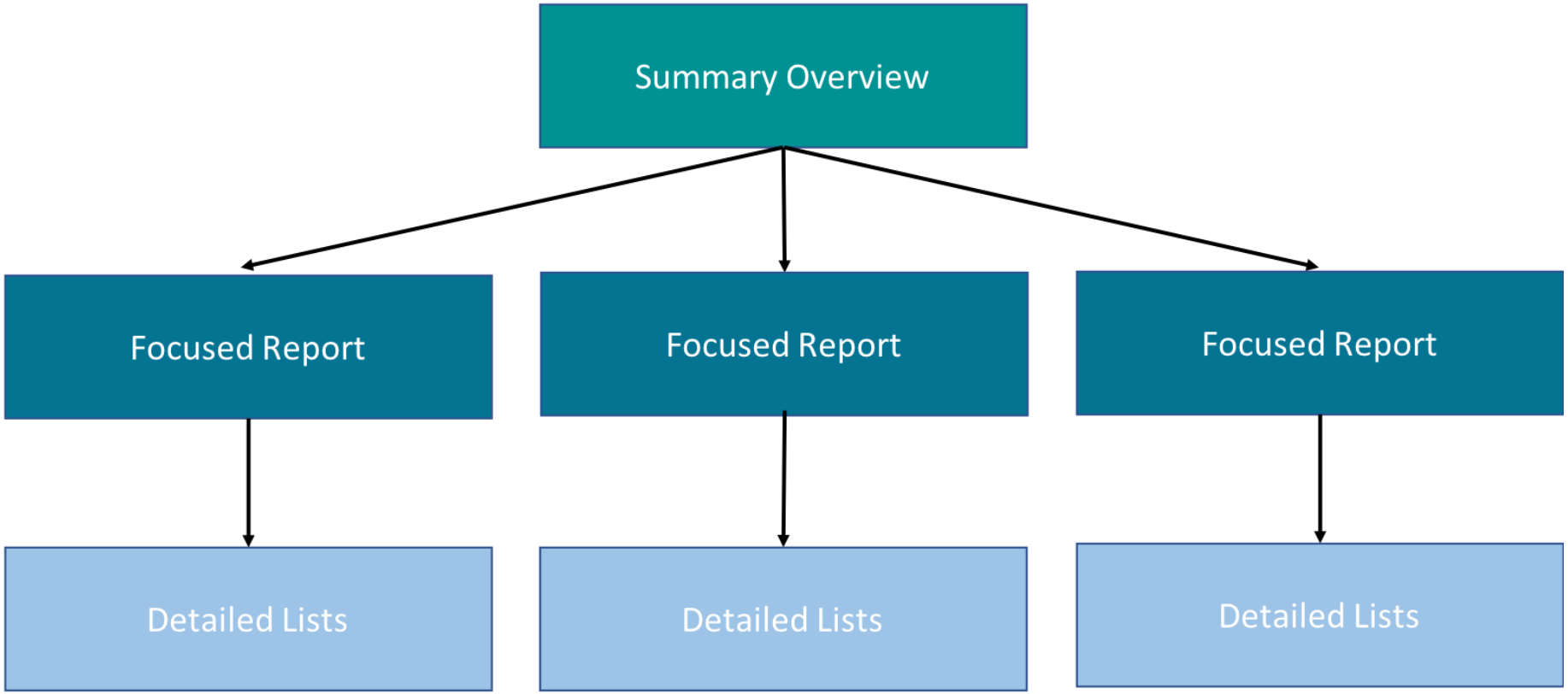
that has been

consolidated on a single computer screen

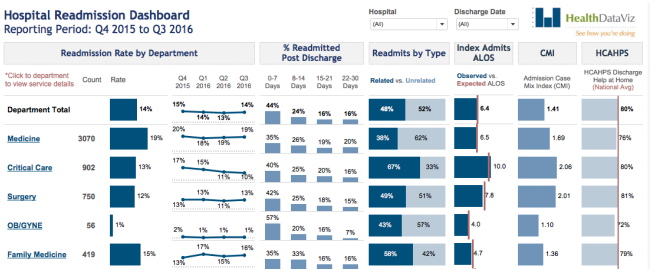
so it can be

monitored at a glance

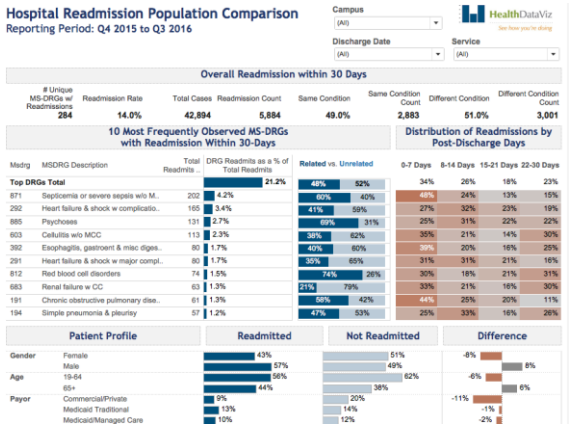
Guided Analytics Framework



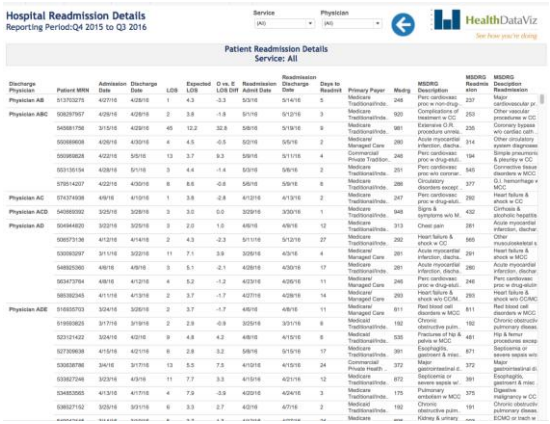
30-Day All Cause Readmissions



SUMMARY OVERVIEW



FOCUSED SUPPORTING REPORT



DETAILS ON DEMAND

Summary Overview Hospital Readmissions Dashboard

Hospital Readmission Dashboard
Reporting Period: Q4 2015 to Q3 2016

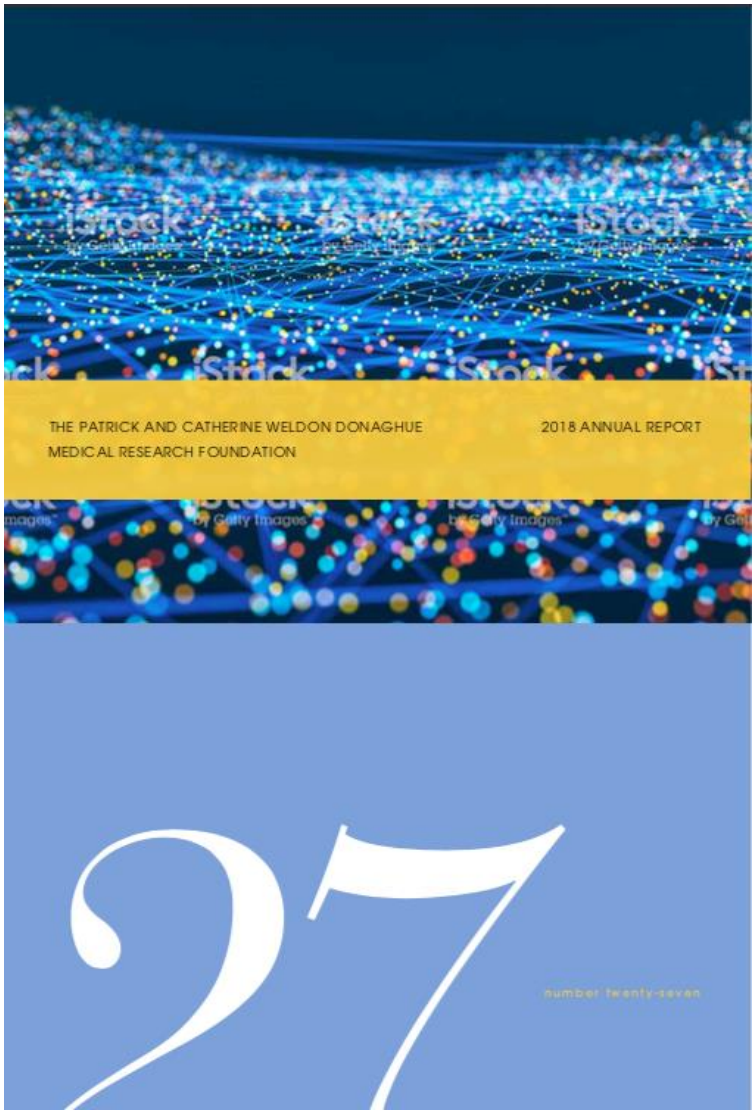
Hospital: (All)
Discharge Date: (All)

HealthDataViz
See how you're doing

	Readmission Rate by Department						% Readmitted Post Discharge				Readmits by Type		Index Admits ALOS		CMI	HCAHPS
*Click to department to view service details	Count	Rate	Q4 2015	Q1 2016	Q2 2016	Q3 2016	0-7 Days	8-14 Days	15-21 Days	22-30 Days	Related vs. Unrelated		Observed vs. Expected ALOS		Admission Case Mix Index (CMI)	HCAHPS Discharge Help at Home (National Avg)
Department Total		14%	15%	14%	13%	14%	44%	24%	16%	16%	48%	52%	6.4		1.41	80%
Medicine	3070	19%	20%	18%	19%	19%	35%	26%	19%	20%	38%	62%	6.5		1.69	76%
Critical Care	902	13%	17%	15%	11%	10%	40%	25%	20%	16%	67%	33%	10.0		2.06	80%
Surgery	750	12%	13%	13%	11%	13%	42%	25%	18%	15%	49%	51%	7.8		2.01	81%
OB/GYNE	56	1%	2%	1%	1%	1%	57%	20%	16%	7%	43%	57%	4.0		1.10	72%
Family Medicine	419	15%	13%	17%	15%	16%	35%	33%	16%	16%	58%	42%	4.7		1.36	79%

Public Displays (Loosening up -- *just a bit!*)

Donaghue Foundation 2018 Annual Report



Greater Value Portfolio Research Spotlight

INCORPORATING QUALITY OF CARE INFORMATION INTO A TIERED COST-SHARING HEALTH INSURANCE BENEFIT

Bryan Dowd, PhD, University of Minnesota

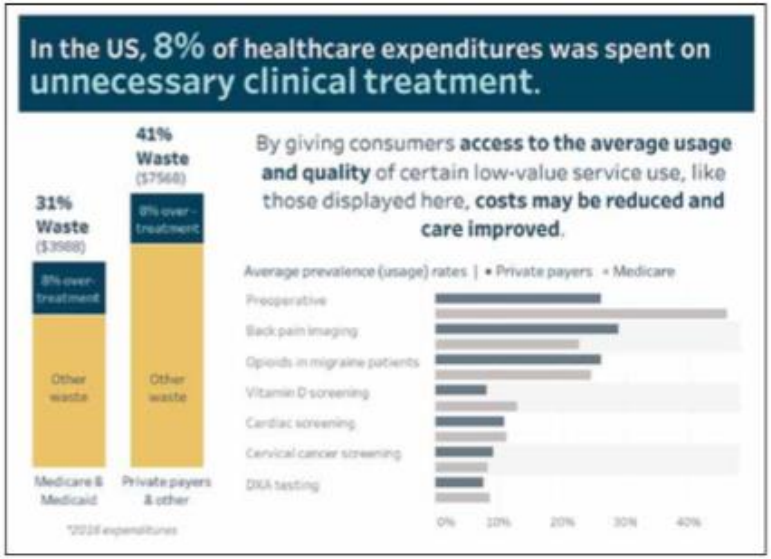
Contribution to Improved Value
Test models of care and coverage that address current financial disincentives for systemic change

About This Project
This study will develop and test ways to present data on both quality of care and cost to employees choosing among primary care clinics. The two-year award is for $367,659. Dr. Dowd and his research team are partnering with the Minnesota State Employees Group Insurance Program (SEGIP).

The Problem
Currently it is difficult for consumers to compare both the quality and the expected cost of care when choosing among primary care clinics. Economists cite this lack of comprehensive cost and quality data, presented in a useful way to consumers, as one of the primary causes of inefficiency in the U.S. health system — i.e., our inability to maximize quality at any level of health care spending.

Project Approach
Quality measures such as ambulatory care sensitive admissions, avoidable emergency department visits, potentially preventable rehospitalizations, and low-value care will be developed using claims data and quality information from state and federal agencies. Interviews also will be conducted with health care providers, health plan administrators, and union leadership to understand the best ways to present and use these quality measures.

Translating Research into Practice
Minnesota SEGIP has a national reputation for successfully using tiered cost-sharing system for primary care clinics. Adding quality data will be of interest to other employee groups. The results of this project will be shared with employers, health plans, policymakers, and academicians through in-person presentations, research briefs, policy memoranda, and articles in the peer reviewed academic literature.



Greater Value Portfolio Research Spotlight

IMPACT OF A MULTIFACETED EARLY MOBILITY INTERVENTION ON OUTCOMES AND ICU-MORBIDITIES IN CRITICALLY ILL CHILDREN

Sapna R. Kudchakar, MD, PhD, Johns Hopkins University

Contribution to Improved Value
Value refers to both how much we pay and, just as importantly, the outcomes we get for that cost.

About this project
The goal of this project is to determine the impact of an early mobility program on children in ICUs and assess facilitators and barriers to its wider implementation. The two-year award is for $443,448. The partnering organizations are four tertiary-care pediatric ICUs of diverse size, setting, and geographic location.

The Problem
Although mortality in pediatric ICUs has decreased, long-term ICU stays are associated with longer immobility, heavier sedation, and insufficient delirium prevention that increase ICU-acquired morbidities and hospital lengths of stays.

Project Approach
A pilot study of a multi-intervention program to promote early mobility, efficient sleep, and delirium prevention had positive results for safety and feasibility. This study will assess patient-level clinical outcomes and facility-level success in implementing the program more broadly and with

Translating Research into Practice
In addition to traditional scholarly dissemination, translation approaches include developing key messages for stakeholders and other researchers from the partnering organizations, summaries in lay language about the benefits of an early mobility program for families, and a set of summaries, tools and resources for clinicians.

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ASSESSING TOXICITY AND ADHERENCE OF ORAL CANCER THERAPY WITH ELECTRONIC PATIENT REPORTED OUTCOMES (EPROS)

Nadine Jackson McCleary, MD, MPH, Dana-Farber Cancer Institute

Contribution to Improve Value

This project studies the impact of systematic electronic patient reported data to improve outcomes for patients receiving oral anticancer therapy as part of routine clinical practice in a large oncology academic and community practice.

About this project

This study will leverage cancer informatics to improve oral chemotherapy treatment outcomes, increase treatment adherence, and manage toxicity. The goal is to develop the tools needed for the oral cancer therapy monitoring system; conduct a pilot implementation at the point of care and between visits; and assess clinician and patient engagement, and overall impact of the program for better outcomes. The two-year award is for $440,000. The partnering organization is Dana-Farber Cancer Institute.

The Problem

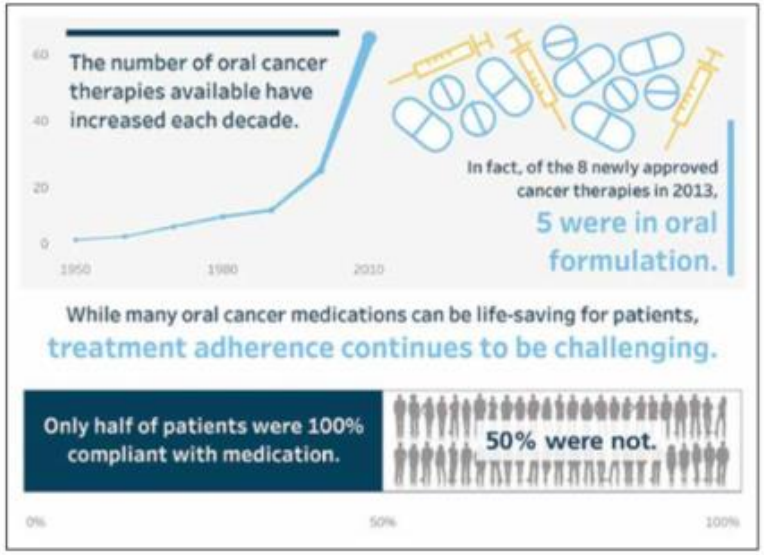
The number of oral cancer-directed therapies (OCDT) is expected to increase over time, potentially increasing risk of non-adherence and unique toxicities. Patients and their caregivers need additional access to communicate concerns as well as enhanced skills to learn how to safely administer, store and monitor potential adverse effects.

Project Approach

After an in-clinic electronic system (ePRO) to collect patient report of symptoms related to treatment or disease was recently found to be feasible, ePROs will be captured via tablets during clinic visits or by mobile devices between clinic visits to understand the impact of ePRO for OCDT administered for breast or gastrointestinal cancers on outcomes, adherence, toxicity, and patient and provider engagement.

Translating Research into Practice

The project results will guide future implementation strategies for OCDT adherence and toxicity monitoring and inform scalable strategies for oncology.



Greater Value Portfolio Research Spotlight

VALUE-BASED FORMULARY ESSENTIALS: TESTING AND EXPANDING ON VALUE IN PRESCRIPTION DRUG BENEFIT DESIGNS

Kai Yeung, PharmD, PhD, Kaiser Permanente Washington Health Research Institute

Contribution to Improved Value

Test models of care and coverage that address current financial disincentives for higher value healthcare

About this project

This study will expand a small pilot study of aligning out-of-pockets costs for drugs with their estimated value. The two-year award is for $399,917. Premera Blue Cross is the partnering organization.

The Problem

Pharmaceutical costs are a significant and increasing factor in the high cost of healthcare in the U.S. Employers and health plans have enacted cost-sharing drug formularies to reduce the employers' cost burden, but some of these may have unintended consequences by reducing patient adherence to drugs that improve health outcomes.

Project Approach

A pilot study conducted by Premera Blue Cross added cost effectiveness of drugs to the method used to rank medication on how much patients should pay for them. After safety review and efficacy review, a cost effectiveness review was added to estimate the value of each drug. In general, members would pay less for drugs that had a higher estimated value for improving health. The findings showed cost savings to both plan members and the Premera company. This project extends a new evaluation of the value-based drug formulary and cost-sharing plan to 50,000 members.

Translating Research into Practice

The results of this study will be used by Premera to help determine the degree to which they will expand their pilot value-based formulary. Beyond that, a communication plan will be developed to disseminate the study findings to health policy journals and to other entities that are designing value-based healthcare plans.

Questions?

Thanks!

Survey

(we greatly welcome and appreciate your feedback)

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