

# Using Data Visualization in Public Health Communications

THURSDAY, MARCH 21

1:00 – 2:30pm ET / 10:00 – 11:30am PT

This event will be recorded. The recording and slides will be available on [publichealthcollaborative.org](https://publichealthcollaborative.org) later this week.

All attendees are automatically muted upon entry.

# *Closed Captioning and ASL Interpretation*

**If you'd like to use closed captions or ASL interpretation:**  
Hover over the “More” button or the “Interpretation” button on the bottom of your Zoom screen.

- Live closed captioning is being provided by AI Media.
- ASL interpretation is being provided by Keystone Interpreting Solutions.

# Meet Today's Experts



**Jessica Malaty Rivera**  
Senior Science Communication Advisor  
de Beaumont Foundation



**Peter Walker**  
Head of Insights  
Carta



**Caroline Hoffman, MPH**  
Senior Public Health Promotion Specialist  
Rhode Island Department of Health

# **Hello everyone!**

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**My name is Peter Walker.**

**In a former life, I ran the data visualization team at  
The Covid Tracking Project.**

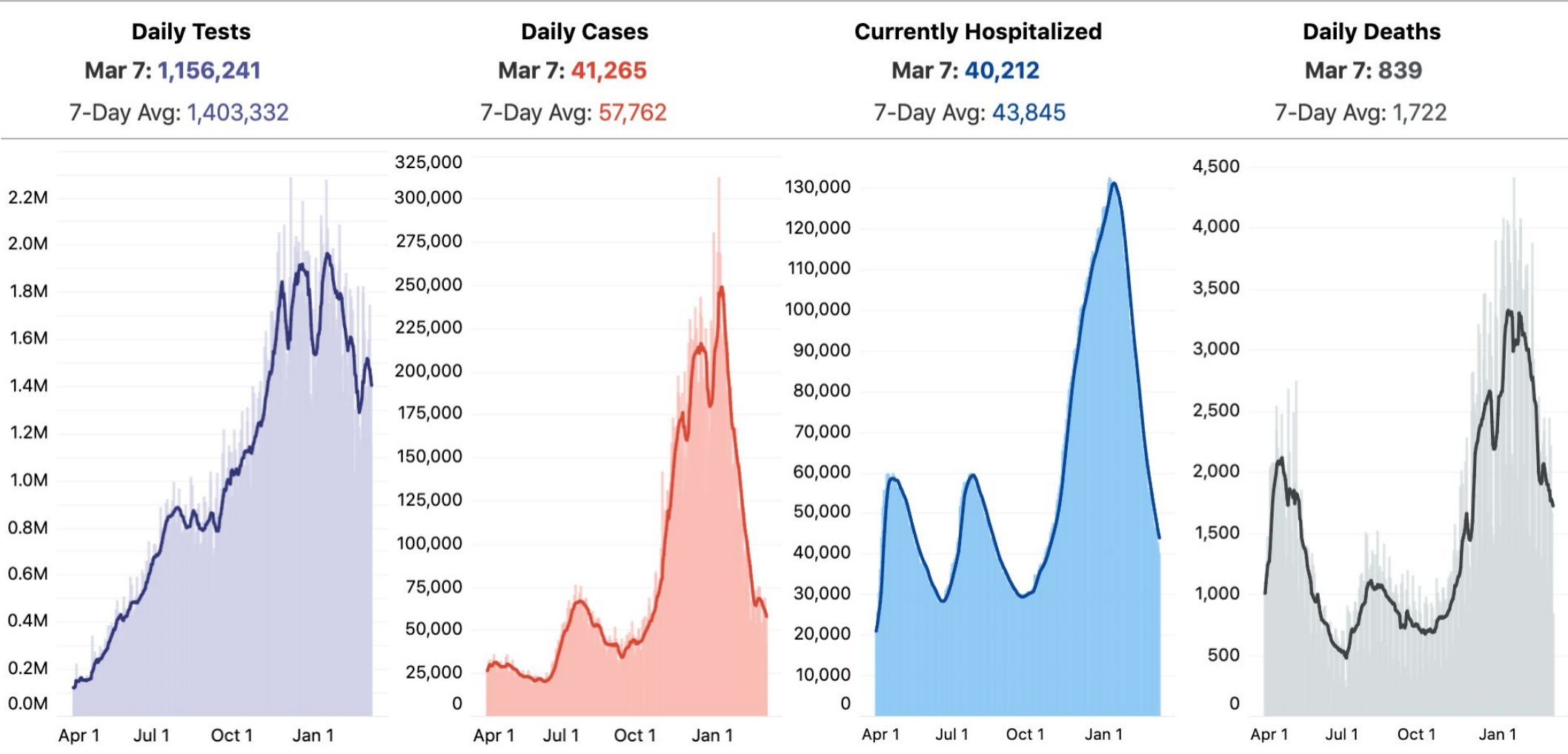
**You may have seen a few of our charts during the peak of the  
pandemic.**



# Public outputs: visualizations

NATIONWIDE COVID-19 METRICS. 7-DAY AVERAGE LINES

Apr 1, 2020 - Mar 7, 2021



Source: The COVID Tracking Project



Data visualization is...

The art of telling stories with data

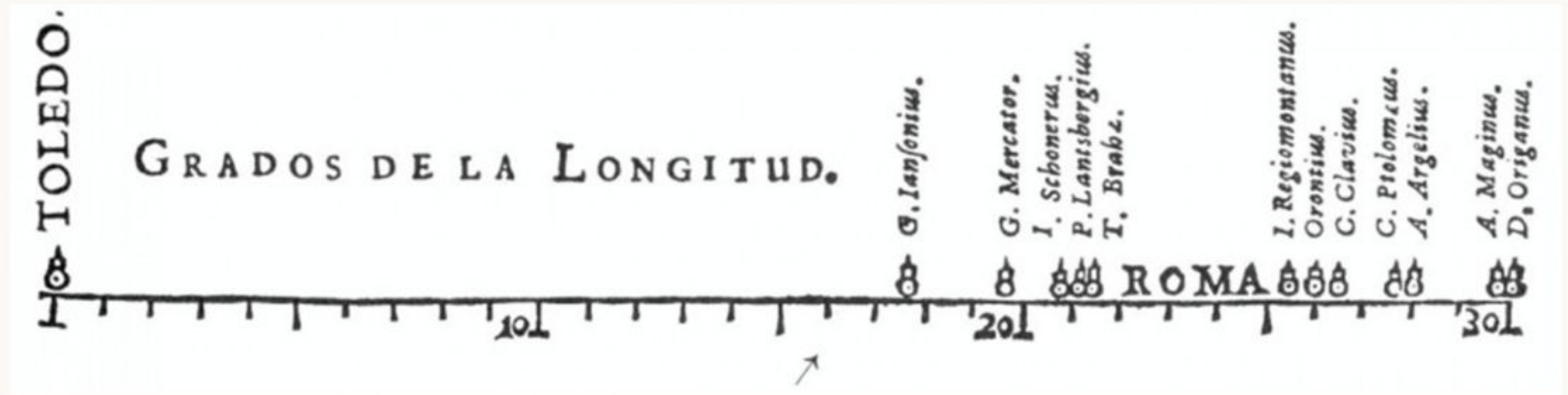
# My goals for this session

- 1 Convince you that good charts = stories
- 2 Walk through a few examples of good -> better -> best
- 3 Inspire you to dig deeper into data viz (stretch goal)

# The history of data viz

Michael Florent Van Langren, 1644

First visual representation of statistical data

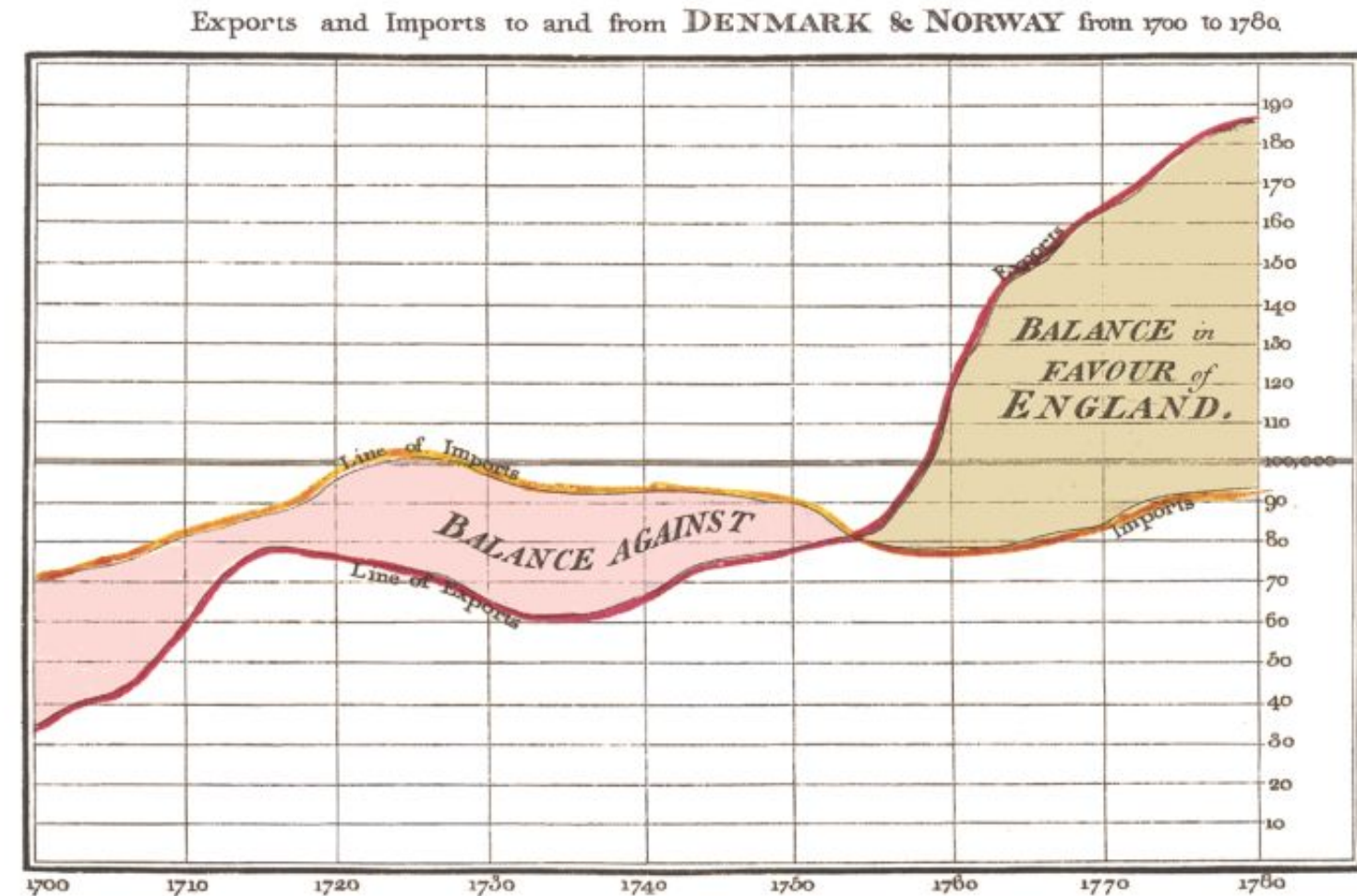


# The history of data viz

## William Playfair, 1786

Chart Innovator:

- Line
- Area
- Bar
- Pie



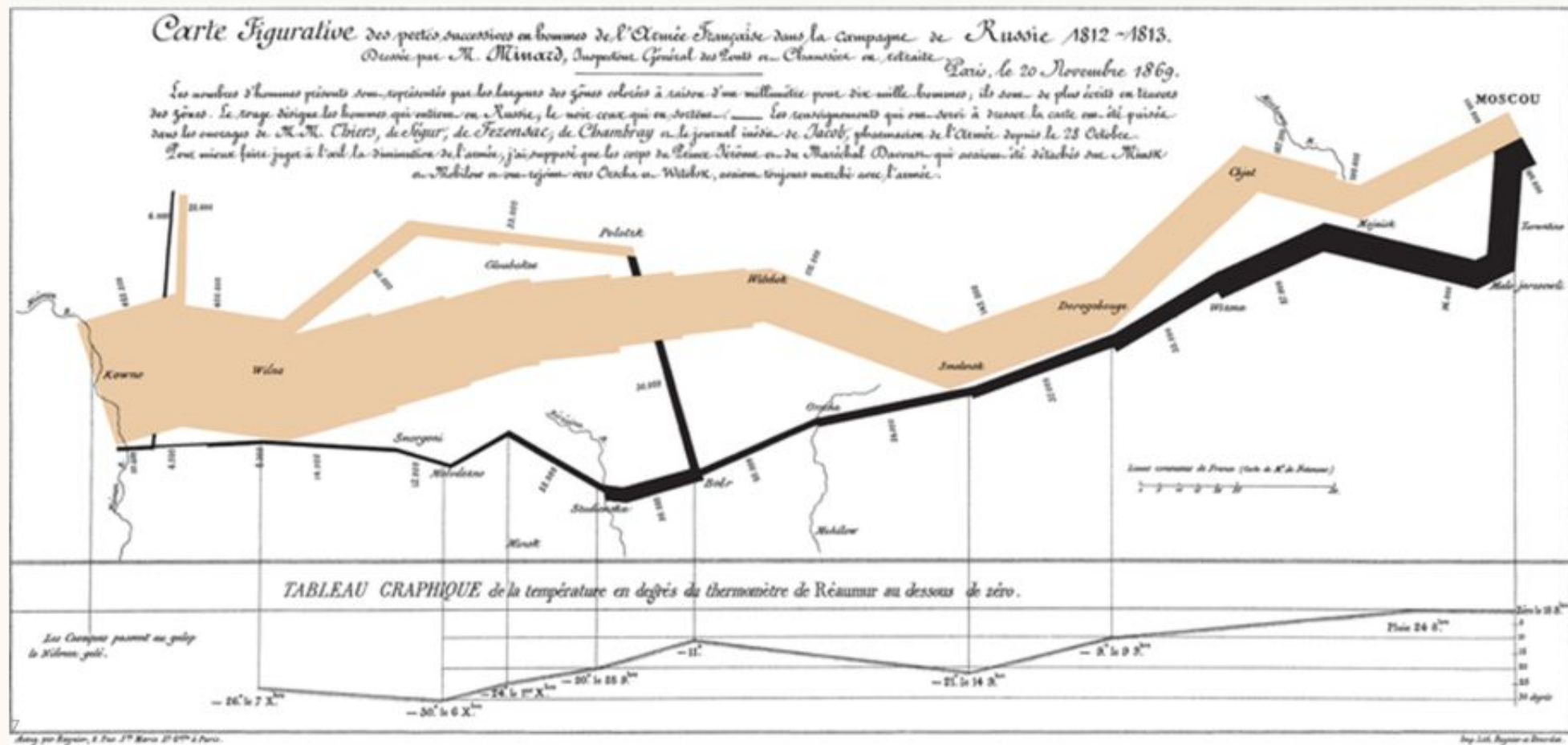
*The Bottom line is divided into Years, the Right hand line into £10,000 each.*  
*Published as the Act directs, 14<sup>th</sup> May 1786, by W<sup>m</sup> Playfair*  
*Reale script 302, Strand, London.*



# The history of data viz

Charles Minard, 1869

The failure of Napoleon's 1812 invasion of Russia

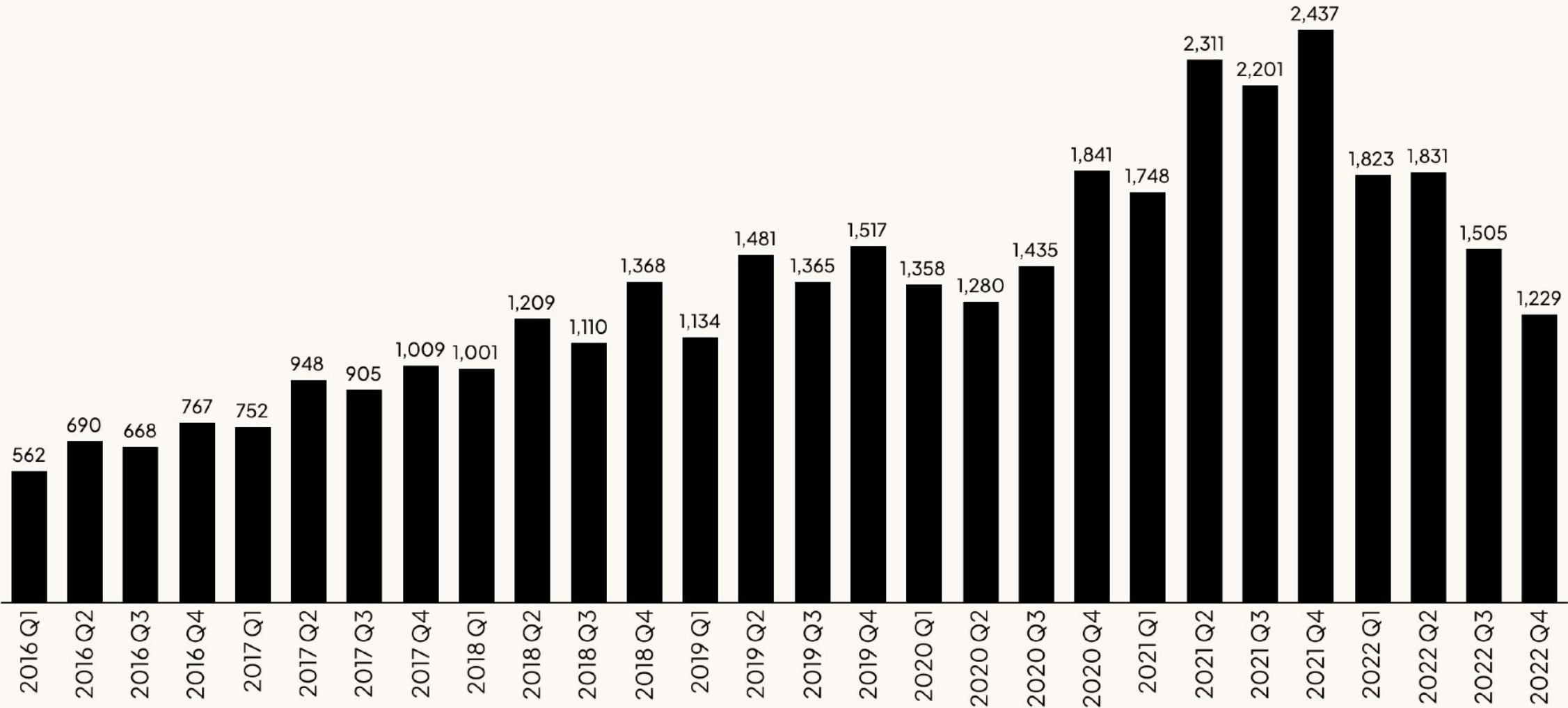


Real world example

Minor details, big impact

# Deal volume is headed down

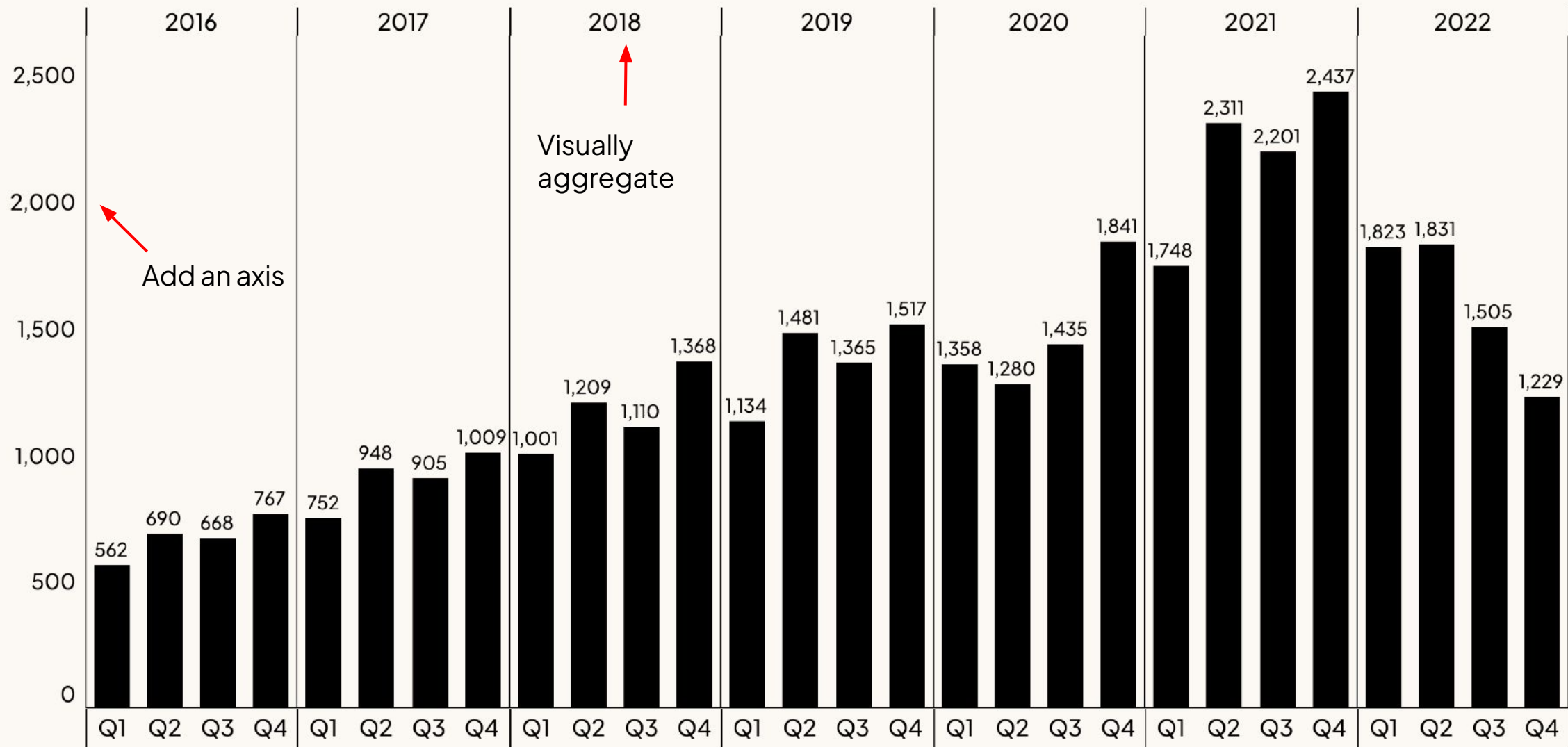
Number of quarterly deals completed by Carta companies | 2016–2022





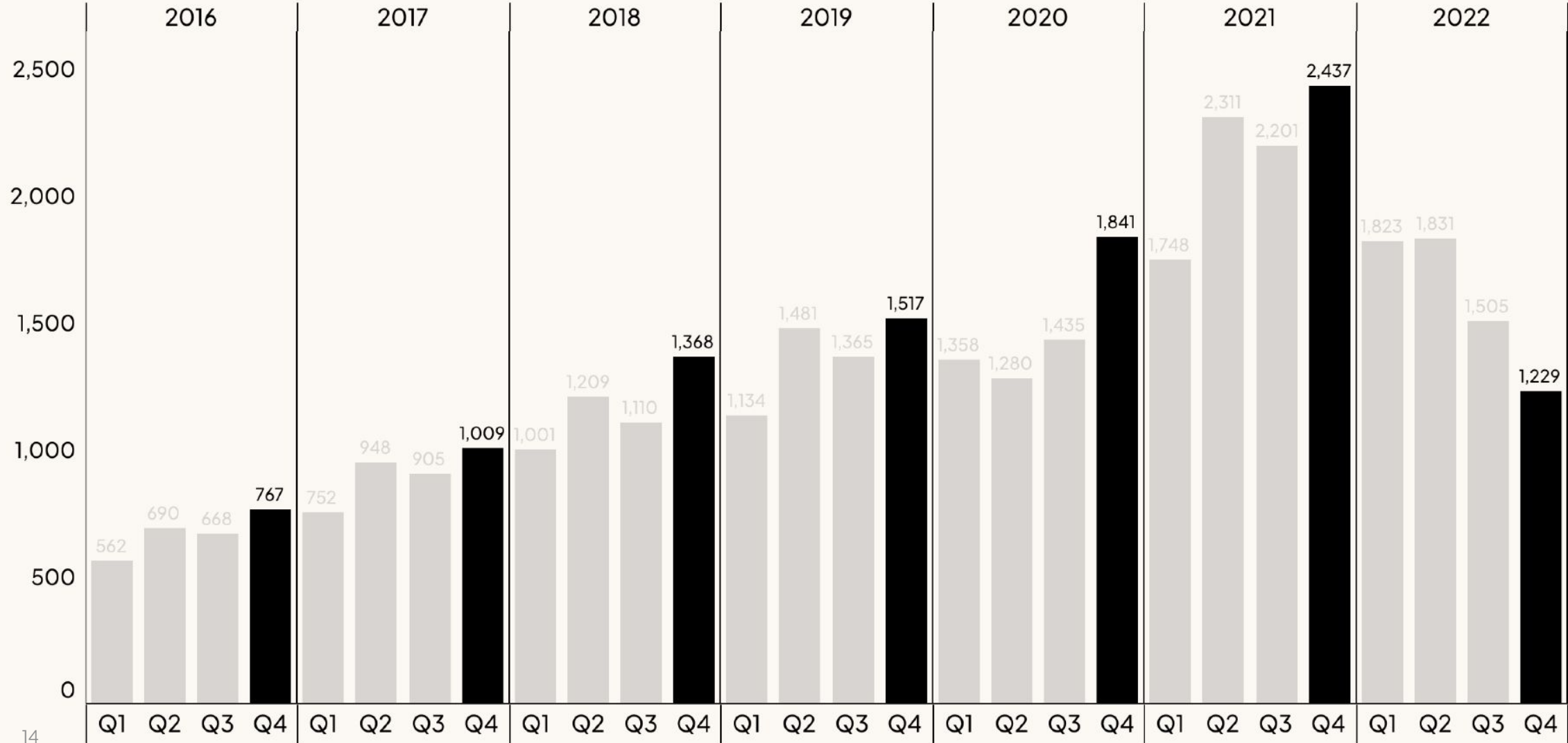
# Deal volume is headed down

Number of quarterly deals completed by Carta companies | 2016–2022



# Lowest Q4 deals since 2017

Number of quarterly deals completed by Carta companies | 2016–2022

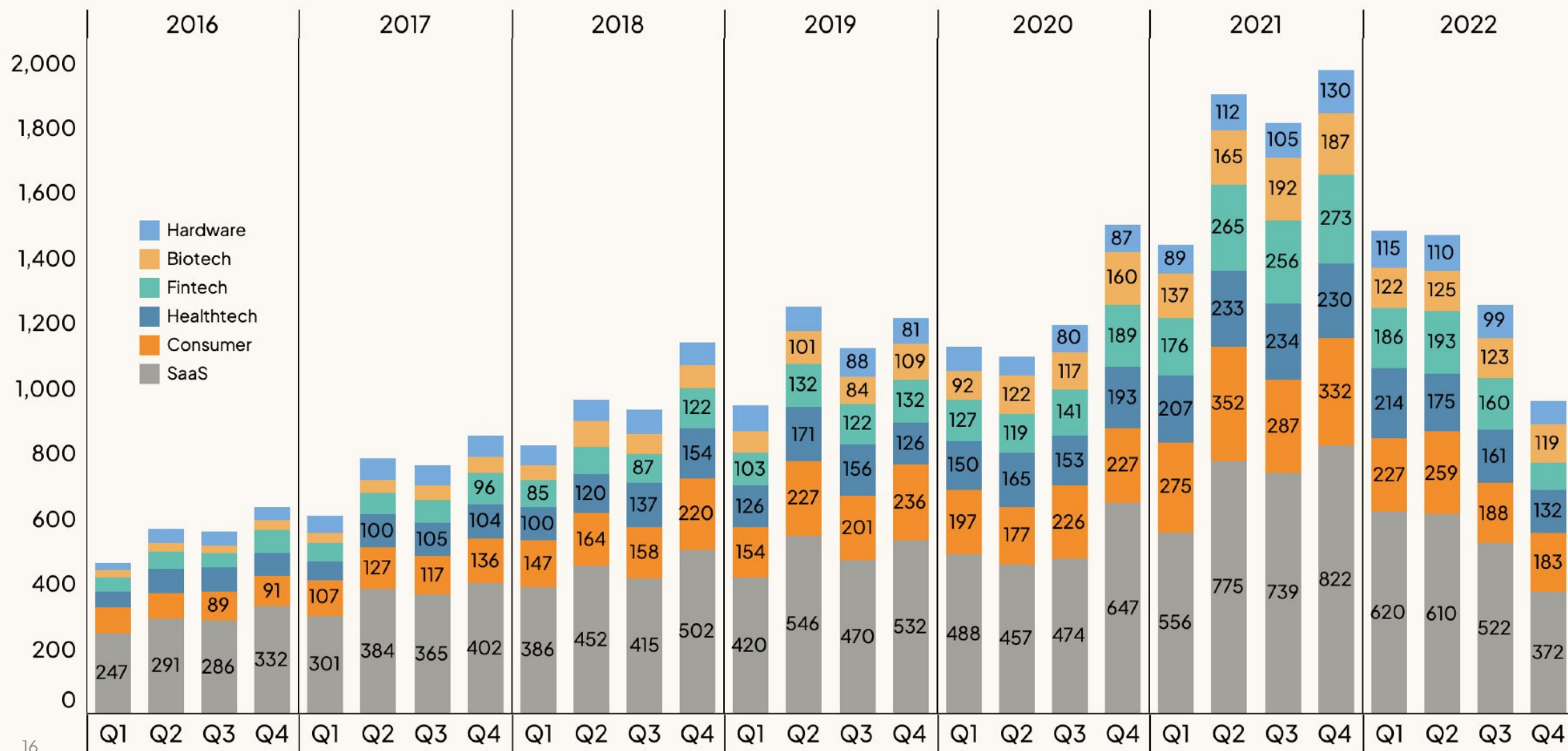


Real world example

# The small slice problem

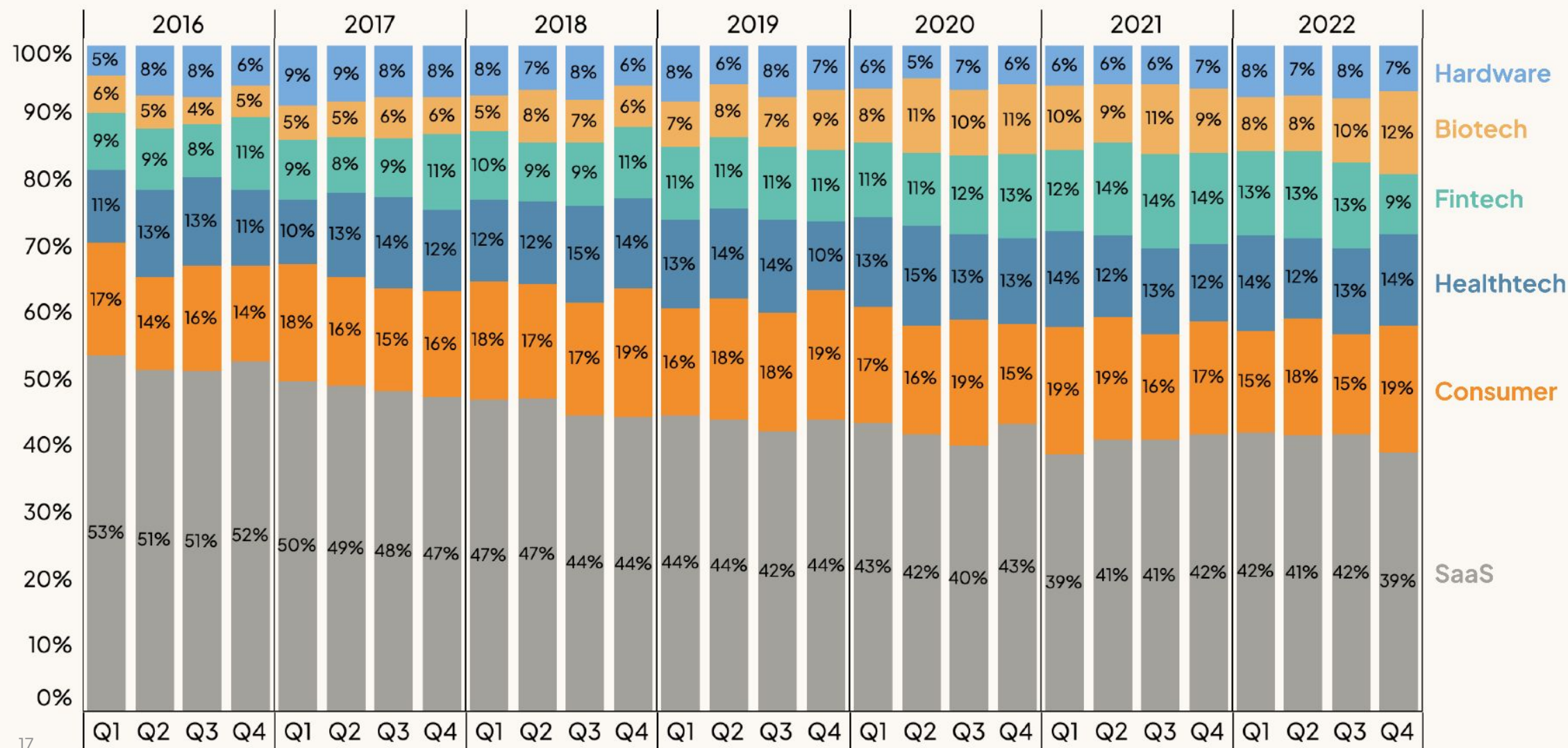
# Wait this doesn't really work, does it...

Number of quarterly deals completed by Carta companies | 2016–2022



# This is better! But what about the volume?

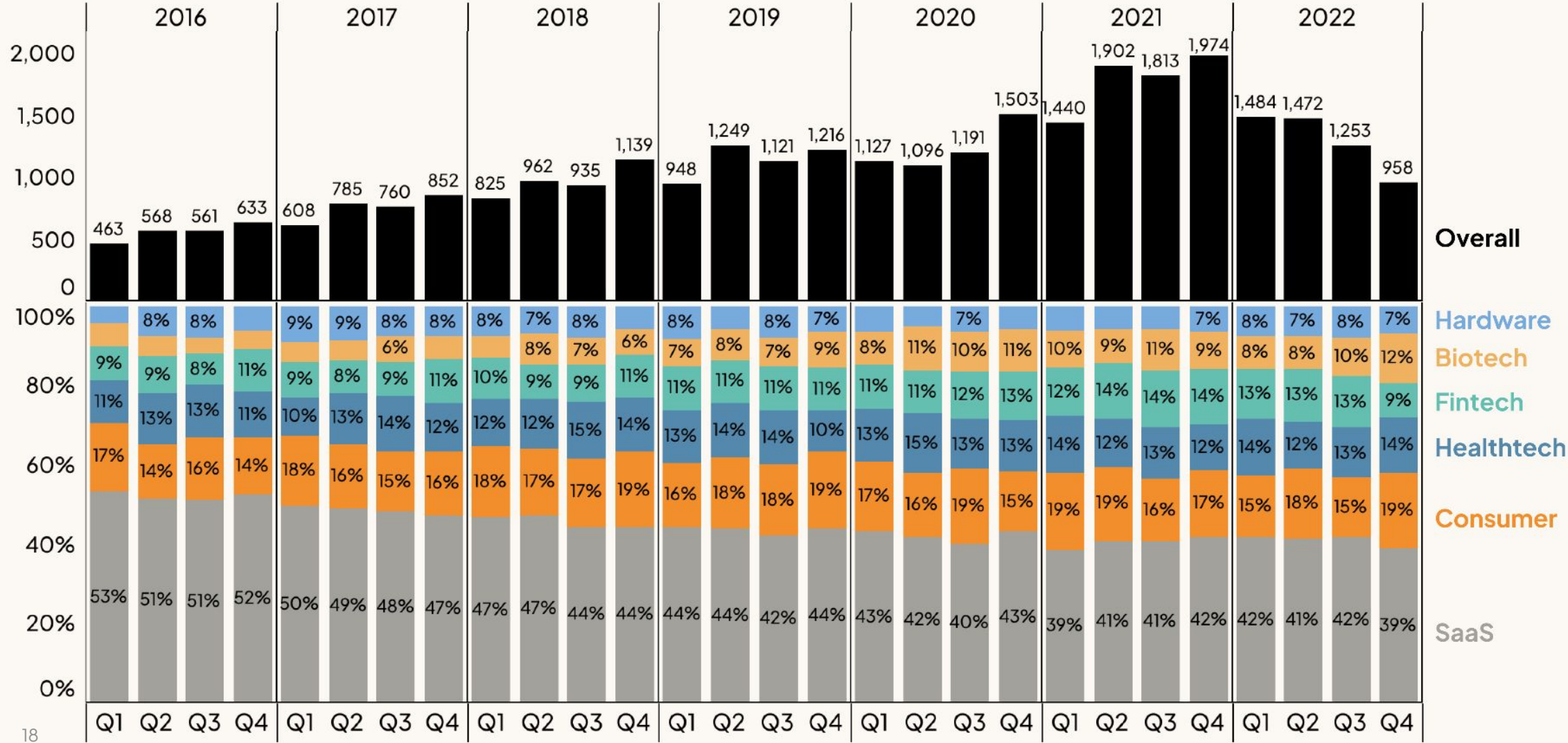
Number of quarterly deals by industry completed by Carta companies | 2016–2022





# Less than 40% of deals in Q4 2022 were SaaS

Number of quarterly deals by industry completed by Carta companies | 2016–2022

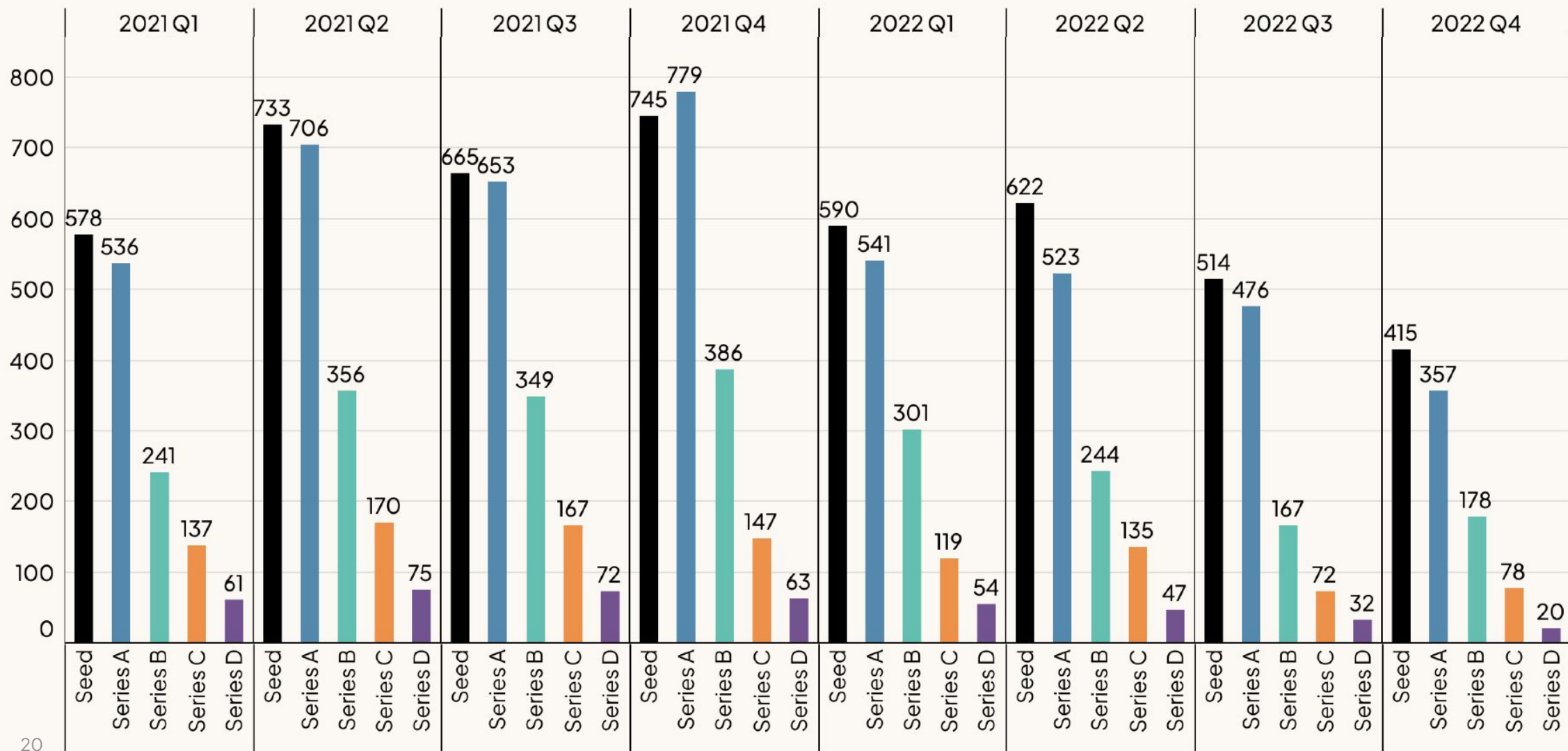


Real world example

# Categories galore

# Objectively not a good chart

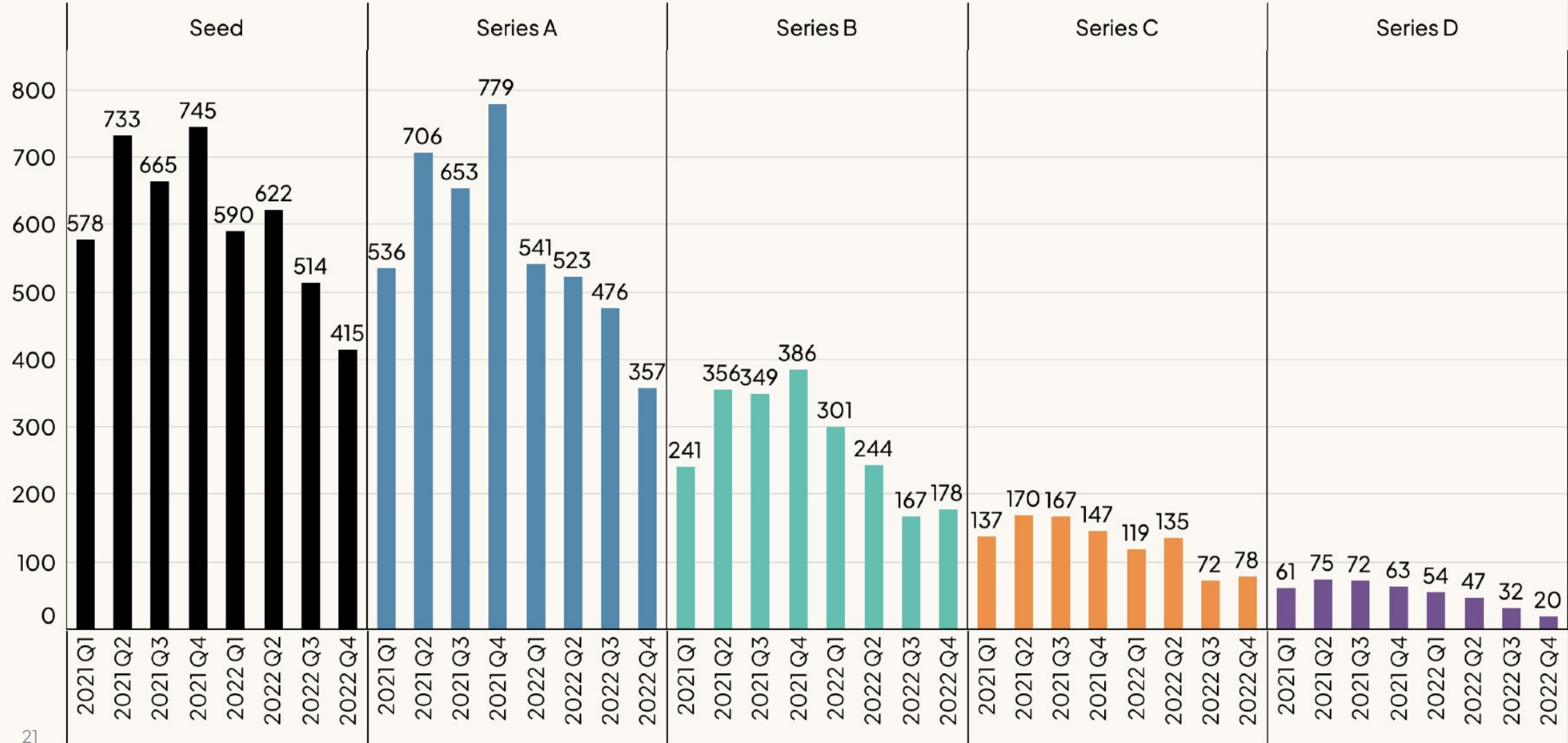
Number of quarterly deals completed by Carta companies by stage | 2021–2022





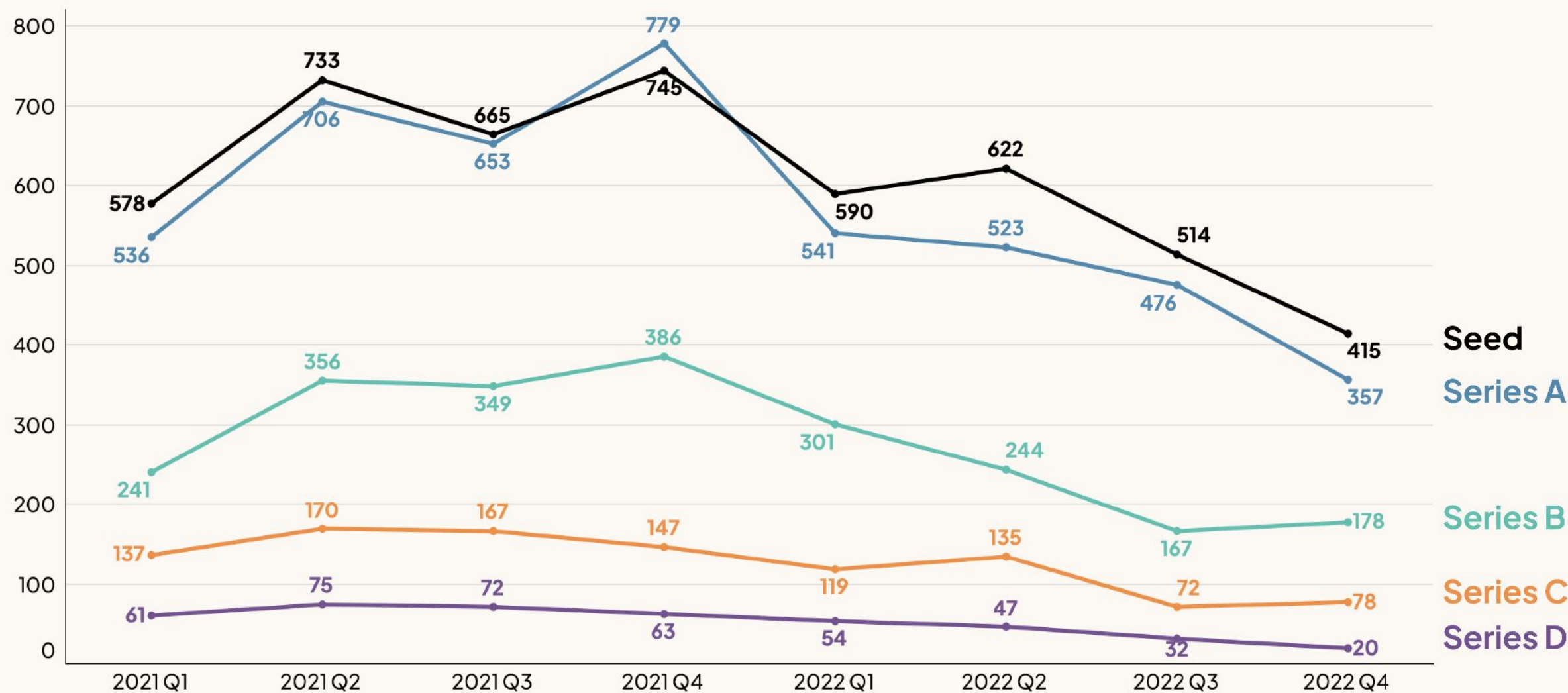
# Objectively better! But what are we saying?

Number of quarterly deals completed by Carta companies by stage | 2021–2022



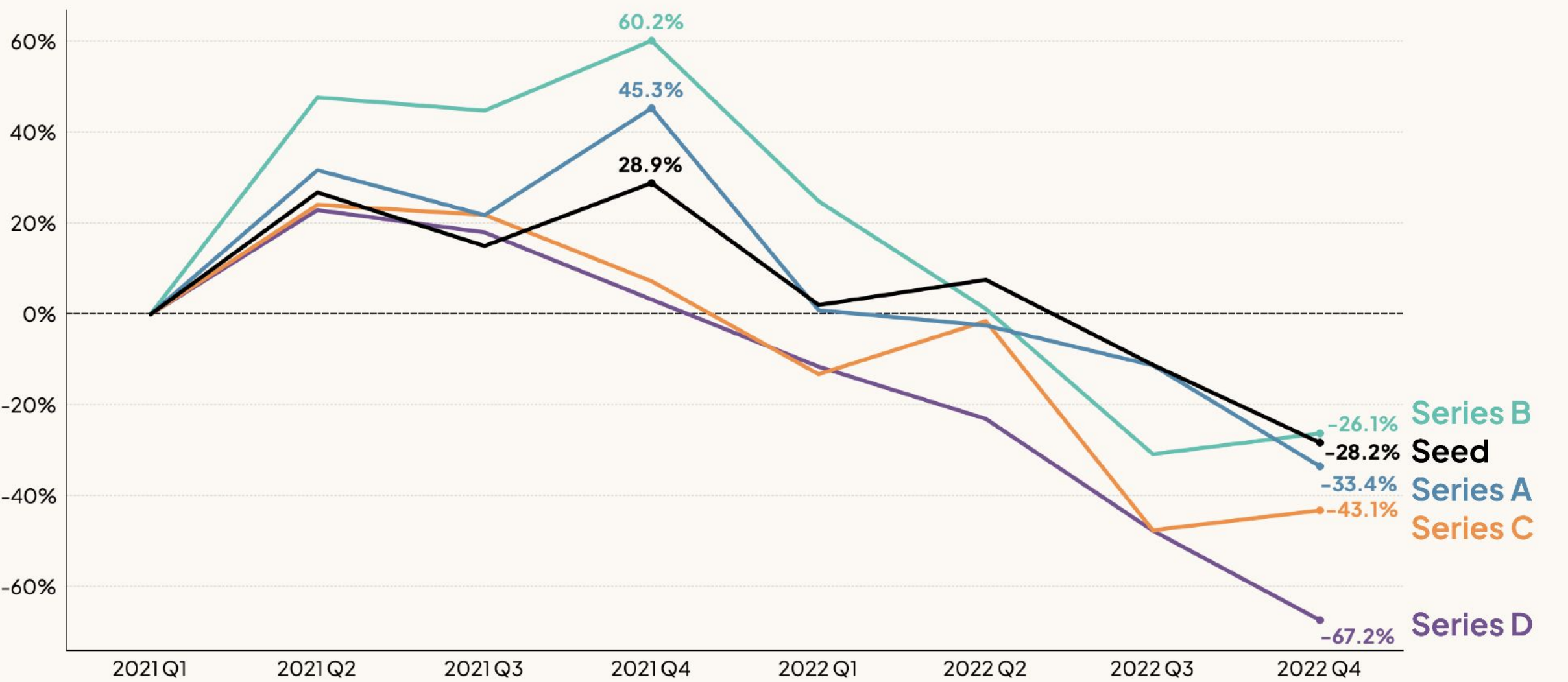
# This may be a step backward...

Number of quarterly deals completed by Carta companies by stage | 2021–2022



# Series D deal volume is down nearly 70% from Q1 2021

Percent change from Q1 2021 in quarterly deals completed by Carta companies by stage | 2021–2022



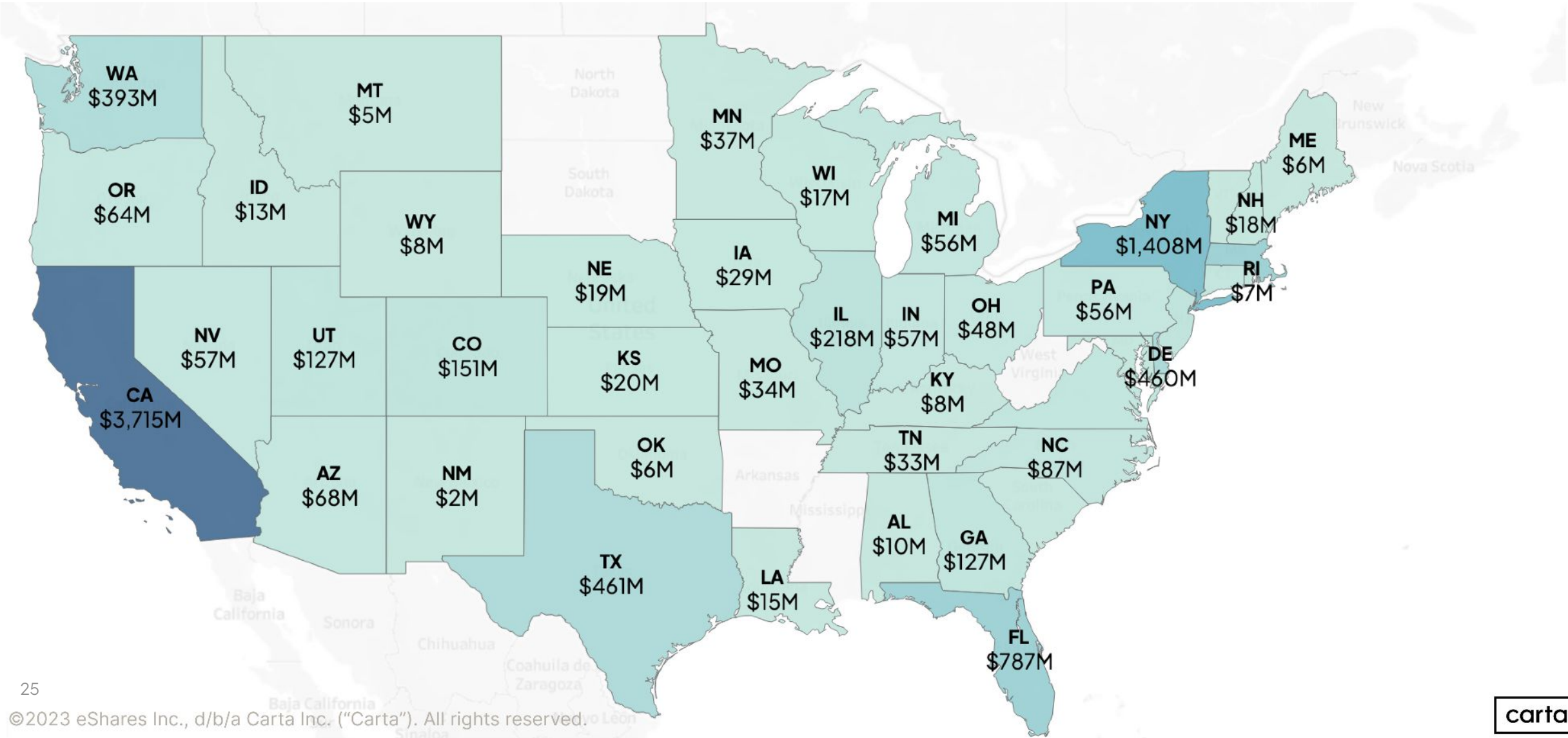
Real world example

Location, location, location



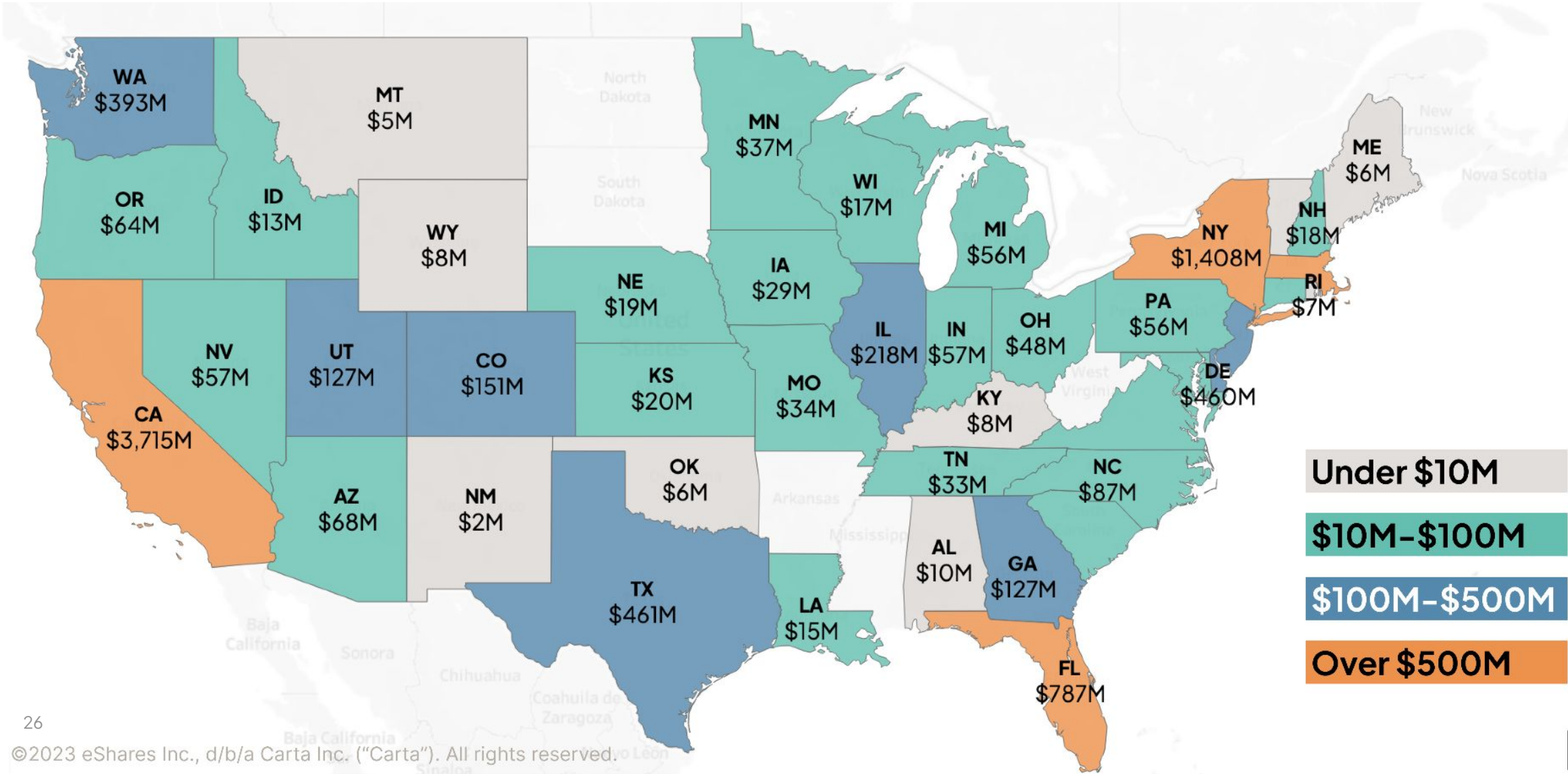
# Everybody loves maps!

Total seed-stage capital raised by companies in each state | 2022



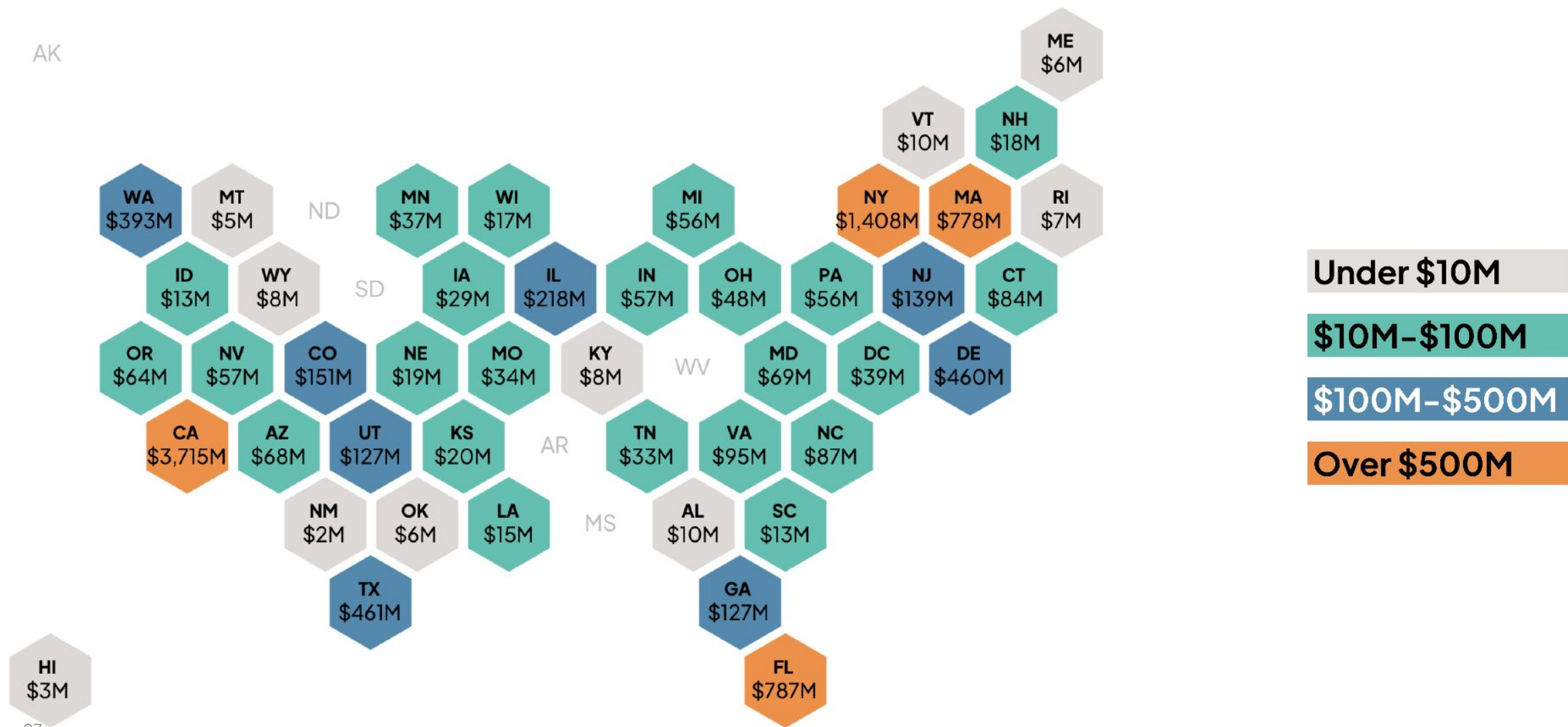
# Tiers > gradients

Total seed-stage capital raised by companies in each state | 2022



# Abstractions may function better than real maps

Total seed-stage capital raised by companies in each state | 2022





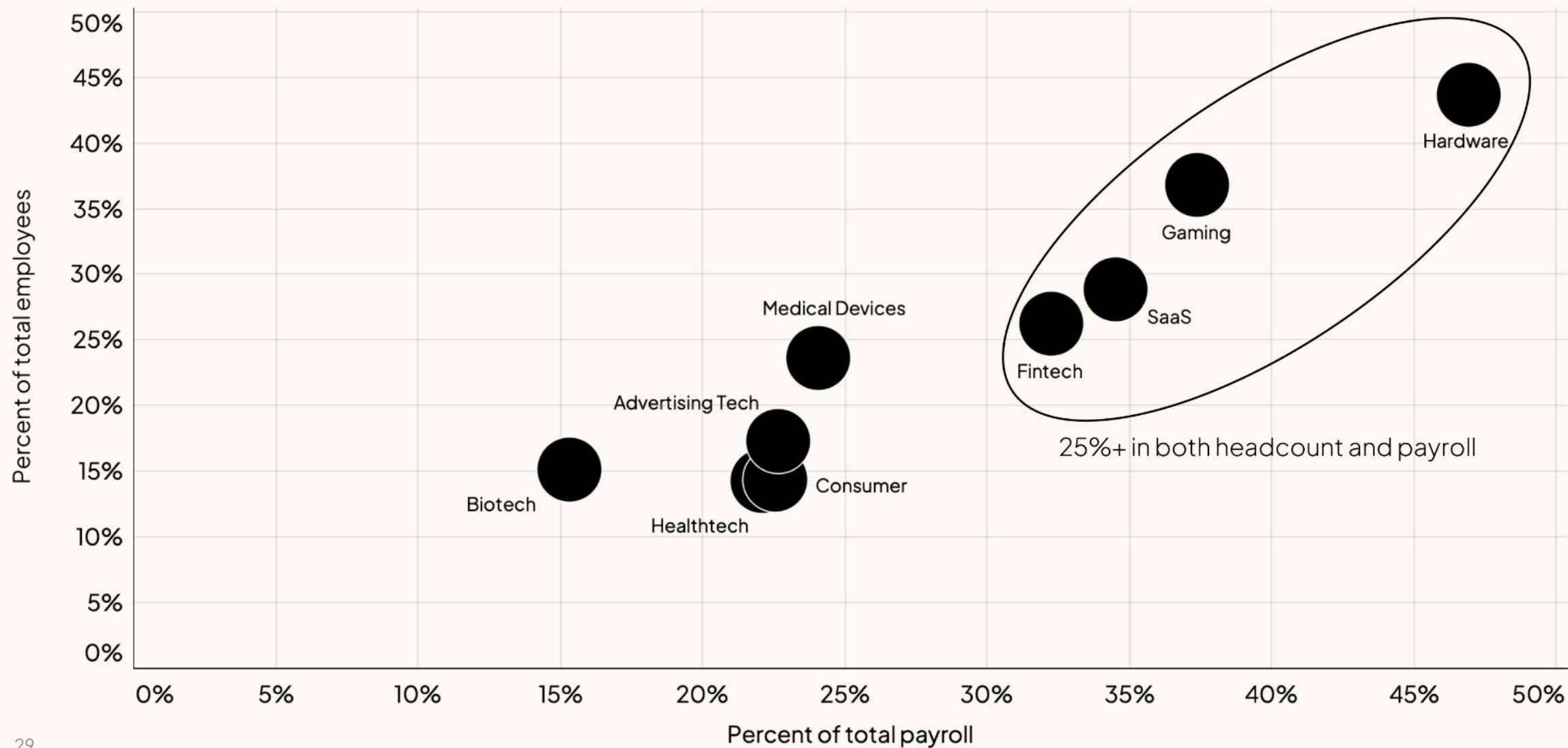
Quick hits

# Additive annotation



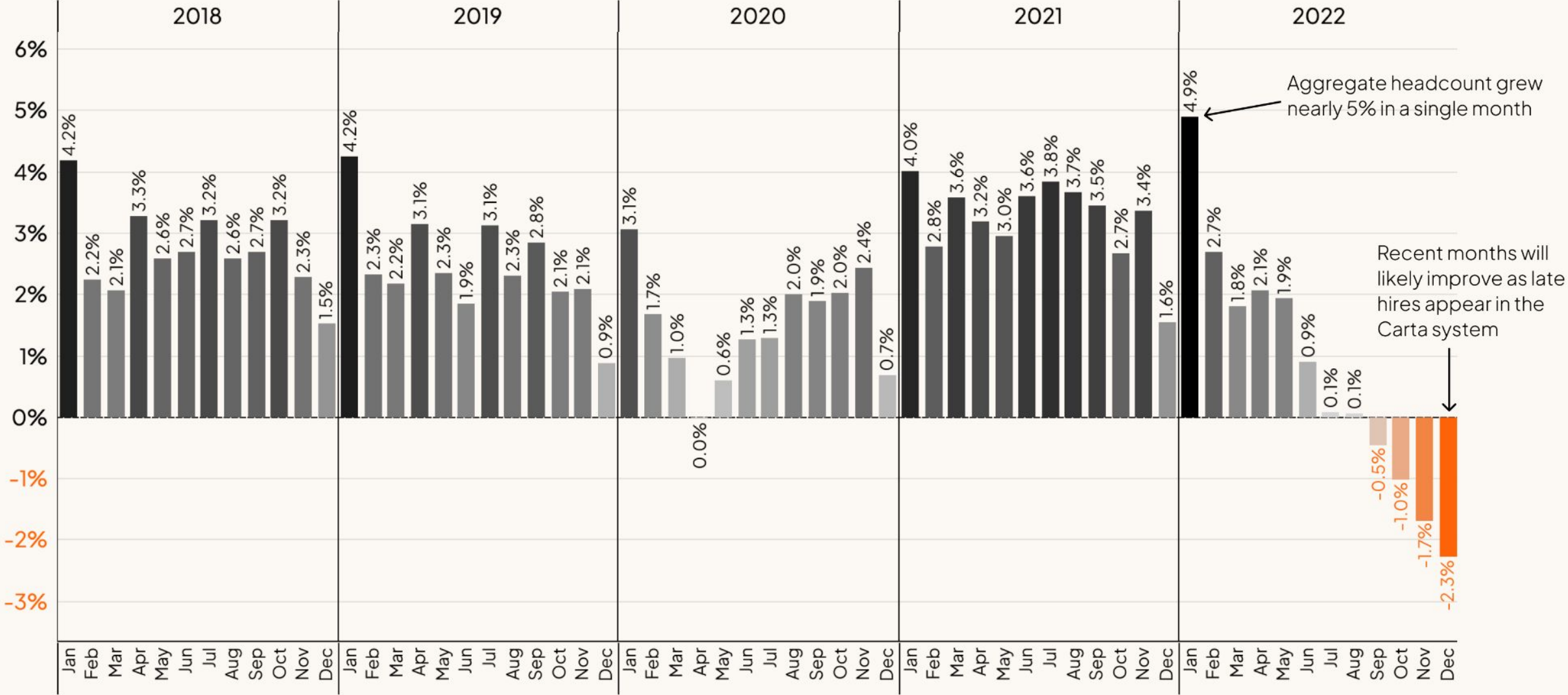
# Engineering doesn't always command a large share

Percent of headcount and payroll that goes to engineering by industry



# Aggregate headcount growth turned negative in Sept

Percent growth / **reduction** in headcount by month across all existing Carta companies | Data as of Feb 15, 2023







# Data Visualizations and Storytelling

**March 21, 2024**

**Caroline  
Hoffman**

**Virtual**

# Introduction



- 10+ years as a health communicator
- 2+ years at the Rhode Island Department of Health

# Data Visualization and Storytelling Best Practices



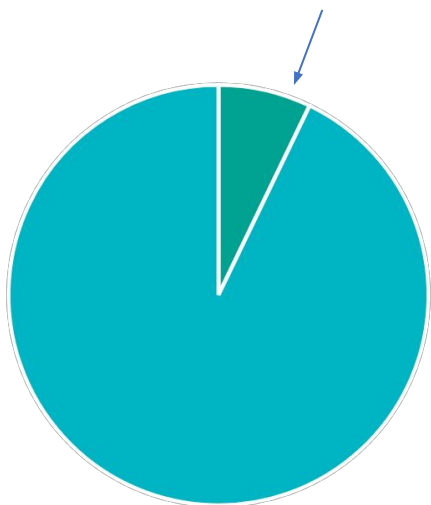
- It needs to be complete.
  - What is the denominator?
  - Is there enough information for it to be understandable on its own?
- It needs context. Don't rely on it to speak for itself.
  - Context helps create meaning.
  - Using plain language to explain key findings in a data visualization helps everyone understand.
- It should (ideally) be actionable.
  - Answer the question, "So what now?"
  - Calls-to-action empower the audience.
- In public health, our numbers represent **people**.



# Choose the Visual That Best Tells Your Story



Children entering kindergarten in Rhode Island in 2019 that had lead in their body



One in 14 children entering kindergarten in Rhode Island in 2019 had lead in their body.

## Get Your Child Tested for Lead

**Lead can have life-long effects** on development, including learning disabilities, loss of IQ, and reduced attention span.

**Lead is most dangerous to children younger than six years old.**

**Testing is the only way to know** if your child is lead poisoned.

**Lead screenings for children younger than six years old are free.**

Talk to your child's doctor for more information.

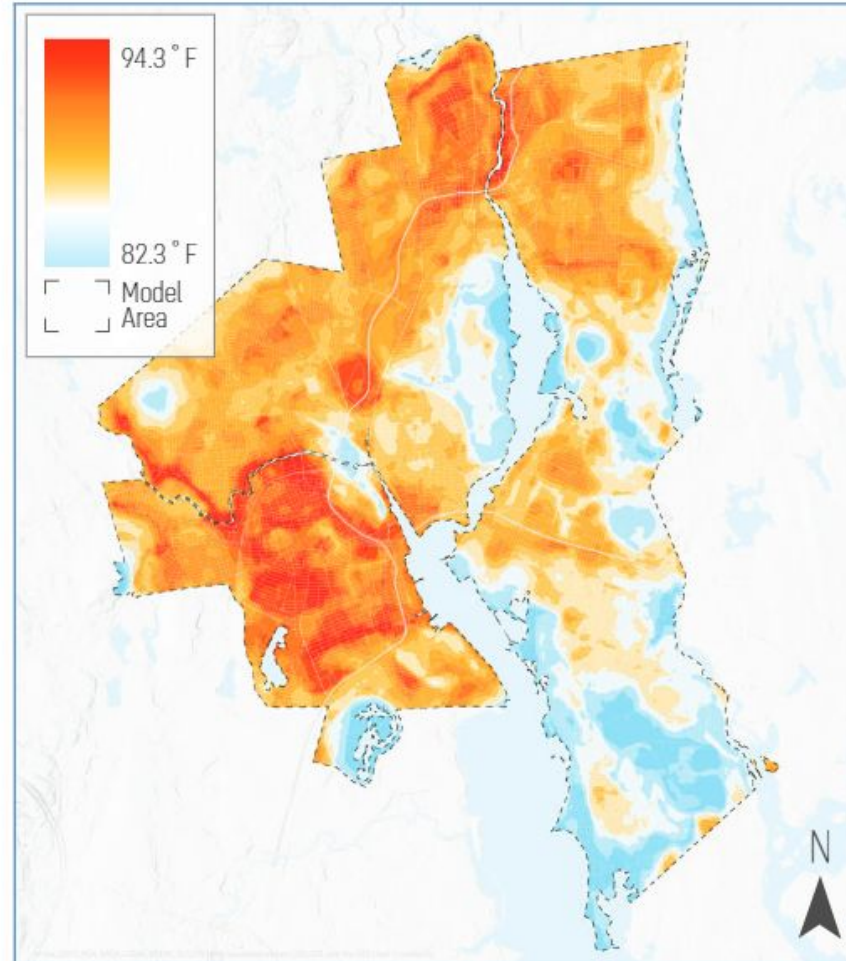


Learn more at [health.ri.gov/lead](https://health.ri.gov/lead)

# Maps Can Be Data-Rich Visualizations

- Model of urban heat island
- 12 degree temperature difference across the same city

Afternoon Area-Wide Predictions (3 - 4 pm)





# Combining Data and Images Adds Meaning



Homogeneous residential streets full of concrete and little shade can create "hot spots" within neighborhoods



Long stretches of asphalt and concrete without shade can create harsh conditions for pedestrians.



## Initial Observations

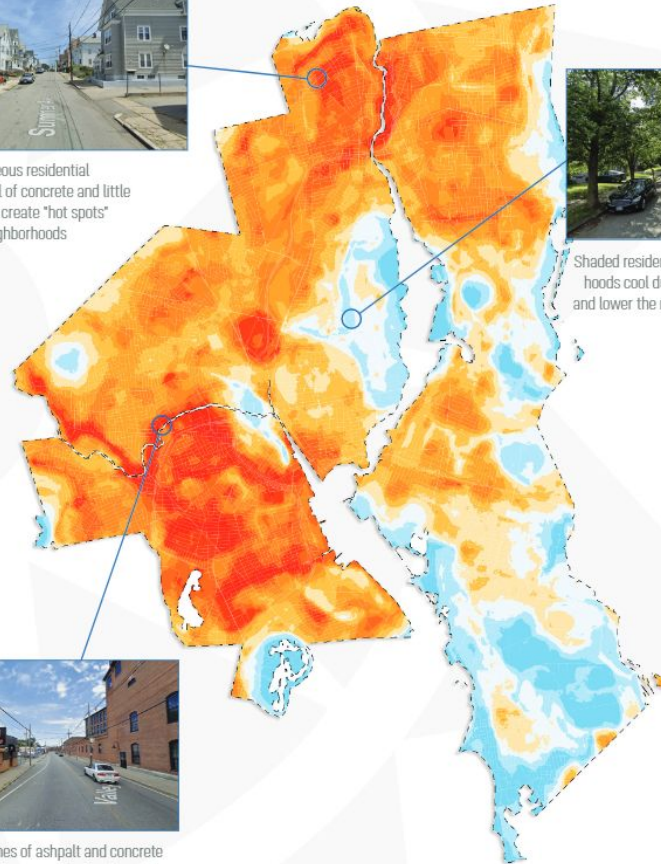
The distribution of heat across a region often varies by qualities of the land and its use. Here are several observations of how this phenomenon may be occurring in your region.



Homogeneous residential streets full of concrete and little shade can create "hot spots" within neighborhoods



Long stretches of asphalt and concrete without shade can create harsh conditions for pedestrians.



Shaded residential areas keep neighborhoods cool during summer heat waves and lower the risk of heat-related illness for residents.



Shaded residential areas keep neighborhoods cool during summer heat waves and lower the risk of heat-related illness for residents.

# Create With Your Audience In Mind



## Landlord / Homeowner

- How common is lead really?
- How can I find out if my properties are safe?

## Individual

- Is my house safe?
- What can I do?

### Get Your Home Inspected for Lead



82% of renter-occupied homes in Rhode Island were built before 1978



77% of owner-occupied homes in Rhode Island were built before 1978



If your home was built before 1978, it most likely has lead-based paint. When lead-based paint chips, peels, cracks, or turns to dust, small children can swallow it or breathe it in.

You can get your home inspected for lead-based paint by a certified lead professional.



Learn more at [health.ri.gov/lead](https://health.ri.gov/lead)

### Do you live in the City of Woonsocket?






*This program is funded by the City of Woonsocket through the US Department of Housing and Urban Development.*

Lead is poisonous, especially to young children. Lead poisoning is preventable, and it starts at home.

**Funding and expertise are available to help you fix lead-based paint in your home from the City of Woonsocket's Lead Hazard Reduction Program.**

**If you:**

-  Live in a home or apartment built before 1978
-  Meet income requirements
-  Have a child under six who lives at or frequently visits the home

Contact Woonsocket City Hall for more information.



Learn more at [health.ri.gov/lead](https://health.ri.gov/lead)

# Keep It Simple



**Protect Yourself from  
Unhealthy Air.**

**Air Quality Alert:** The air you are breathing  
may be harmful to your health



Rhode Island  
**Healthy Air**  
Collaborative



**Protect Yourself from  
Unhealthy Air.**



The air you are breathing may  
be harmful to your health.



Rhode Island  
**Healthy Air**  
Collaborative



# Maximizing Limited Resources



- Is there something that already exists?
- Find areas of common ground with another program and work together.
  - Helps avoid duplicating efforts too.
- Share your visualization on multiple platforms.



# Leveraging Existing Visualizations: Data Spotlights



Explanation of Data



Existing Data Visualization



Context



Call-to-Action

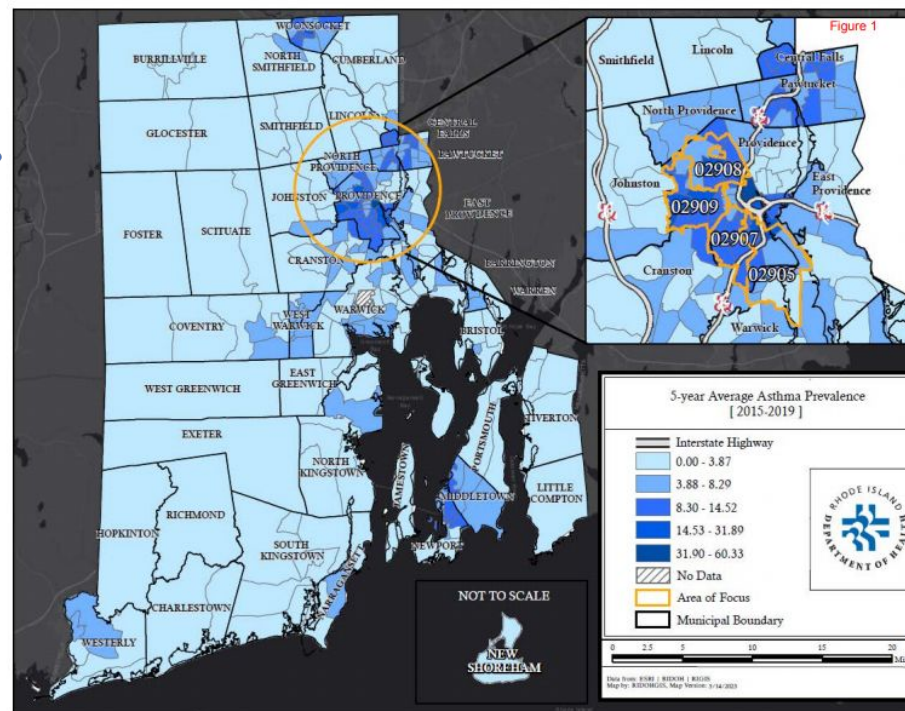


## Asthma in Rhode Island

May is Asthma Awareness Month—a time to educate friends, family, and patients about asthma and promote awareness about how this serious, chronic lung disease can be managed.

### Key Findings

- This map shows asthma hot spots across a 5 year period with Medicaid claims data. Hot spots are areas where the prevalence of asthma is higher than others.
- More people who live in the 02908, 02909, 02907, and 02905 ZIP codes have asthma during 2015-2019, compared to other areas in the state.



### Why It Matters

Asthma makes it hard to breathe, and causes wheezing, coughing, and tightness in the chest. People with mild asthma have attacks that are a minor annoyance. For some people, especially children, asthma attacks can be much worse, even requiring hospitalization.

Asthma cannot be cured, but it can be controlled. Asthma attacks can be avoided by taking medicine exactly as the doctor or other medical professional says and by avoiding triggers that can cause an attack. Things in the environment can trigger asthma attacks or make the condition worse – such as dust, allergens, air pollution and more.

Learn more at [health.ri.gov/asthma](https://health.ri.gov/asthma). If you have asthma, the [Asthma Control Program](#) may be able to help.



# Data Spotlights

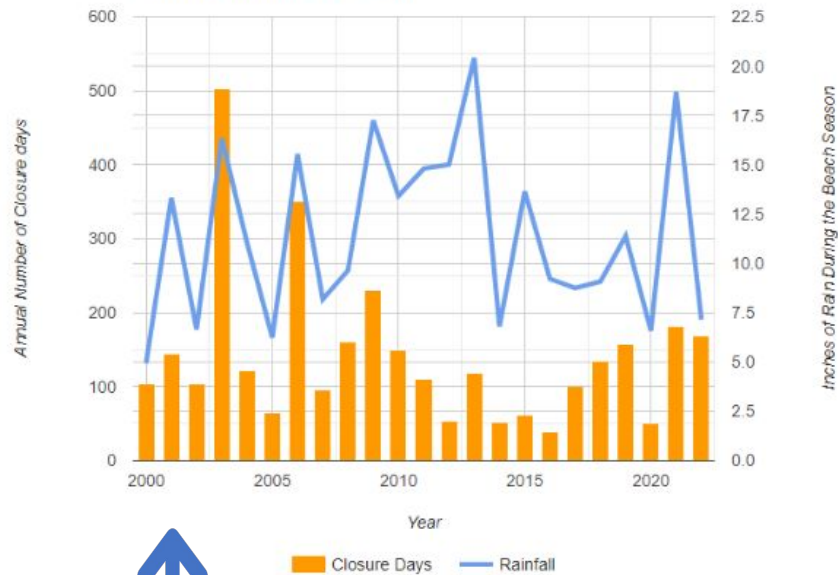


## ▼ August 2023 – Beach Closure Data

### Rhode Island Beach Closure Data



#### Beach Closures by Year



#### Key Findings

- This graph shows the relationship between rainfall and beach closures.
- Historically, beach closures in Rhode Island have been closely tied to precipitation. Stormwater runoff from roads, parking lots, and other impervious surfaces transports contamination (including bacteria) to our fresh and salt-water bodies.
- From 2000-2009, years with more beach closure days also had rainfall. This trend changes after 2009, when the first of several stormwater improvement and other infrastructure projects was completed.

#### Why It Matters

The [Beach Monitoring Program](#) tests water at the state's licensed beach facilities to determine if the water is safe for swimming. The program tests the amount (concentration) of Enterococci bacteria in beach water. RIDOH recommends closing beaches for swimming if the bacteria levels are too high because people can get sick.

Numerous municipalities including Barrington, Bristol, and Newport have installed stormwater improvement projects at and around their beaches. The City of Warwick has removed thousands of cesspools and installed municipal sewer connections in the Oakland Beach area. The Narragansett Bay Commission's "Combined Sewer Overflow Abatement Program" created a system of tunnels beneath Providence that store combined sewer and storm water during heavy rainfall events. The first phase was completed in 2009. Once the storm has subsided, the combined sewer and storm water goes through a wastewater treatment facility before entering Narragansett Bay. While some problems still exist, these cities and towns have seen improved water quality and fewer beach closures as a result. Additional municipalities are in the process of installing systems to improve the quality of water at their beaches.

Learn more at [health.ri.gov/beaches](https://health.ri.gov/beaches).

Explanation of Data

Context

Call-to-Action

Existing Data Visualization

# Our Data Becomes Part of the Story



## HEALTHCARE

### What to know about asthma rates in RI and why Providence is an asthma 'hot spot'

*What is Rhode Island doing to address high asthma rates?*



**Jack Perry**

The Providence Journal

Published 5:07 a.m. ET June 6, 2023 | Updated 8:42 p.m. ET June 6, 2023



Rhode Islanders with [asthma](#) have faced a challenging environment this spring as [high pollen counts](#) and [smoke from wildfires in Canada can aggravate symptoms](#).

And [Rhode Island has a higher percentage of asthma sufferers than the national average](#), according to the state Department of Health. Providence, in particular, is an asthma "hot spot" for the state, the department says.

Here is a Q&A on the disease with Ashley Robinette, [asthma-control program manager for the Rhode Island Department of Health](#):

## Number of Ocean State Beach Closures Highest in Nearly 20 Years

By Rob Smith / ecoRI News staff

August 21, 2023

Share



Print this page

According to data from the state Department of Health's [beach monitoring](#) program, freshwater and saltwater beaches around the state have been closed for a combined 284 days since Memorial Day, the highest number of closures recorded since 2006.

Beaches are closed by order of DOH when they test positive for elevated levels of enterococci bacteria; anything higher than the sample standard of 60 colony forming units (CFU) per 100 milliliters of water is closed until the tests produce a clean result again.

The situation has improved greatly over the past 15 years, according to DOH, as municipalities around the state, and the Narragansett Bay Commission's combined sewer overflow abatement program, have improved stormwater management up and down the bay. An increase in rainfall no longer always means an increase in the number of beach closures.

# Key Steps



- Determine your topic and your audience.
- Define the scope and the audience's needs.
- Assemble your team.
- Develop, review, revise.
- Invite your community to provide input.
- Anticipate the questions your visualization may raise – and be ready.



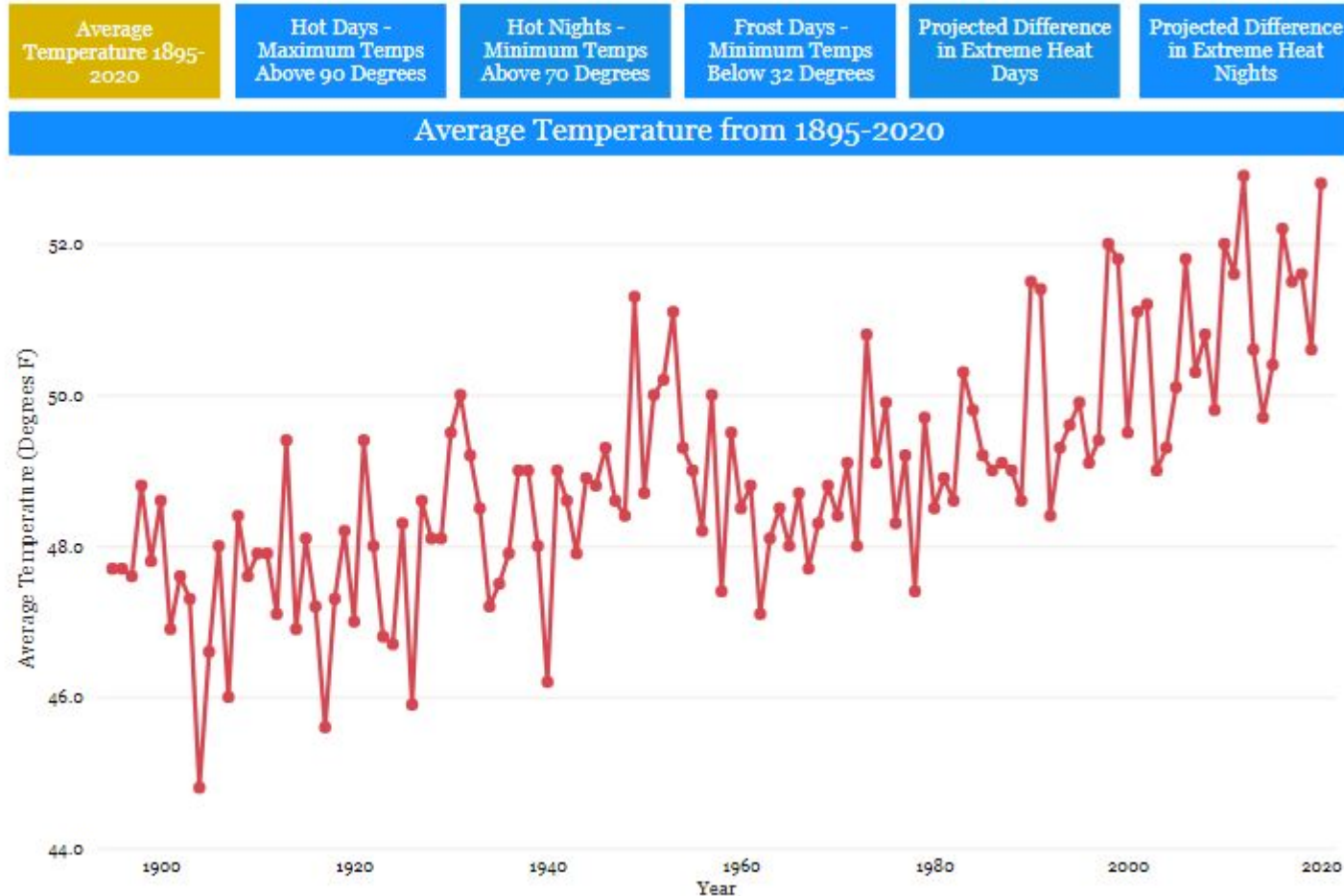
# Example: Climate Change Data Explorer





## RIDOH Climate Explorer

- Home
- Demographics
- Temperature**
- Heat Illness
- Degree Days
- Rainfall
- Drought



Rhode Island's current rate of warming is about 0.3 degrees F per decade. Since 1900, temperatures have risen around three degrees. New England is the fastest warming region of the country. This is largely because we are close to the Atlantic Ocean and the Gulf Stream current, which brings warm water from the south. Additionally, our water temperatures and sea levels are rising faster than the rest of the country. Data Source: [NOAA Climate at a Glance Statewide Time Series](#)

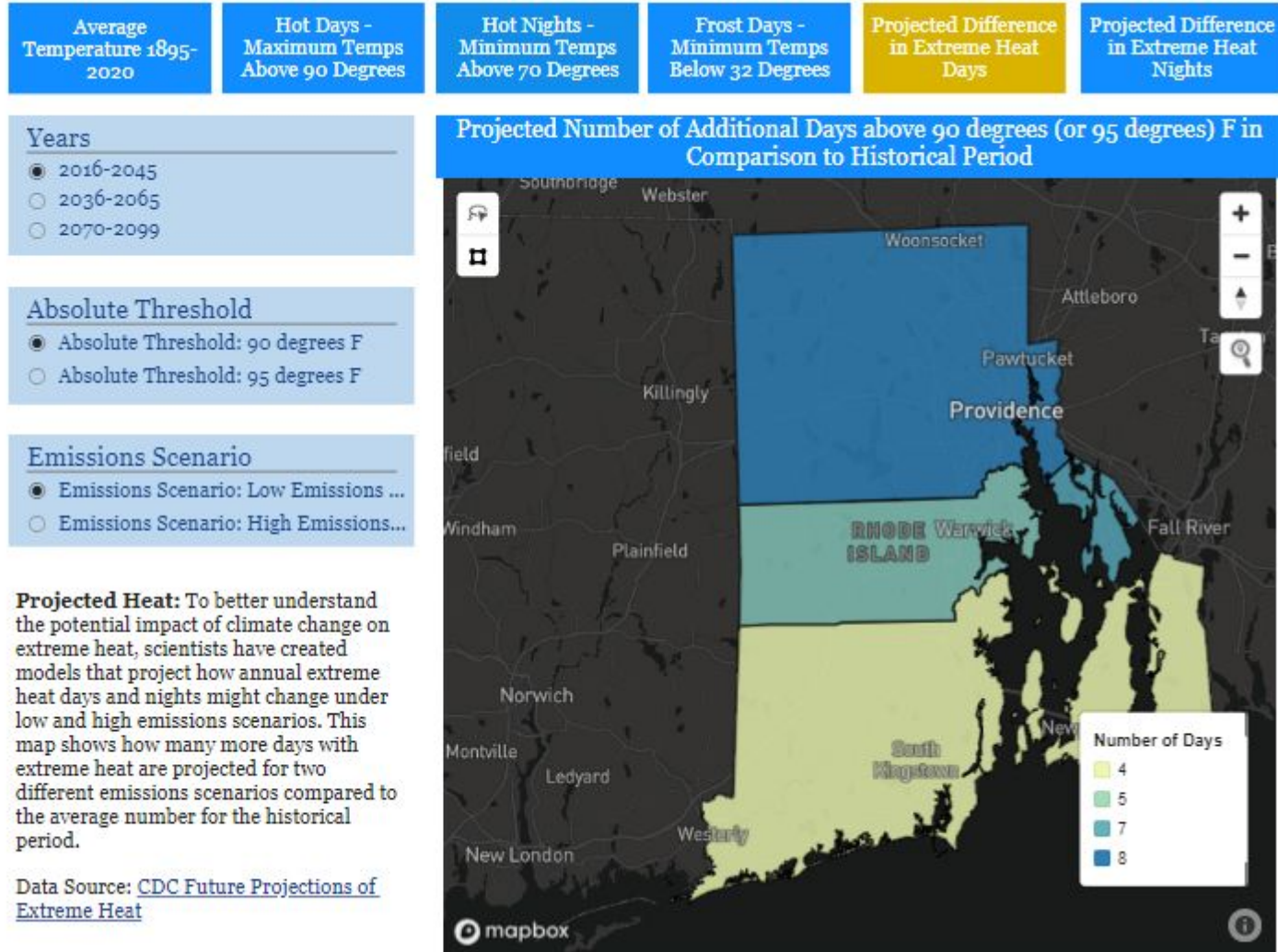
# Climate Change Data Explorer





## RIDOH Climate Explorer

- Home
- Demographics
- Temperature
- Heat Illness
- Degree Days
- Rainfall
- Drought





# Climate Change Data Explorer



**The Ask:** Create an interactive data product that would help Rhode Islanders understand weather trends related to climate change – and their connection to human health.

## **The Team:**

- Data analyst
- Climate change and health subject matter expert
- Communications specialist

# Climate Change Data Explorer



## The Process:

- Climate change expert and communications specialist defined scope and goal of project.
- Climate change expert identified topics and data sets.
- Data analyst developed product framework and draft visualizations.
- Team discussed if visualization formats were the best display for certain data point.
- Climate change expert and communications specialist added narrative context.
- Reviewed. Negotiated. Edited. Reviewed.

# Spread the Word



## **Proactive Distribution**

- Environmental Public Health Tracking Program Newsletter
- Climate Change and Health Newsletter
- Announced on social media
- Featured in data spotlights on Tracking web page; cross posted to social media

## **Reactive Storytelling Aid**

- Used in response to media inquiries
- Provided to staff at the Governor's Office
- Shared with DEM and academic partners
- Join the conversation

# Look for Opportunities to Join the Conversation



## RIDOH Climate Explorer

Home

Demographics

Temperature

Heat Illness

Degree Days

Rainfall

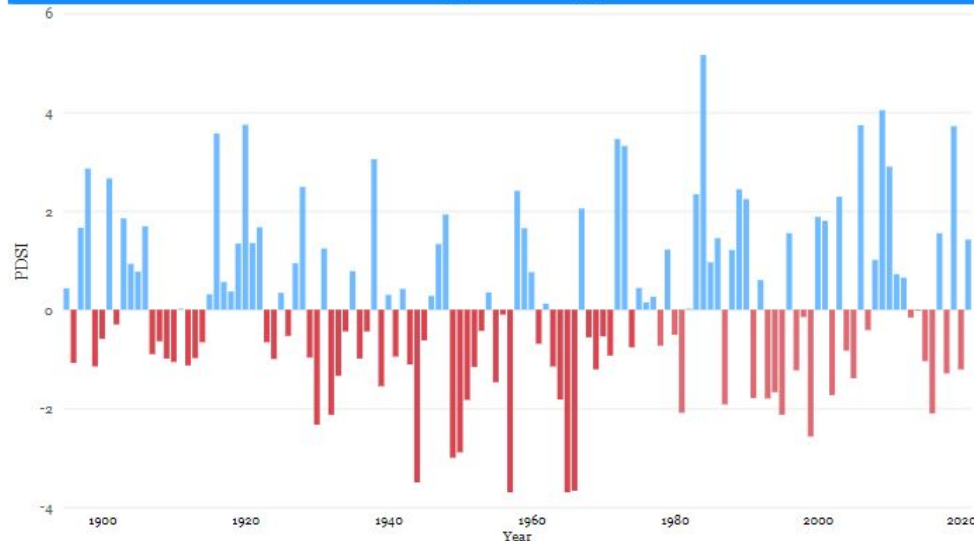
Drought

Palmer Drought Index 1895-  
2020

Percent of Weeks in Drought

Total Number of Weeks in  
Drought

Palmer Drought Index 1895 - 2020



The Palmer Drought Severity Index (PDSI) uses temperature and precipitation data to estimate relative dryness. It is a standardized index that generally spans -10 (dry) to +10 (wet). Maps of operational agencies like NOAA typically show a range of -4 to +4, but more extreme values are possible. Data Source: [NOAA Climate at a Glance Statewide Time Series](#)

**Did you know that nearly all of Rhode Island is in an extreme drought?**

**Rhode Island has had 5 fewer inches of rainfall this year than normal.**

## What is a drought?

A drought is a period of time when there is abnormally low rain or precipitation.

Steady rain, not short and intense rain, is needed to end a drought.

## Why does it matter?

- Increased risk of forest fires.
- Loss of crops can result in rising food prices or shortages.
- Dry and dusty conditions can worsen air quality and respiratory conditions like asthma.



# Example: Infographic

**The Ask:** Create a document to educate family-based child care providers about environmental contaminants.

## The Team:


- Toxicologist
- Program Manager
- Communications specialist


**KEY**


May be present

Avoid introducing

There are regulations and requirements for this contaminant.


This contaminant can cause health effects.

There is an additional action that needs to be taken (i.e., you need to test or have an inspection done).

Rhode Island Department of Health
























## Making Your Home Safe for Family-Based Child Care

There's more to safety than child-proofing. Sometimes things in a house can make people sick, especially young children who are still growing and developing. Many can be fixed. Use this document to learn about what to look for in your home before opening a family-based child care center.



**KEY**

- May be present
- Avoid introducing
- There are regulations and requirements for this contaminant.
- This contaminant can cause health effects.
- There is an additional action that needs to be taken (i.e., you need to test or have an inspection done).

1	<b>Lead</b>	Lead is a toxic metal that is common in paint and in pipes in houses built before 1987.	  
2	<b>Asbestos</b>	Asbestos is a fiber that was used in construction. If damaged, it can cause lung problems when it's breathed for a long time.	  
3	<b>Radon</b>	Radon is a radioactive, colorless, odorless gas. It naturally occurs in the ground and can enter a home.	  
4	<b>Unsafe Drinking Water</b>	Dangerous chemicals and germs can get into drinking water. If your water is from a public water system, ask about lead test kits. If you have a private well, it should be tested for chemicals and germs. The Center for Drinking Water Quality can help.	  
5	<b>Carbon Monoxide</b>	Carbon monoxide (CO) is a poisonous gas that has no color or smell. Install a CO detector.	  
6	<b>Smoking or Vaping</b>	Smoking or vaping in a family-based child care center while children are present is banned. Smoking or vaping inside while children aren't present is strongly discouraged – and parents of all children must be notified. Toxins from cigarettes build up on surfaces and cannot be removed by normal cleaning. They are especially dangerous for children.	  
7	<b>Chemicals</b>	Dangerous chemicals are used in some pest traps or treatments and cleaning products. Choose non-toxic products when possible. Store cleaning and pest products securely and out of children's reach.	  
8	<b>Mold</b>	Mold spores are common. When moisture is present, mold can grow on surfaces in a house and cause health problems. Properly clean visible mold. Fix leaks and ensure proper ventilation to reduce moisture.	  

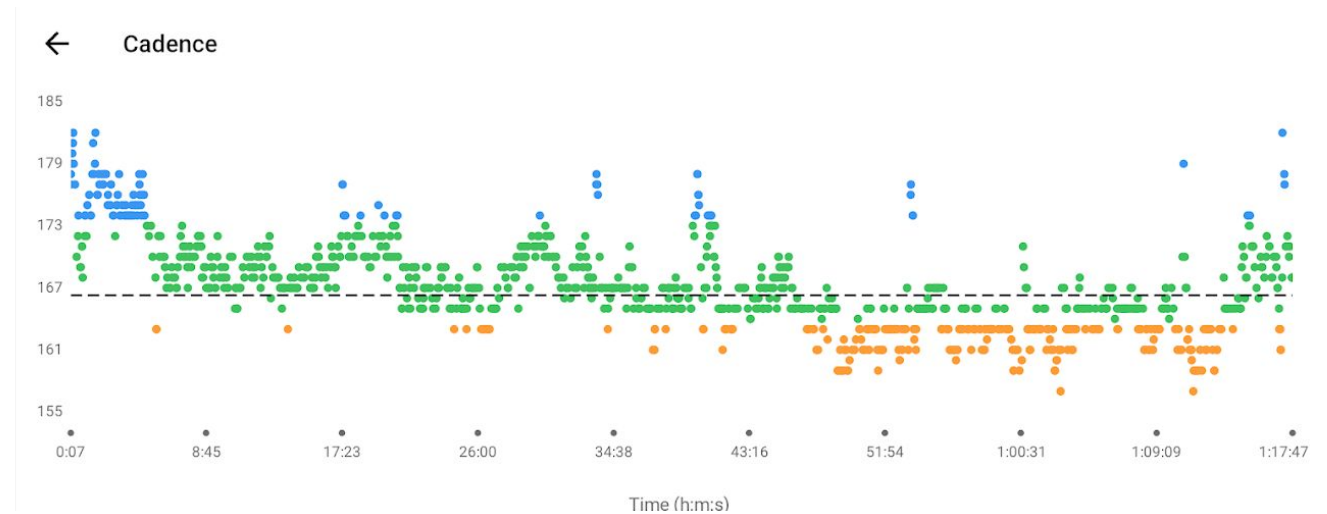
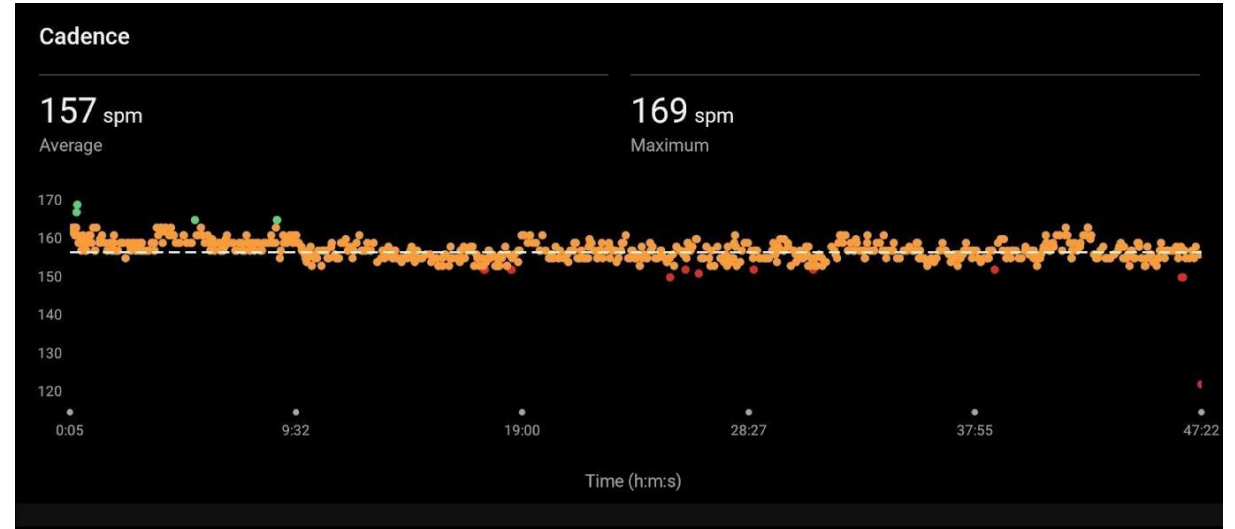
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# Consider Accessibility



- Mobile devices
- Translation
- Screen readers
- Image descriptions
- Color-blind friendly





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# Thank You

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