



Inspiring change with data visualization

Steve Wexler

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Twitter: @DataRevelations





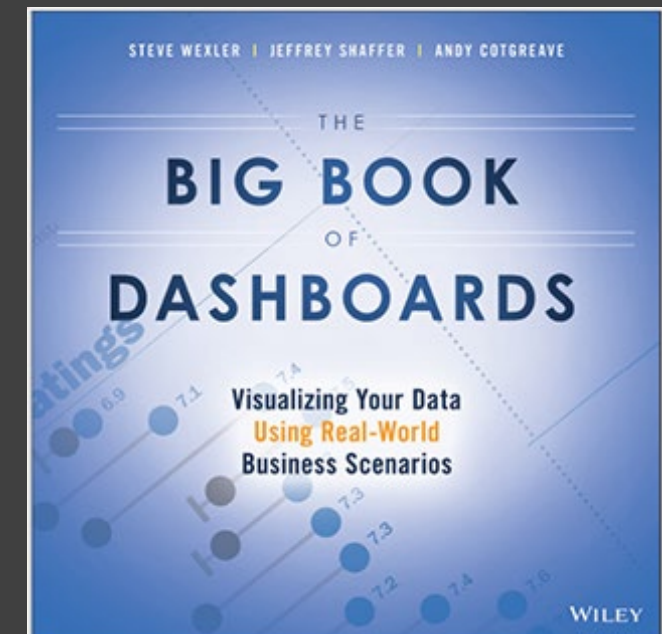
Steve Wexler

Founder of Data Revelations

Tableau Iron Viz Champion

Tableau Zen Master (Hall of Fame)

Author





You are
encouraged
to disagree

Carte Figurative des pertes successives en hommes de l'Armée Française dans la campagne de Russie 1812-1813.

Dressée par M. Minard, Inspecteur Général des Ponts et Chaussées en retraite. Paris, le 20 Novembre 1869.

Les nombres d'hommes présents sont représentés par les largeurs des zones colorées à raison d'un millimètre pour dix mille hommes; ils sont de plus écrits en travers des zones. Le rouge désigne les hommes qui ont été en Russie, le noir ceux qui en sont sortis. — Les renseignements qui ont servi à dresser la carte ont été puisés dans les ouvrages de M. M. Chiers, de Ségur, de Fezensac, de Chambray et le journal inédit de Jacob, pharmacien de l'Armée depuis le 28 Octobre.

Pour mieux faire juger à l'œil la diminution de l'armée, j'ai supposé que les corps du Prince Jérôme et du Maréchal Davout qui avaient été détachés sur Minsk et Mohilow et qui rejoignent vers Orscha et Witebsk, avaient toujours marché avec l'armée.

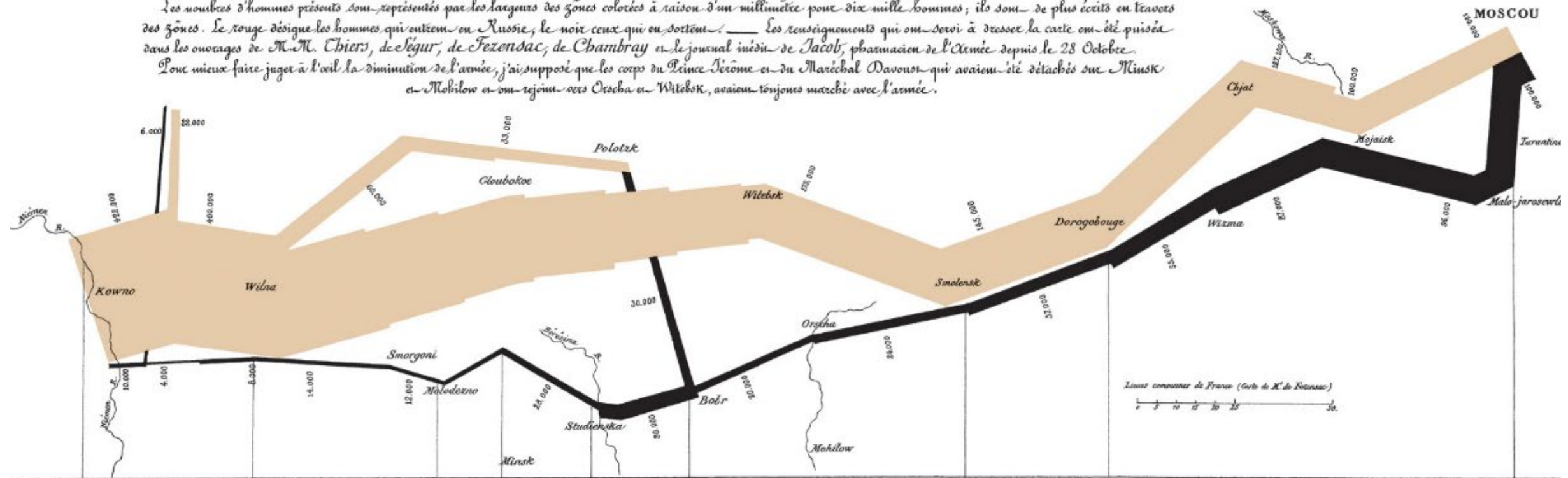
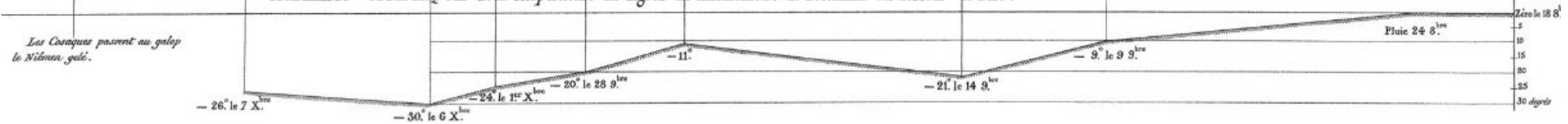


TABLEAU GRAPHIQUE de la température en degrés du thermomètre de Réaumur au dessous de zéro.



Les Cosaques passent au galop le Niemen gelé.

Dessiné par Regnier, 2. Fac. S^{te} Marie S^{te} O^{ne} à Paris.

Imp. Lith. Regnier et Douardat

Figurative des pertes successives en hommes de l'Armée Française dans la campagne de Russie 1812
 Dressée par M. Minard, Inspecteur Général des Ponts et Chaussées en retraite. Paris, le 20 Nov

Les hommes présents sont représentés par les largeurs des zones colorées à raison d'un millimètre pour dix mille hommes; ils sont de plus en plus étroits à mesure qu'on avance en Russie. — Les renseignements qui ont servi à dresser la carte sont de M. M. Chiers, de Ségur, de Fezensac, de Chambray et le journal inédit de Jacob, pharmacien de l'Armée depuis le 28 Sept. — Pour juger à l'œil la diminution de l'armée, j'ai supposé que les corps du Prince Jérôme et du Maréchal Davoust qui avaient été détachés en Mohilow et ont rejoint vers Orscha et Witebsk, avaient toujours marché avec l'armée.

The best statistical graph ever drawn?

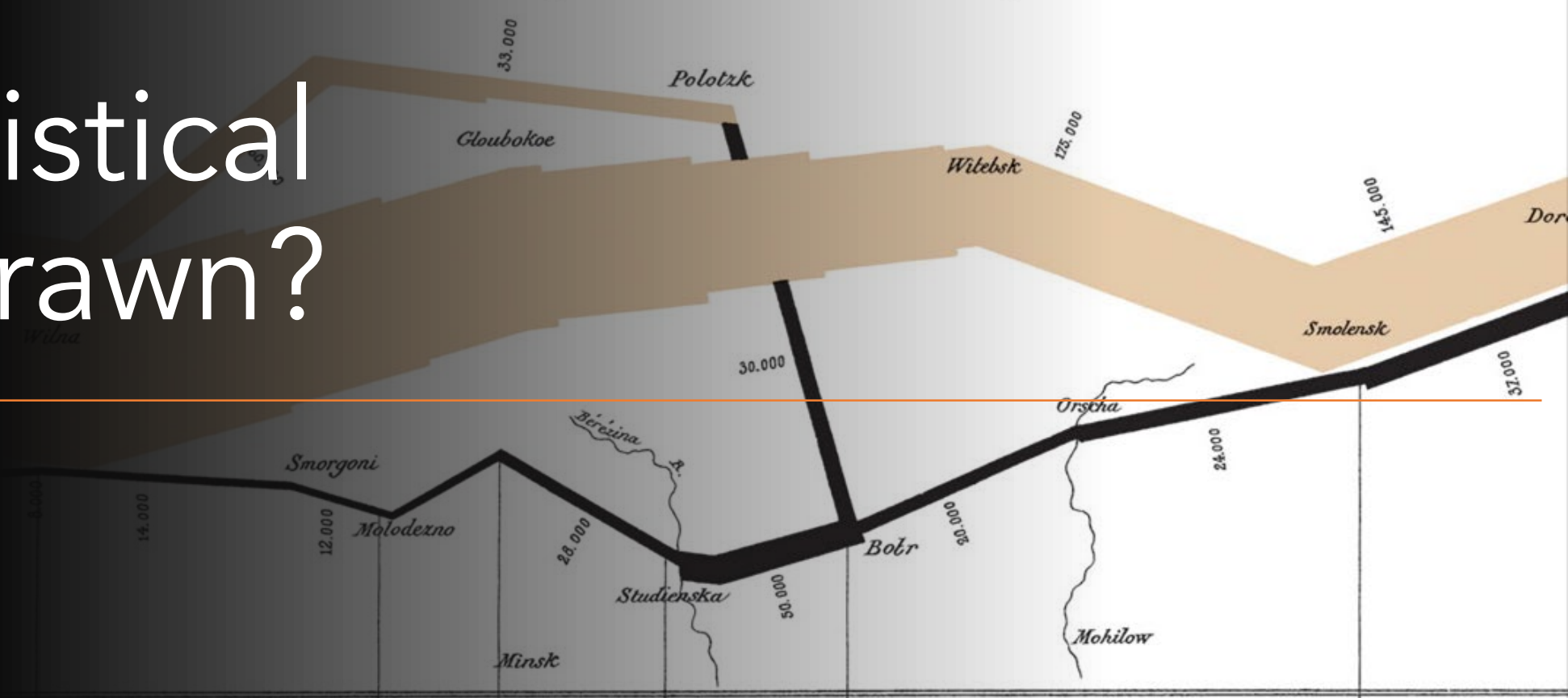


TABLEAU GRAPHIQUE de la température en degrés du thermomètre de Réaumur au dessous de zéro.

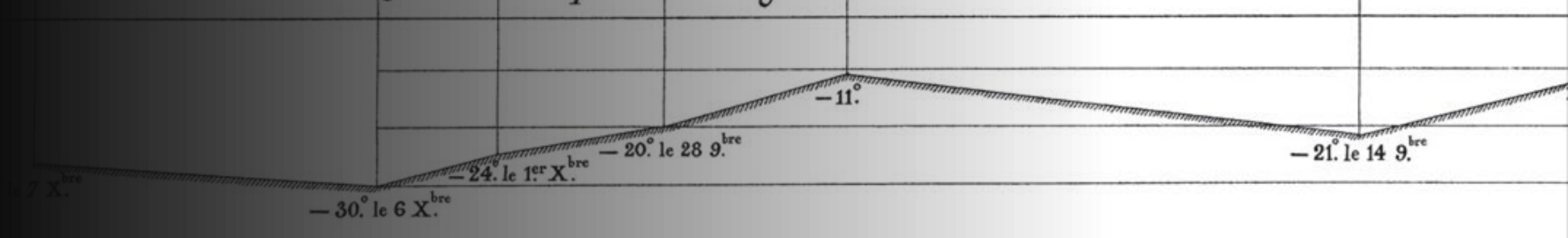
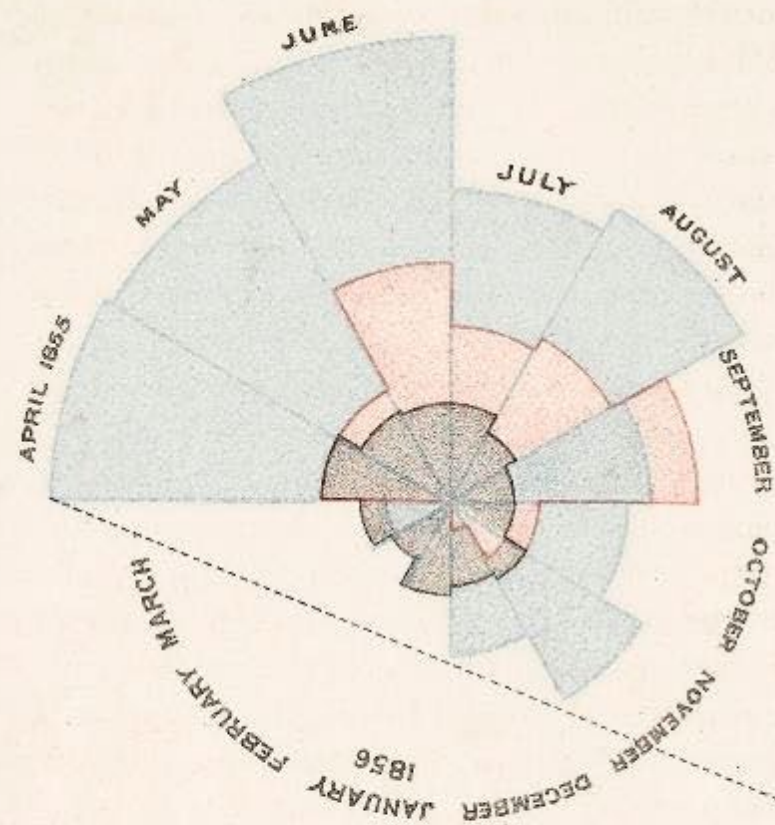
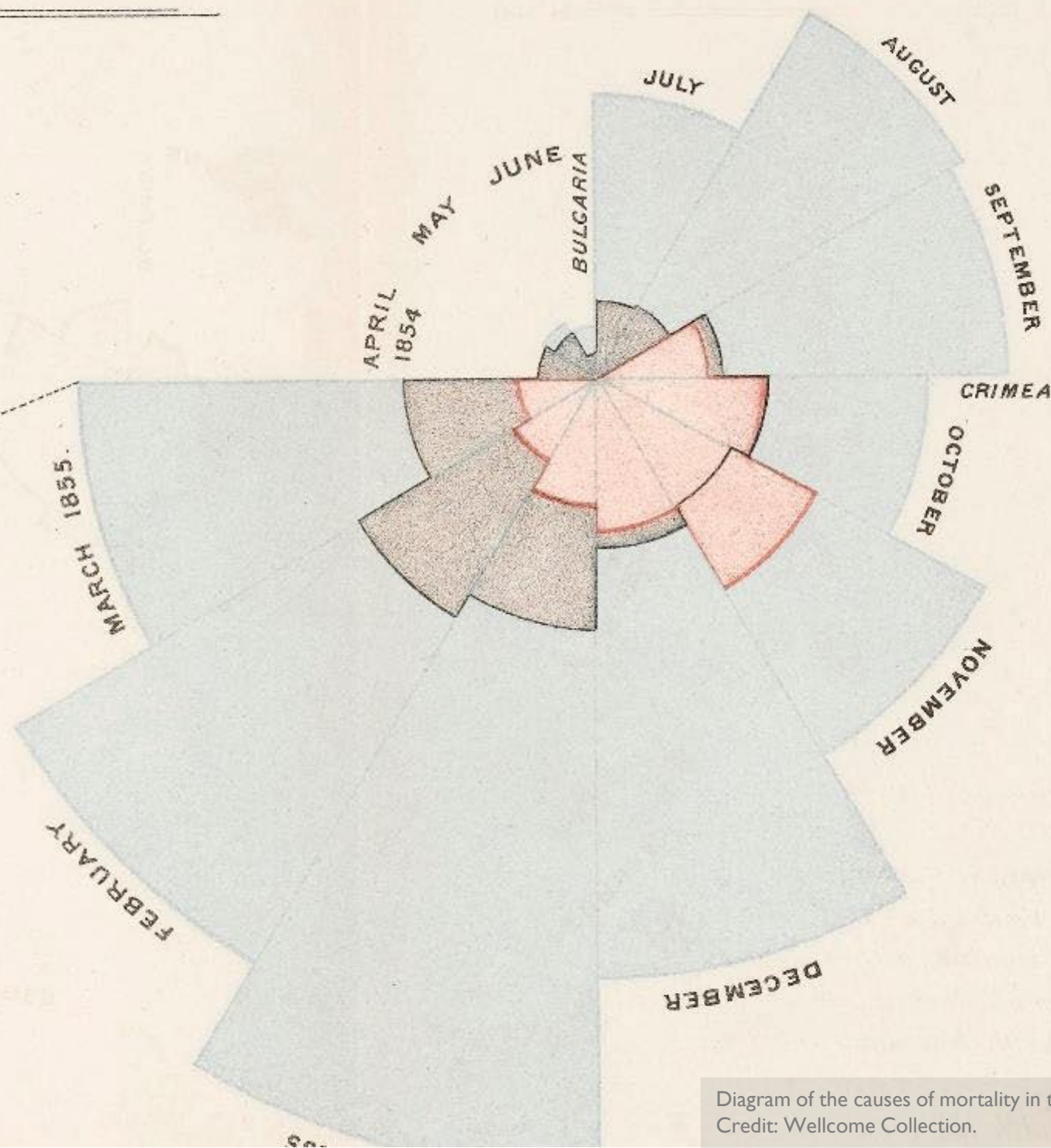


DIAGRAM OF THE CAUSES OF MORTALITY IN THE ARMY IN THE EAST.

2.
APRIL 1855 TO MARCH 1856.



1.
APRIL 1854 TO MARCH 1855.



The Areas of the blue, red, & black wedges are each measured from the centre as the common vertex.

The blue wedges measured from the centre of the circle represent area for area the deaths from Preventible or Mitigable Zymotic diseases, the red wedges measured from the centre the deaths from wounds, & the black wedges measured from the centre the deaths from all other causes.

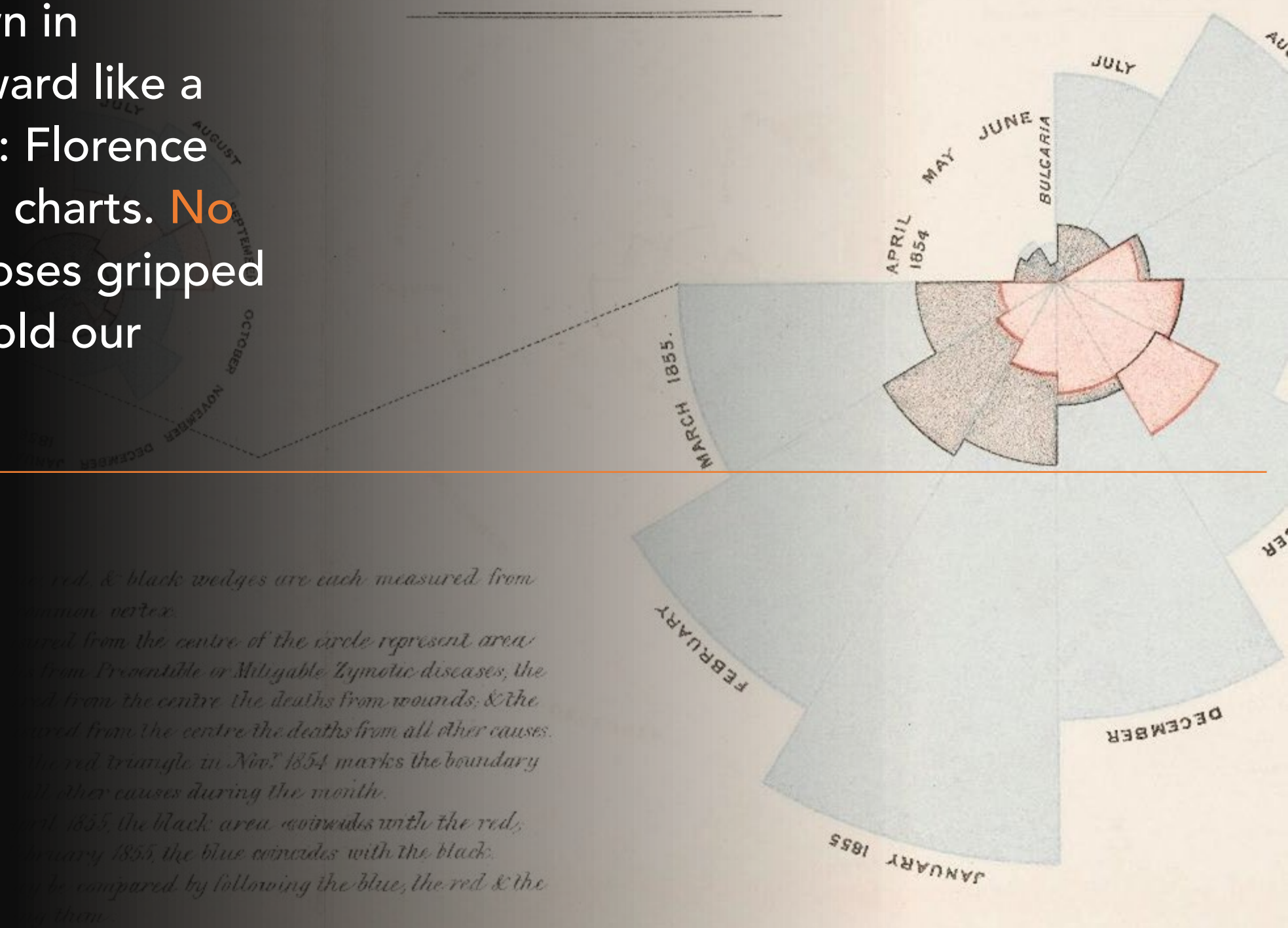
The black line across the red triangle in Nov^r 1854 marks the boundary of the deaths from all other causes during the month.

In October 1854, & April 1855, the black area coincides with the red;

Critics suggest that [Nightingale's] mortality data is better shown in something more straightforward like a bar chart. But this is not true: Florence Nightingale made lots of bar charts. **No one cares about them!** Her roses gripped 1858 readers and they still hold our attention today.

DIAGRAM OF THE CAUSES OF MORTALITY
IN THE ARMY IN THE EAST.

1.
APRIL 1854 TO MARCH 1855



RJ Andrews

The red & black wedges are each measured from a common vertex.
The area measured from the centre of the circle represent area
from Preventible or Mitigable Zymotic diseases; the
red from the centre the deaths from wounds; & the
black from the centre the deaths from all other causes.
The red triangle in Nov^r 1854 marks the boundary
of all other causes during the month.
In Dec^r 1854, the black area coincides with the red;
In Jan^y 1855, the blue coincides with the black.
The data may be compared by following the blue, the red & the
black lines.

DIAGRAM OF THE CAUSES OF MORTALITY
IN THE ARMY IN THE EAST.

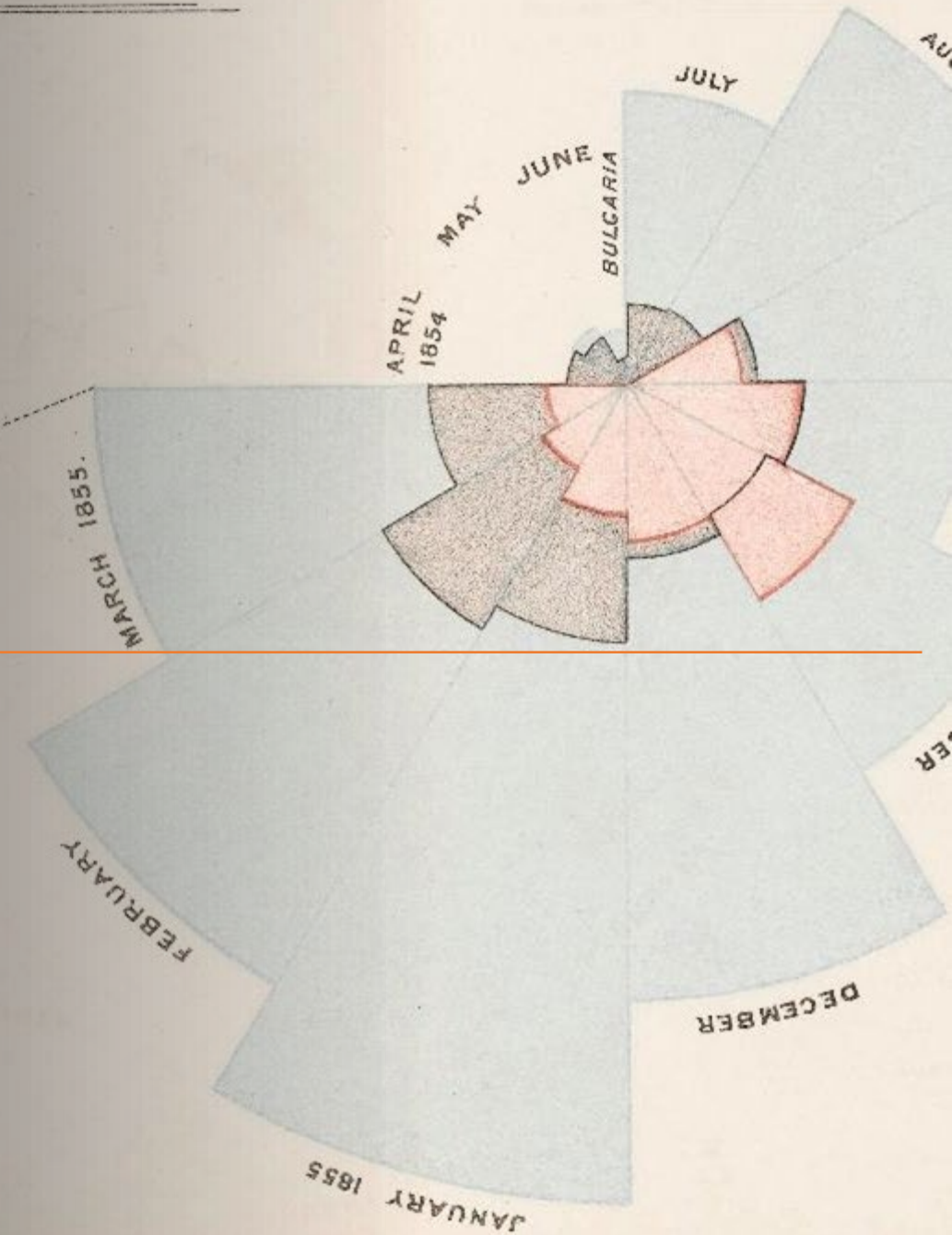
16 MARCH 1856.

1.
APRIL 1854 TO MARCH 1855.

I believe [Nightingale's] goal wasn't just to inform but also to persuade with an intriguing, unusual, beautiful picture. A bar graph conveys the same message effectively, but it may not be as attractive to the eye.

Alberto Cairo
How Chart Lie

The red & black wedges are each measured from a common vertex.
The red from the centre of the circle represent area
from Preventible or Mitigable Zymotic diseases; the
black from the centre the deaths from wounds; & the
blue from the centre the deaths from all other causes.
The red triangle in Nov^r 1854 marks the boundary
of all other causes during the month.
In Dec^r 1854, the black area coincides with the red;
in January 1855, the blue coincides with the black.
They may be compared by following the blue, the red & the
black then.



—

Hmm. I guess I
should be
making charts
like these, right?





No, you
shouldn't be
making charts
like these!



IMPORTANT

A close-up photograph of a person's hands holding a white rectangular sign. The person is wearing a dark grey suit jacket, a white dress shirt, and a dark tie. The sign is held horizontally in front of their chest. The text on the sign is centered and reads "WHO IS YOUR AUDIENCE?". The word "WHO" is in red, "IS YOUR" is in black, and "AUDIENCE?" is in red. The background is a dark, textured surface, likely the person's suit.

WHO
IS YOUR
AUDIENCE?

What's the message?





Minard and Nightingale knew their audiences







Let's look at some real-world
inspiration

Understanding racial and ethnic disparities

Organization Workforce Racial/Ethnic Representation

Does our workforce reflect our community?

Race/Ethnicity	Community	2020	Closing the Gap
White	 60%	69%	 Reflects Community
Black	20%	22%	Reflects Community
Hispanic	 13%	5%	 ▼
Asian / Pacific Islander	5%	3%	▼
American Indian / Alaskan Native	2%	1%	▼

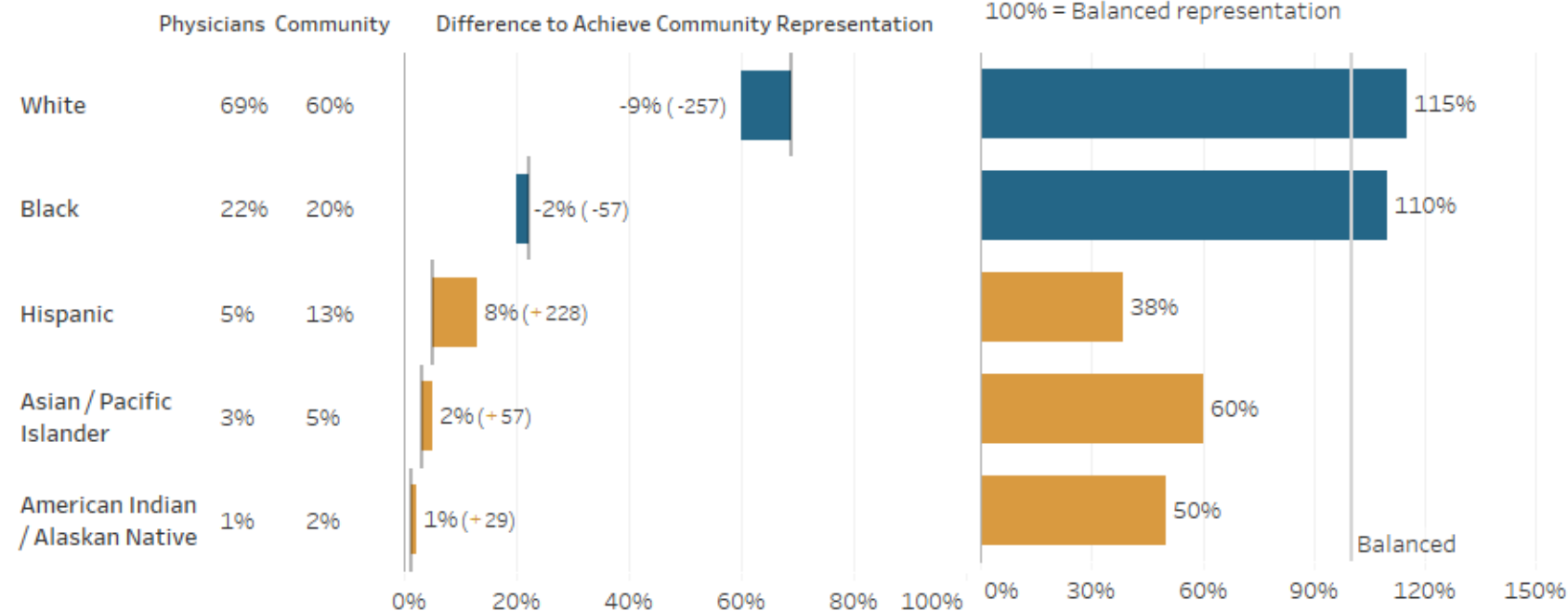
Does our physician team reflect our community?

Race/Ethnicity	Community	2020	Closing the Gap
White	60%	80%	Reflects Community
Black	20%	9%	▼
Hispanic	13%	10%	▼
Asian / Pacific Islander	5%	1%	▼
American Indian / Alaskan Native	2%	0%	▼

Working to Reflect the Diverse Community We Serve

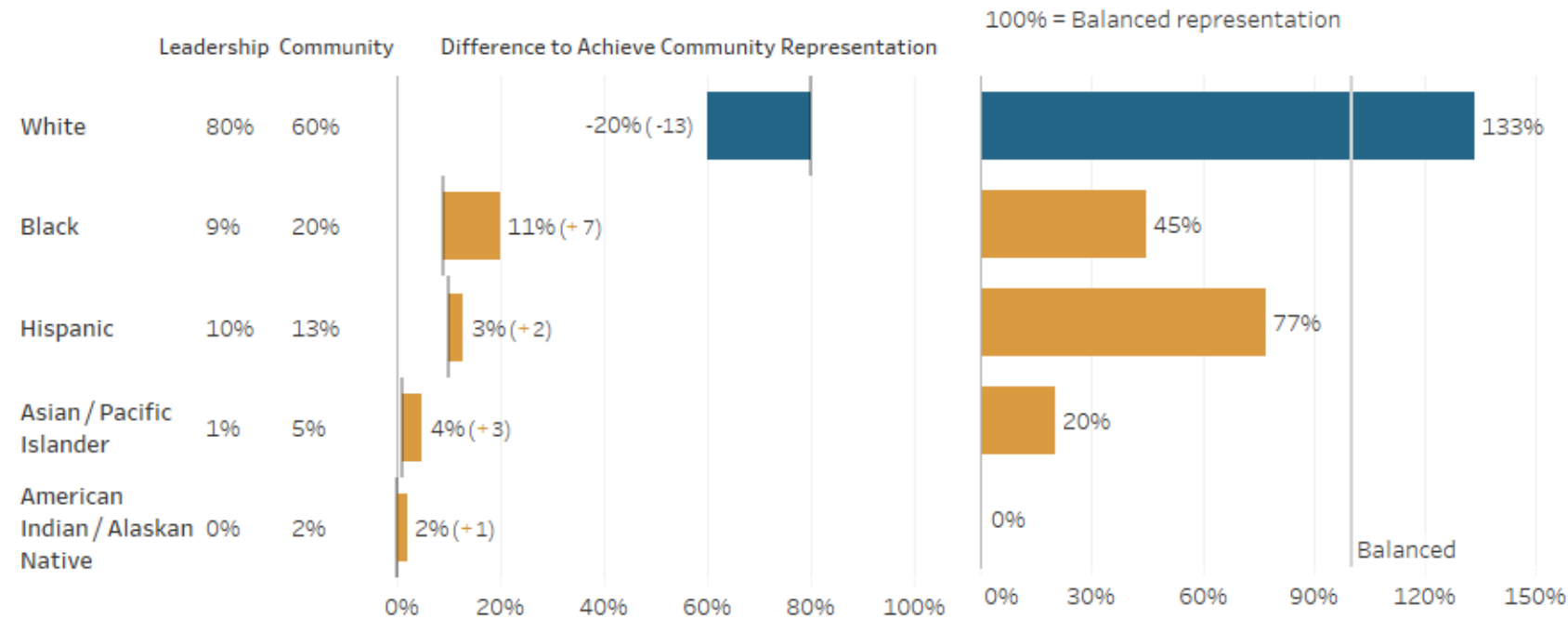
Does our physician network reflect our community?

Current Physicians: 2,855 individuals



Does our leadership team reflect our community?

Current Executive Leaders: 65 individuals

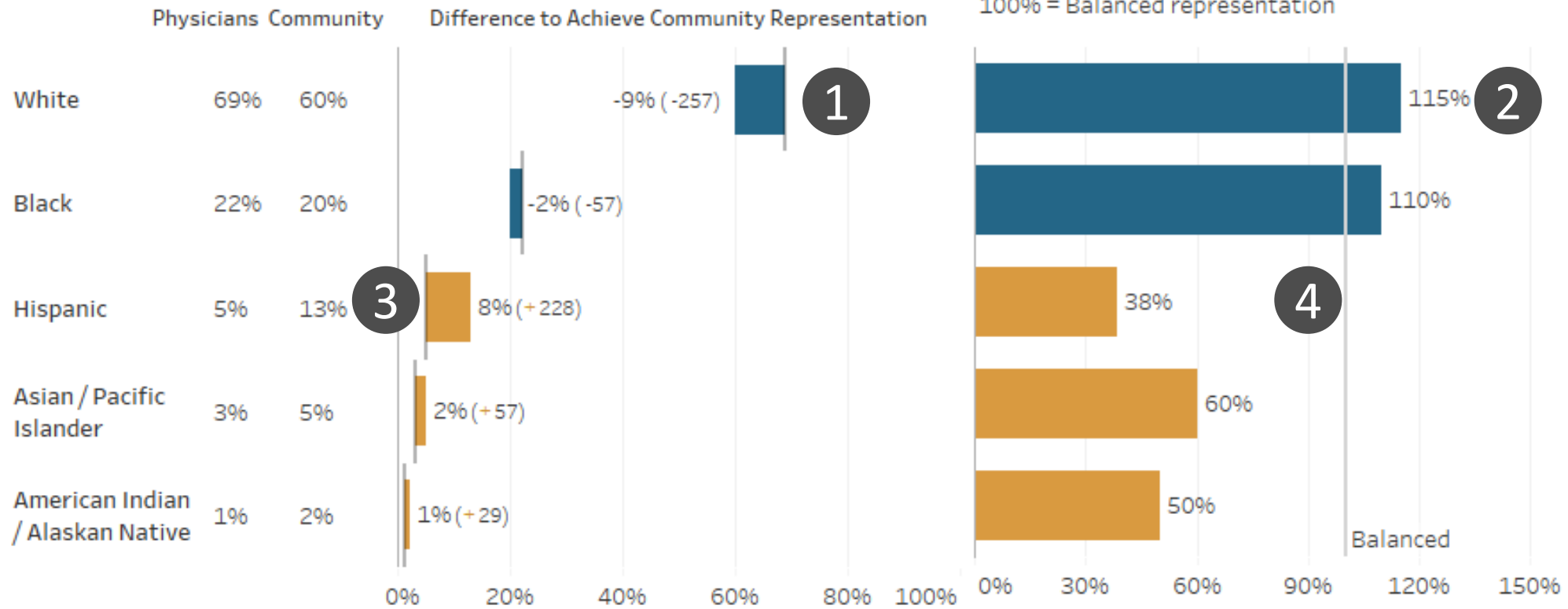


Designer: Lindsay Betzendahl
Organization: HealthDataViz

Working to Reflect the Diverse Community We Serve

Does our physician network reflect our community?

Current Physicians: 2,855 individuals



The **Impact**

Tracking eCommerce

CIMΛLP

Total Revenue

€12,298.39

% of Total: 100.00% (€12,298.39)

Visits

4,755

% of Total: 100.00% (4,755)

Ecommerce conversion rate

2.59%

Avg for View: 2.59% (0.00%)

Transactions

123

% of Total: 100.00% (123)

Visits and Product Revenue by Source / Medium

Source / Medium	Sessions	Revenue per User
google / cpc	1,618	€2.57
Newsletter_promo / email	502	€4.25
google / organic	456	€4.17
(direct) / (none)	326	€7.20
facebook / Shoes Sweat	278	€0.36
criteo / retargeting	252	€0.24
criteo / display	185	€0.46
bing / cpc	159	€3.26
facebook / Sholytical	143	€0.59
facebook / ppl	143	€0.25

Average order value

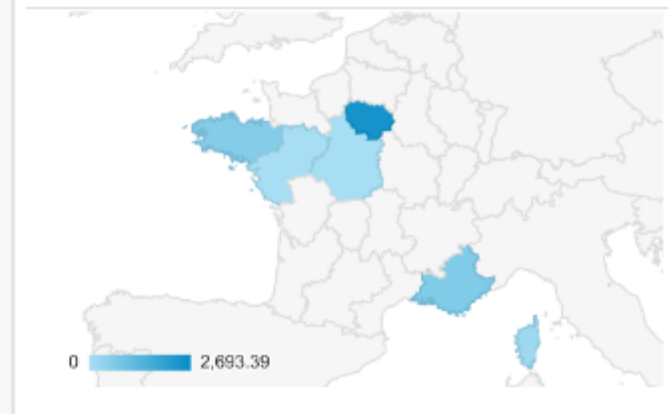
€99.99

Avg for View: €99.99 (0.00%)

Top 10 products

Product	Product Revenue	Unique Purchases
Shoes Dandy	€2,158.20	18
Shoque	€999.00	10
Shoes Sweat	€996.00	4
Sholytical	€838.60	12
Hiking Excel	€715.36	8
Hiking Result	€679.60	4
Shoes Draft	€679.60	4
Running Shift	€599.00	10
Walking Reflect	€566.20	21
Ski Gold	€559.50	5

CA par région

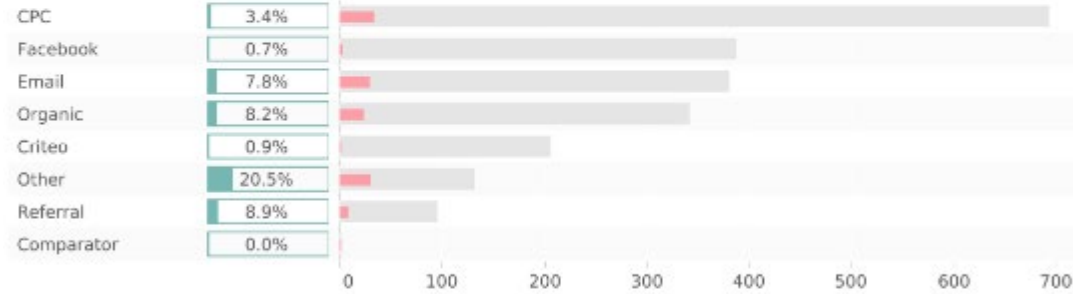




CIMALP

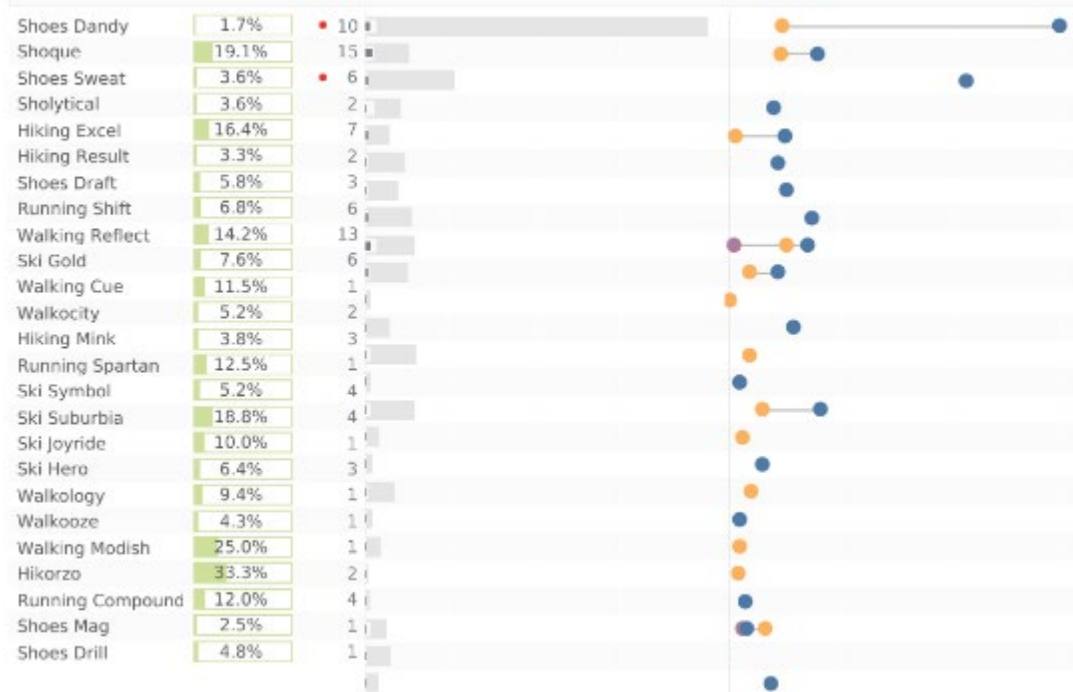
Daily Performance Report
2020-07-23

4.52% Conv. Rate | ▼7.3% **172** Conv. | ▲32.3% **3,804** Sessions | ▲42.7% **14,143€** Revenue | ▲54.1% **82€** AOV | ▲16.4%

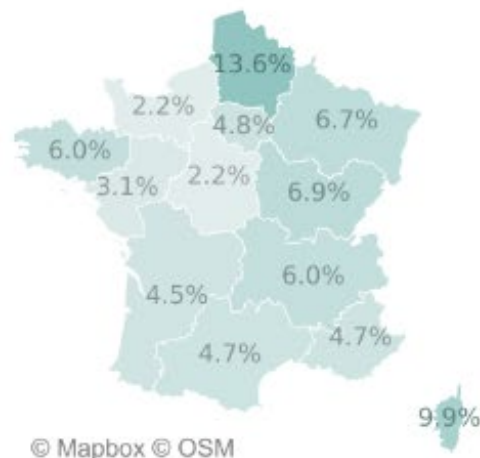


Breakdown by product

• sorted by unique purchases •



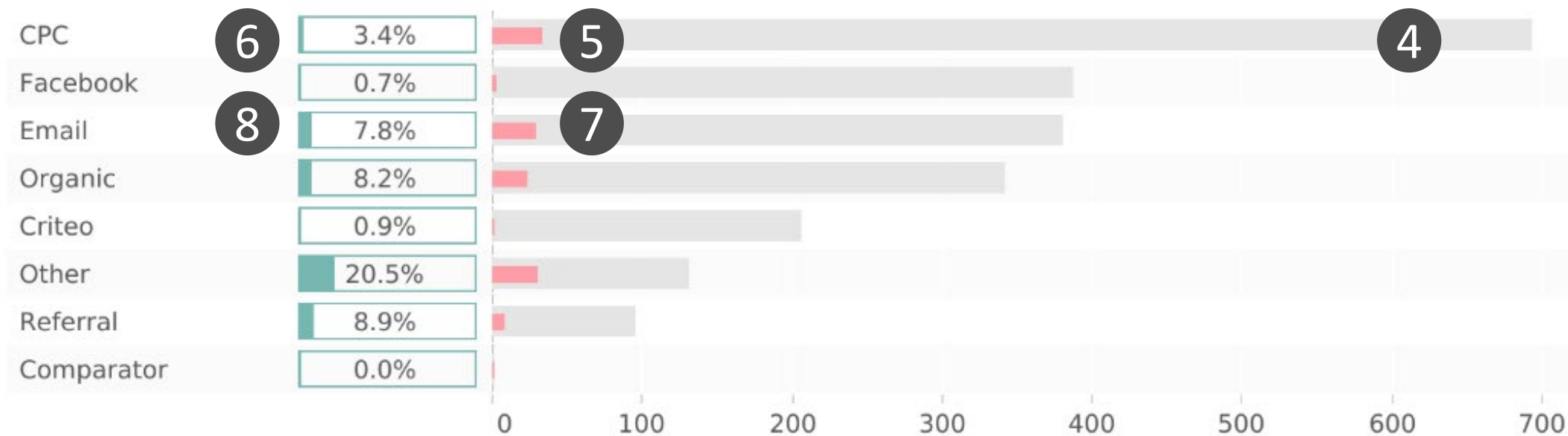
Designer: Dorian Banutoiu
Organization: Canonicalized



CIMALP

Daily Performance Report 2020-07-23

1 4.52% Conv. Rate ▼7.3%	2 172 Conv. ▲32.3%	3 3,804 Sessions ▲42.7%	14,143€ Revenue ▲54.1%	82€ AOV ▲16.4%
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Breakdown by product

• sorted by unique purchases •



Product	Conversion Rate	Unique Purchases	Detail Views	Criteo Views	Organic Views	CPC Views
Shoes Dandy	1.7%	10				
Shoque	19.1%	15				
Shoes Sweat	3.6%	6				
Sholytical	3.6%	2				
Hiking Excel	16.4%	7				
Hiking Result	3.3%	2				
Shoes Draft	5.8%	3				
Running Shift	6.8%	6				
Walking Reflect	14.2%	13				
Ski Gold	7.6%	6				
Walking Cue	11.5%	1				
Walkocity	5.2%	2				
Hiking Mink	3.8%	3				
Running Spartan	12.5%	1				
Ski Symbol	5.2%	4				
Ski Suburbia	18.8%	4				
Ski Joyride	10.0%	1				
Ski Hero	6.4%	3				
Walkology	9.4%	1				
Walkooze	4.3%	1				
Walking Modish	25.0%	1				
Hikorzo	33.3%	2				
Running Compound	12.0%	4				
Shoes Mag	2.5%	1				
Shoes Drill	4.8%	1				

...

The Impact

This is brilliant

Percentage of goal

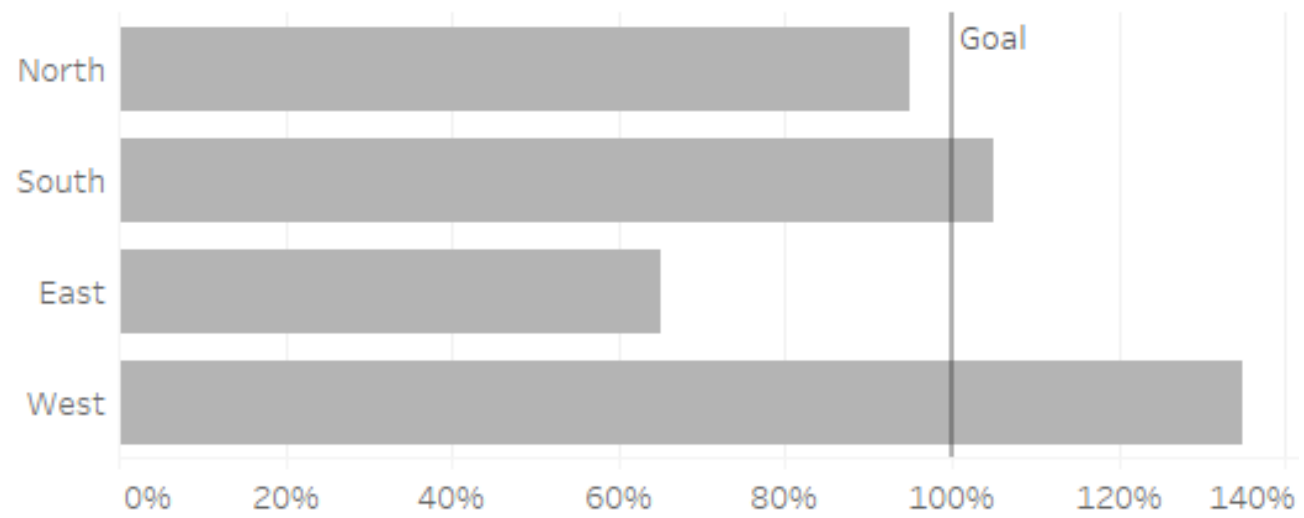
North	95%
-------	-----

South	105%
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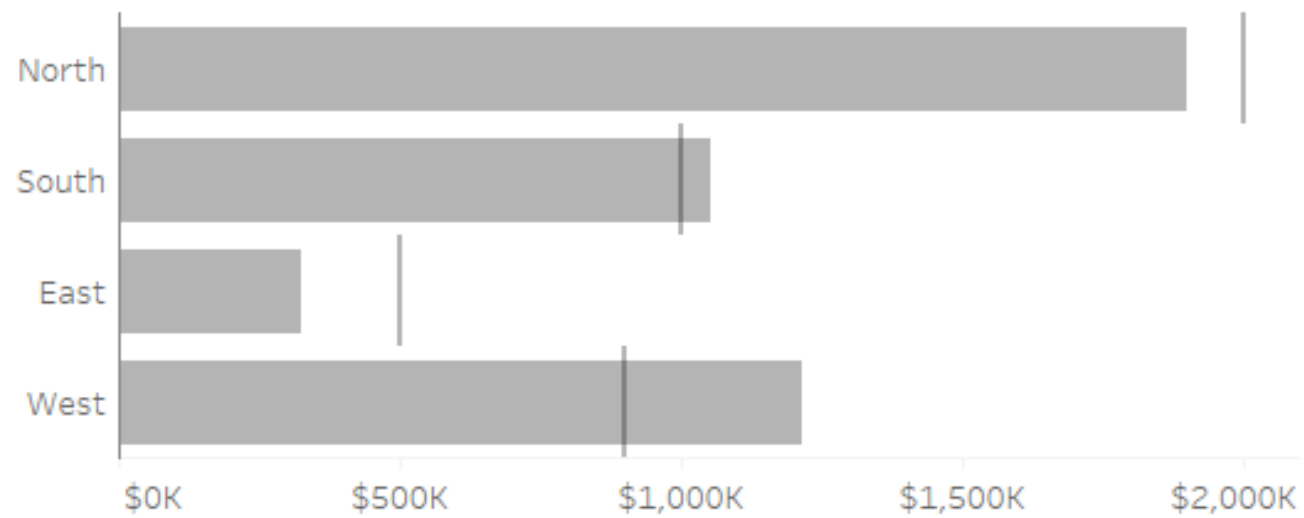
East	65%
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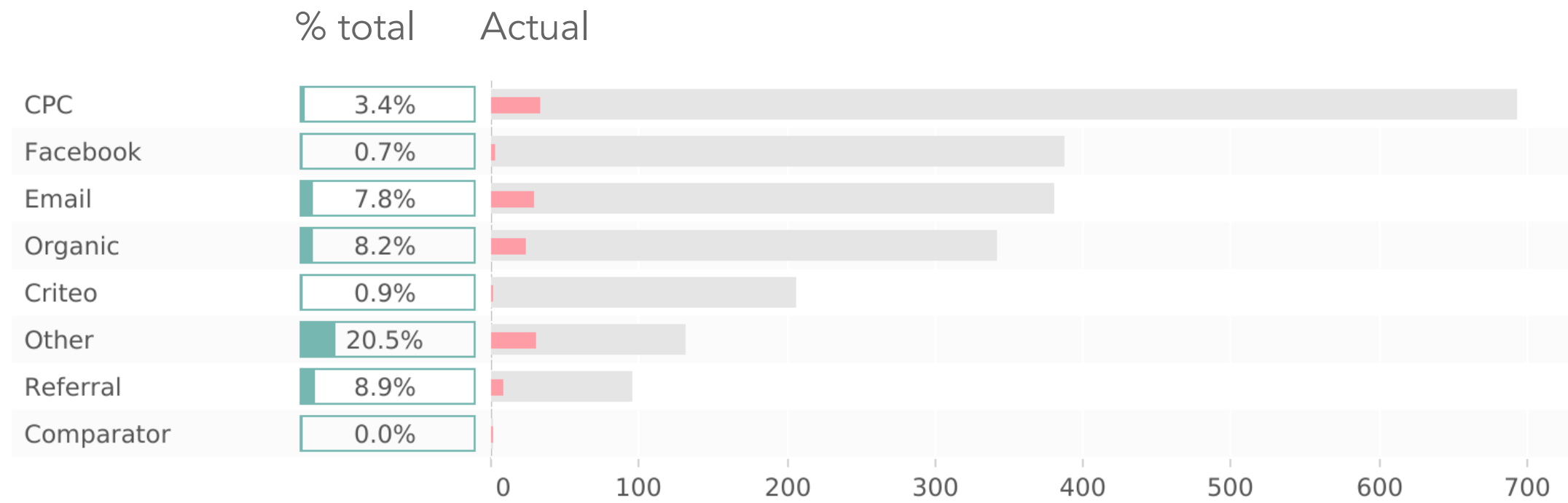
West	135%
------	------

Percentage of goal



Actual vs Goal (|)

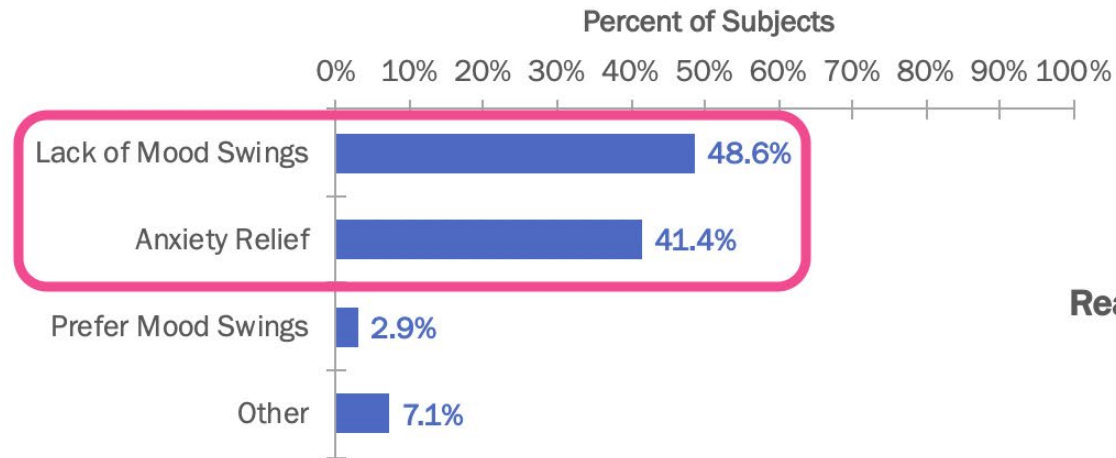




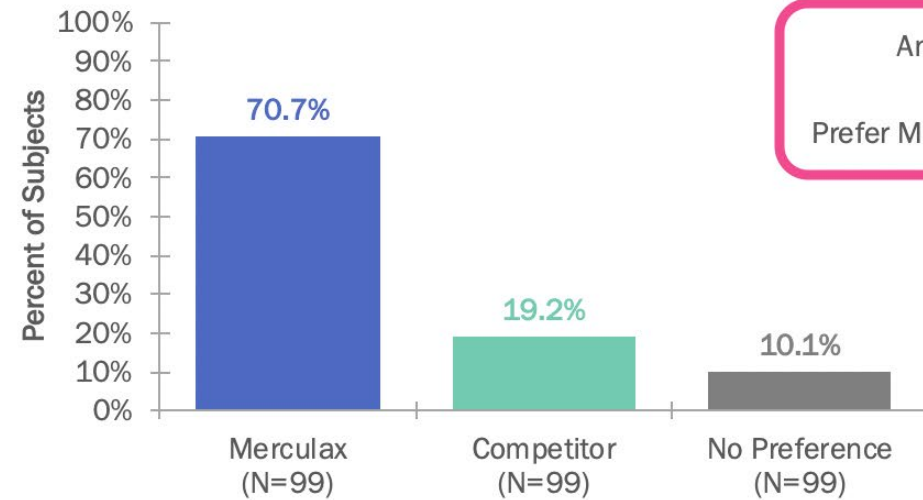
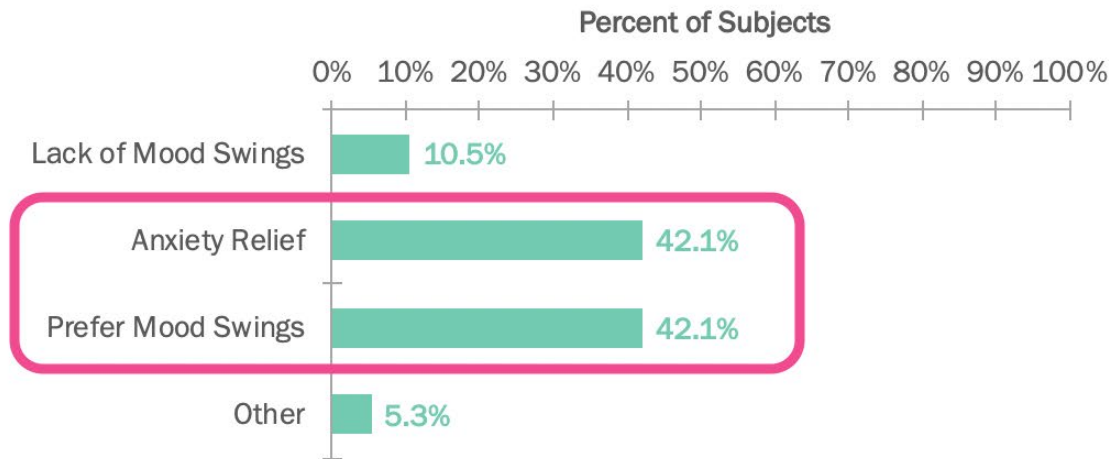
Reimagining pharmaceutical study results for two audiences

PROJECT ATMOSPHERE: REASONS FOR PREFERENCE

Reasons for Preferring Merculax (n=70)



Reasons for Preferring Competitor (n=19)



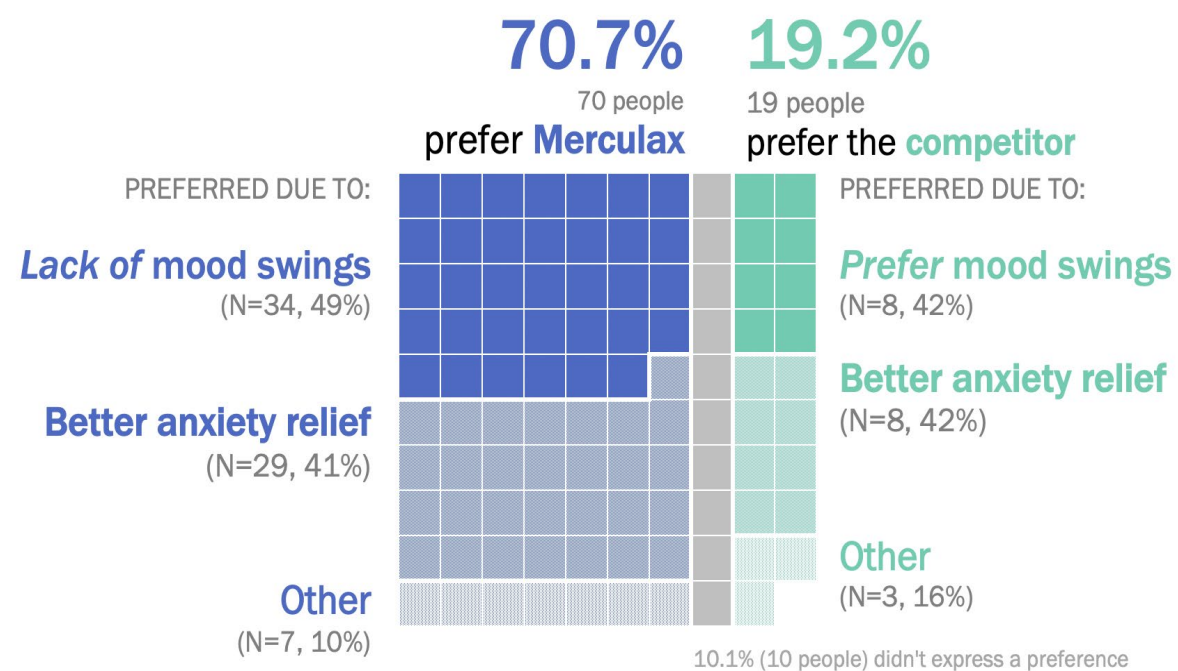
Define the audience

Define the audience

Define the audiences

Let's understand Merculax preference

Of the 99 patients in our study,



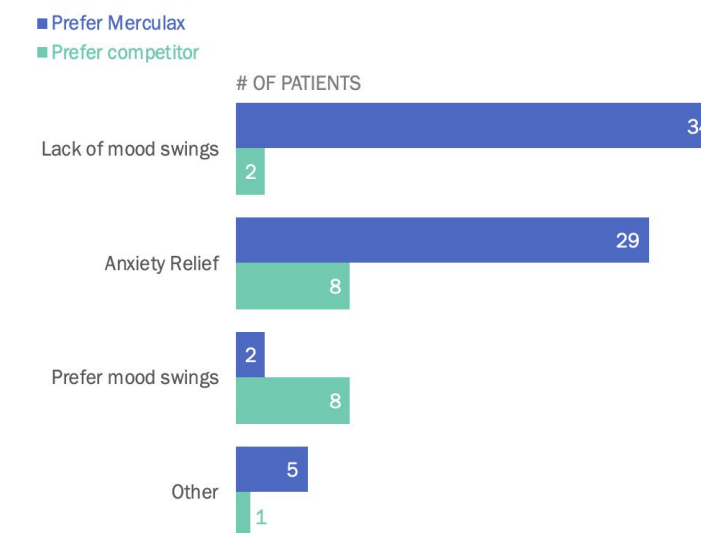
LACK OF MOOD SWINGS & ANXIETY RELIEF DRIVE MERCULAX PREFERENCE

Of the 99 patients in our study,

70.7% expressed preference for **Merculax** (N=70), mainly due to **lack of mood swings** and **better anxiety relief**

19.2% expressed preference for the **competitor** (N=19)*, citing **better anxiety relief** and **preference for mood swings** as primary reasons.

Reasons for preference



*The remaining 10.1% of patients (N=10) did not state a preference.

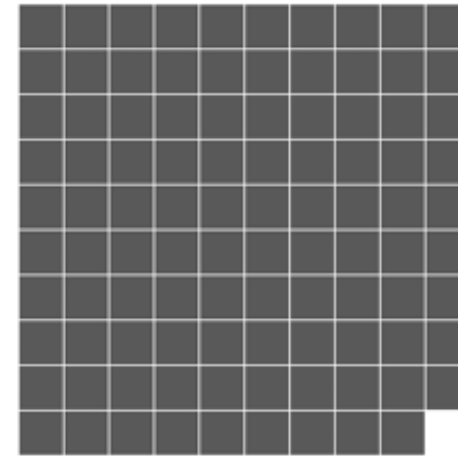
Designer: Cole Knaflic
Organization: storytelling with data

Consider a square



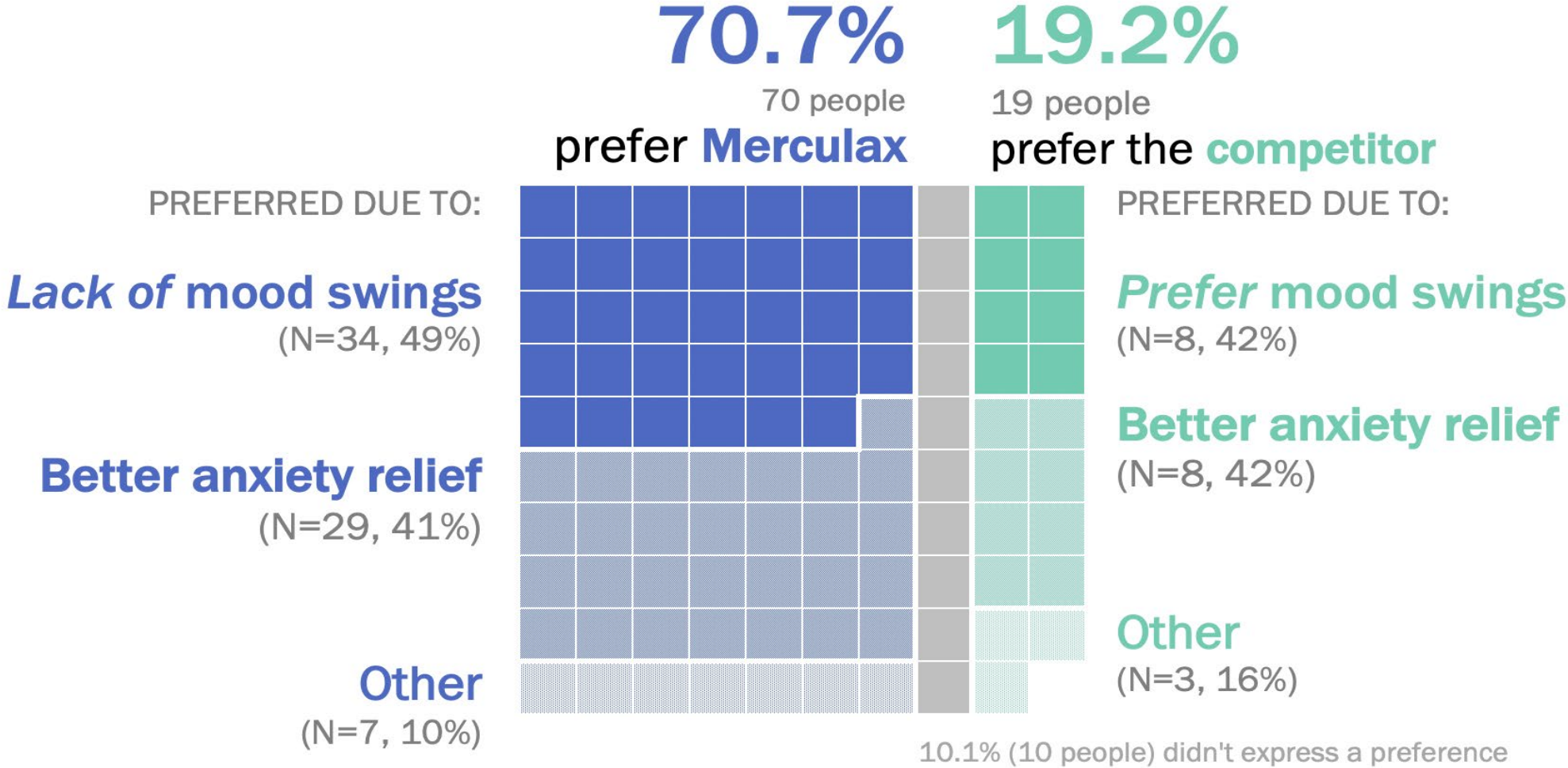
Imagine a single square represents
a patient in our study

There were **99 patients** in our study



Let's understand Merculax preference

Of the 99 patients in our study,



LACK OF MOOD SWINGS & ANXIETY RELIEF DRIVE MERCULAX PREFERENCE

Of the 99 patients in our study,

70.7%

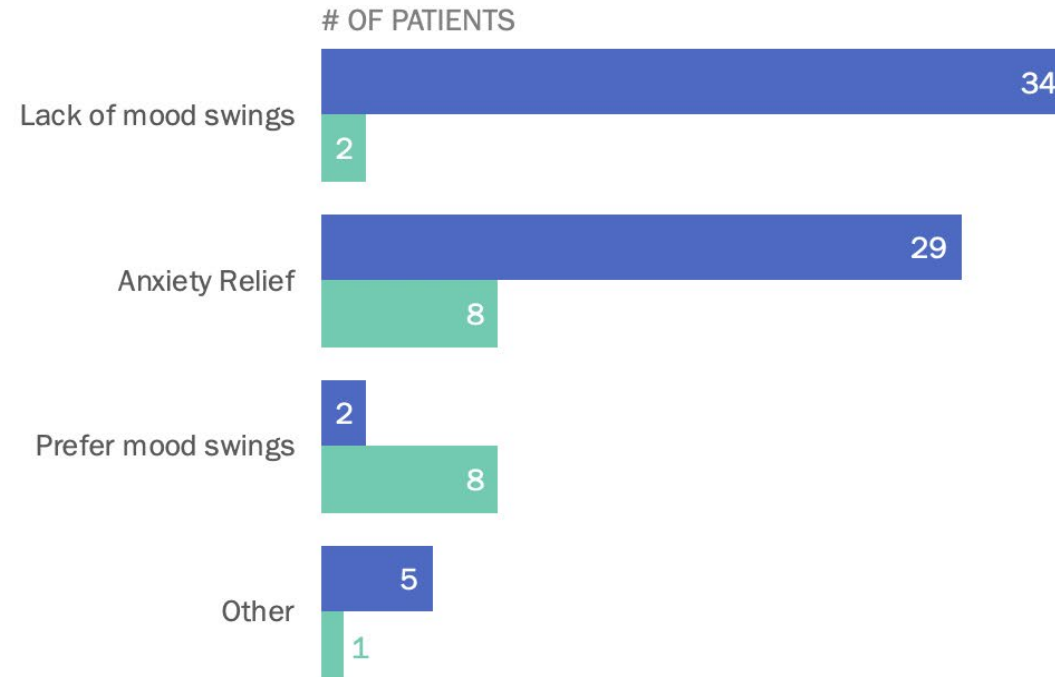
expressed preference for **Merculax** (N=70), mainly due to **lack of mood swings and better anxiety relief**

19.2%

expressed preference for the **competitor** (N=19)*, citing **better anxiety relief and preference for mood swings** as primary reasons.

Reasons for preference

- Prefer Merculax
- Prefer competitor



*The remaining 10.1% of patients (N=10) did not state a preference.

The impact



Andy Cotgreave and “Cotgreave’s law”

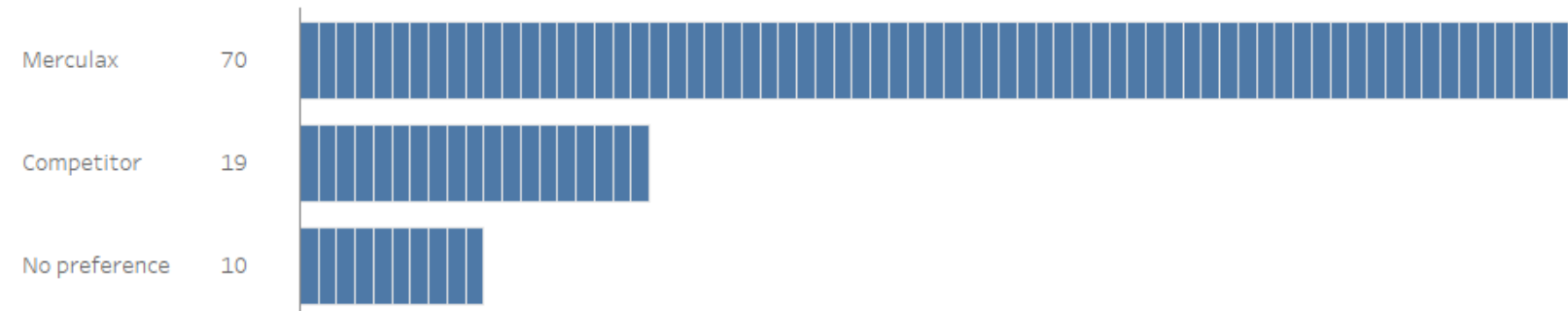
—

The longer an innovative visualization exists, the probability someone says it should have been a line/bar chart approaches 1

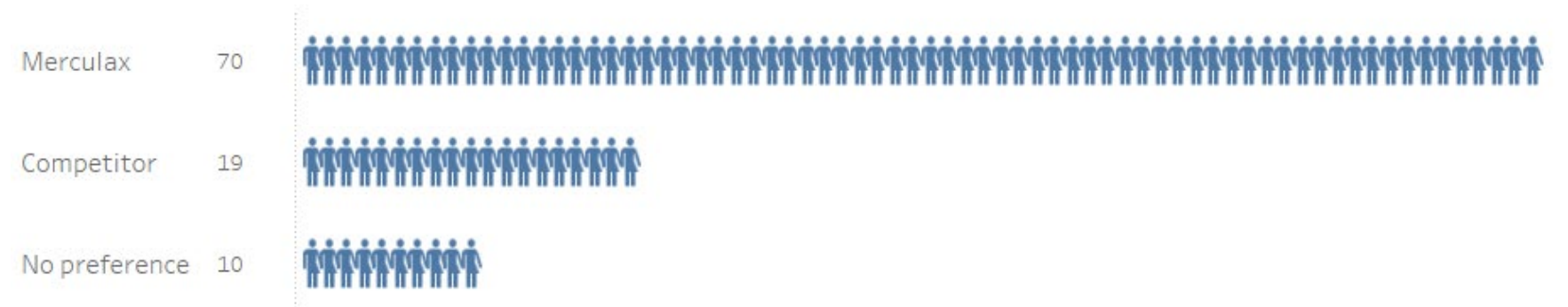
Of the 99 people surveyed people preferred



Of the 99 people surveyed people preferred

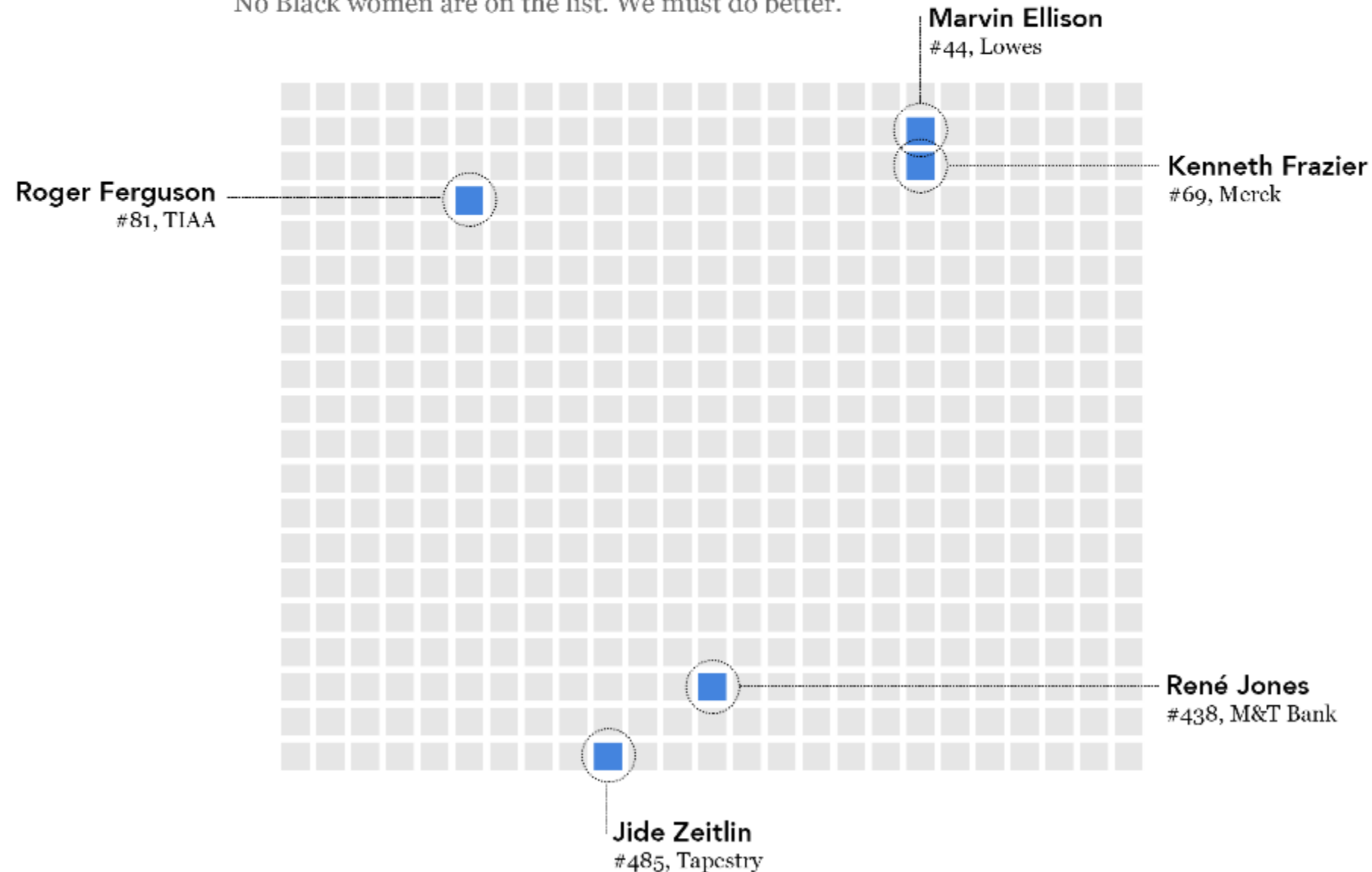


Of the 99 people surveyed, people preferred



There are only **5 Black** CEOs on the 2020 Fortune 500 List

African-Americans represent 13.4% of the U.S. population yet only make up 1% of the top 500 CEOs. No Black women are on the list. We must do better.



Can you glean the **insights you need** from your KPI dashboard?

KPI GLOBAL DASHBOARD

Last Updated: 10.01.2020

KPI Date
December, 2019

Data updated 10th day of the month.

Global Drill Down
Global

Three Tier Analysis - Global,
Region, Country

Global: Cost

KPI Topic	KPI Description	KPI Target	
Metric 1	Description 2	< 100%	100.00%
Metric 2	Description 5	Full year increase over same period in previous year	PASS
	Description 6	Full year increase over same period in previous year	PASS
	Description 7	Full improvement in score	53.30%
Metric 3	Description 1	Green >= 100% Imp'd Amber >= 100% w/F'cast Red < 100% w/F'cast	104.28%
Metric 4	Description 3	Meet or exceed expected completion % each month	100.00%

Global: Risk

KPI Topic	KPI Description	KPI Target	
Metric 5	Description 13	>= 98%	99.82%
	Description 14	100%	99.09%
	Description 15	>= 98%	98.78%
	Description 18	>=99.995%	100%
	Description 19	>=99.995%	100%
	Description 20	>=99.95%	100%
	Description 21	>=99.9%	100%
	Description 22	>=99.9%	100%
Metric 7	Description 17	Green >=95% Amber >=85% <95% Red <85%	98.20%

Reporting Period: May 2020
 For quarterly reporting select the relevant 3 months
 Region(s): All
 Countries/Ter.: All
 Business Line(s): All
 Colour Palette: JLL Palette
 Click here to view all non-compliant KPIs by countries/territories 183 out of 637

Why is it important?
Responding promptly to employee requests and ensuring buildings are well run help improve the employee experience.

Click here to view non-compliant Service Quality KPIs by countries/territories.

36 out of 157

Colours explained
Metrics are coloured based on their MSA compliance status.

- Compliant
- Partial Fail
- Non Compliant

Service Quality

KPI Topic	KPI Description	Value	Non Compliant Countries	Additional Context	Chart
Topic 2	Metric 16	98.5%	2 / 130		
	Metric 17	93.1%	9 / 130		
	Metric 18	95.1%	28 / 569		
	Metric 19	92.7%	41 / 561		
	Metric 20	94.5%	651 / 11,935		
	Metric 21	94.3%	721 / 12,717		
	Metric 22	90.8%	174 / 1,885		
	Metric 23	88.1%	1,340 / 11,302		
Topic 2	Metric 24	95.5%	144 / 3,207		

Why is it important?
With strong risk and compliance processes we maximise the uptime of buildings enabling HSBC to run its business without interruption.

Mitigating risks protects HSBC's reputation and prevents issues that would distract HSBC from focusing on growth.

Click here to view non-compliant Risk and Compliance KPIs by countries/territories.

1 out of 1

Risk and Compliance

KPI Topic	KPI Description	Value	Non Compliant Countries	Additional Context	Chart	
Topic 2	Metric 3	100%	0 mins			
	Metric 4	100%	0 mins			
	Metric 5	100%	0 mins			
	Metric 6	100%	0 mins			
	Metric 7	100%	0 mins			
	Topic 3	Metric 8	1.4%	14,153,608		
		Metric 9	8.4%	974 / 1.1K		
Topic 4	Metric 10	96.9%	26 / 850			

Designer: Hesham Eissa, with Simon Beaumont and Chris Lay
 Organization: JLL Corporate Solutions

GLOBAL KPI

GEOGRAPHIC SPECIFIC OVERVIEW



Reporting Period
May 2020

For quarterly reporting select the relevant 3 months

Region(s)
All

Countries/Ter.
All

Business Line(s)
All

Colour Palette
JLL Palette

Click here to view all non-compliant KPIs by countries/territories

out of
181 637

1

Why is it important?
Responding promptly to employee requests and ensuring buildings are well run help improve the employee experience.

Click here to view non-compliant Service Quality KPIs by countries/territories.

2 out of 36 187

Colours explained
Metrics are coloured based on their MSA compliance status.

- Compliant ● ●
- Partial Fail ● ●
- Non Compliant ● ●

Service Quality

KPI Topic	KPI Description			Non Compliant Countries	Additional Context		
	Metric 16		● 98.5%	●	2 / 130		
	Metric 17		● 93.1%	●	9 / 130		
	Metric 18		● 95.1%		28 / 569		
	Metric 19		● 92.7%	●	41 / 561		
Topic 2	Metric 20		● 94.5%	●	651 / 11,935		
	Metric 21		● 94.3%	●	721 / 12,717		
	Metric 22		● 90.8%	●	174 / 1,885		
	Metric 23		● 88.1%	●	1,340 / 11,302		
	Metric 24		● 95.5%	●	144 / 3,207		

Why is it important?
With strong risk and compliance processes we maximize the uptime of

Risk and Compliance

KPI Topic	KPI Description			Non Compliant Countries	Additional Context		

KPI Description			Non Compliant Countries	Additional Context		
Metric 16		1	98.5%	2/130		
Metric 17			93.1%	9/130		
Metric 18			95.1%	28/569		
Metric 19			92.7%	41/561		
Metric 20			94.5%	651/11,935		
Metric 21		2	94.3%	721/12,717		
Metric 22			90.8%	174/1,885		
Metric 23		4	88.1%	1,340/11,302	5	
Metric 24			95.5%	144/3,207		
			70% 80% 90% 100%		D J F M A M	

651 /
11,935



Metric 20

Countries missed target

EUR

COUNTRY 48

81.4%

11 out of
59

COUNTRY 21

79.7%

37 out of
182

COUNTRY 1

60.7%

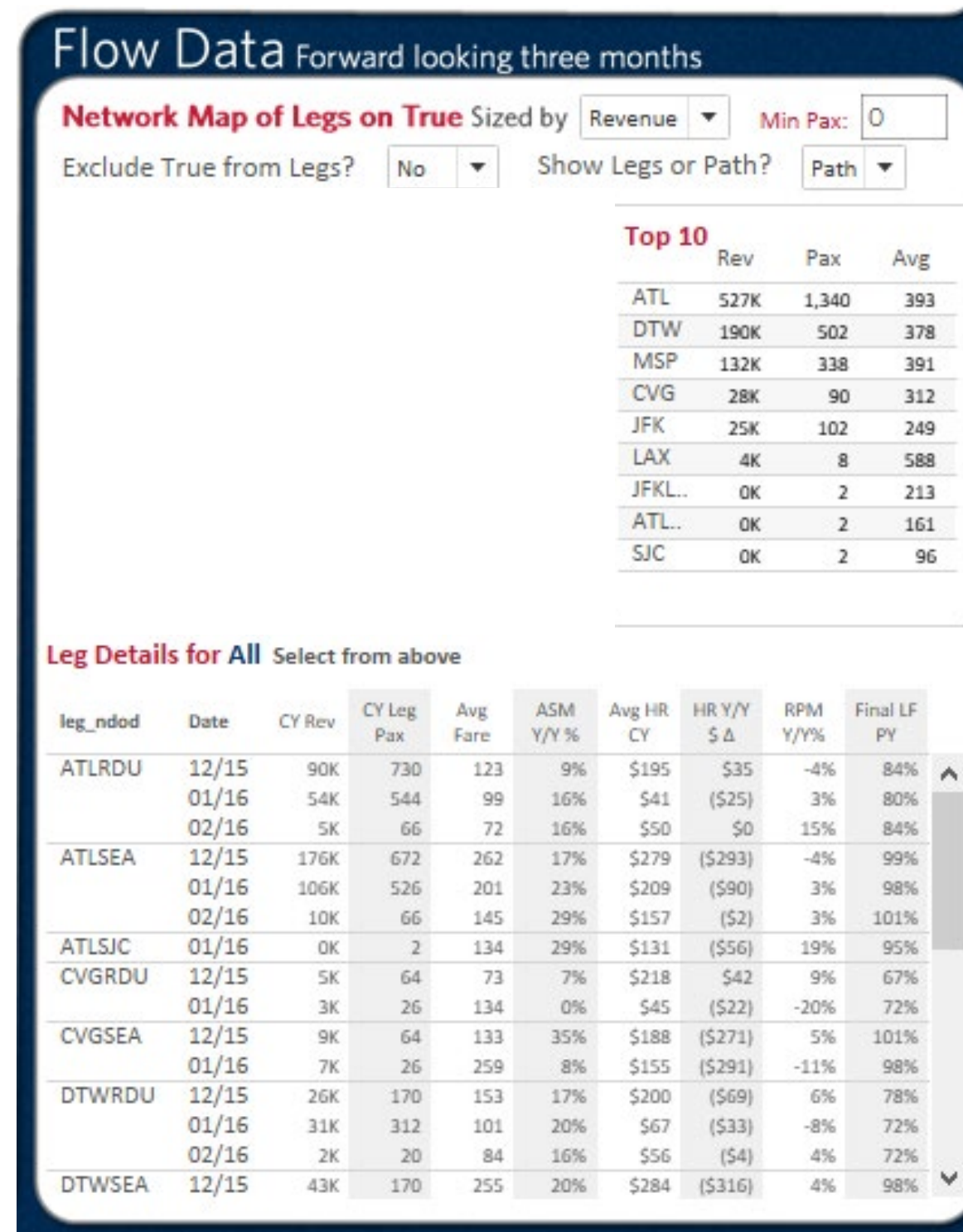
251 out of
638

The impact

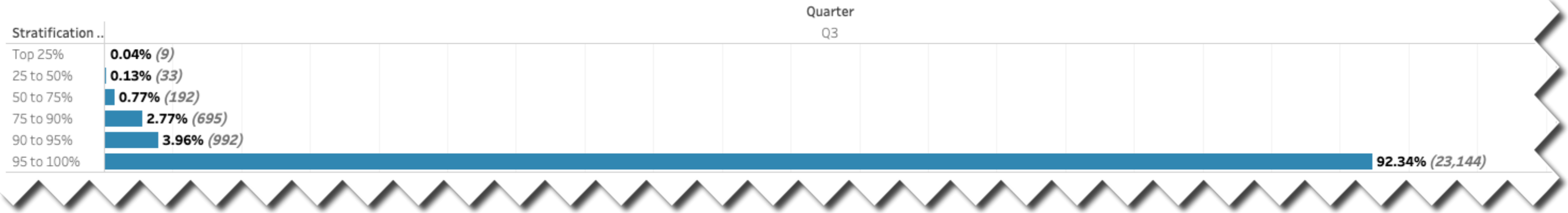
How do I get to **Seattle?**

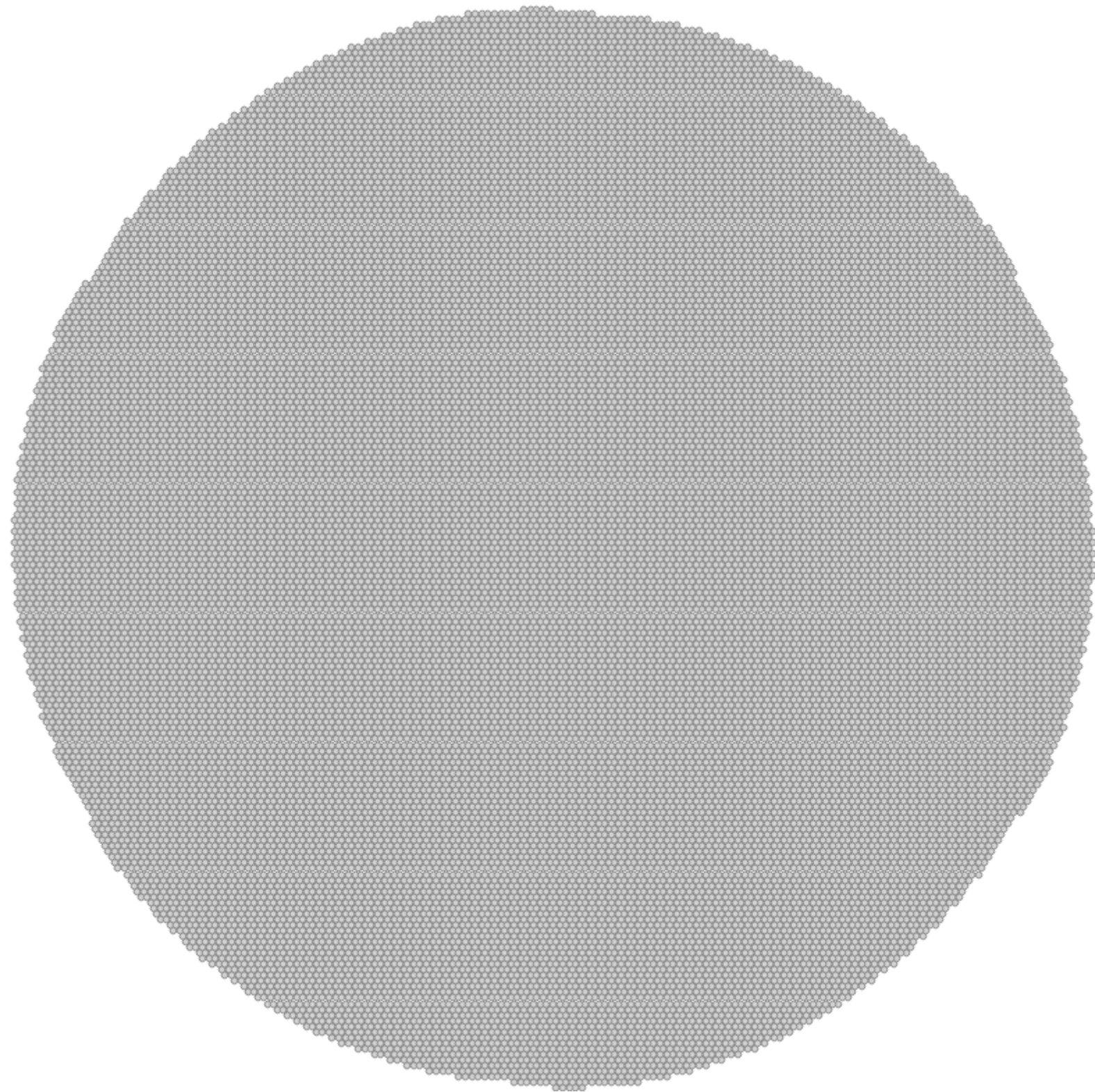
Q: Why not show this on a map?

A: We tried a map, it didn't work. Please don't try making a map again.

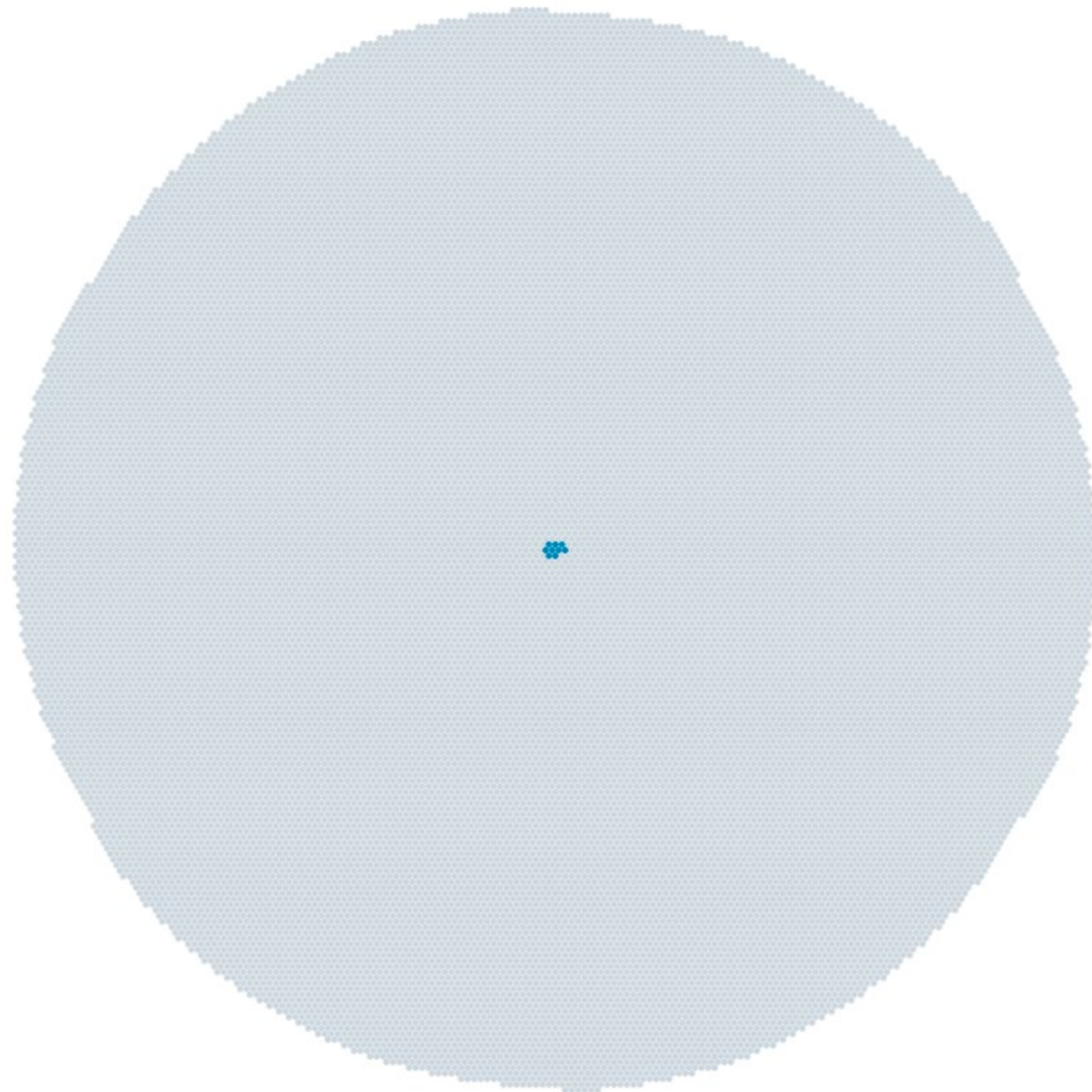


Stratification Modeling

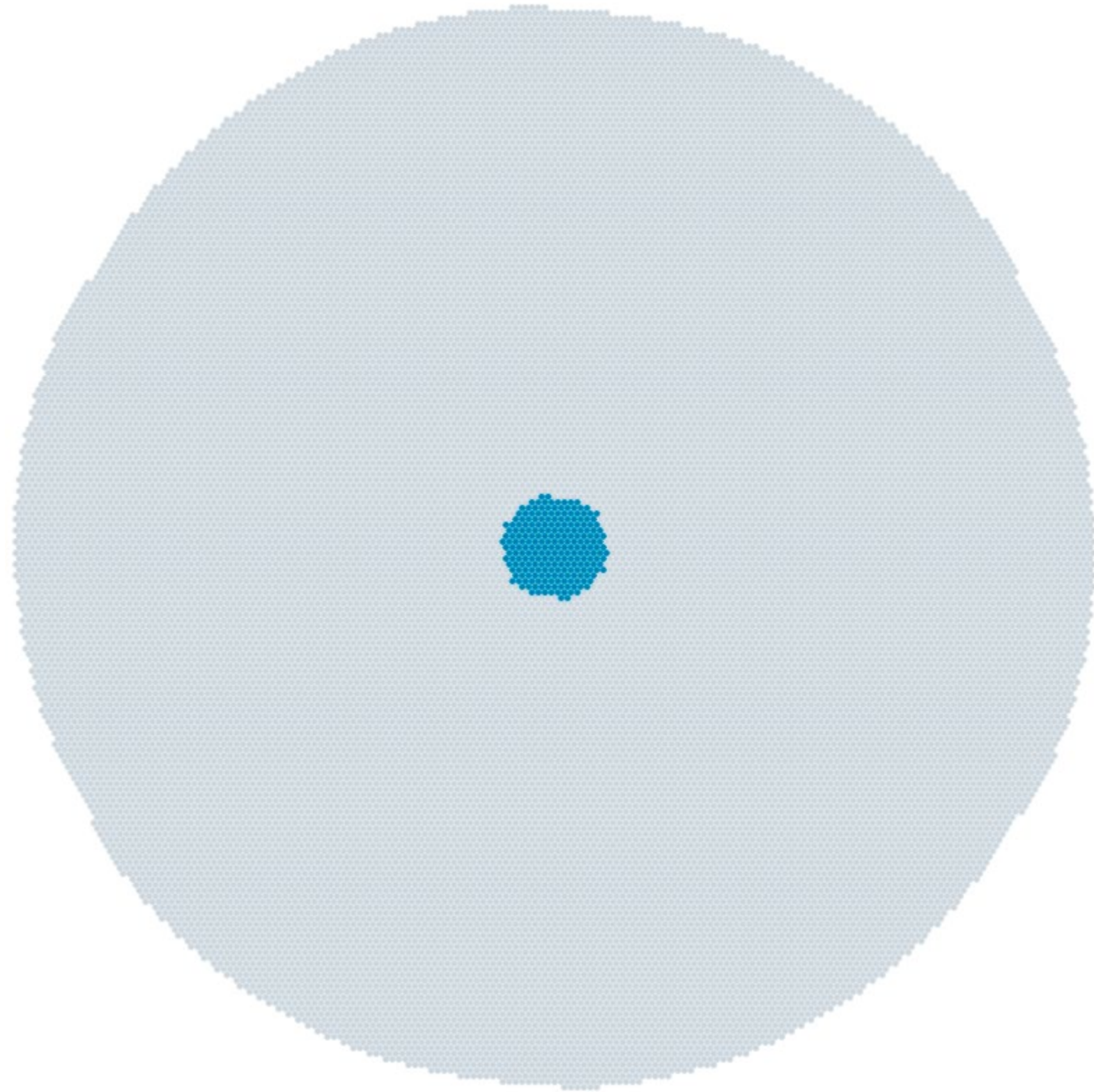




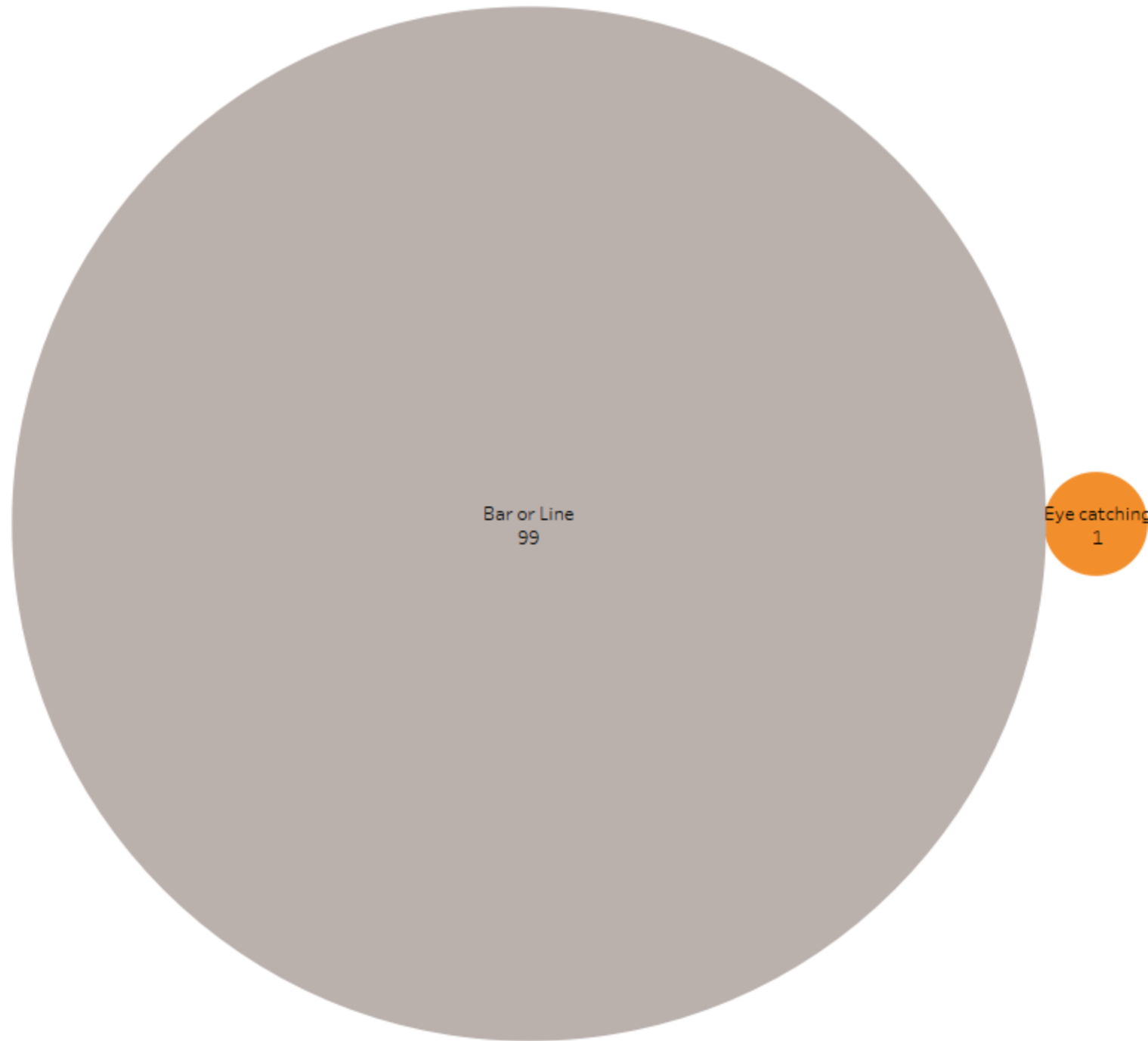
25% of income



75% of income

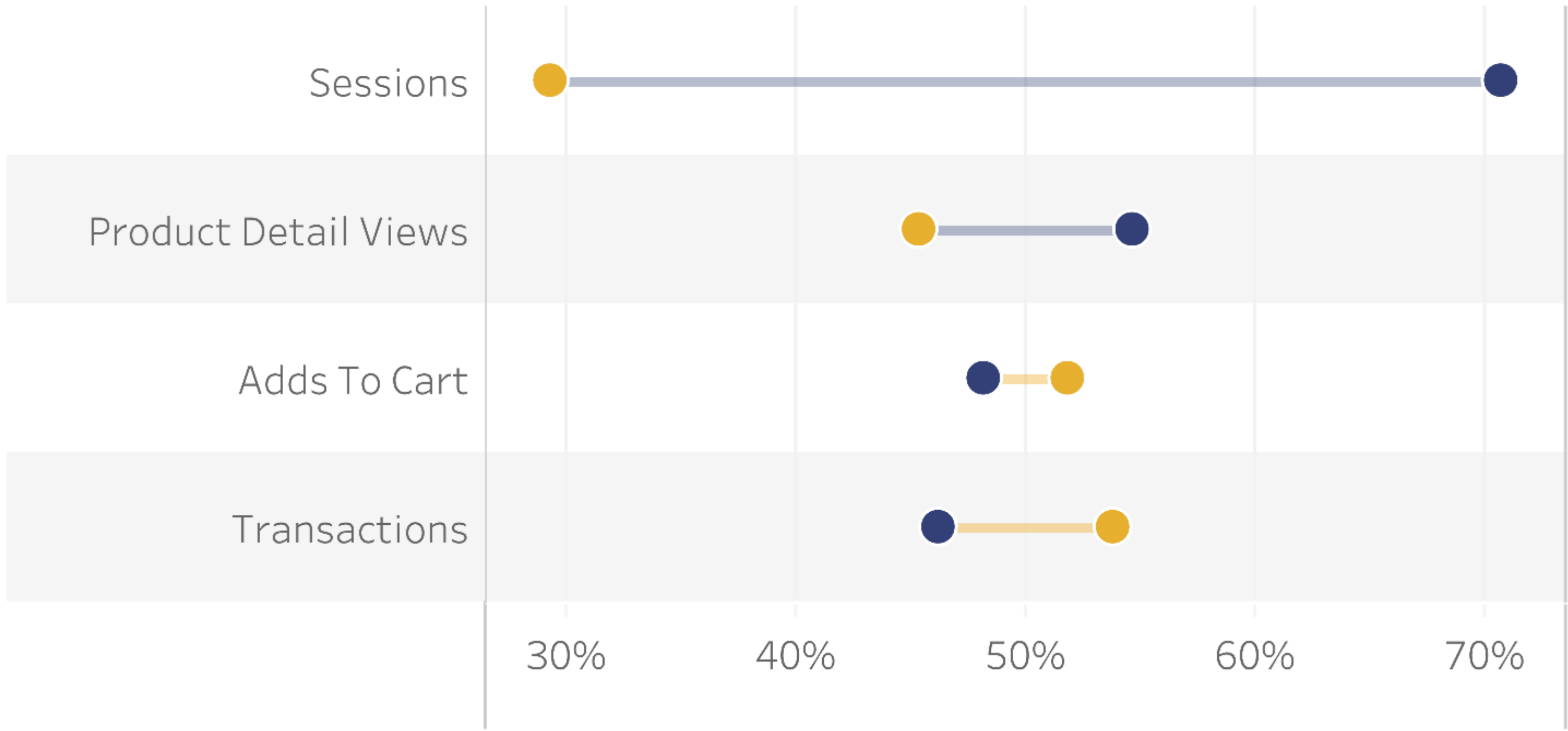


How many times out of 100 should I use a bar or line chart vs. something **eye catching**?



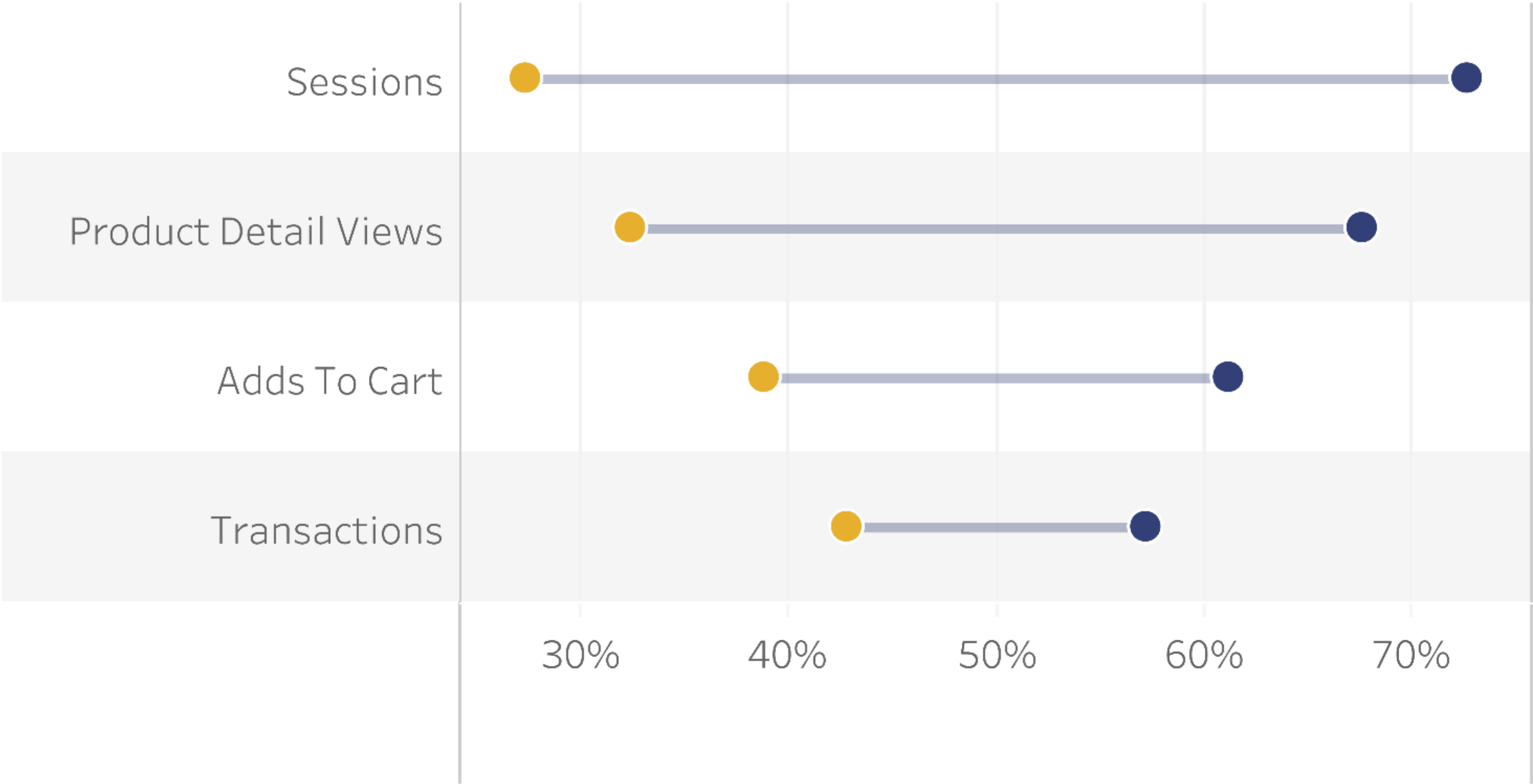
**eCommerce: shifting from
desktop to mobile**

Traffic distribution by reached funnel level: **mobile** vs. **desktop**



Source: Dorian Banutoiu

Similar store is doing better: **mobile vs. desktop**



The impact



Shock and awe



Imagine what could be...

DAIMLER P&L

2014-2018

FLOW TO NET PROFIT 2018 (in M€)

OVER TIME (in M€)

MARGINS (in % of Revenue)

Filter Year to...

- 2014
- 2015
- 2016
- 2017
- 2018

Show value...

- in M€
- in % of Revenue

Revenue

167,362

Gross Profit

33,067

EBIT

10,251

EBT

10,595

Net Profit

7,582

Cost of sales 134,295

OOI 2,330

Selling 13,067

GA 4,036

R&D 6,581

OOE 1,462

Equity Method Investments 656

OFI 210

Interest income 271

Interest expense 793

Income taxes 3,013

Revenue

167,362

Cost of sales

134,295

Selling

13,067

R&D

6,581

4,036

1,462

Fin. Profit

344

Income taxes

3,013

21.7%

19.8%

Gross Margin

7.2%

6.1%

EBIT-Margin

7.8%

6.3%

EBT-Margin

5.6%

4.5%

Net Profit-Margin



Created by **Klaus Schulte**
 Twitter: @ProfDrKSchulte
 Web: <http://vizjockey.com>

Inspired by **Nadieh Bremer**
 Twitter: @nadiehbremner
<https://www.visualcinnamon.com/portfolio/adyen-re..>

DAIMLER P&L

2014-2018

FLOW TO NET PROFIT 2018 (in % of Revenue)

OVER TIME (in % of Revenue)

MARGINS (in % of Revenue)

Filter Year to...

- 2014
- 2015
- 2016
- 2017
- 2018

Show values...

- in M€
- in % of Revenue

Revenue

100.0%

Gross Profit

19.8%

EBIT

6.1%

EBT

6.3%

Net Profit

4.5%

Cost of sales 80.2%

OOI 1.4%

Selling 7.8%

GA 2.4%

R&D 3.9%

OGE 0.9%

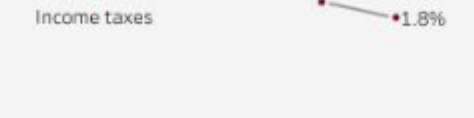
Equity Method Investments 0.4%

OFI 0.1%

Interest income 0.2%

Interest expense 0.5%

Income taxes 1.8%



Created by **Klaus Schulte**
 Twitter: @ProfDrKSchulte
 Web: <http://vizjockey.com>

Inspired by **Nadieh Bremer**
 Twitter: @nadiehbrem
<https://www.visualcinnamon.com/portfolio/adyen-re..>

Me:

55-82%

**General
population:**

1.9%

CANCER TYPE

CANCER RISK

POPULATION RISK

RELATED TO

BODY PART

To age xx

XX%-XX%

X.X%

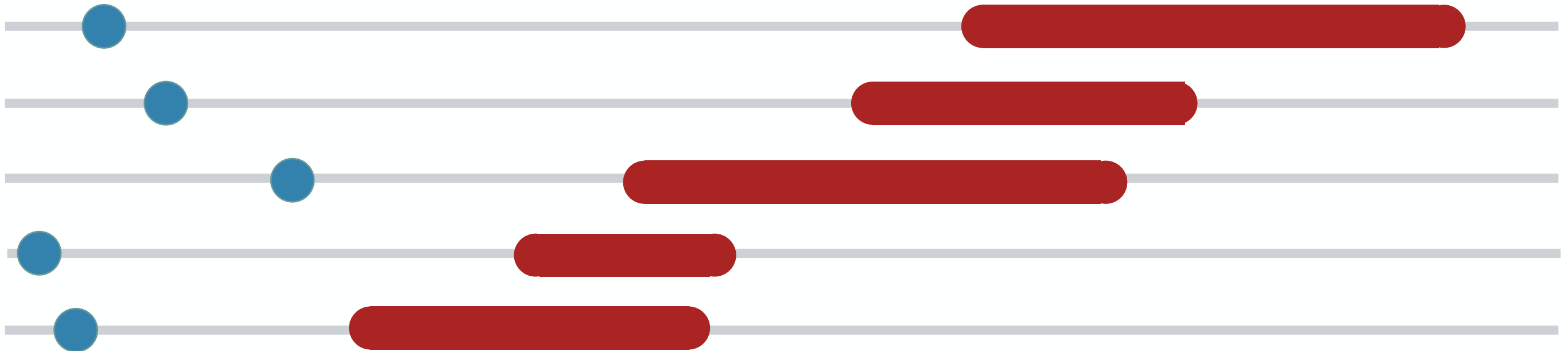
GENE MUTATION YOU HAVE

55-82%

1.9%

General population

Your risk

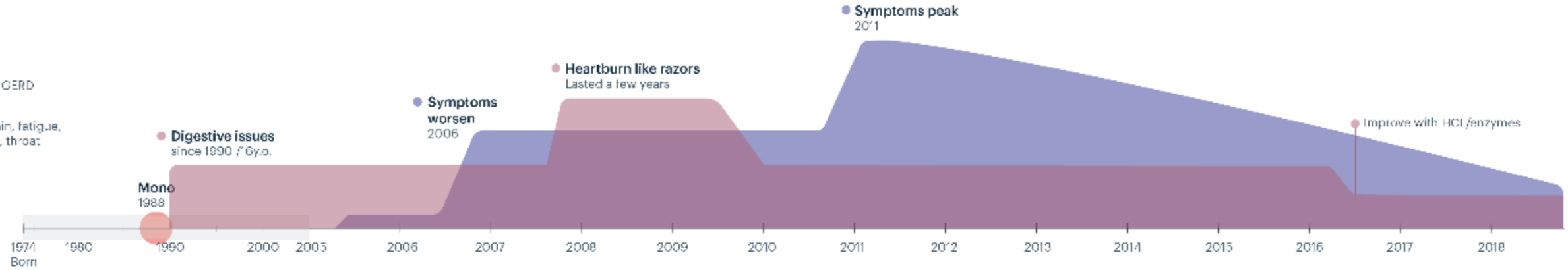


Health timeline

SYMPTOMS

● **Digestive**
gas, bloating, GERD

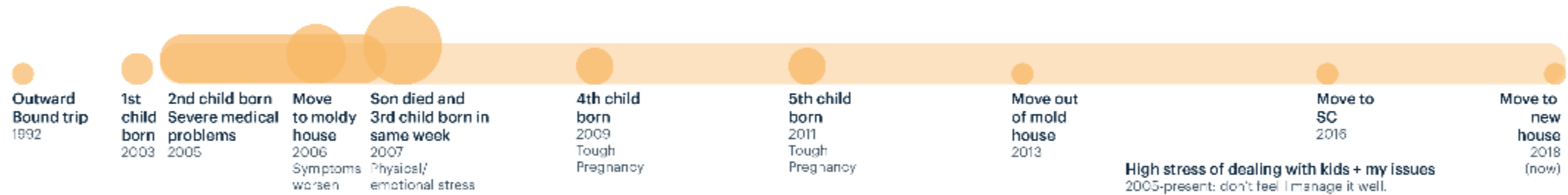
● **MCS/Lyme**
numbness, pain, fatigue,
stiff, brain fog, throat
swollen



DIAGNOSES

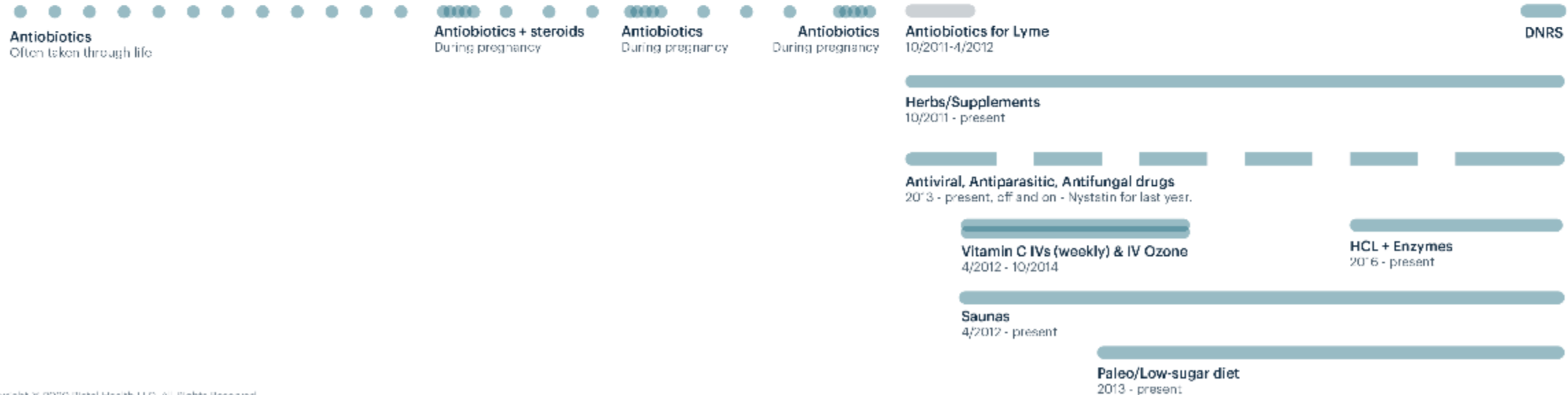


LIFE EVENTS



TREATMENTS

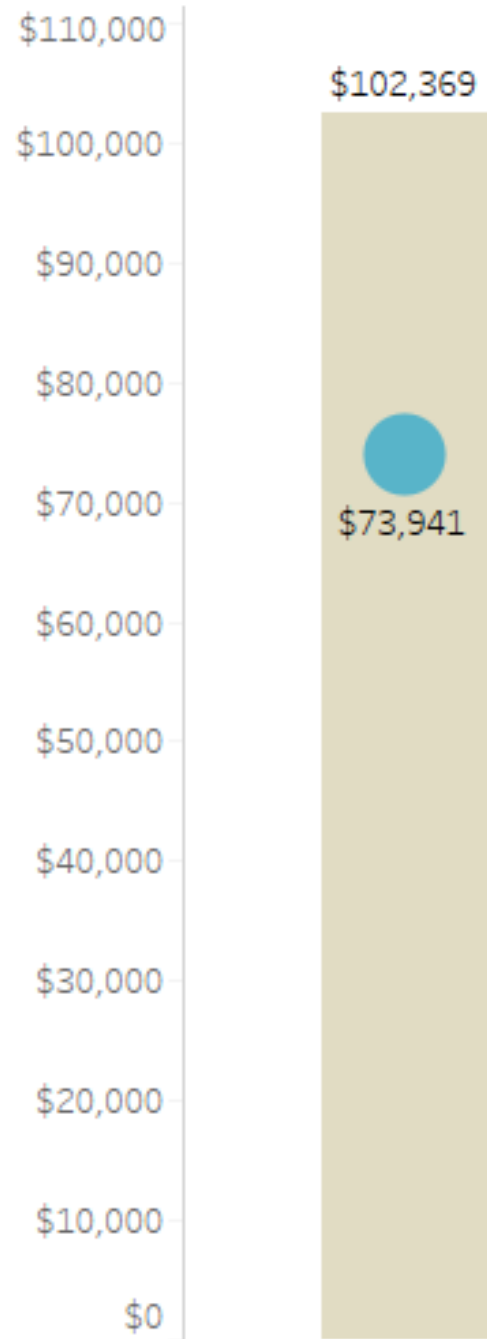
● Helps
● Not sure if helps
● Did not help



Summary vs
disaggregated
data

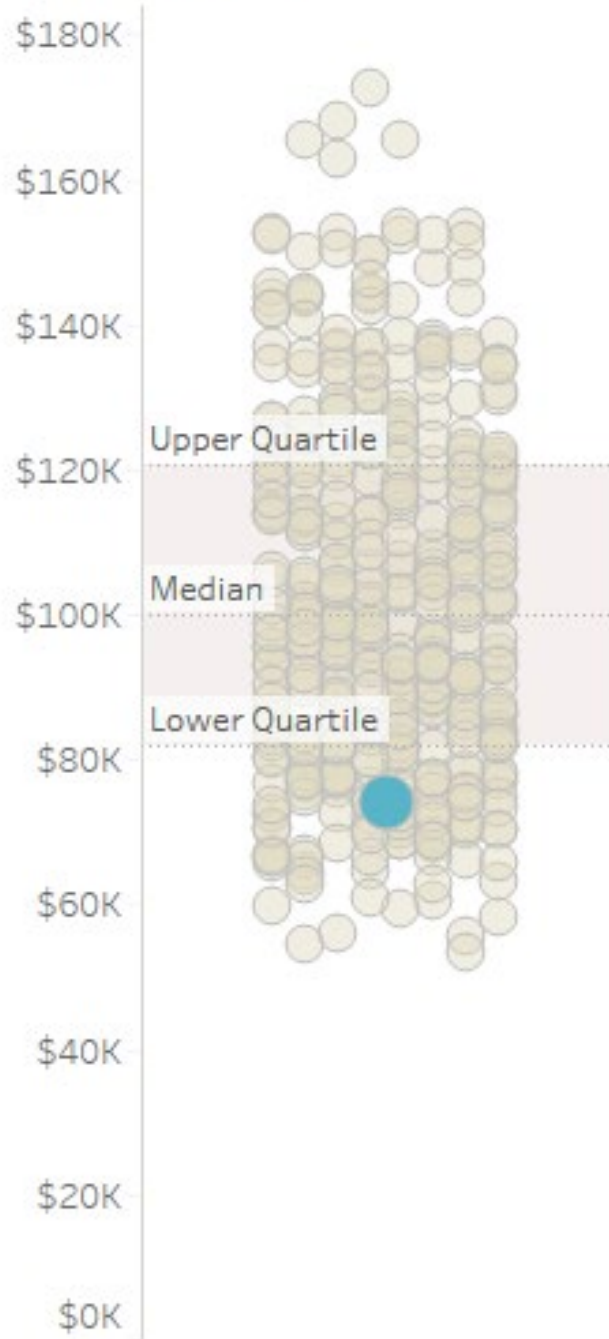
Salary distribution

You compared with everybody else



Salary distribution

You compared with everybody else



Mean

What would my
starting salary be?



I'll put it this way:
our average starting
salary is \$80,000!



you → \$ 30,000

all your coworkers { \$ 30,000
\$ 30,000
\$ 30,000
\$ 30,000
\$ 30,000
\$ 30,000

CEO's son → \$ 430,000

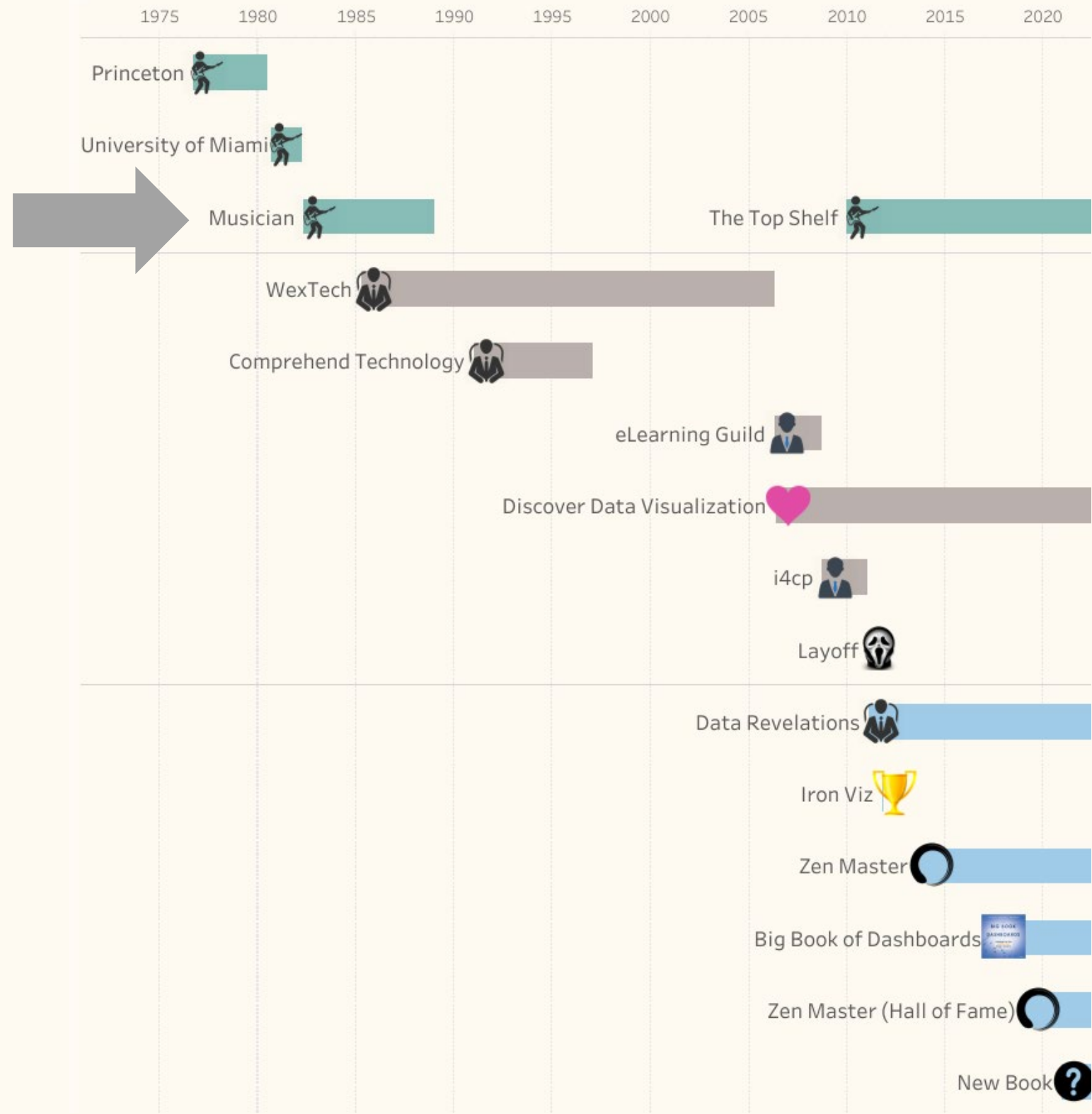
Average: \$80,000.



My story

Changing peoples' behavior

Hover over an icon for more information





James Jamerson

It's the year 2005...



It's the year 2005...



I literally
moved people

It's the year 2014...

The setup...

- **Major health care company**
- **Data on thousands of companies and millions of people**
- **Saving costs... and saving lives through compliance... how can we get buy in?**

Incidence of diabetes

Your organization: 18.5%

Average of all organizations: 4.9%

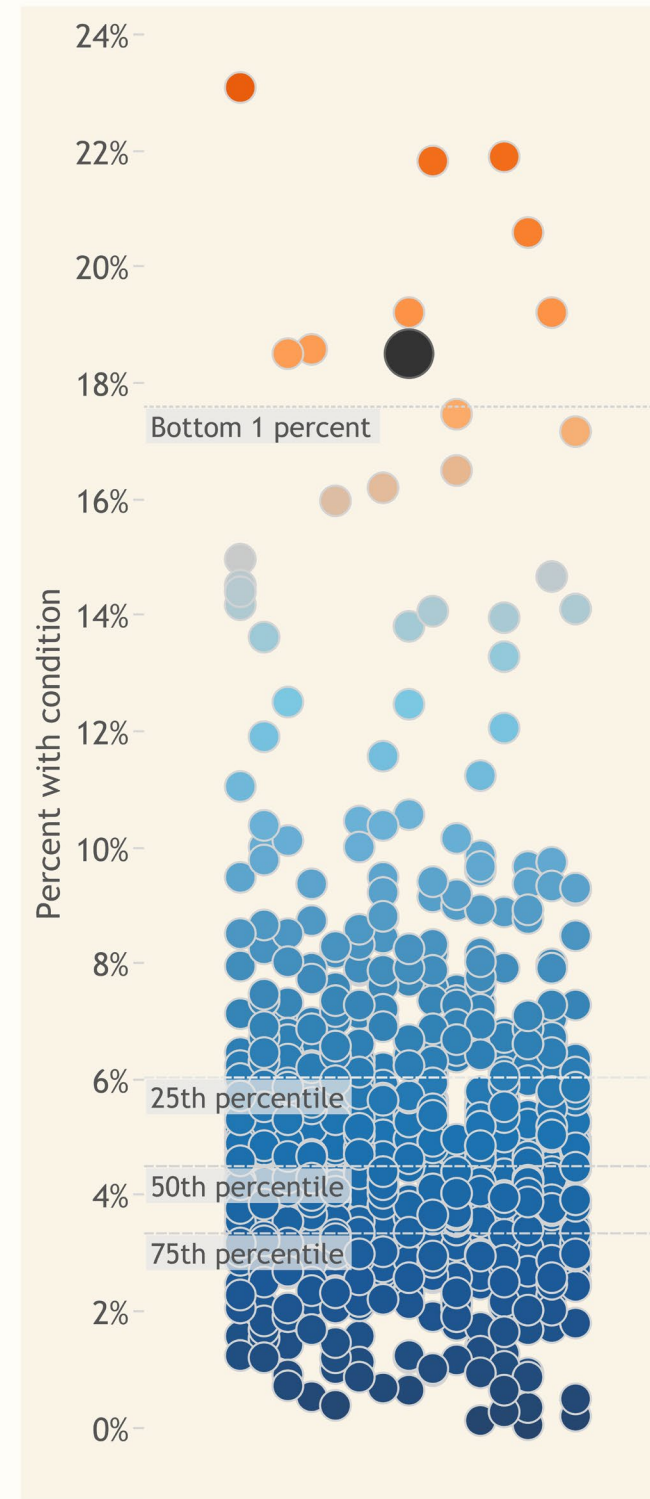


Incidence of diabetes

Your organization vs. other organizations

There are 790 different organizations, each represented by a dot.

Dots near the bottom indicate a **low incidence of diabetes**; dots near the top indicate a **high incidence**.



The impact

I *figuratively*
moved people



IMPORTANT

A close-up photograph of a person's hands holding a white rectangular sign. The person is wearing a dark grey suit jacket, a white dress shirt, and a dark tie. The sign is held horizontally in front of their chest. The text on the sign is centered and reads "WHO IS YOUR AUDIENCE?". The word "WHO" is in a large, bold, red font. "IS YOUR" is in a smaller, bold, black font. "AUDIENCE?" is in a large, bold, red font, matching the size of "WHO". The background is slightly blurred, focusing attention on the sign and the hands holding it.

WHO
IS YOUR
AUDIENCE?

What's the message?



Provide the **greatest** degree of understanding
with the **least** amount of effort.

You may not change the world,
but you **can** change your organization

STEVE WEXLER | JEFFREY SHAFFER | ANDY COTGREAVE

THE
BIG BOOK
OF
DASHBOARDS

Visualizing Your Data
Using Real-World
Business Scenarios

DataRevelations.com

Steve Wexler
twitter: @DataRevelations
swexler@datarevelations.com