

# MAKING DECISIONS IN VISUALIZATION



Alberto Cairo

Coda.Br 2020

We are living through a golden age of information graphics

# How Y'all, Youse and You Guys Talk

What does the way you speak say about where you're from? Answer all the questions below to see your personal dialect map.

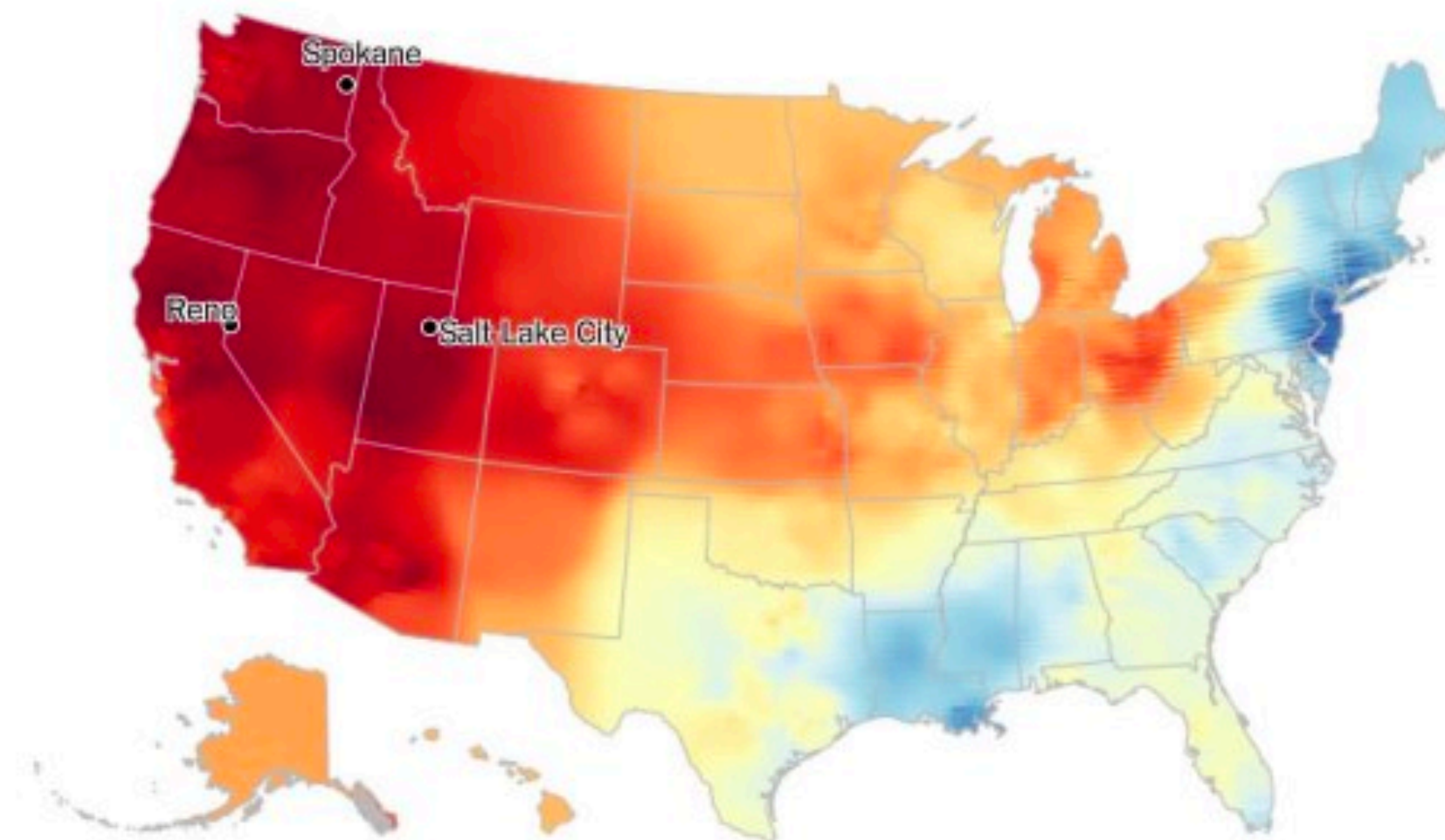
## Your Map

See the pattern of your dialect in the map below. Three of the most similar cities are shown.

Least similar Most similar

Show least similar

SHARE YOUR MAP:



These maps show your most distinctive answer for each of these cities.



## NYTimes' Dialect Quiz

<https://www.nytimes.com/interactive/2014/upshot/dialect-quiz-map.html>

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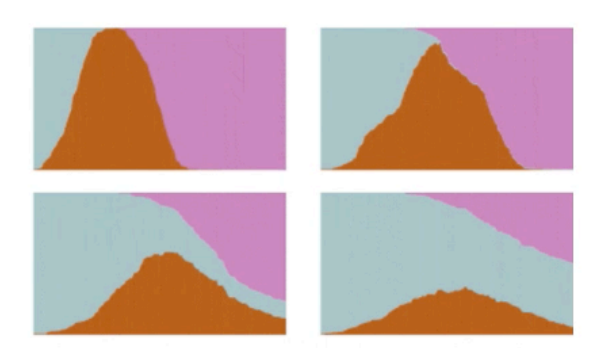
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2.6k



Health

# Why outbreaks like coronavirus spread exponentially, and how to “flatten the curve”

By [Harry Stevens](#) March 14, 2020

PLEASE NOTE

The Washington Post is providing this story for free so that all readers have access to this important information about the coronavirus. For more free stories, [sign up for our daily Coronavirus Updates newsletter](#).

<https://www.washingtonpost.com/graphics/2020/world/corona-simulator/>



The Post's visual journalism, which involves staff throughout the newsroom, has attracted large audiences and contributed to record subscriber growth.

Six of the seven most visited stories in The Washington Post's history have been graphics, including the [coronavirus simulator](#) that became the most visited article in The Post's history, with more than three times as many visits as the second. It also includes this year's [Democratic candidate quiz](#), which set the record for converting readers to subscribers.

<https://www.washingtonpost.com/pr/2020/06/26/washington-post-expand-graphics-design-teams-with-14-new-positions/>

## At the same time, we're still dealing with some misconceptions and myths:

1. “A picture is worth a thousand words”
2. “Visualization is intuitive”
3. “The data should speak for itself”
4. “Show, don't tell!”
5. “Learn the rules of visualization (by reading this book by [insert author's name here])!”



Visuals are often ambiguous





Visuals are often ambiguous

Visualizations can't be designed based just on our personal preferences—although these *are* important.

**Visualization is a bit like writing:** beyond some conventions and constraints regarding symbols, visual grammar, perception, and cognition, visualization **can't be based on “rules” that are set in stone.**

Instead, when designing visualizations, we need to be guided by **reasoned, justifiable choices.**



“Facts give us **reasons** [...] when they count in favor of our having some belief or desire, or acting in some way.”

Derek Parfit, *On What Matters*



# I. Why should my visualization exist?

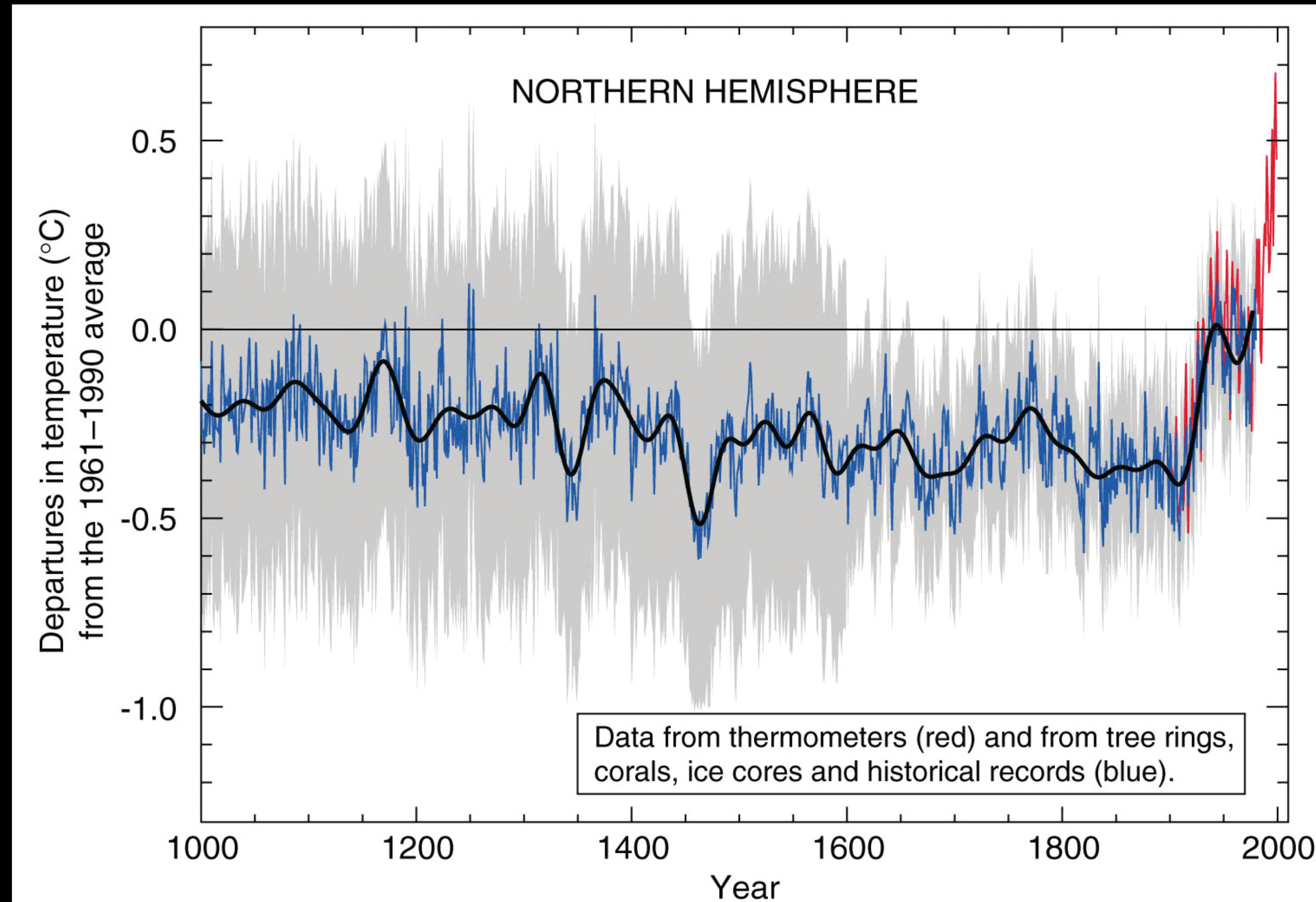
Do the potential benefits of designing my visualization outweigh the possible harm it might cause?

# Detecting patterns

	A	B	C	D	E	F	G		A	B	C	D	E	F	G	H
1	YEAR	TEMP	YEAR	1 SIGMA	2 SIGMA			878	1876	-0.1891	1876	0.113228	0.226456	8.25297E-02	7.75207E-02	
2	1000	0.0659	1000	0.240346	0.480693	0.206137	0.123588	879	1877	-0.0140	1877	0.113228	0.226457	8.25299E-02	7.75209E-02	
3	1001	-0.1241	1001	0.240347	0.480694	0.206137	0.123589	880	1878	-0.0873	1878	0.113228	0.226457	8.25298E-02	7.75209E-02	
4	1002	-0.1208	1002	0.240346	0.480692	0.206136	0.123588	881	1879	-0.2959	1879	0.113229	0.226458	8.25302E-02	7.75212E-02	
5	1003	-0.1801	1003	0.240347	0.480694	0.206137	0.123589	882	1880	-0.2368	1880	0.113229	0.226457	8.25300E-02	7.75210E-02	
6	1004	-0.0711	1004	0.240347	0.480693	0.206137	0.123588	883	1881	-0.1977	1881	0.113229	0.226458	8.25302E-02	7.75212E-02	
7	1005	-0.1334	1005	0.240346	0.480692	0.206136	0.123588	884	1882	-0.2036	1882	0.113229	0.226457	8.25300E-02	7.75210E-02	
8	1006	-0.0644	1006	0.240346	0.480693	0.206137	0.123588	885	1883	-0.2489	1883	0.113228	0.226455	8.25293E-02	7.75204E-02	
9	1007	0.0042	1007	0.240347	0.480693	0.206137	0.123588	886	1884	-0.2125	1884	0.113229	0.226457	8.25301E-02	7.75211E-02	
10	1008	-0.1288	1008	0.240347	0.480693	0.206137	0.123588	887	1885	-0.1896	1885	0.113228	0.226457	8.25299E-02	7.75210E-02	
11	1009	-0.0296	1009	0.240347	0.480693	0.206137	0.123588	888	1886	-0.1084	1886	0.113228	0.226456	8.25298E-02	7.75208E-02	
12	1010	0.1187	1010	0.240347	0.480694	0.206137	0.123589	889	1887	-0.3265	1887	0.113228	0.226456	8.25296E-02	7.75206E-02	
13	1011	-0.1252	1011	0.240346	0.480692	0.206136	0.123588	890	1888	-0.1694	1888	0.113228	0.226457	8.25298E-02	7.75209E-02	
14	1012	-0.1634	1012	0.240347	0.480694	0.206137	0.123588	891	1889	-0.1339	1889	0.113228	0.226456	8.25298E-02	7.75208E-02	
15	1013	-0.0791	1013	0.240347	0.480693	0.206137	0.123588	892	1890	-0.3107	1890	0.113229	0.226457	8.25301E-02	7.75211E-02	
16	1014	-0.1120	1014	0.240347	0.480693	0.206137	0.123588	893	1891	-0.1754	1891	0.113229	0.226457	8.25300E-02	7.75210E-02	
17	1015	-0.1146	1015	0.240346	0.480692	0.206136	0.123588	894	1892	-0.3186	1892	0.113228	0.226456	8.25295E-02	7.75205E-02	
18	1016	-0.1206	1016	0.240346	0.480692	0.206136	0.123588	895	1893	-0.3236	1893	0.113228	0.226456	8.25297E-02	7.75207E-02	
19	1017	-0.0815	1017	0.240347	0.480693	0.206137	0.123588	896	1894	-0.1970	1894	0.113228	0.226456	8.25295E-02	7.75205E-02	
20	1018	-0.2031	1018	0.240346	0.480693	0.206137	0.123588	897	1895	-0.1578	1895	0.113228	0.226456	8.25297E-02	7.75207E-02	
21	1019	0.0305	1019	0.240347	0.480693	0.206137	0.123588	898	1896	-0.0804	1896	0.113228	0.226456	8.25298E-02	7.75208E-02	
22	1020	0.1098	1020	0.240347	0.480694	0.206137	0.123589	899	1897	-0.0537	1897	0.113228	0.226456	8.25298E-02	7.75208E-02	
23	1021	0.0244	1021	0.240347	0.480693	0.206137	0.123588	900	1898	-0.2195	1898	0.113229	0.226457	8.25301E-02	7.75211E-02	
24	1022	-0.0743	1022	0.240347	0.480693	0.206137	0.123588	901	1899	-0.3486	1899	0.113228	0.226456	8.25297E-02	7.75207E-02	
25	1023	-0.0323	1023	0.240347	0.480693	0.206137	0.123588	902	1900	-0.1253	1900	0.113229	0.226457	8.25300E-02	7.75210E-02	
26	1024	-0.0434	1024	0.240346	0.480693	0.206137	0.123588	903	1901	-0.1575	1901	0.113228	0.226456	8.25296E-02	7.75206E-02	



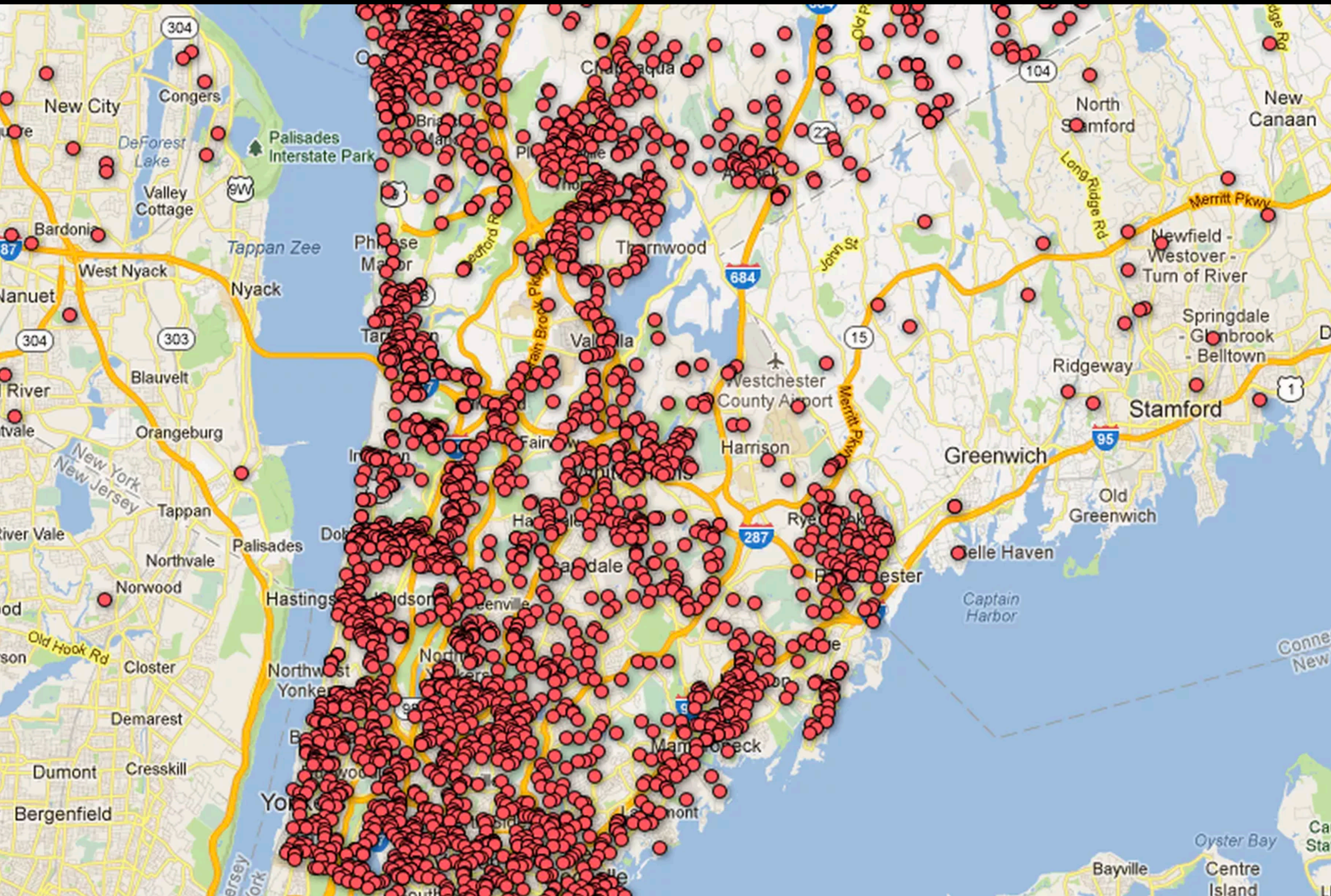
# Detecting patterns



**Michael E. Mann, Raymond S. Bradley, and Malcolm K. Hughes**  
Intergovernmental Panel on Climate Change (IPCC), Third Report, 2001



Published Dec. 23, 2012 (the Sandy Hook Elementary School shooting was on Dec. 14)

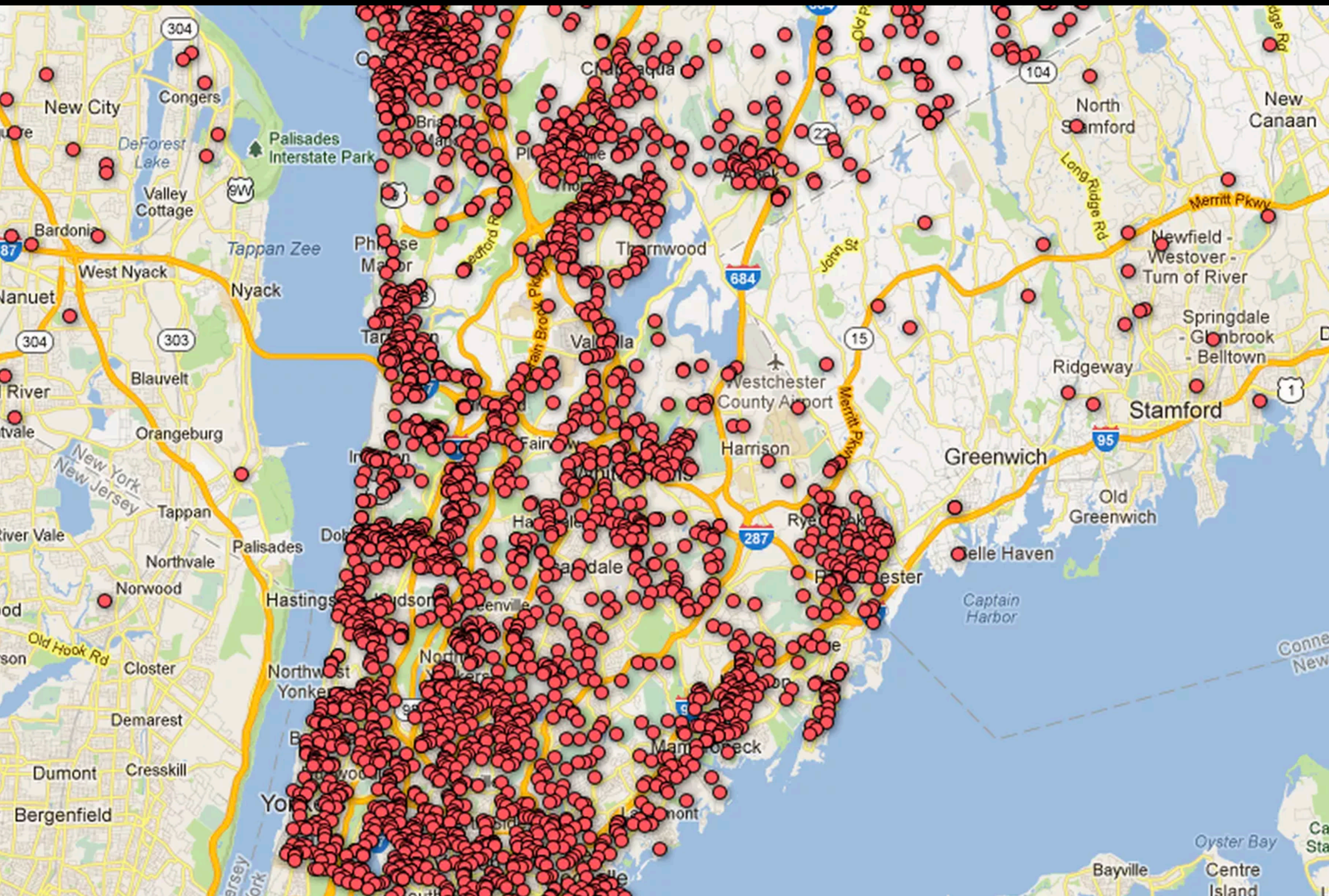


"Where are the gun permits in your neighborhood?" That's the question posed by **The Journal News**, a New York newspaper that published a Google map on Sunday that shows the names and addresses of pistol or revolver permits in Westchester and Rockland counties."

<https://www.theverge.com/2012/12/25/3802960/new-york-newspaper-posts-map-with-names-addresses-of-gun-owners>



Published Dec. 23, 2012 (the Sandy Hook Elementary School shooting was on Dec. 14)



**“We felt sharing information about gun permits in our area was important in the aftermath of the Newtown shootings.”**

**Janet Hasson,  
president and  
publisher of the  
Journal News  
Media Group**



Published Dec. 23, 2012 (the Sandy Hook Elementary School shooting was on Dec. 14)

# WHY?

Why should this data be made public?

Why should it be made public through a map?

Why should it be *this type* of map?

Even if we decided that this data is worth publishing, wouldn't a different map be better?

What are the potential consequences of my decisions?

**Are the benefits worth the risk of harm?**





## 2. What to visualize?

Do I understand my data, its limitations, uncertainty, or glitches?  
What or who is being measured (*or not being measured*,) and why?

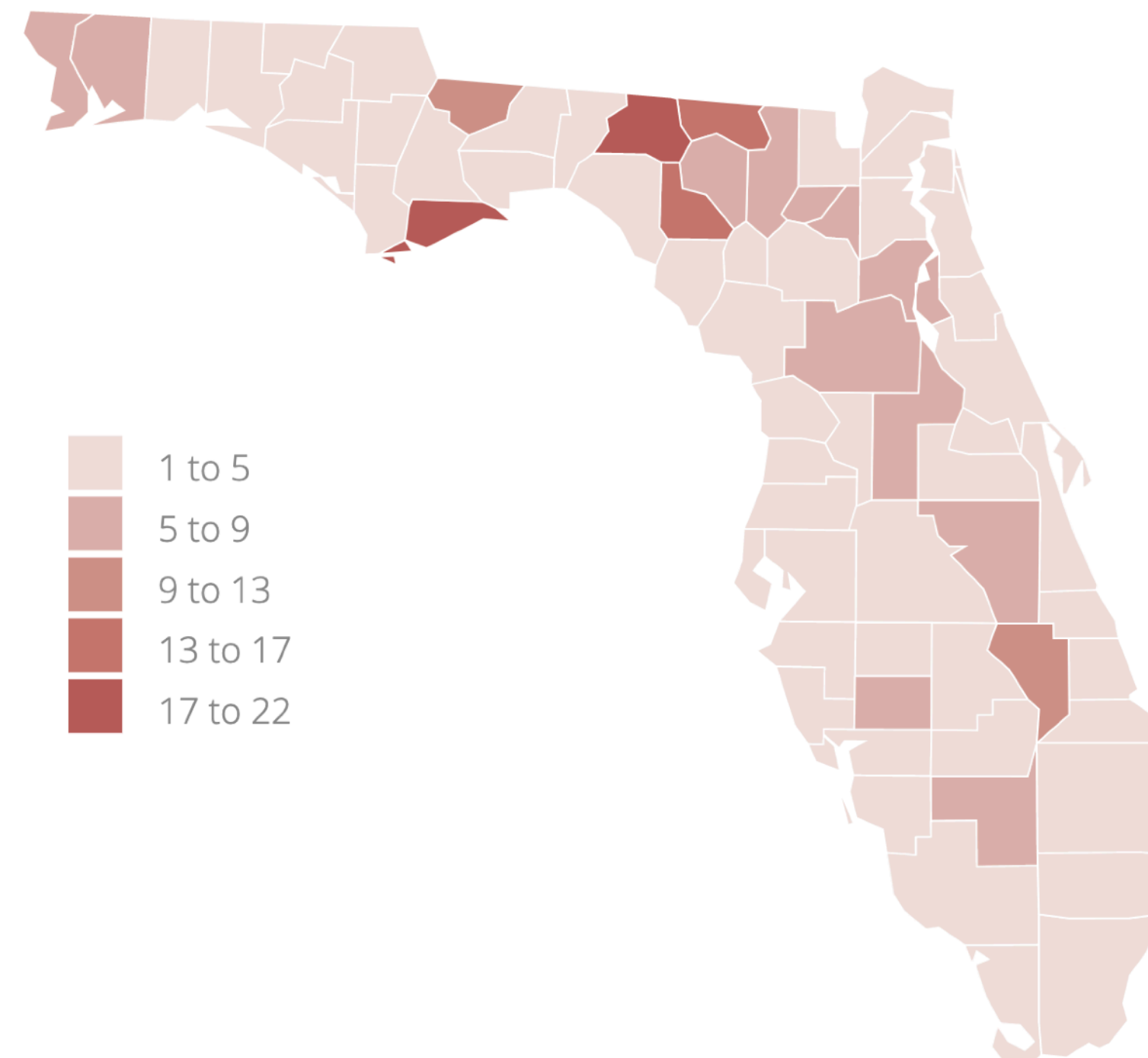
# AT SCHOOL

# WITHOUT A ROOF

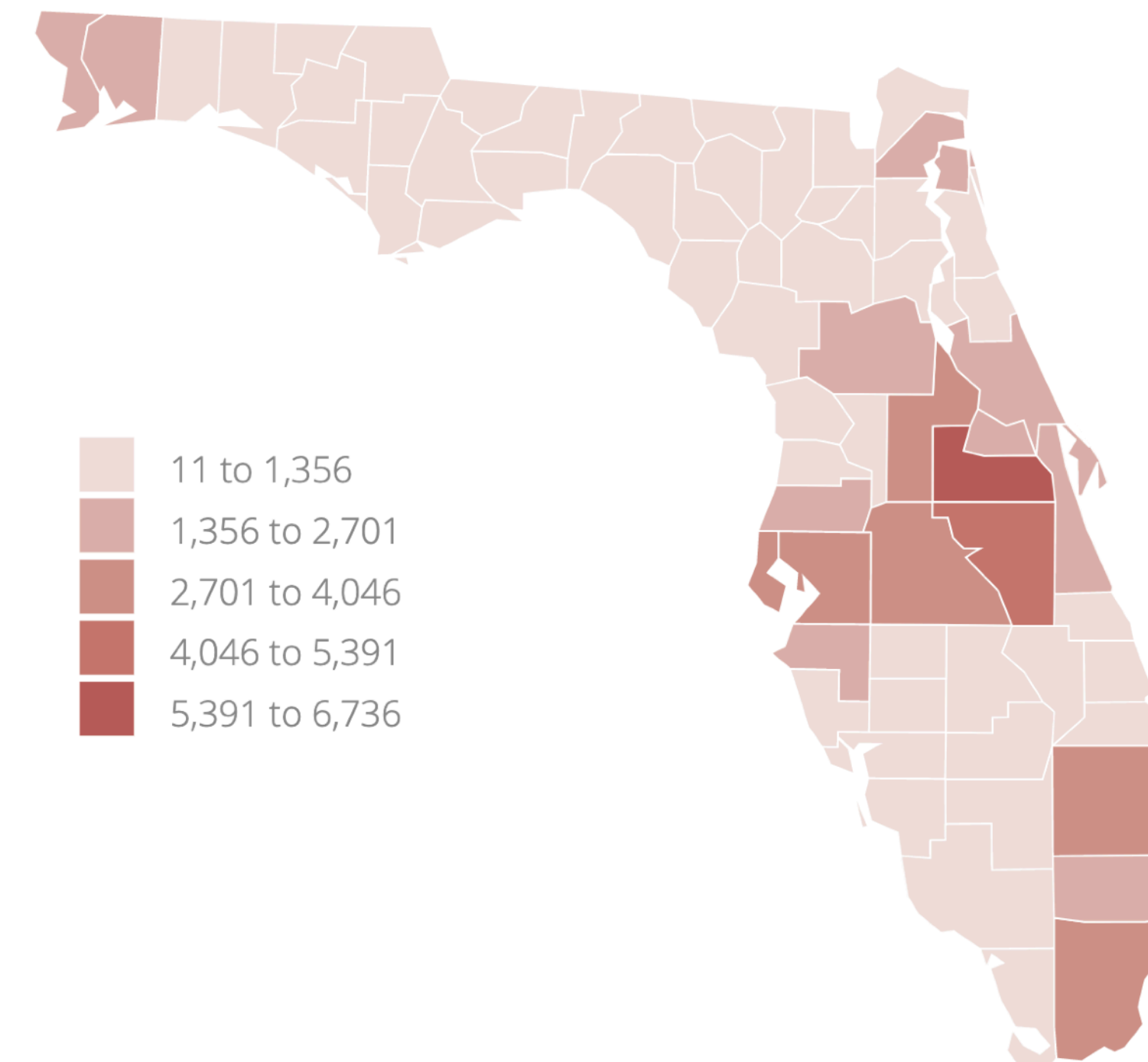
[http://  
www.lmelgar.me/  
without-a-roof/](http://www.lmelgar.me/without-a-roof/)

In Florida more than 71,000 students are homeless. During the last decade, this population rocketed as a result of the recession and how hard it has become for the poorest families to find affordable housing.

Percentage Total



Percentage Total



DATOS DEL CENTRO DE ESTUDIOS DE OPINIÓN ›

# El no a la independencia de Cataluña gana al sí por primera vez desde 2012

El 'CIS catalán' constata que el apoyo a la secesión cae un 9% en los últimos dos meses



3042



PERE RÍOS

Barcelona - 19 DIC 2014 - 15:51 EST

pais.com/ccaa/catalunya.html

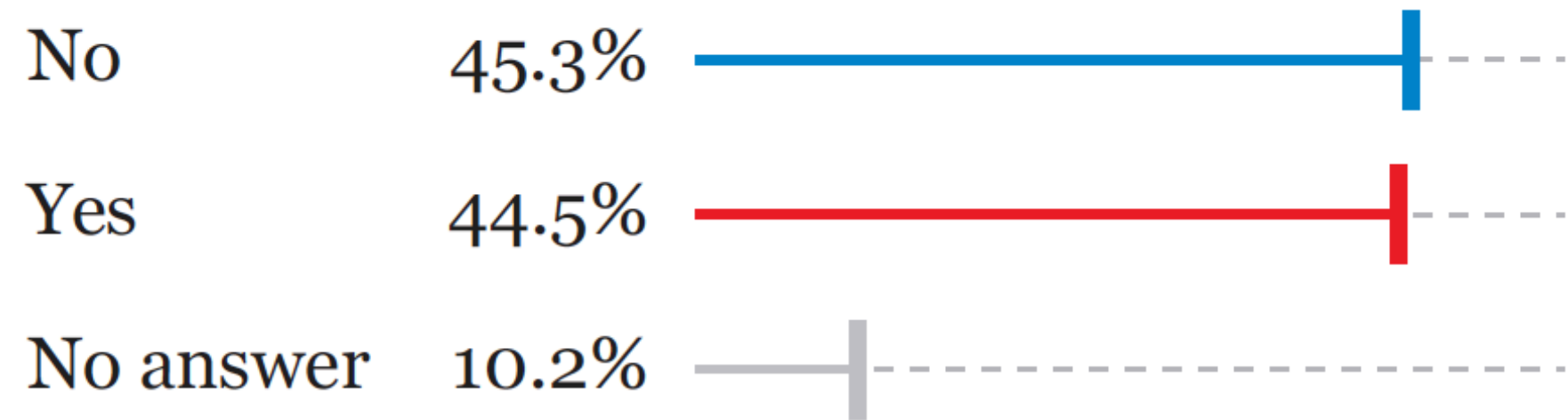
[https://elpais.com/ccaa/2014/12/19/catalunya/1418984873\\_128596.html](https://elpais.com/ccaa/2014/12/19/catalunya/1418984873_128596.html)



For the first time since Catalan leader Artur Mas began his ongoing independence drive in 2012, a survey shows that a majority in the region would reject secession if a referendum were held now.

The latest poll by the Catalan executive's Opinion Studies Center (CEO) shows that 45.3 percent of citizens would vote no to the question: "Would you like Catalonia to become an independent state?" compared with 44.5 percent who would support the move.

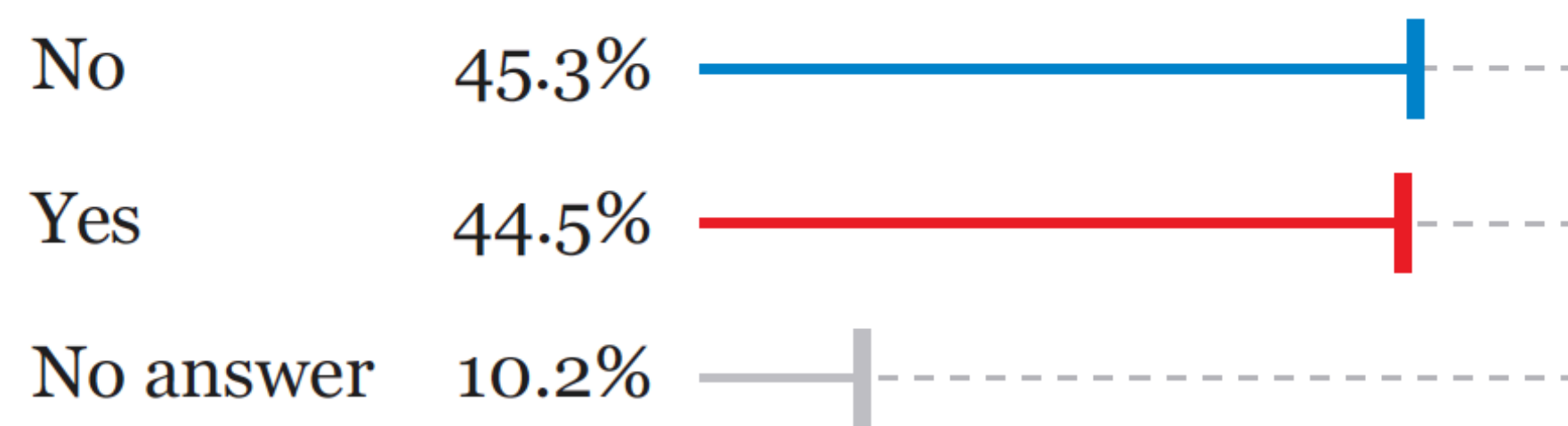
*Do you want Catalonia  
to become an independent state?*



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*Do you want Catalonia  
to become an independent state?*



Margin of error: +/-2.95 at 95% confidence level

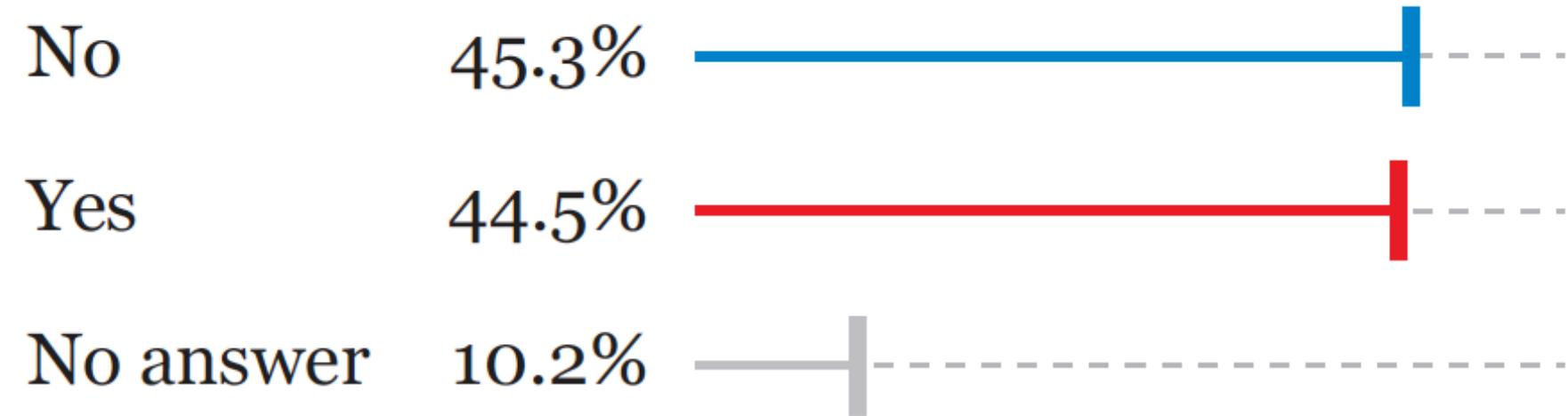
**“The margin of error of the poll is 2.95, a relevant fact considering the tight difference between the YES and the NO to the independence of Catalonia”**



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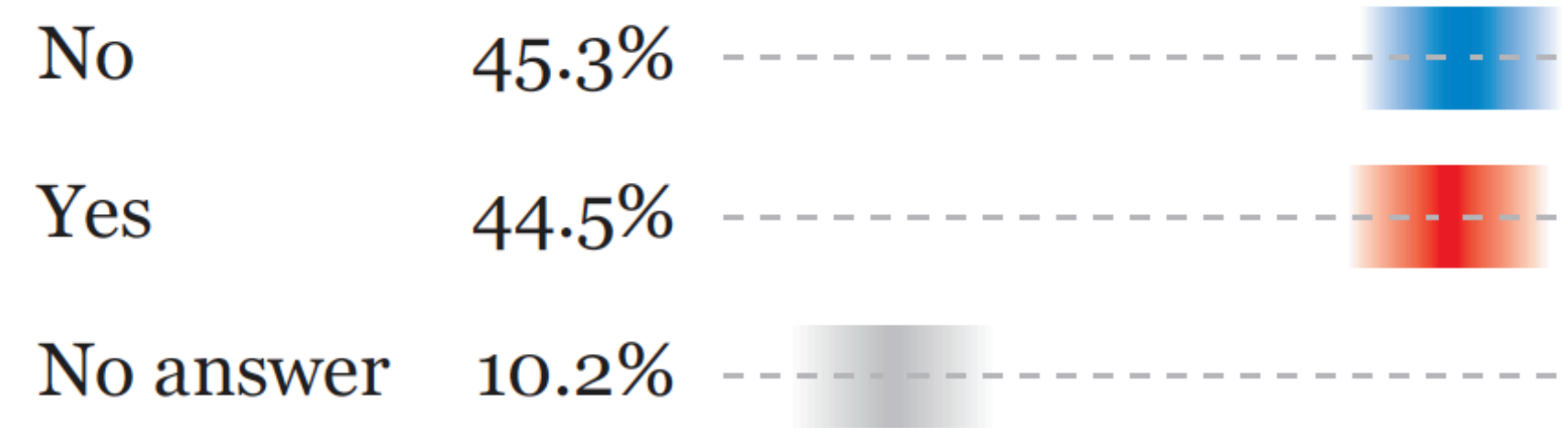
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*Do you want Catalonia to become an independent state?*



Margin of error: +/-2.95 at 95% confidence level

*Do you want Catalonia to become an independent state?*



The probability of the tiny difference between the "No" and the "Yes" being just due to random chance is very high

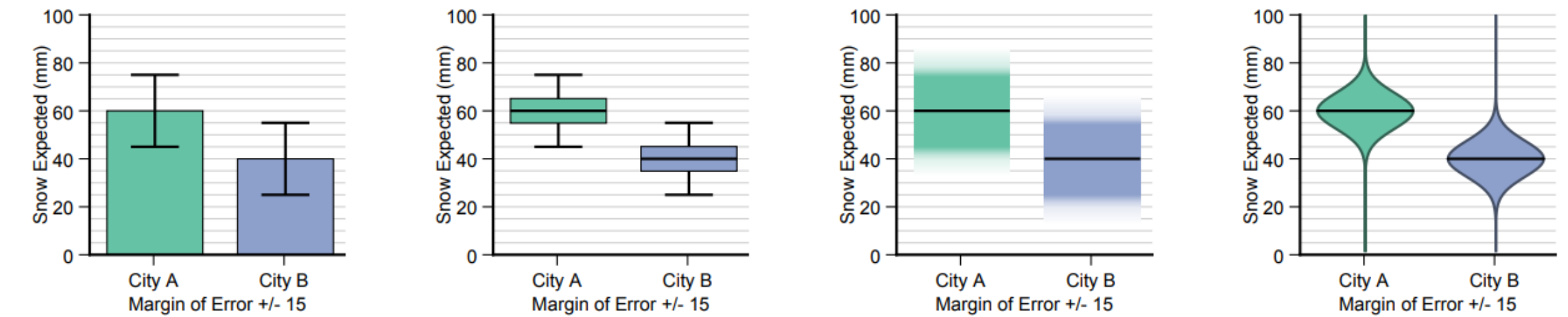
**"The margin of error of the poll is 2.95, a relevant fact considering the tight difference between the YES and the NO to the independence of Catalonia"**

# Disclosing limitations and uncertainty

**Uncertainty and graphicacy**  
**How should statisticians, journalists, and designers reveal uncertainty in graphics for public consumption?**

## Error Bars Considered Harmful: Exploring Alternate Encodings for Mean and Error

Michael Correll *Student Member, IEEE*, and Michael Gleicher *Member, IEEE*



<https://ec.europa.eu/eurostat/cros/powerfromstatistics/OR/PfS-OutlookReport-Cairo.pdf>

<https://graphics.cs.wisc.edu/Papers/2014/CGI4/Preprint.pdf>

## Collection of papers about visualizing uncertainty:

<https://www.dropbox.com/sh/jk4ginxyai6ylqu/AABvqdyTlhJtyFN9nKNHyX9Ba?dl=0>



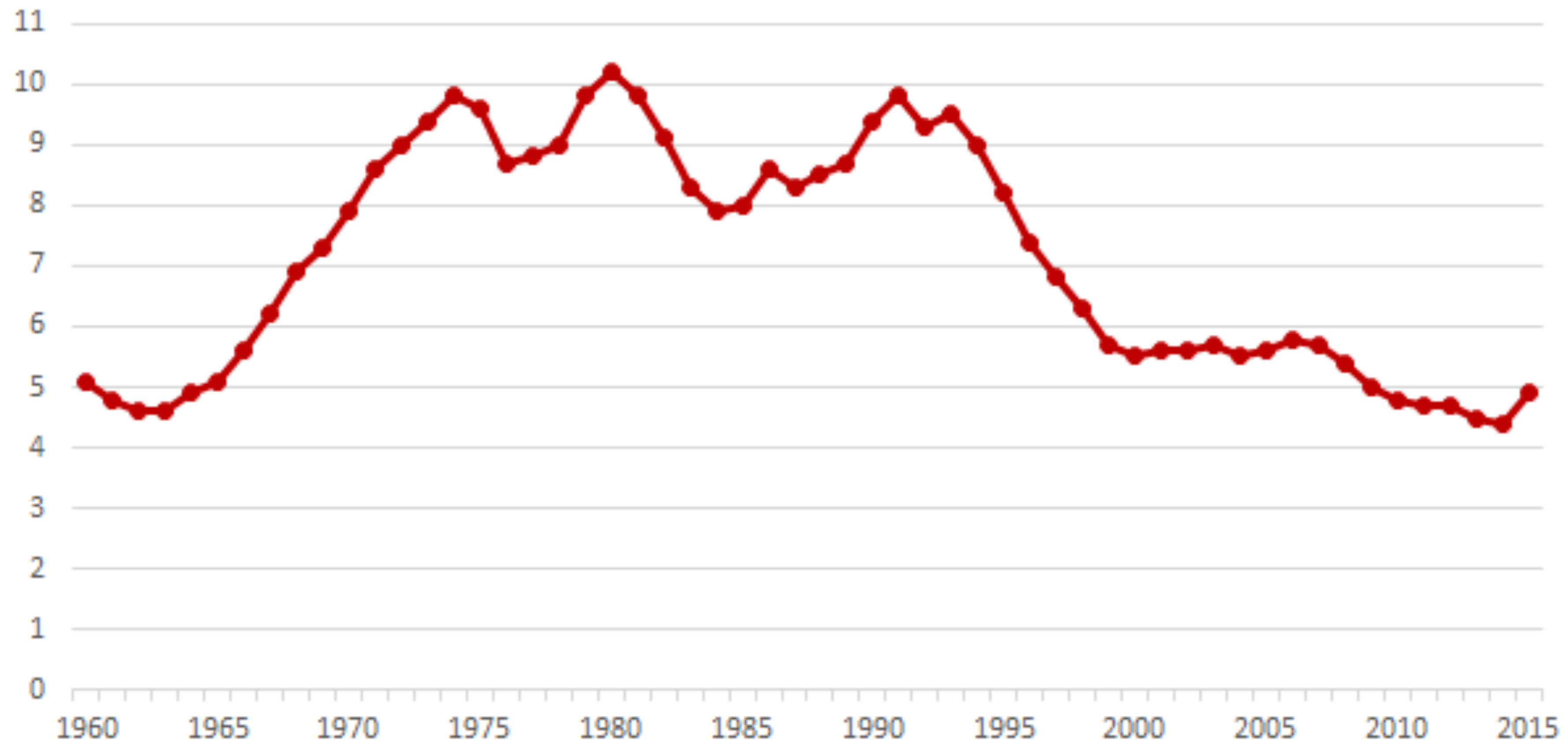
### 3. How much to visualize?

Am I showing too little?

Am I showing too much?

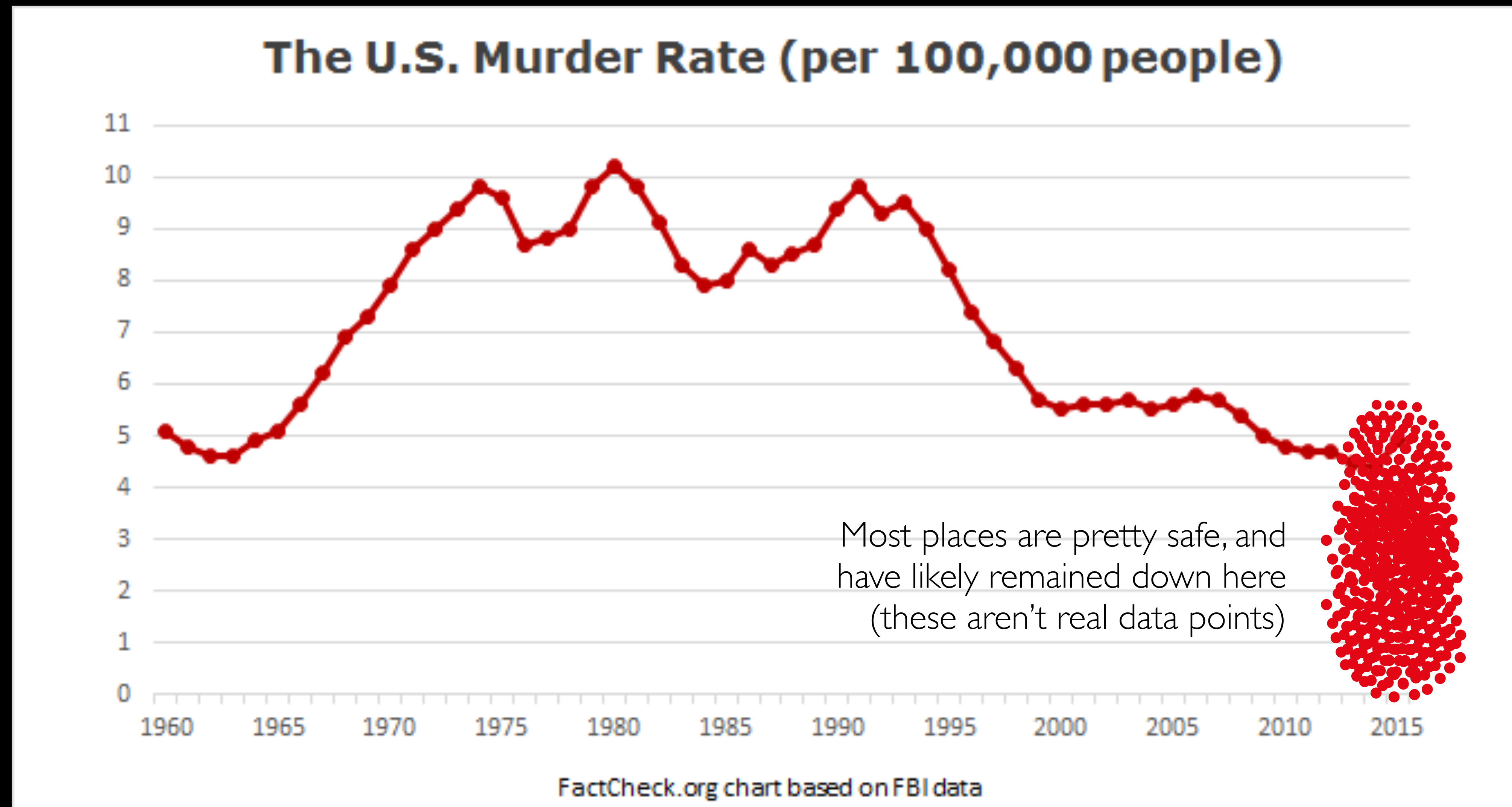


## The U.S. Murder Rate (per 100,000 people)

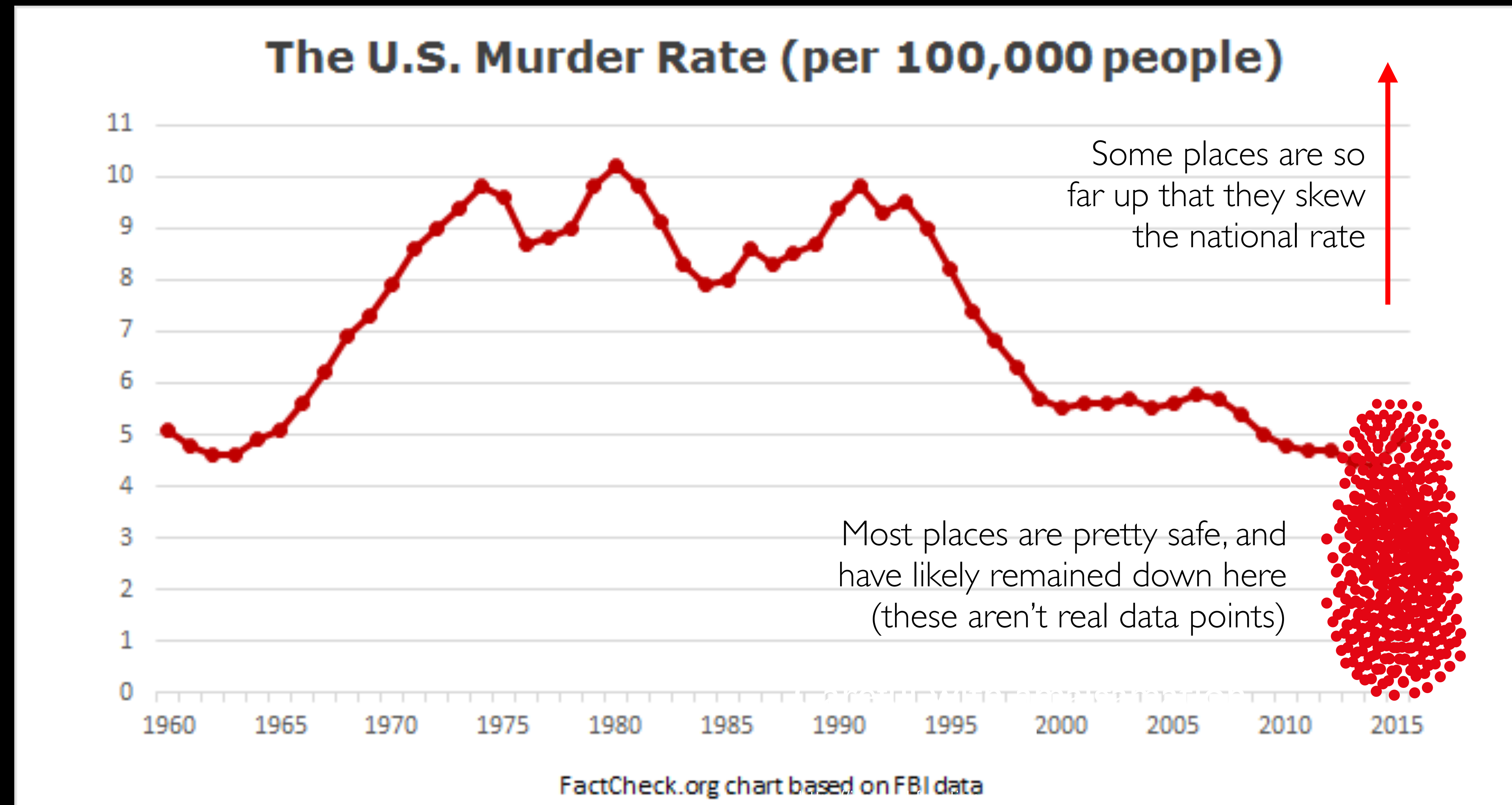


FactCheck.org chart based on FBI data

The danger of aggregating data too much,  
and presenting just averages and other statistical summaries



The danger of aggregating data too much,  
and presenting just averages and other statistical summaries





## 4. How to visualize it?

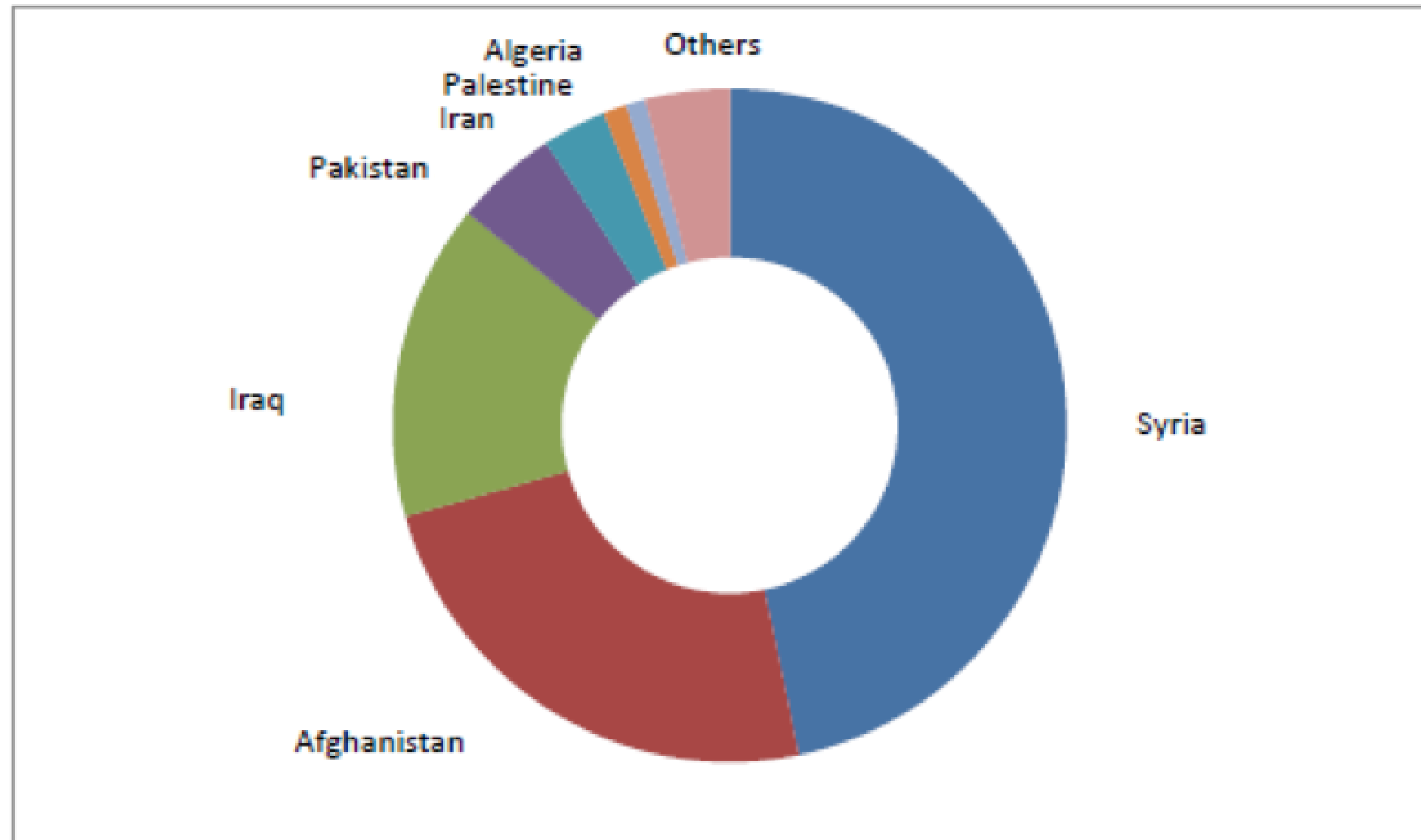
What types of charts or maps should I use?

What is the best way to organize the visualization?



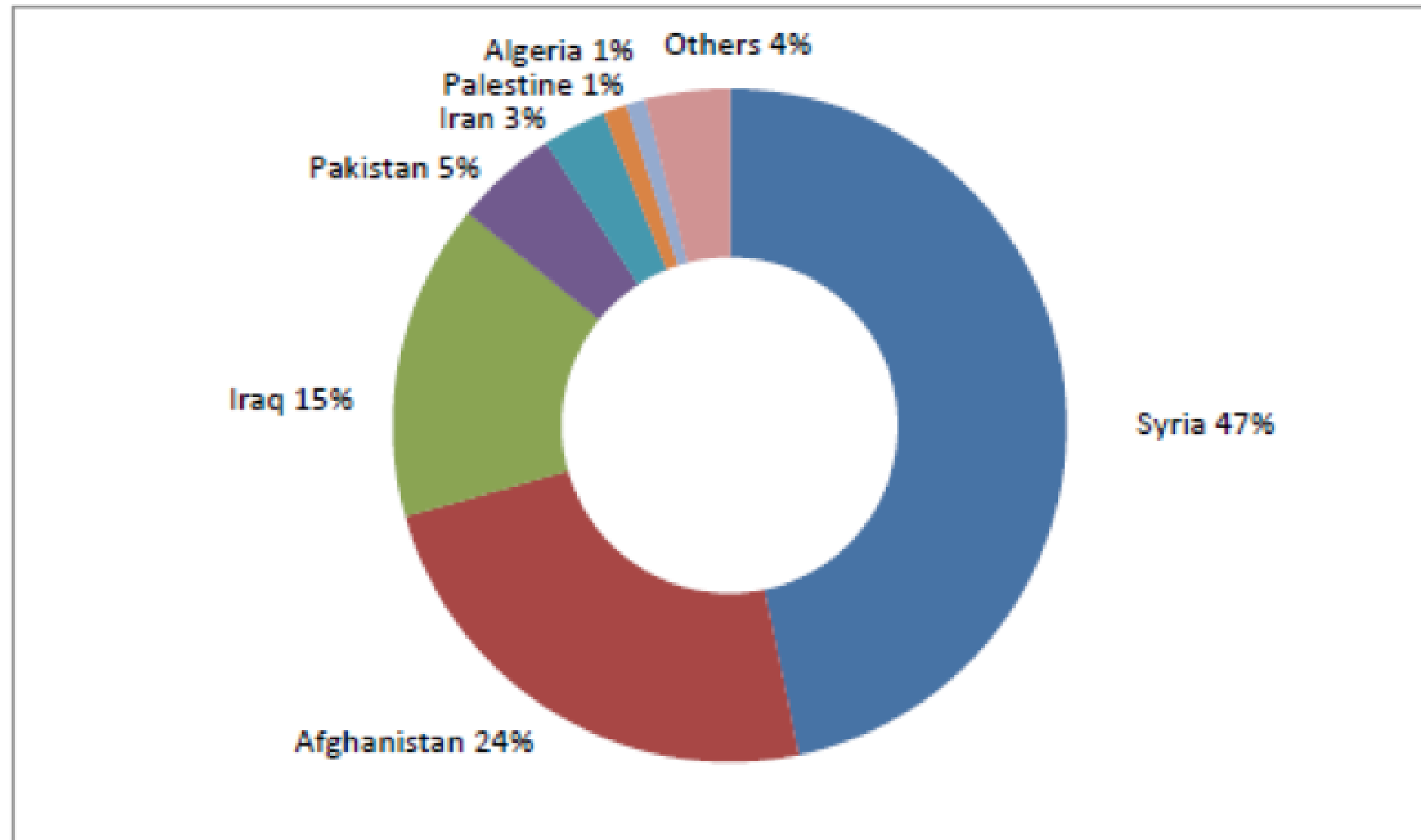
Figure 2 - Main nationalities of arriving migrants – 2016

Greece

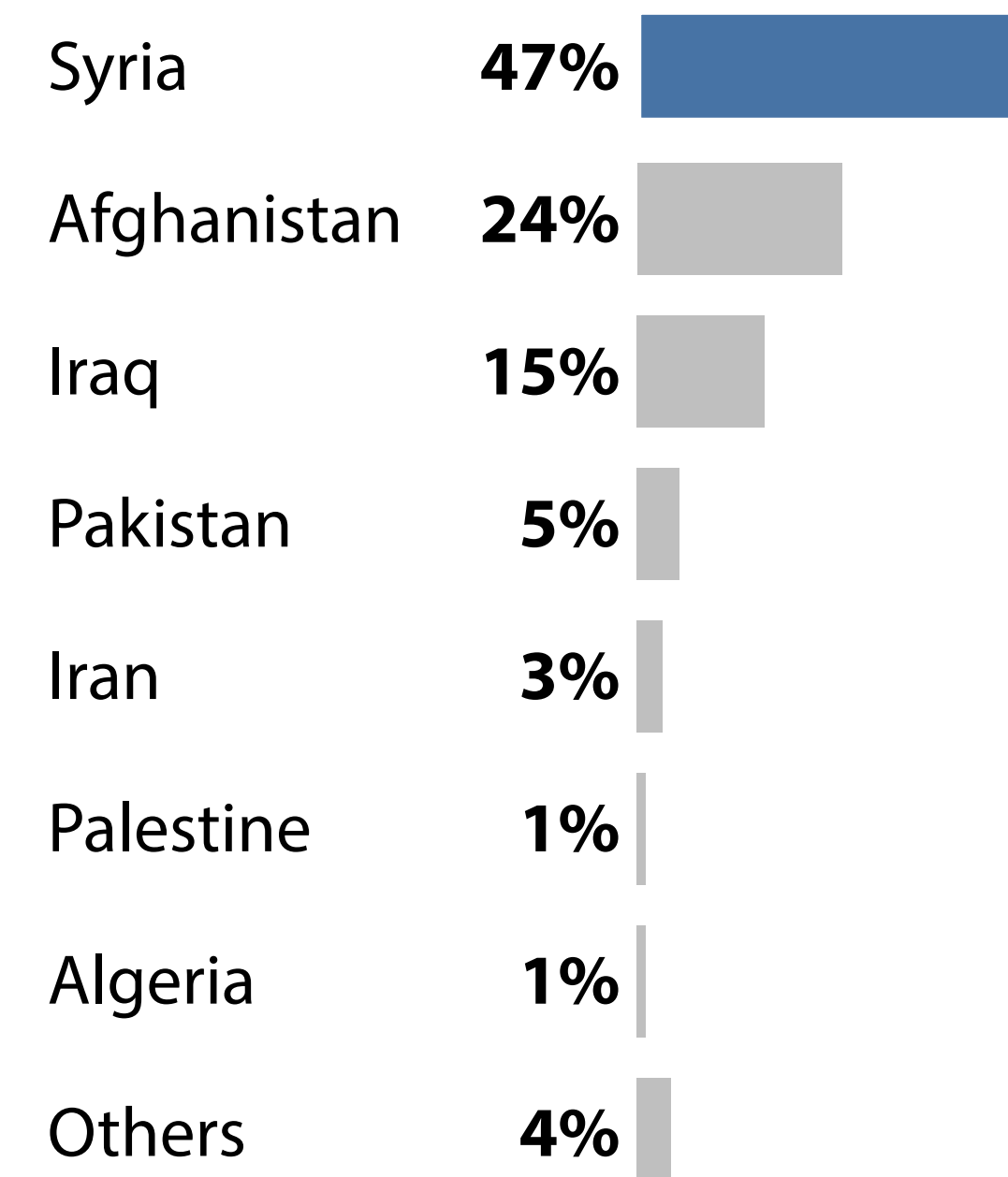
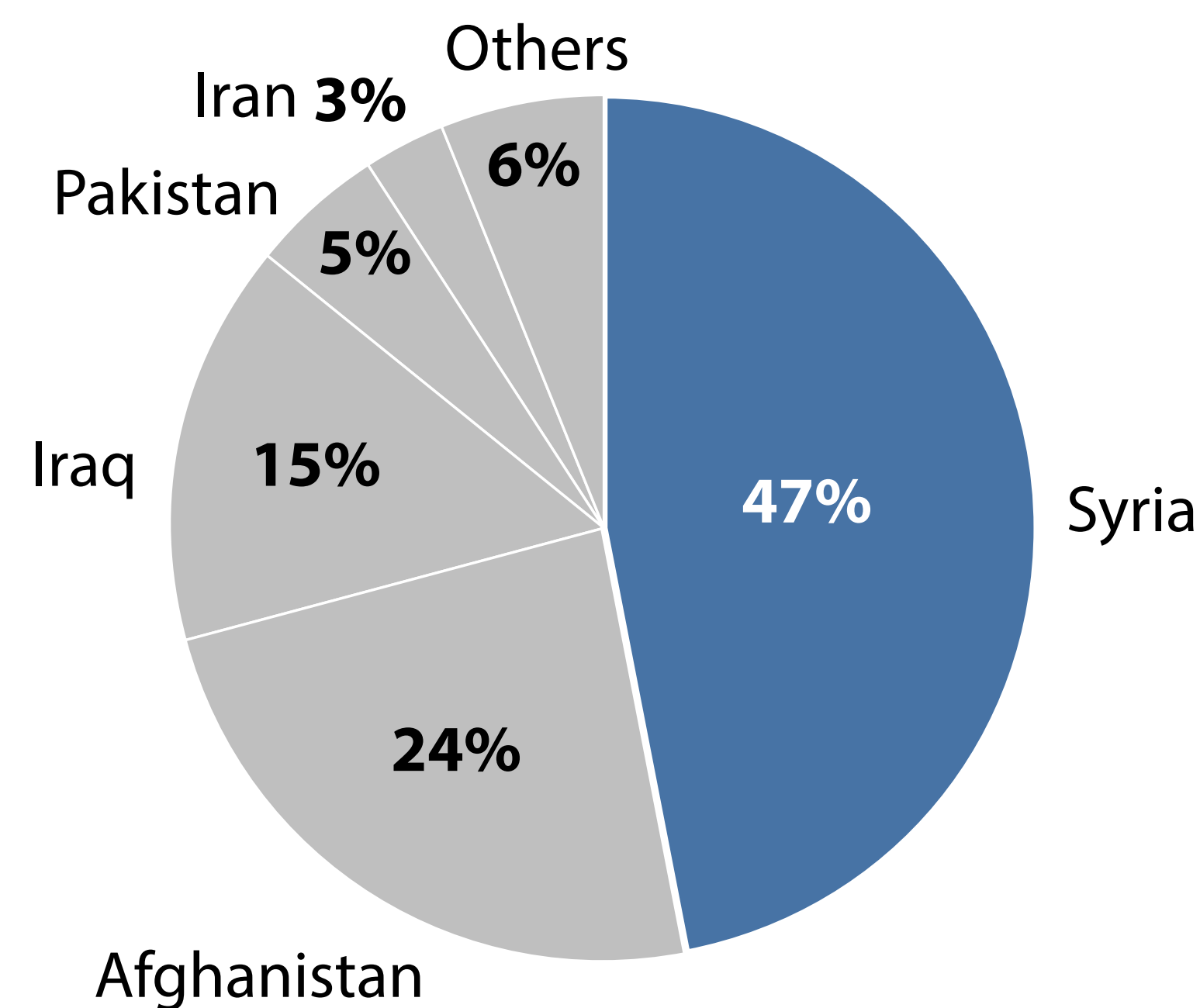
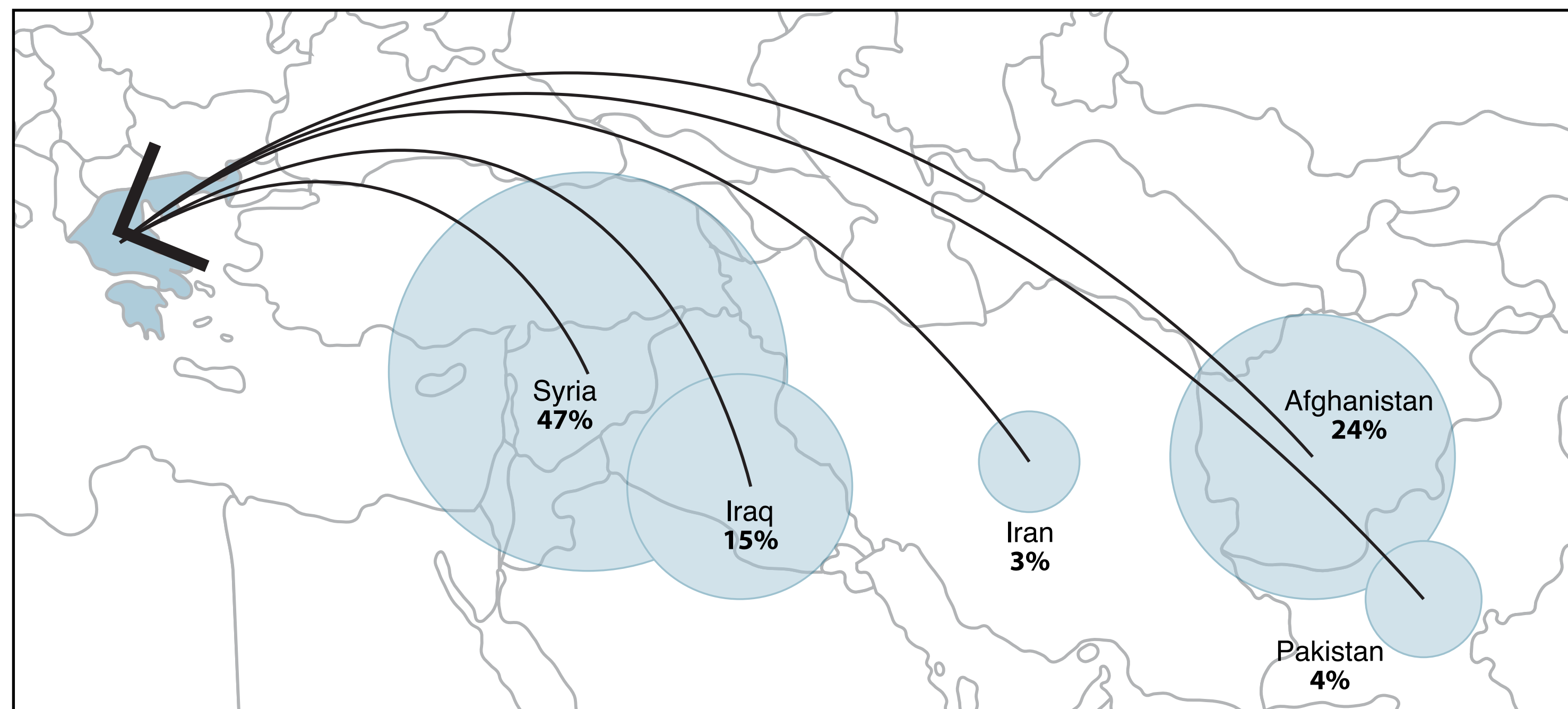


**Figure 2 - Main nationalities of arriving migrants – 2016**

Greece









# The Data Visualisation Catalogue

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## Deviation

Emphasize variations (+/-) from a fixed reference point. Typically the reference point is zero but it can also be a target or a long-term average. Can also be used to show sentiment (positive/negative/neutral).

**Example FT uses**  
Trade surplus/deficit, climate change

**Diverging bar**  
A simple standard bar chart that can handle both negative and positive magnitude values.

**Diverging stacked bar**  
Perfect for presenting survey results which involve sentiment (eg. disagree/neutral/agree).

**Spine chart**  
Splits a single value into 2 contrasting components (eg. Male/Female).

**Surplus/deficit filled line**  
The shaded area of these charts allows a balance to be shown – either against a baseline or between two series.

## Correlation

Show the relationship between two or more variables. Be mindful that unless you tell them otherwise, many readers will assume the relationship you show them to be causal (ie. one causes the other).

**Example FT uses**  
Inflation & unemployment, income & life expectancy

**Scatterplot**  
The standard way to show the relationship between two continuous variables, each of which has its own axis.

**Line + Column**  
A good way of showing the relationship between an amount (columns) and a rate (line).

**Connected scatterplot**  
Usually used to show how the relationship between 2 variables has changed over time.

**Bubble**  
Like a scatterplot, but adds additional detail by storing the circles according to a third variable.

**XY heatmap**  
A good way of showing the patterns between 2 categories of data, less good at showing fine differences in amounts.

## Ranking

Use where an item's position in an ordered list is more important than its absolute or relative value. Don't be afraid to highlight the points of interest.

**Example FT uses**  
Wealth, deprivation, league tables, constituency election results

**Ordered bar**  
Standard bar charts display the ranks of values much more easily when sorted into order.

**Ordered column**  
See above.

**Ordered proportional symbol**  
Use when there are big variations between values and/or seeing fine differences between data is not so important.

**Dot strip plot**  
Dots placed in order on a strip are a space-efficient method of laying out ranks across multiple categories.

**Slope**  
Perfect for showing how ranks have changed over time or vary between categories.

**Lollipop chart**  
Lollipops draw more attention to the data value than standard bar/columns and can also show rank and value effectively.

## Distribution

Show values in a dataset and how often they occur. The shape (or 'skew') of a distribution can be a memorable way of highlighting the lack of uniformity or equity in the data.

**Example FT uses**  
Income distribution, population, (age)sex distribution

**Histogram**  
The standard way to show a statistical distribution – keep the gaps between columns small to highlight the 'shape' of the data.

**Boxplot**  
Summarise multiple distributions by showing the median, quartiles and range of the data.

**Violin plot**  
Similar to a box plot but more effective with complex distributions (data that cannot be summarised with simple averages).

**Population pyramid**  
A standard way for showing the age and sex breakdown of a population distribution; effectively, back to back histograms.

**Dot strip plot**  
Good for showing individual values in a distribution, can be a problem when there are many dots have the same value.

**Dot plot**  
A simple way of showing the change or range (min/max) of data across multiple categories.

**Barcode plot**  
Like dot strip plots, good for displaying all the data in a table; they work best when highlighting individual values.

**Cumulative curve**  
A good way of showing how unequal a distribution is; y axis is always cumulative frequency, x axis is always a measure.

## Change over Time

Give emphasis to changing trends. These can be short (or 'spike') movements or extended series (trending upwards or downwards). Choosing the correct time period is important to provide suitable context for the reader.

**Example FT uses**  
Share price movements, economic time series

**Line**  
The standard way to show a changing time series. If data are irregular, consider markers to represent data points.

**Column**  
Columns work well for showing the size and proportion of data at the same time – as long as the data are not too complicated.

**Line + column**  
A good way of showing the relationship over time – but usually best with only one series of data at a time.

**Stock price**  
Usually focused on day-to-day activity, these charts show the opening/closing and high/low points of each day.

**Slope**  
Good for showing changing data as long as the data can be simplified into 2 or 3 points without missing a key part of story.

**Area chart**  
Use with care – these are good at showing changes to total, but seeing change in components can be very difficult.

**Fan chart (projections)**  
Use to show the uncertainty in future projections – usually this grows the further forward to projection.

**Connected scatterplot**  
A good way of showing changing data for two variables whenever there is a relatively clear pattern of progression.

**Calendar heatmap**  
A great way of showing temporal patterns (daily, weekly, monthly) – at the expense of showing precision in quantity.

**Priestley timeline**  
Great when date and duration are key elements of the story in the data.

**Circle timeline**  
Good for showing discrete values of varying size across multiple categories (eg. earthquakes by continent).

**Seismogram**  
Another alternative to the circle timeline for showing series where there are big variations in the data.

## Part-to-whole

Show how a single entity can be broken down into its constituent elements, if the reader's interest is solely in the use of the components, consider a magnitude-type chart instead.

**Example FT uses**  
Fiscal budgets, company structures, national election results

**Stacked column**  
A simple way of showing the part-to-whole relationships but can be difficult to read with more than a few components.

**Proportional stacked bar**  
A good way of showing the size and proportion of data at the same time – as long as the data are not too complicated.

**Pie**  
A common way of showing part-to-whole data – but be aware that it's difficult to accurately compare the size of the segments.

**Donut**  
Similar to a pie chart – but the centre can be a good way of making space to include more information about the data (eg. total).

**Treemap**  
Use for hierarchical data; the size and proportion of data at the same time – as long as the data are not too complicated.

**Voronoi**  
A way of turning points into areas – any point within each area is closer to the central point than any other centroid.

**Sunburst**  
Another way of visualising hierarchical part-to-whole relationships – usually only with whole numbers (do not slice off an arm to represent a decimal).

**Arc**  
A hemicircle, often used for visualising political results in parliaments.

**Gridplot**  
Good for showing % information, they work best when used on whole numbers and work well in multiple layout form.

**Venn**  
Generally only used for schematic representation.

**Waterfall**  
Can be useful for showing part-to-whole relationships where some of the components are negative.

## Magnitude

Show size comparisons. These can be relative (size being able to be larger/smaller) or absolute (need to see fine differences). Usually these show a 'counted' number (for example, barrels, dollars or people) rather than a calculated rate or per cent.

**Example FT uses**  
Commodity production, market capitalisation

**Column**  
The standard way to compare the size of things. Must always start at 0 on the axis.

**Bar**  
See above. Good when the data are not time series and labels have long category names.

**Paired column**  
As per standard column but allows for multiple series. Can become tricky to read with more than 2 series.

**Paired bar**  
See above.

**Proportional stacked bar**  
A good way of showing the size and proportion of data at the same time – as long as the data are not too complicated.

**Proportional symbol**  
Use when there are big variations between values and/or seeing fine differences between data is not so important.

**Isotype (pictogram)**  
Excellent solution in some instances – use only with whole numbers (do not slice off an arm to represent a decimal).

**Lollipop chart**  
Lollipop charts draw more attention to the data value than standard bar/column – does not HAVE to start at zero (but preferable).

**Radar chart**  
A space-efficient way of showing value of multiple variables – but make sure they are organised in a way that makes sense to reader.

**Parallel coordinates**  
An alternative to radar charts – again, the arrangement of the variables is important. Usually benefits from highlighting values.

## Spatial

Used only when precise locations or geographical patterns in data are more important to the reader than anything else.

**Example FT uses**  
Locator maps, population density, natural resource locations, natural disaster risk/impact, catchment areas, variation in election results

**Basic choropleth (categorical)**  
The standard approach for putting data on a map – should always be rates rather than values and use a sensible base geography.

**Proportional symbol (count/magnitude)**  
Use for totals rather than rates – be wary that small differences in data will be hard to see.

**Flow map**  
For showing unambiguous movement across a map.

**Contour map**  
For showing areas of equal value on a map. Can use deviation colour schemes for showing +/- values.

**Equalized cartogram**  
Converting each unit on a map to a regular and equally-sized shape – good for representing voting regions with equal values.

**Scaled cartogram (value)**  
Stretching and shrinking a map so that each area is sized according to a particular value.

**Dot density**  
Used to show the location of individual events/locations – make sure to annotate any patterns the reader should see.

**Heat map**  
Grid-based data values mapped with an intensity colour scale. As choropleth map – but not trapped to an administrative unit.

## Flow

Show the reader volumes or intensity of movement between two or more states or conditions. These might be logical sequences or geographical locations.

**Example FT uses**  
Movement of funds, trade, migrants, lawsuits, information relationship graphs.

**Sankey**  
Shows changes in flows from one condition to at least one other; good for tracing the eventual outcome of a complex process.

**Waterfall**  
Designed to show the sequencing of data through a flow process, typically budgets. Can include +/- components.

**Chord**  
A complex but powerful diagram which can illustrate 2-way flows (and net winner) in a matrix.

**Network**  
Used for showing the strength and inter-connectedness of relationships of varying types.

# Visual vocabulary

Designing with data

There are so many ways to visualise data - how do we know which one to pick? Use the categories across the top to decide which data relationship is most important in your story, then look at the different types of chart within the category to form some initial ideas about what might work best. This list is not meant to be exhaustive, nor a wizard, but is a useful starting point for making informative and meaningful data visualisations.

FT graphic: Alan Smith; Chris Campbell; Jan Both; Li Fei; Graham Parish; Billy Ehrenberg; Paul McCallum; Martin Stabe  
Inspired by the Graphic Continuum by Jon Schwabish and Severino Ribeca

[ft.com/vocabulary](https://ft.com/vocabulary)



<http://www.datavizcatalogue.com/>

<https://github.com/ft-interactive/chart-doctor/blob/master/visual-vocabulary/Visual-vocabulary.pdf>

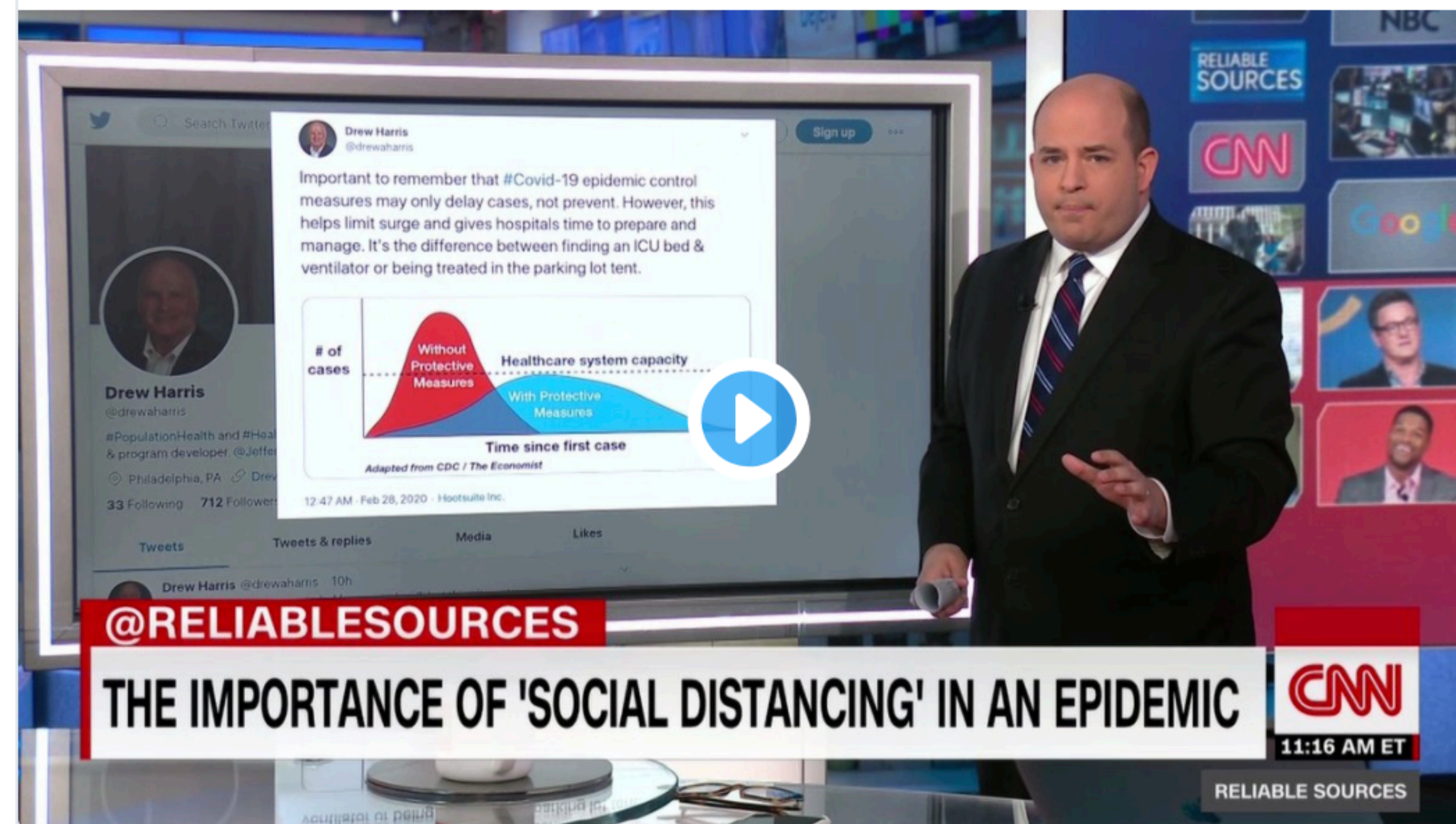




Good journalism isn't just showing charts. It's also about explaining them: [twitter.com/brianstelter/s...](https://twitter.com/brianstelter/s...)

**Brian Stelter**  @brianstelter

This infographic is worth a thousand words – showing why "social distancing" and other protective measures helps to slow an outbreak. Hat tips to CDC, @theeconomist, @drewharris, and @CT\_Bergstrom



♡ 227 5:58 PM - Mar 8, 2020

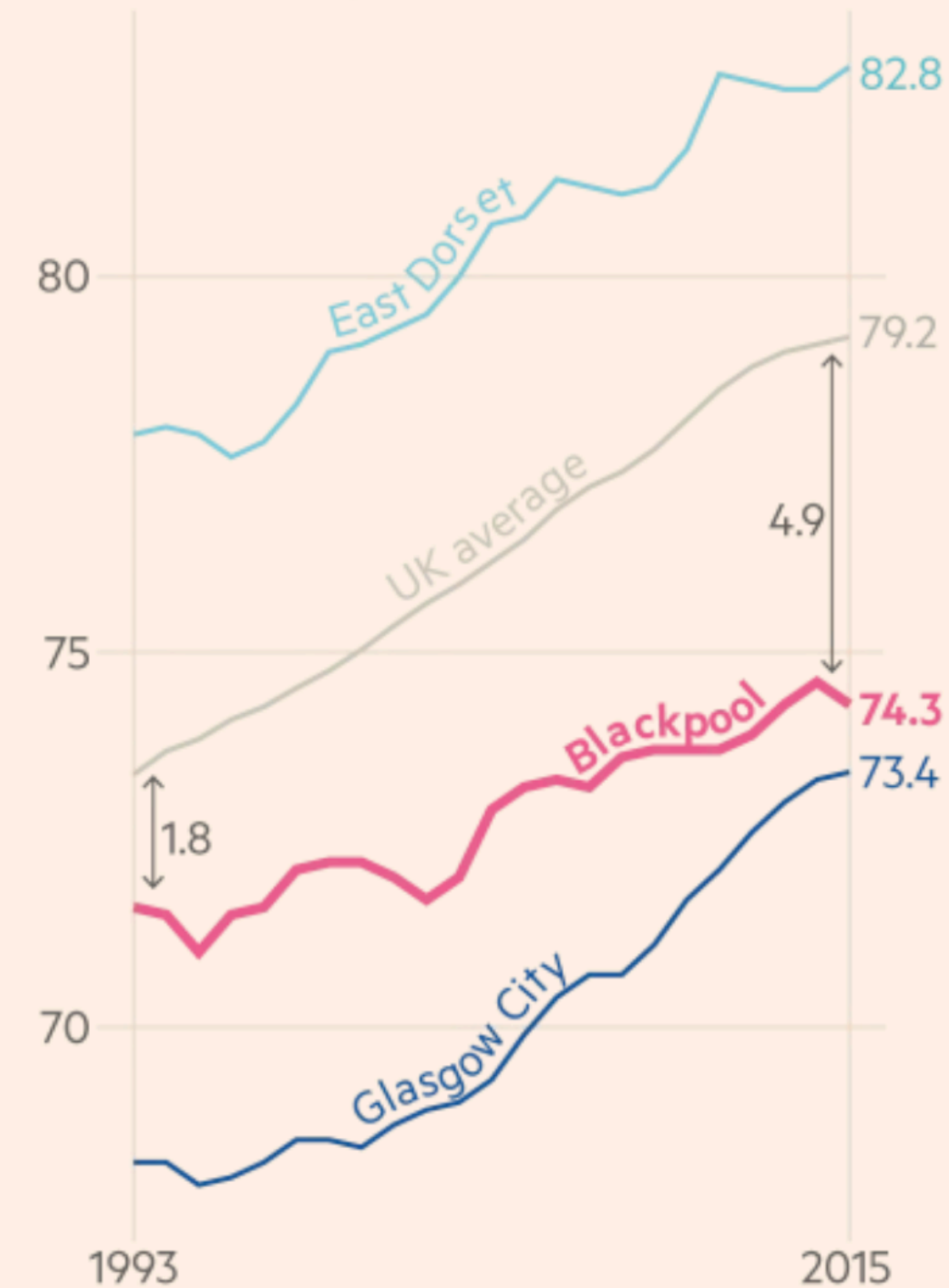


<https://twitter.com/AlbertoCairo/status/1236773377865658370>

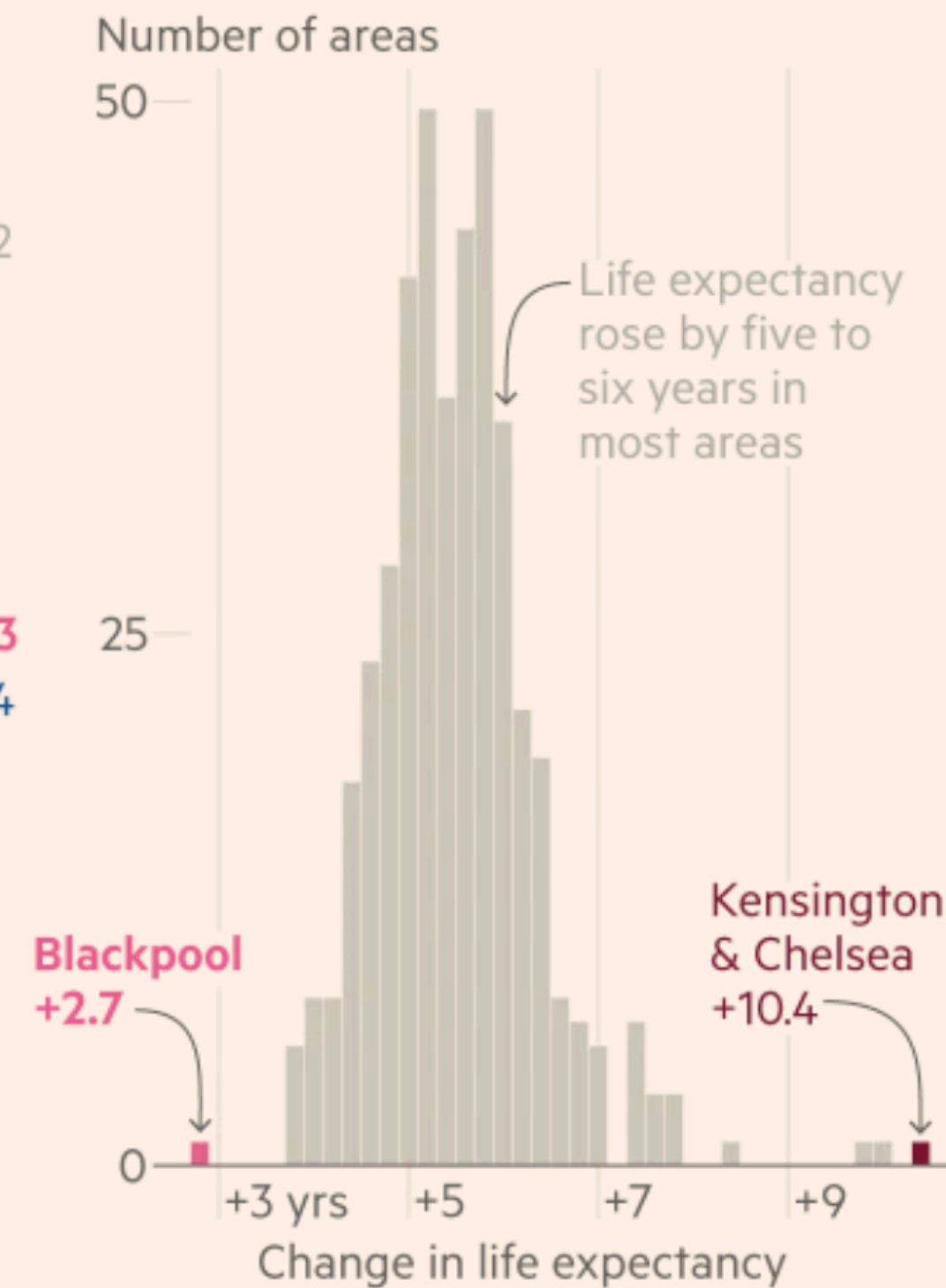


Boys born in **Blackpool** can expect to live just 74 years — the second lowest in the UK, and up by just 2.7 years since 1993

Male life expectancy at birth in selected local authorities, 1993-2015



Distribution of change in male life expectancy at birth from 1993 to 2015, all UK local authorities



Source: ONS

Graphic by John Burn-Murdoch / @jburnmurdoch

© FT

“I and my colleagues here at the FT, we really do think one of the most valuable things we can do as data visualization practitioners is add this expert annotation layer.”

**John Burn-Murdoch**

**Financial Times**

<https://policyviz.com/podcast/episode-155-john-burn-murdoch/>

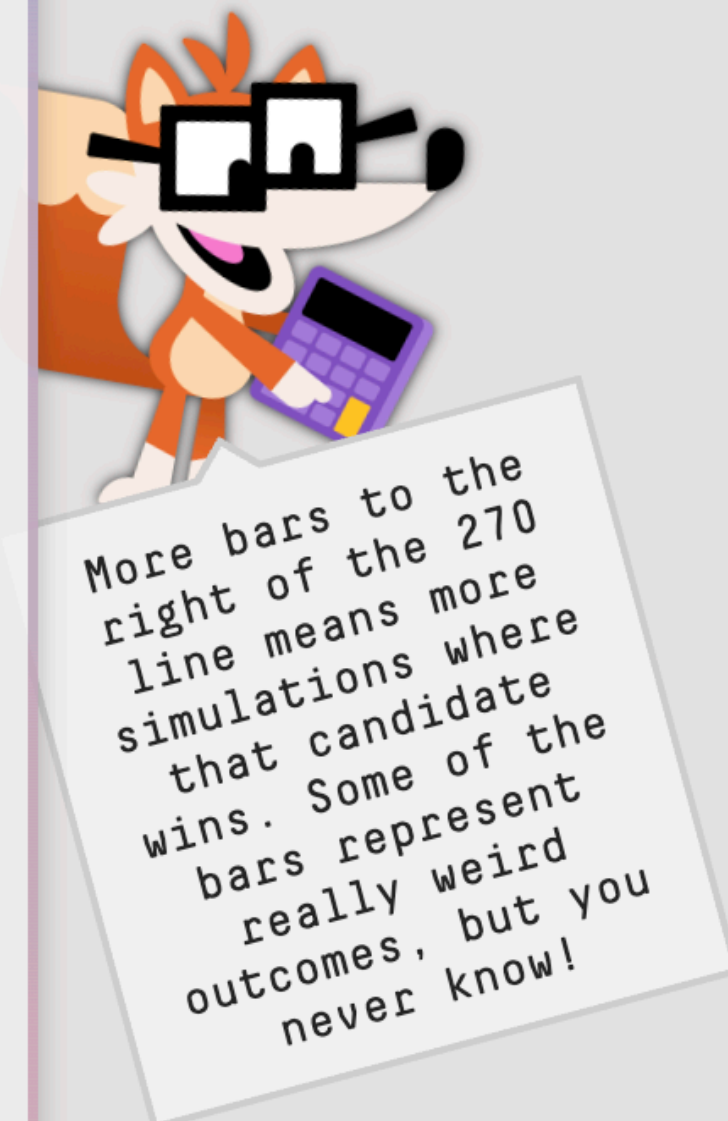
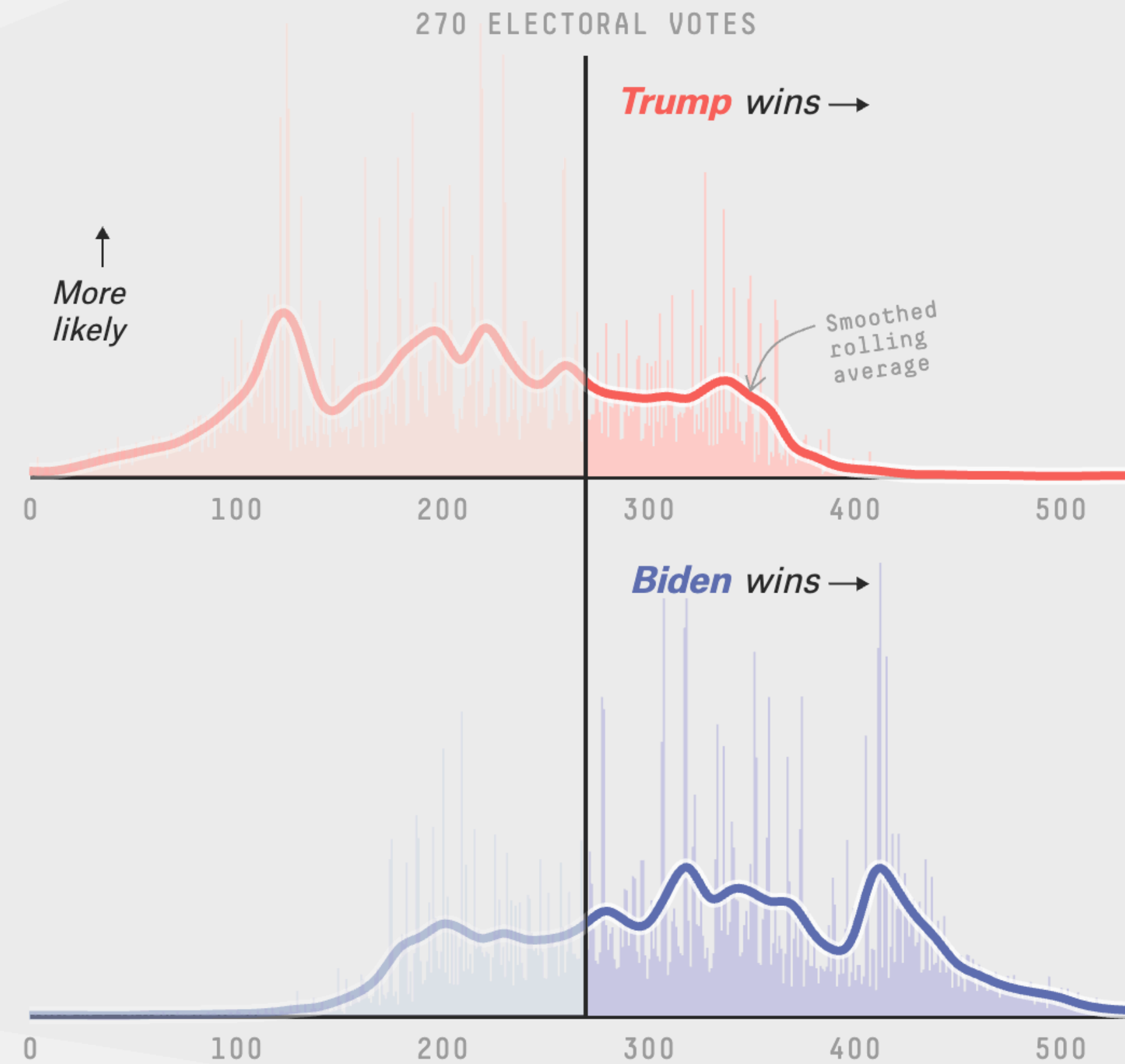
“Design secrets behind the FT’s best charts of the year”

<https://www.ft.com/content/4743ce96-e4bf-11e7-97e2-916d4fbac0da>



## Every outcome in our simulations

All possible Electoral College outcomes for each candidate, with higher bars showing outcomes that appeared more often in our 40,000 simulations



<https://projects.fivethirtyeight.com/2020-election-forecast/>



## 5. What style to use?

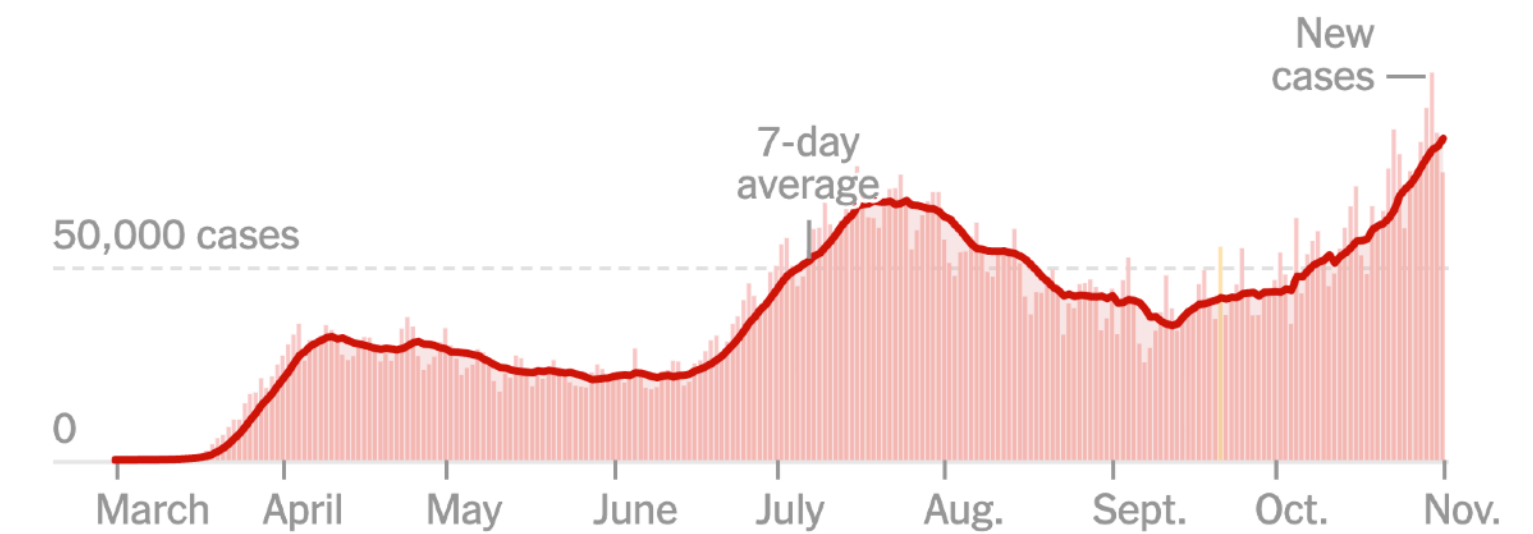
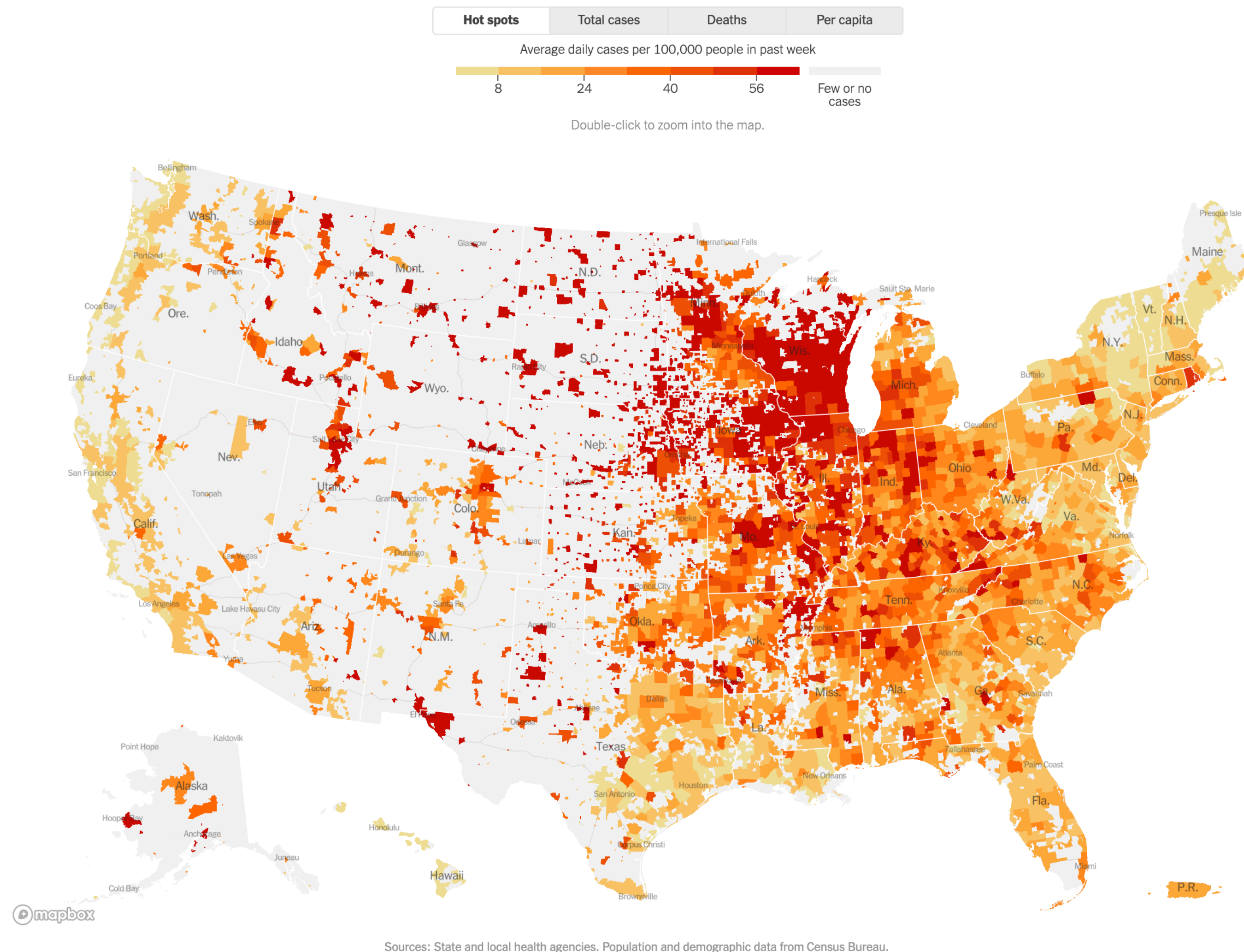
Not all visualizations need to be minimalist.

Not all visualizations need to be flashy and innovative, either.



# Standard visualizations

## Appropriate for graphics we use all the time



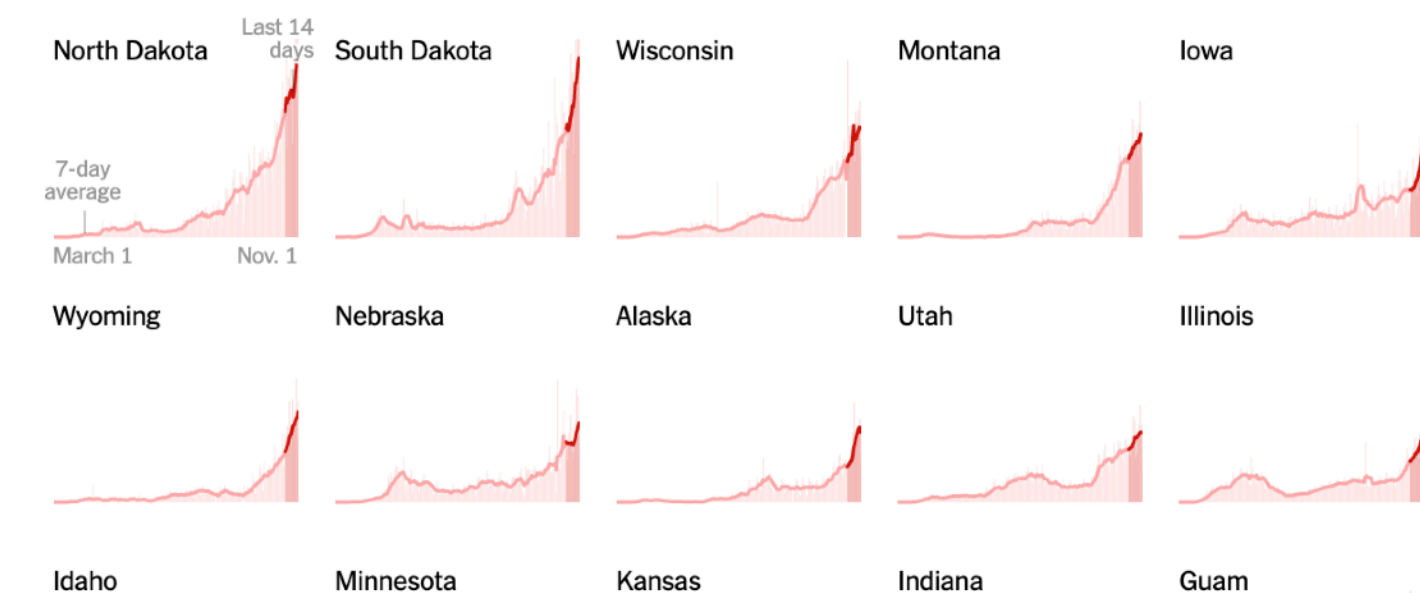
	TOTAL REPORTED	ON NOV. 1	14-DAY CHANGE
<b>Cases</b>	<b>9.2 million+</b>	<b>74,113</b>	<b>+45%</b> →
<b>Deaths</b>	<b>230,937</b>	<b>427</b>	<b>+17%</b> →

Day with data reporting anomaly.

Includes confirmed and probable cases where available. 14-day change trends use 7-day averages.

### Where new cases are **higher** and **staying high**

States where new cases are higher had a daily average of at least 15 new cases per 100,000 people over the past week. Charts show daily cases per capita and are on the same scale. Tap a state to see detailed map page.



<https://www.nytimes.com/interactive/2020/us/coronavirus-us-cases.html>



## Fully customized style:

Appropriate for one-time use when we want to provoke curiosity, surprise —or simply a smile



<https://jaimeserra-archivos.blogspot.com/>







## Unusual or unique visualizations

**Lupa** | Google News Initiative

**NO EPICENTRO**

### E se todos os mortos por Covid-19 no Brasil fossem seus vizinhos?

Descubra o que aconteceria com a sua vizinhança caso o epicentro da epidemia de Covid-19 no Brasil fosse sua casa.

Publicado em 24 de julho de 2020.  
Dados atualizados em 1 de novembro de 2020.

Insira seu endereço aqui

📍 USAR MINHA LOCALIZAÇÃO

<http://piaui.folha.uol.com.br/lupa/epicentro/>



The purpose of visualization isn't visualization per se. The purpose of visualization is to help people **make sense of the world** through a combination of visuals and words.



The End.

[www.thefunctionalart.com](http://www.thefunctionalart.com) , [www.albertocairo.com](http://www.albertocairo.com) , [alberto.cairo@gmail.com](mailto:alberto.cairo@gmail.com)