THE POWER OF DATA VISUALIZATION

Manizeh Afridi, MPH - Public Health Consultant for BME Strategies
Pooja Shelke, MPH - Regional Epidemiologist for MetroWest Shared Public Health Services
Thalita Campelo, BS - Regional Health Communications Specialist for MetroWest Shared Public Health Services

Presentation Overview

By the end of this presentation, you will be able to understand:

- What data visualization is
- Why data visualization is important
- What its purpose and value in local public health is
- How to use it to tell your community’s story and make informed decisions

Data Visualization Is...

The art of communication.

3 Key Questions to Effective Communication

1. Do I know what I'm communicating about?
2. Do I know who I'm communicating to? (Audience)
3. What is the purpose of my communication? (Educate? Inform? Inspire?)

<u>In today's presentation:</u>

1. What are we communicating about? **The importance of data visualization**
2. Who are we communicating to? **MHOA members, local health directors, local public health professionals in MA**
3. What is the purpose of this presentation? **To help educate our local public health colleagues understand what data visualization is, why it is important, what it's purpose and value is in local public health, and how you can use to effectively communicate**

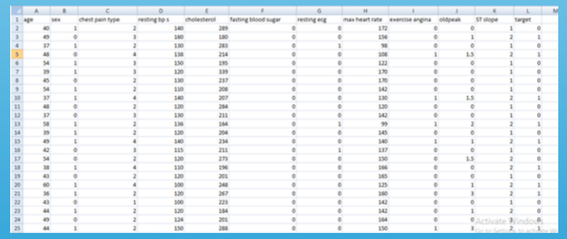
What is Data Visualization?

Data:

Raw facts, figures, or information collected through observation, measurement, or research

Data at its most basic level = INFORMATION

1	Lower respiratory infections†	143
2	Tuberculosis	121
3	Upper respiratory infections	69
4	HIV/AIDS	30
5	Hepatitis‡	22
6	Otitis media	18
7	Diarrheal diseases§	16
8	Varicella	8
9	Encephalitis	6



Disease Investigations*

	Number	Rate per 10,000
Bayside	20	45.6
Brown Deer	178	148.3
Fox Point	24	35.8
Glendale	116	90.1
River Hills	10	62.6
Shorewood	89	67.6
Whitefish Bay	52	36.9
Other	52	
Total	541	83.1

*Confirmed, Probable & Suspect Excluding COVID-19

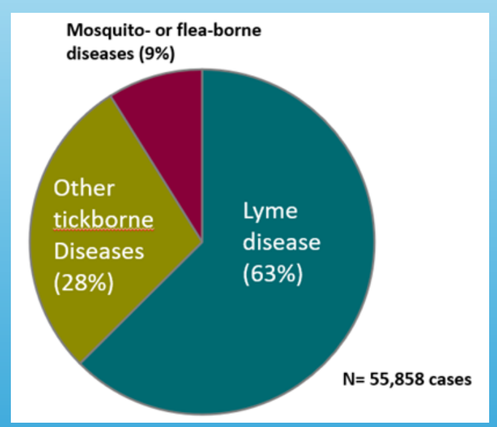
Disease Cases*

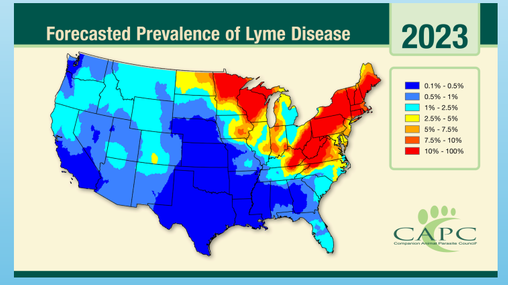
	2019	2020
Food or Water-borne illness	55	30
Hepatitis - A, B, C	12	12
Mycobacterium - non-TB	17	20
Vaccine Preventable**	25	8
Sexually Transmitted Disease	346	323
TB - Active	<5	0
TB - Latent	20	7
Vector-borne (mosquito & tick)	9	5
Influenza Hospitalization	46	39
Strep	14	16
Other	7	7
Total	552	467

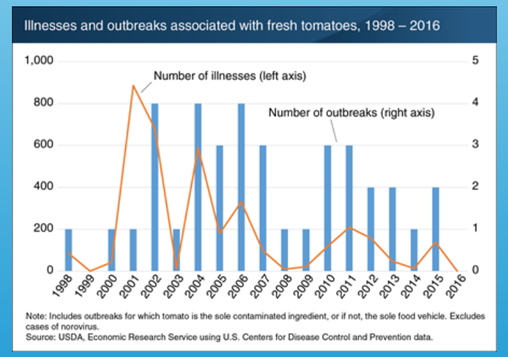
*Confirmed & Probable
**Pertussis, Varicella (chicken pox), Mumps, etc.

Data visualization:

The representation of data in graphical or visual formats, such as charts, graphs, maps, and dashboards, to help people understand and interpret complex information







The importance of data visualization is quite simple:

It is to help people interact with and better understand information.

Data Visualization In Public Health

Data visualization in public health turns raw data into actionable insights.

For example, in your work, this could look like:
Taking the information from MAVEN about the number of COVID-19 cases there are in your town so that you can talk to community members about the importance of social distancing.

Helps to foster:

- Better communication
- Informed decision making
- More effective health strategies

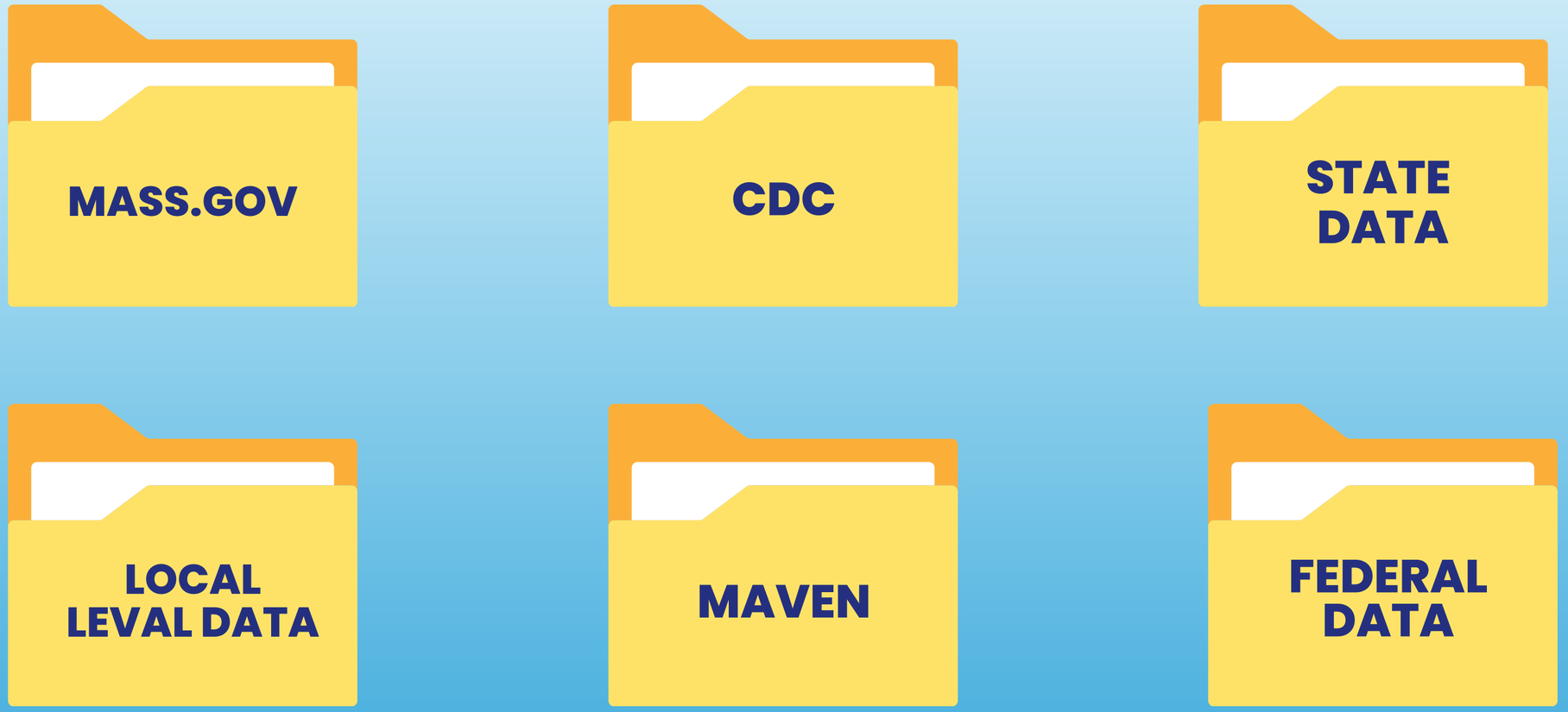
Data Visualization In Public Health

To share your data, you must understand it.

Data Considerations – Understanding Your Data

1. What is the source of this data? What is the time frame?
2. What is the structure and characteristics of the data?
3. What does this data represent?

The Data Source



Data Structure

Qualitative

Non-numerical and descriptive

Examples:

- Focus group interviews
- Key-informant interviews
- Open-ended survey questions
- Stakeholders/Patients feedback

Helps to **understand context, experiences and perspectives of individuals and your communities.**

Quantitative

Numerical

Examples:

- Case count
- Incidence rate
- Prevalance
- Immunization rates

Helps to **identify patterns, trends or relationships between exposures and health outcomes.**

What Does This Data Represent?

Demographic

- Age
- Race
- Gender
- Ethnicity

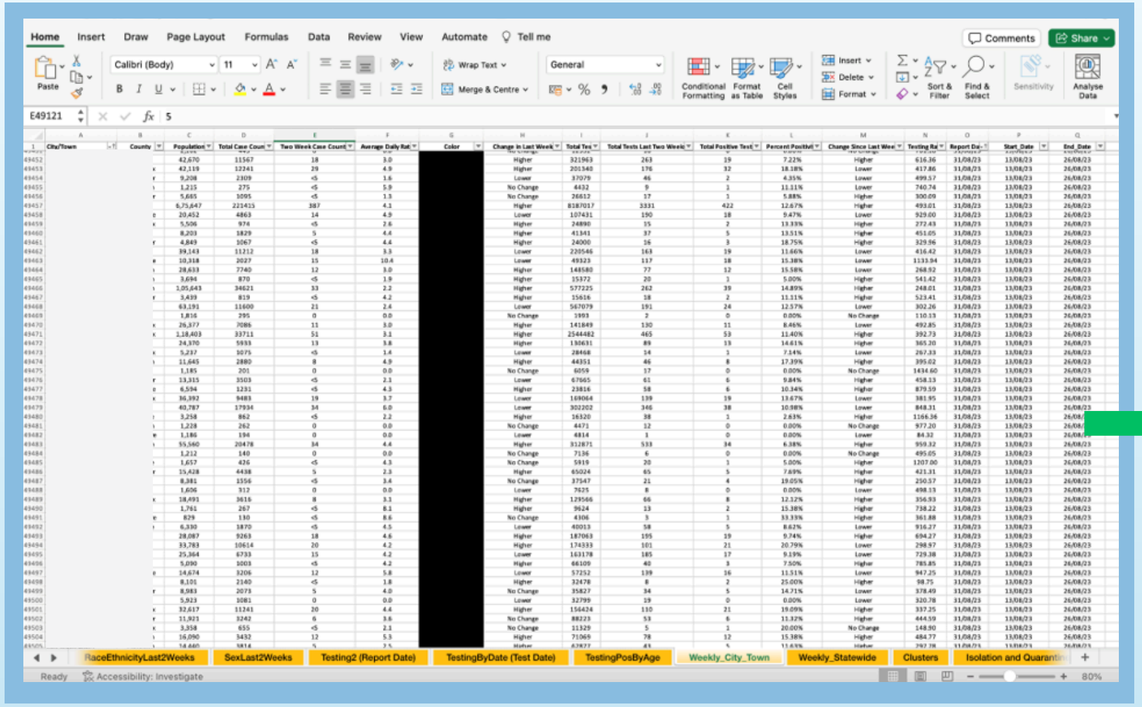
Numerical Data

- Case counts
- Case rates
- Incidence rates
- Immunization rates

Social & Environmental Factors

- Education levels
- Transportation
- Uninsured popoulation
- Employment rates

Visualization is KEY

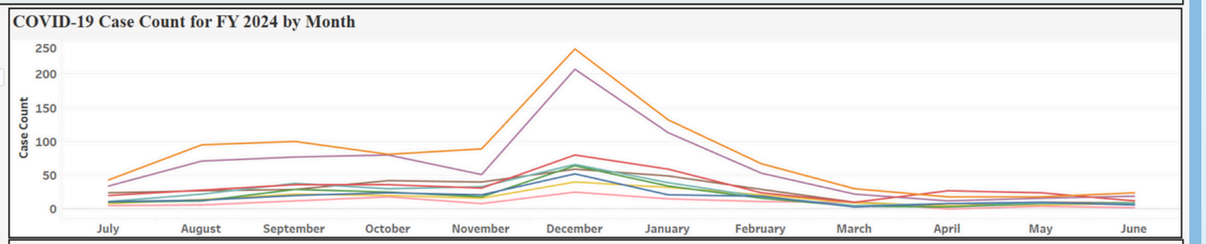


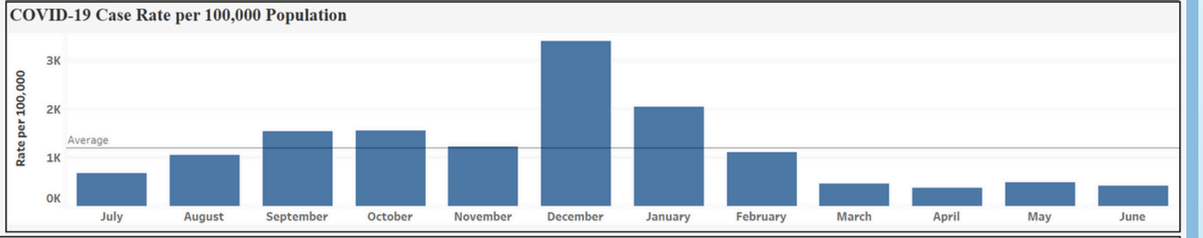
The following data represents the trend of Confirmed Covid-19 cases and Covid-19 case rate per 100,000 population within the MetroWest Shared Public Health Service area for the fiscal year 2024. The data is segmented by each town or city in the MWSPHS area. (Please note: The fiscal year begins in July and ends in June of the following year.)

Official Town/City

(All)

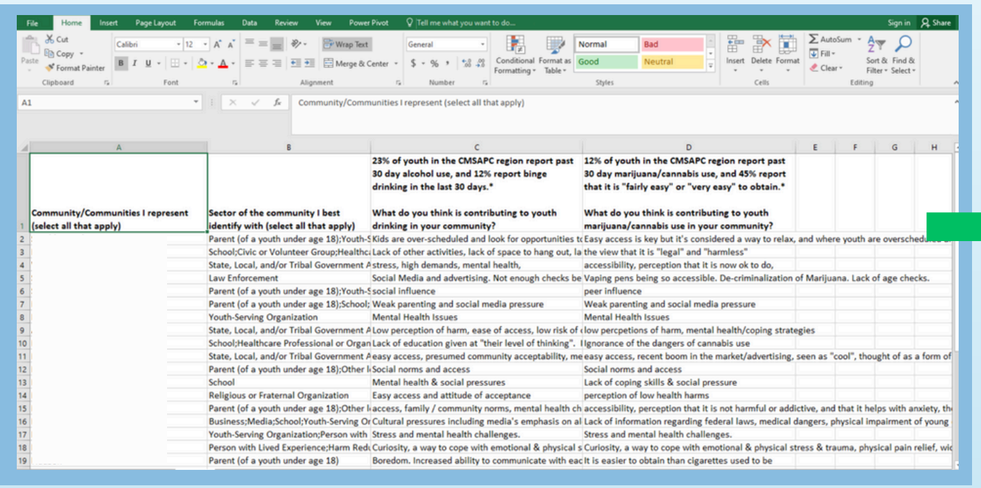
Town/City





A confirmed case is one in which the clinical case description is met and the laboratory confirmation requirement is met. A case may also be considered confirmed if it is linked to a laboratory-confirmed case. Certain diseases may not include laboratory findings as testing is not available.
The COVID-19 case rate per 100,000 population is the number of confirmed COVID-19 cases per 100,000 people and is helpful in assessing to what extent the coronavirus has impacted the community.
(Source: MDPH)

Visualization is KEY



Community/Communities I represent (select all that apply)	Sector of the community I best identify with (select all that apply)	23% of youth in the CMSAPC region report past 30 day alcohol use, and 12% report binge drinking in the last 30 days.* What do you think is contributing to youth drinking in your community?	12% of youth in the CMSAPC region report past 30 day marijuana/cannabis use, and 45% report that it is "fairly easy" or "very easy" to obtain.* What do you think is contributing to youth marijuana/cannabis use in your community?
	Parent (of a youth under age 18);Youth-S	Kids are over-scheduled and look for opportunities t	Easy access is key but it's considered a way to relax, and where youth are overscheduled
	School;Civic or Volunteer Group;Healthc	Lack of other activities, lack of space to hang out, la	the view that it is "legal" and "harmless"
	State, Local, and/or Tribal Government A	stress, high demands, mental health,	accessibility, perception that it is now ok to do,
	Law Enforcement	Social Media and advertising. Not enough checks be	Vaping pens being so accessible. De-criminalization of Marijuana. Lack of age checks.
	Parent (of a youth under age 18);Youth-S	social influence	peer influence
	Parent (of a youth under age 18);School;	Weak parenting and social media pressure	Weak parenting and social media pressure
	Youth-Serving Organization	Mental Health Issues	Mental Health Issues
	State, Local, and/or Tribal Government A	Low perception of harm, ease of access, low risk of	low percpetions of harm, mental health/coping strategies
	School;Healthcare Professional or Organ	Lack of education given at "their level of thinking",	Ignorance of the dangers of cannabis use
	State, Local, and/or Tribal Government A	easy access, presumed community acceptability, me	easy access, recent boom in the market/advertising, seen as "cool", thought of as a form of
	Parent (of a youth under age 18);Other I	social norms and access	Social norms and access
	School	Mental health & social pressures	Lack of coping skills & social pressure
	Religious or Fraternal Organization	Easy access and attitude of acceptance	perception of low health harms
	Parent (of a youth under age 18);Other I	access, family / community norms, mental health ch	accessibility, perception that it is not harmful or addictive, and that it helps with anxiety, th
	Business;Media;School;Youth-Serving Or	Cultural pressures including media's emphasis on al	Lack of information regarding federal laws, medical dangers, physical impairment of young
	Youth-Serving Organization;Person with	Stress and mental health challenges.	Stress and mental health challenges.
	Person with Lived Experience;Harm Red	Curiosity, a way to cope with emotional & physical s	Curiosity, a way to cope with emotional & physical stress & trauma, physical pain relief, wi
	Parent (of a youth under age 18)	Boredom. Increased ability to communicate with eac	It is easier to obtain than cigarettes used to be

Contributing Factors To Youth Drinking - Survey Feedback

Mental Health

- Self-medicating around mental health issues, way to release with academic and life pressures
- Like the way alcohol makes them feel
- A way to cope with emotional & physical stress & trauma

Lack of Parental Supervision

- Parents not being as engaged in knowing what their kids are doing when alone or with peers. Parents having a laid back attitude towards underage use of alcohol
- Uninvolved parents, instability in the home
- Low level of parental/adult disapproval
- In Southborough, there is a healthy amount of parental permissiveness
- Lack of consequences from parents

Peer Pressure

- Wanting to feel included and peer pressure
- If one person in a group does it, others would want to do it as well. Also many people consider it to be fun and a daring challenge
- Peer pressure at parties

Easy Access

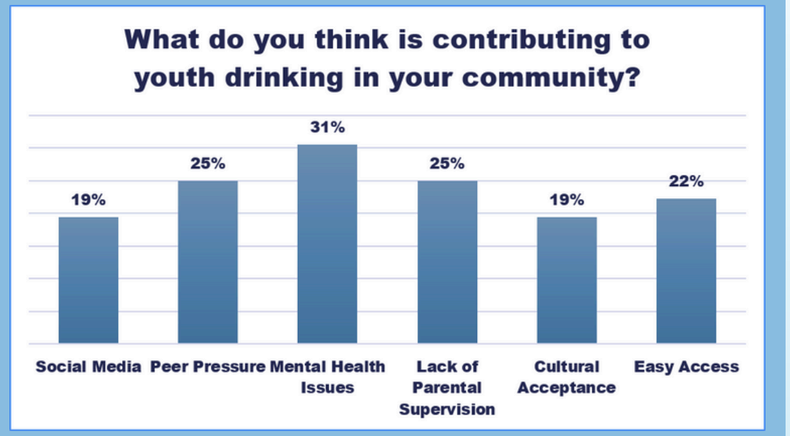
- Ease of access
- Accessibility

Social Media

- Positive depictions of alcohol use in the media and on social media
- Expectations that it is rite of passage behavior, broadcast on TikTok, etc.
- Media/culture glorify drinking

Cultural Acceptance

- Presumed community acceptability
- Social norms
- Accepted youth drinking culture



Contributing Factors To Youth Marijuana/Cannabis Use- Survey Feedback

Cultural Acceptance

- Legalization of cannabis within the state
- Perception that it is not harmful or addictive
- Has become more common in average households; it is easier to hide and the perception that, compared to alcohol, it is easier to drive while high than it is while drunk

Easy Access

- Older individuals (not parents) are giving youth access to drugs and other substances
- Vaping pens are easily accessible & there is a lack of age checks.
- Many stores/online outlets selling products
- Hudson has multiple shops

Mental Health

- Considered a way to relax, and where youth are overscheduled and pressured about academics and sports, they self-medicate
- Curiosity, a way to cope with emotional & physical stress & trauma, pain relief
- Enjoyment of getting high, boredom, looking to feel relaxation

Peer Pressure

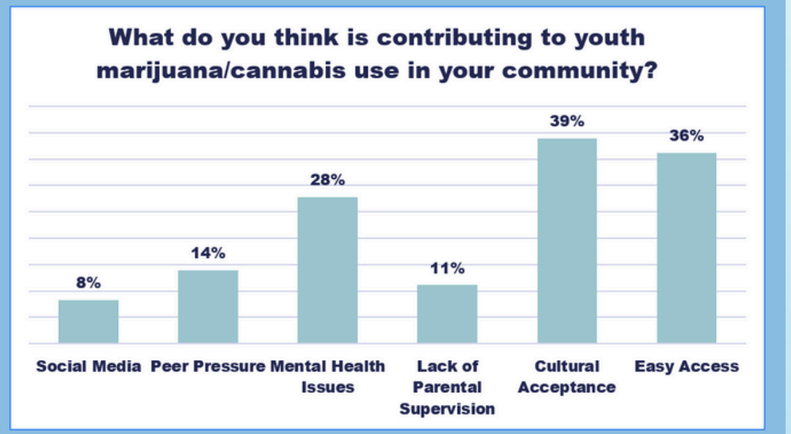
- The pressure to fit in and do it
- Peer influence
- Social/Peer Pressure

Lack of Parental Supervision

- Parents supply their children with substances, as well as "plugs" who will get substances for youth
- Uninvolved parents, instability in the home

Social Media

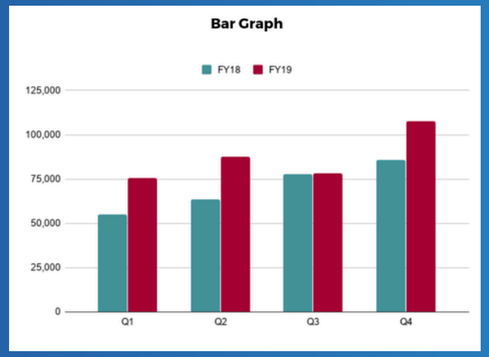
- Recent boom in the market/advertising, seen as "cool"
- The way it is marketed as healthy

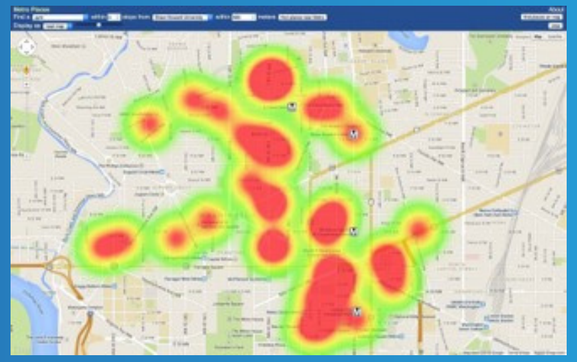


What Data Visualization Can Look Like

EXAMPLES OF GOOD DATA VISUALIZATION:

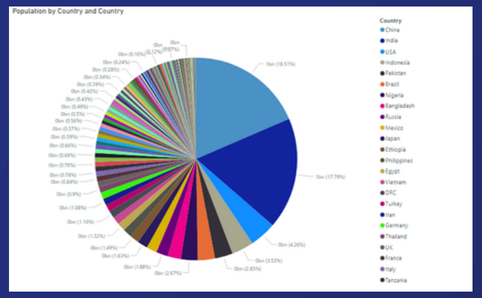
- Simple Bar Graph
- Interactive Dashboard
- Infographics
- Heatmaps
- Geographic Maps

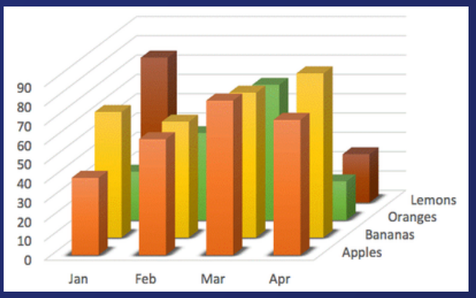




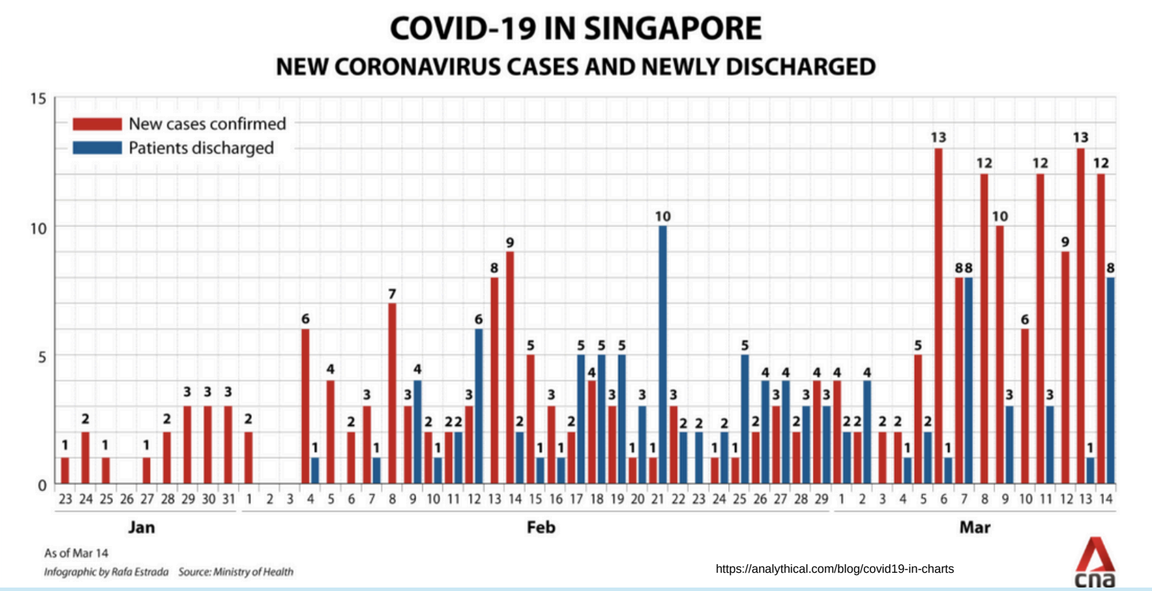
EXAMPLES OF "BAD" OR LESS EFFECTIVE DATA VISUALIZATIONS:

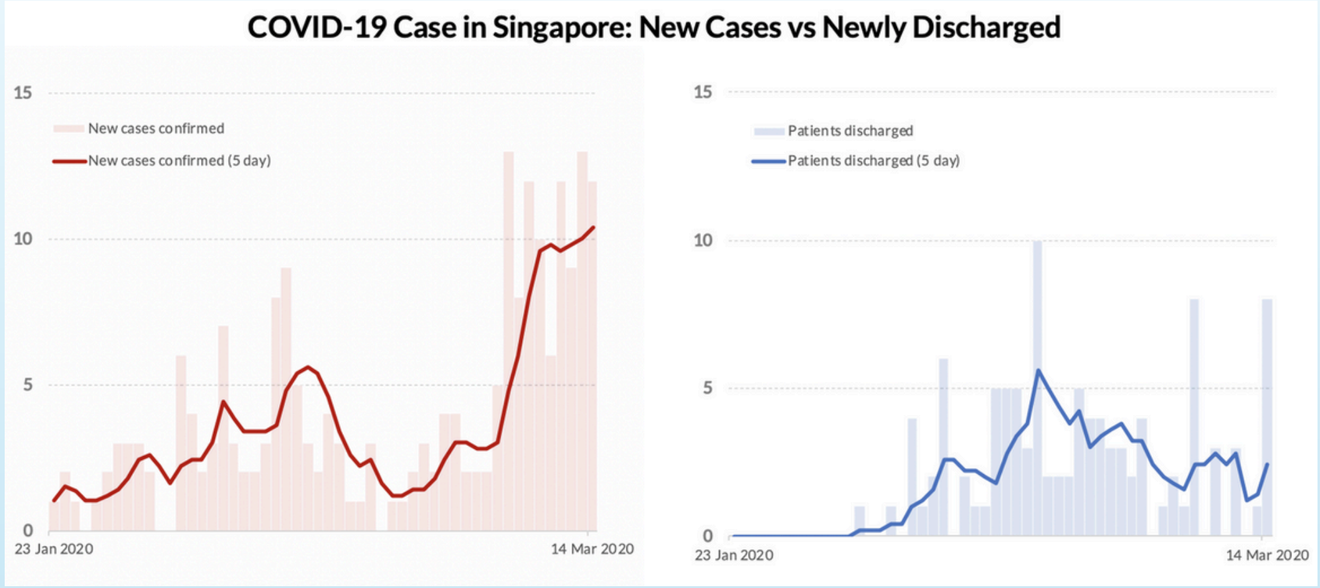
- Overly complex charts
- 3D Bar chart with misleading perspective
- Inconsistent color schemes
- Overly detailed table
- Unlabeled or poorly labeled graphs





Examples of Good & Bad Data Visualization





Data visualization is a powerful tool for deriving meaningful insights from raw information, but **the effectiveness of your visualization depends on how well you communicate your findings.**

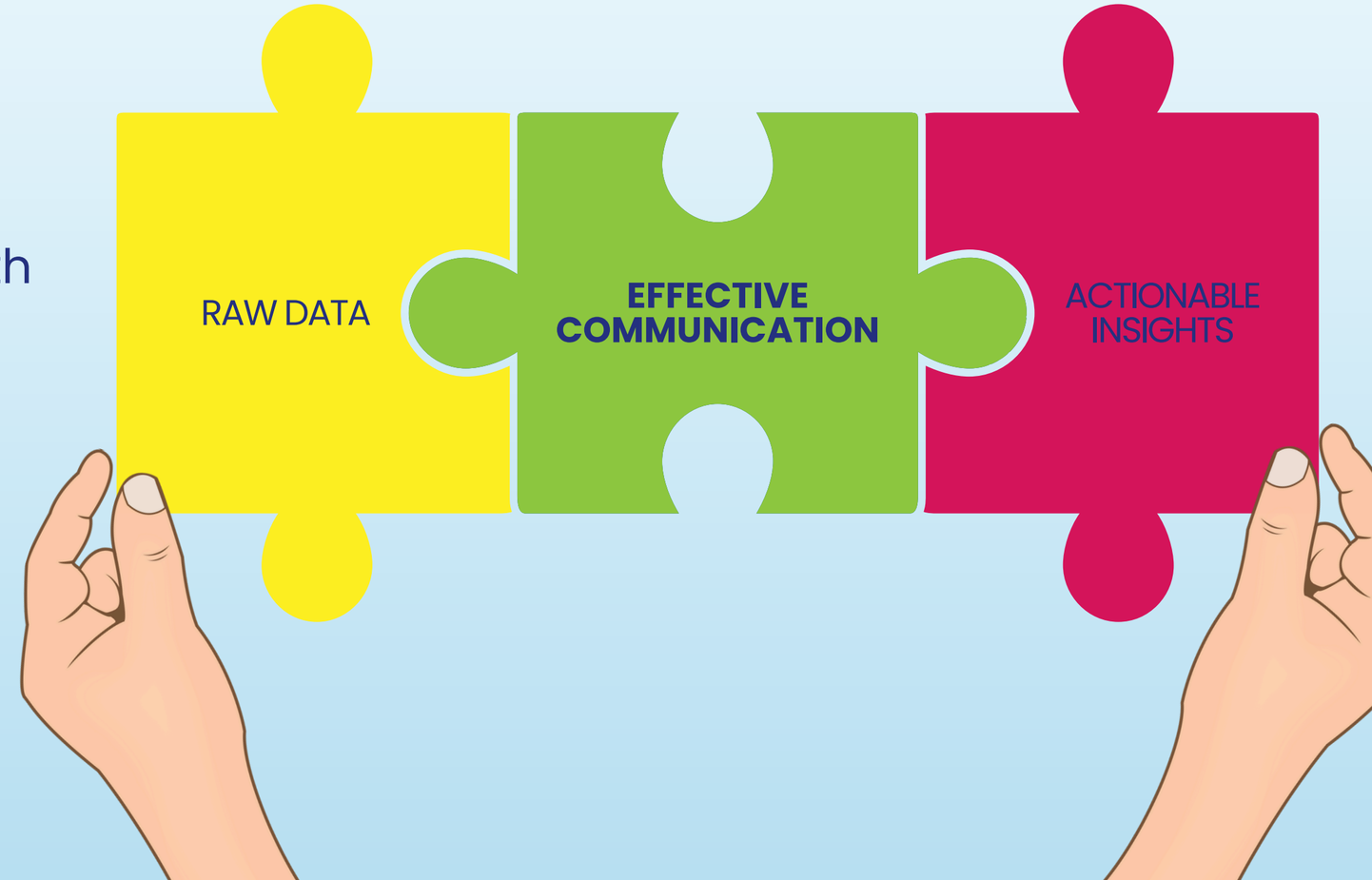
Communications in Data Visualization

In public health, communication through data visualization isn't just about presenting information, it's about making it

- **actionable**
- **understandable**
- **impactful**

Effective communication in public health data visualization **bridges the gap between raw data and actionable insights** enhancing

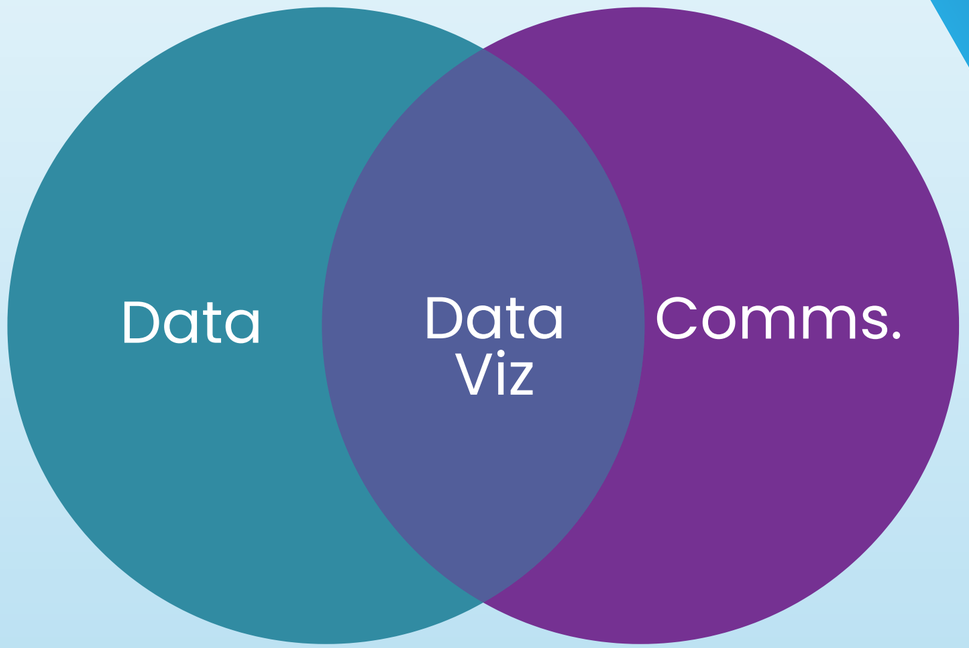
- understanding
- decision-making
- public engagement



Important Considerations – Communications Stand Point

- Two important considerations for successful data visualization:
  1. Understand your audience
  2. Make your delivery appealing

- ***Disclaimer:*** *In this presentation, we are talking about data and communications as separate parts, but it should be noted that these COEXIST when talking about data visualization. They depend on each other, and one cannot exist without the other.*



What is the Purpose of This?

Inform?

Educate?

Create Awareness?

Inspire Action?

Who is My Audience?

- Board Members
- Older Adults
- Youth
- Non-English Speaking Community Members
- Community Stakeholders

Understanding Your Audience

To understand the audience, you must consider the follow questions:

How does your audience consume information?

What channels do your audience use to receive information?

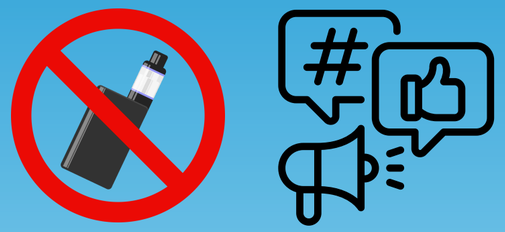
What is the audience's level of comprehension?

In what ways does the audience best engage in receiving information?

If you do not take the time to understand who you are presenting your findings to, you are ultimately **risking doing all your work for nothing.**

Understanding My Audience
Public Health Examples

Example #1



- Digital media (social media)
- Vibrant, eye-catching print materials
- Posted at frequent hangout spots (i.e. Boys and Girls club, Library, etc.)

Example #2

- Traditional media (print materials)
- Materials with large font and more subtle colors
- Distributed at senior center or included in local newspaper, radio, etc.

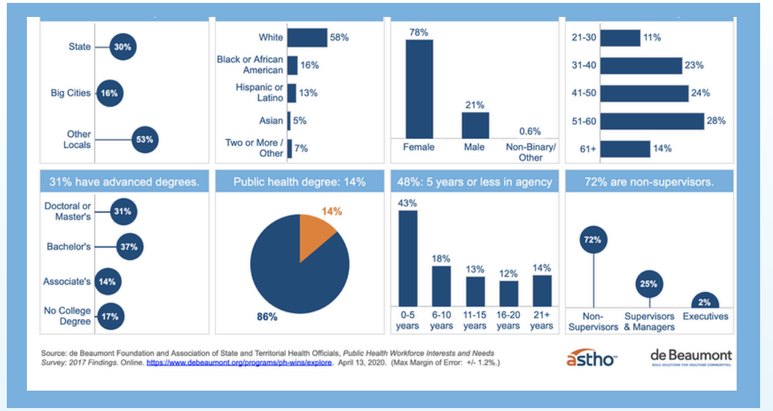
Example #3

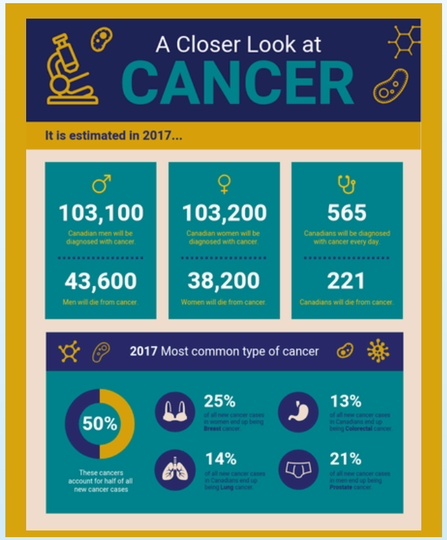
- Translated into native language
- Consider comprehension and text translations
- Cultural competency
- Most used platforms (i.e. social media, WhatsApp)

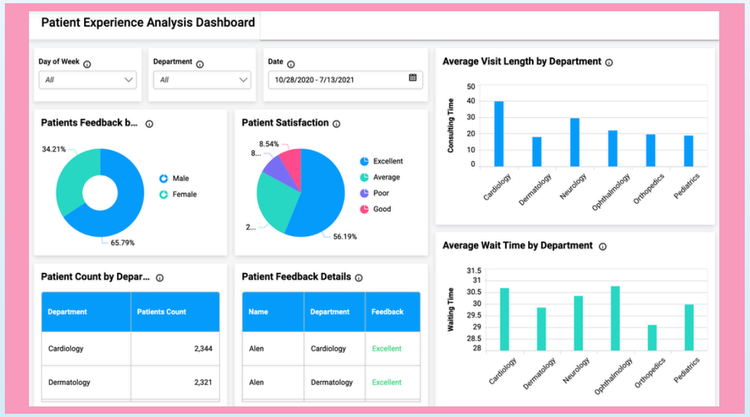
Make it Appealing

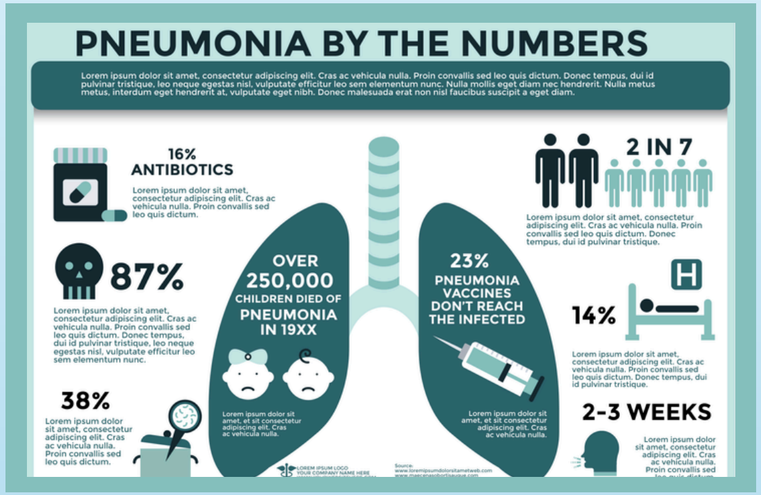
Your deliverables should be attractive!

- Easy to understand, especially upon first glance
- Exciting to engage in
- Include different layouts or components – **not just numbers!**
- Include those visually appealing parts
  - Font style
  - Font size
  - Color schemes
  - Page spacing/ white space
  - Simplicity
  - Clear labeling









Checklist for Good Data Visualization In Public Health

- **Define the Purpose:** Identify the objective, understand the data
- **Consider Your Audience:** Remember your audience's comprehension level. Consider how they consume, engage, and channel their information
- **Select the Right Type of Visualization:** Consider appropriate format, decide how complex your data should/can be
- **Ensure Clarity and Accessibility:** Simple designs, clear labels, maintain consistency, legible text (use readable fonts and sizes for all text elements), consider color choices, inclusive designs, tailor to your intended audience
- **Test and Refine:** Ask for feedback, update regularly (make sure that the data is up-to-date and reflects the most current information as new data becomes available or as public health priorities shift), ask yourself: Did I get the results I was looking for?

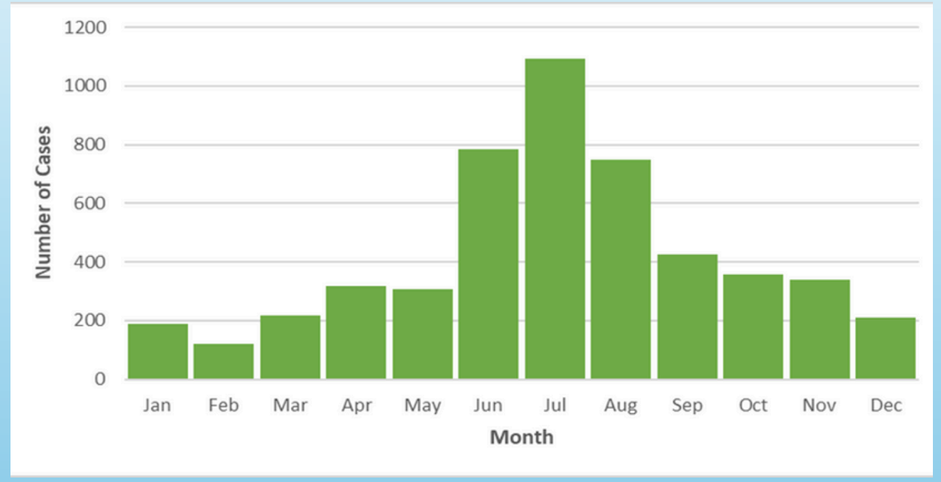
The Power of Data Visualization In Real Time and Telling Your Community's Story

Example #1: How to use data visualization to communicate with your community
Example #2: How to use date visualization to speak with your board
Example #3: How to use data visualization to tell your community's story

What am I communicating about?
What is the data saying?
Do I know who I'm communicating to/who is my audience?
What is the purpose of my communication?

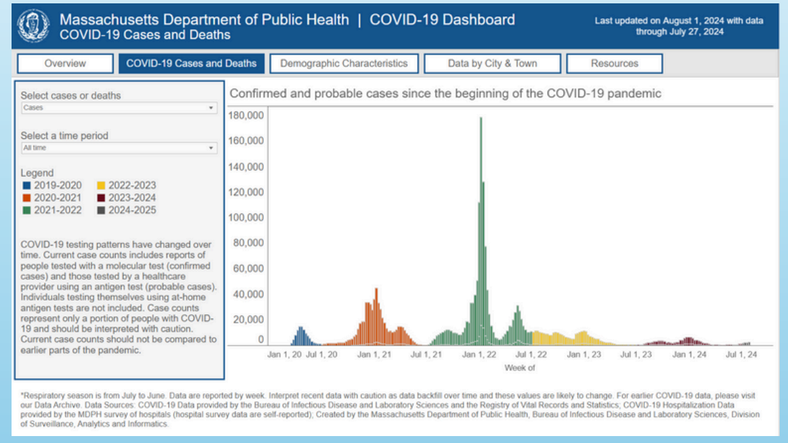
Example #1: How to Use Data Visualization to Communicate With Your Community

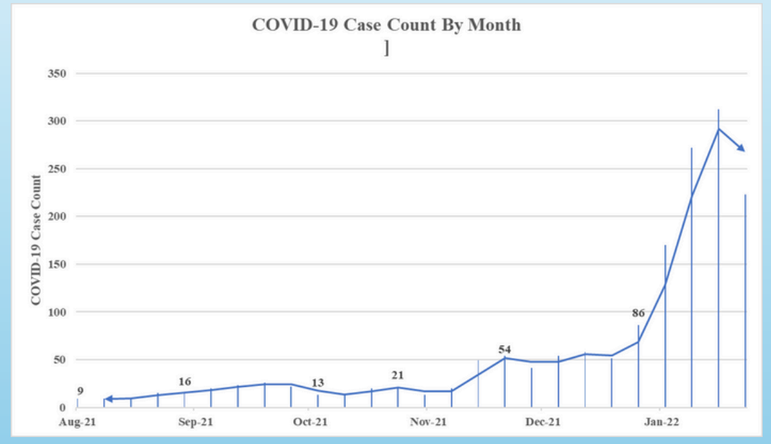
What am I communicating about? Tick borne diseases
What is the data source? MAVEN
What is the data saying? There is an increase in tick borne diseases every year from April to September.
Who is my audience/ who am I communicating to? Brazilian/Portuguese speaking community members
What is the purpose of my communication? Inform and educate to prevent tick bites

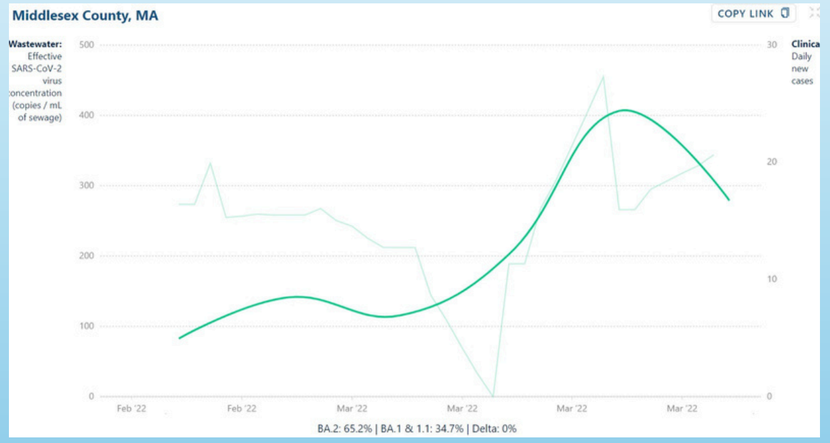


Example #2: How to Use Data Visualization to Speak with Your Board

What am I communicating about? Amount of COVID-19 case in my town
What is the data source? Mass.gov data, MAVEN and wastewater data
What is the data saying? There has been an increase in COVID-19 cases in MA, in my area and in my community since September 2021
Who is my audience/ who am I communicating to? Board of Health members
What is the purpose of my communication? Inform and provide guidance to board members on prevention measures based on the data

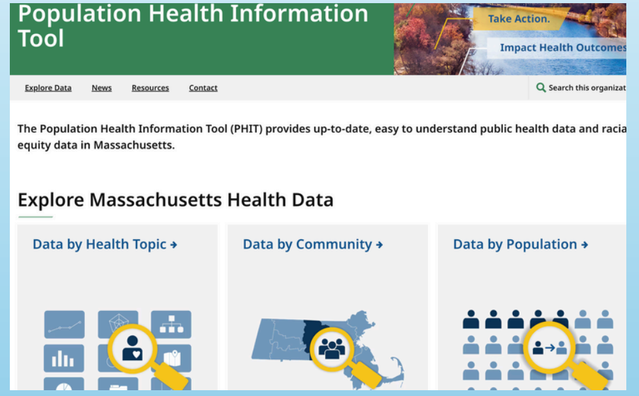


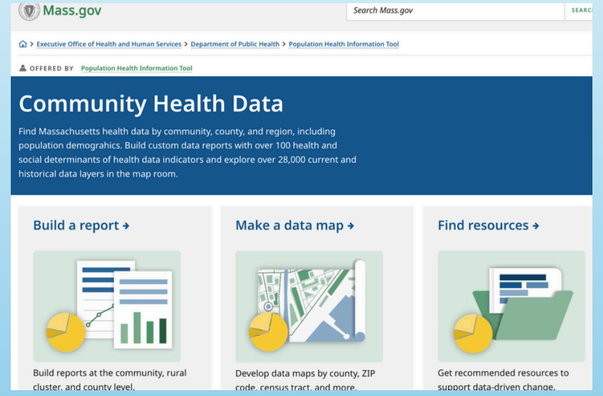


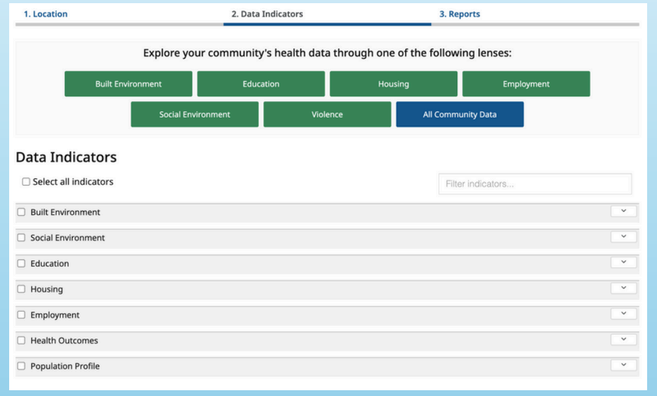


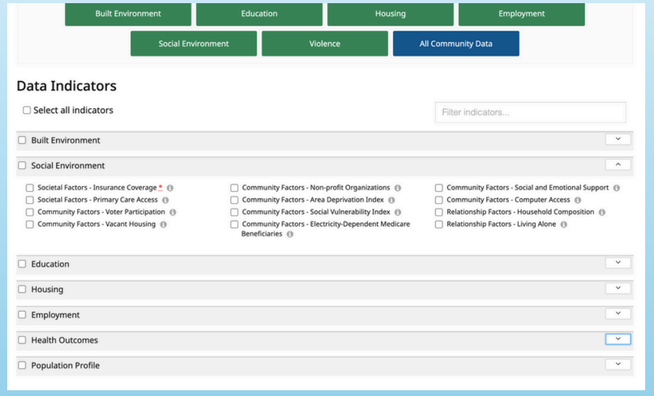
Example #3: How to Use Data Visualization To Tell Your Community's Story

What am I communicating about? Our community's need for a social worker
What is the data source? Population Health Information Tool or PHIT (Mass.gov)
What is the data saying? There is a high rate of uninsured individuals
Who is my audience/ who am I communicating to? The grant providers / stakeholders
What is the purpose of my communication? To advocate for my community's need for a social or community health worker









THANK YOU

QUESTIONS?

mafridi@bmestrategies.com
pshelke@townofhudson.org
tcampelo@townofhudson.org