



# Visually Communicating Public Health Data



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Washington State  
Department of Health

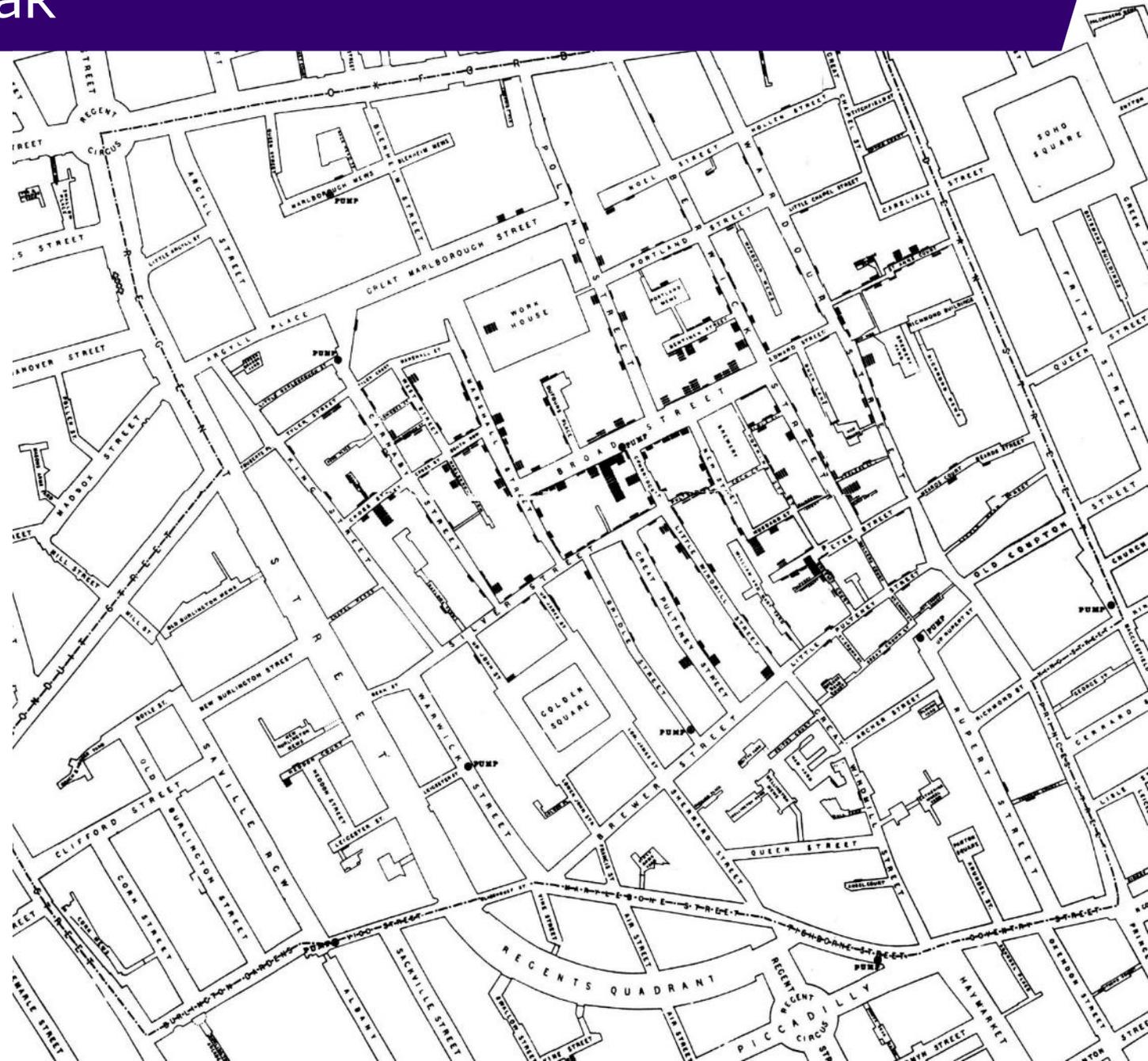


# STORY



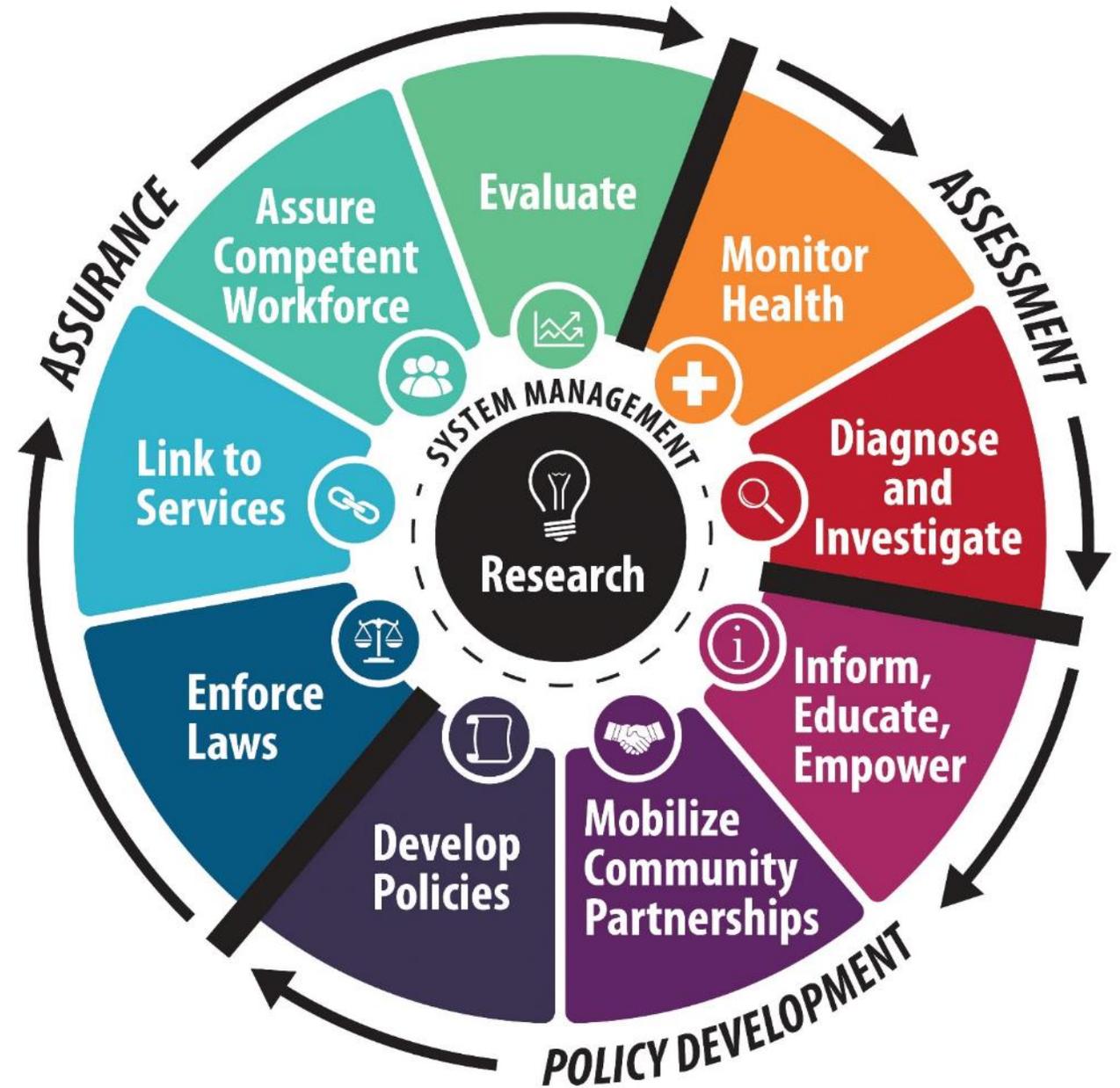
# London's 1854 Cholera Outbreak

- Public health example of storytelling with data
- The beginning of disease mapping and epidemiology



# Public Health's Role Today

- 10 Essential Public Health Services
- Data + Communication
- Serving many audiences



# Question for the Viewers

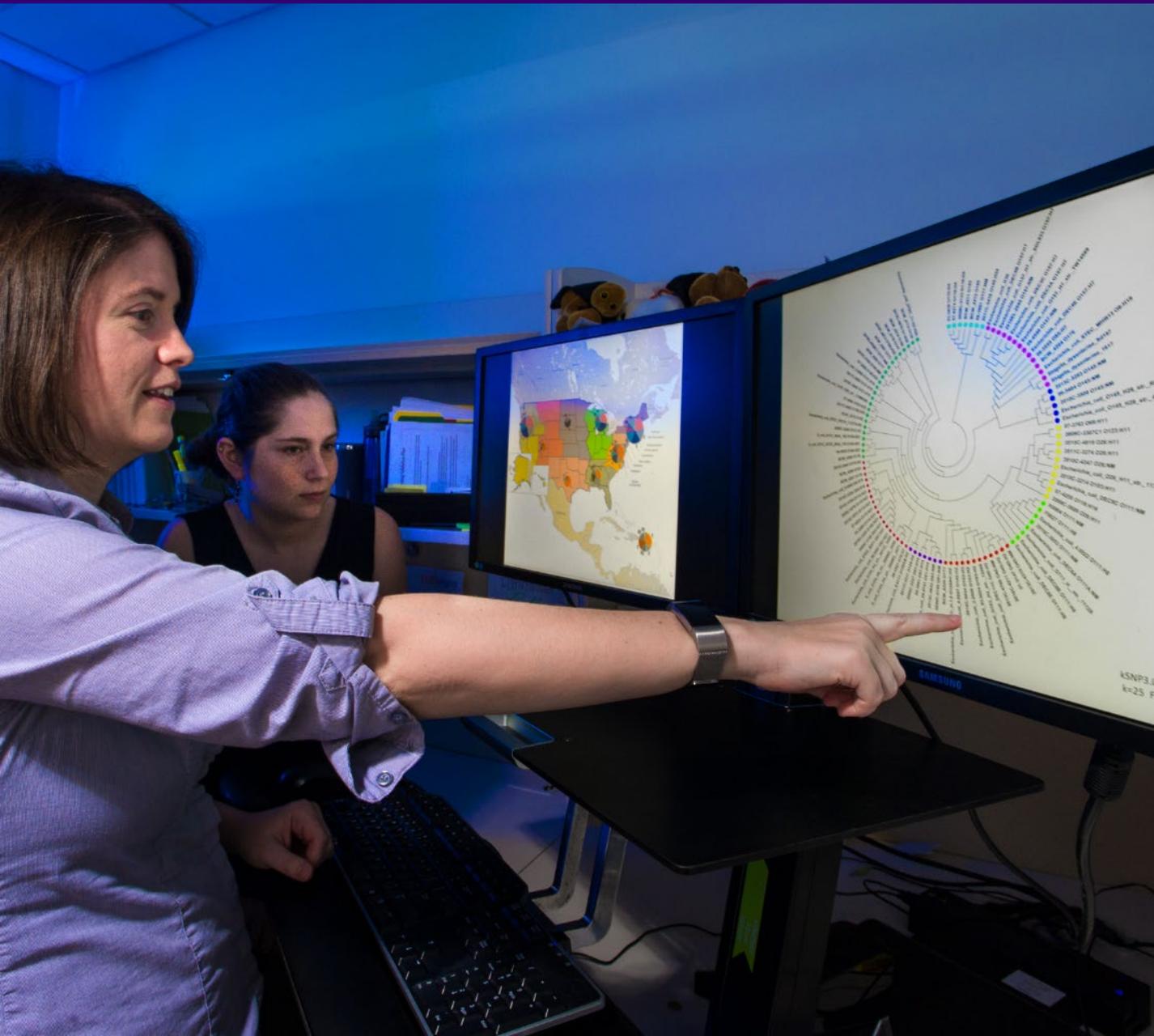
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Who is your primary audience?

- A. Public health professionals
- B. Community leaders or policy makers
- C. Healthcare providers
- D. Public or special populations
- E. Other

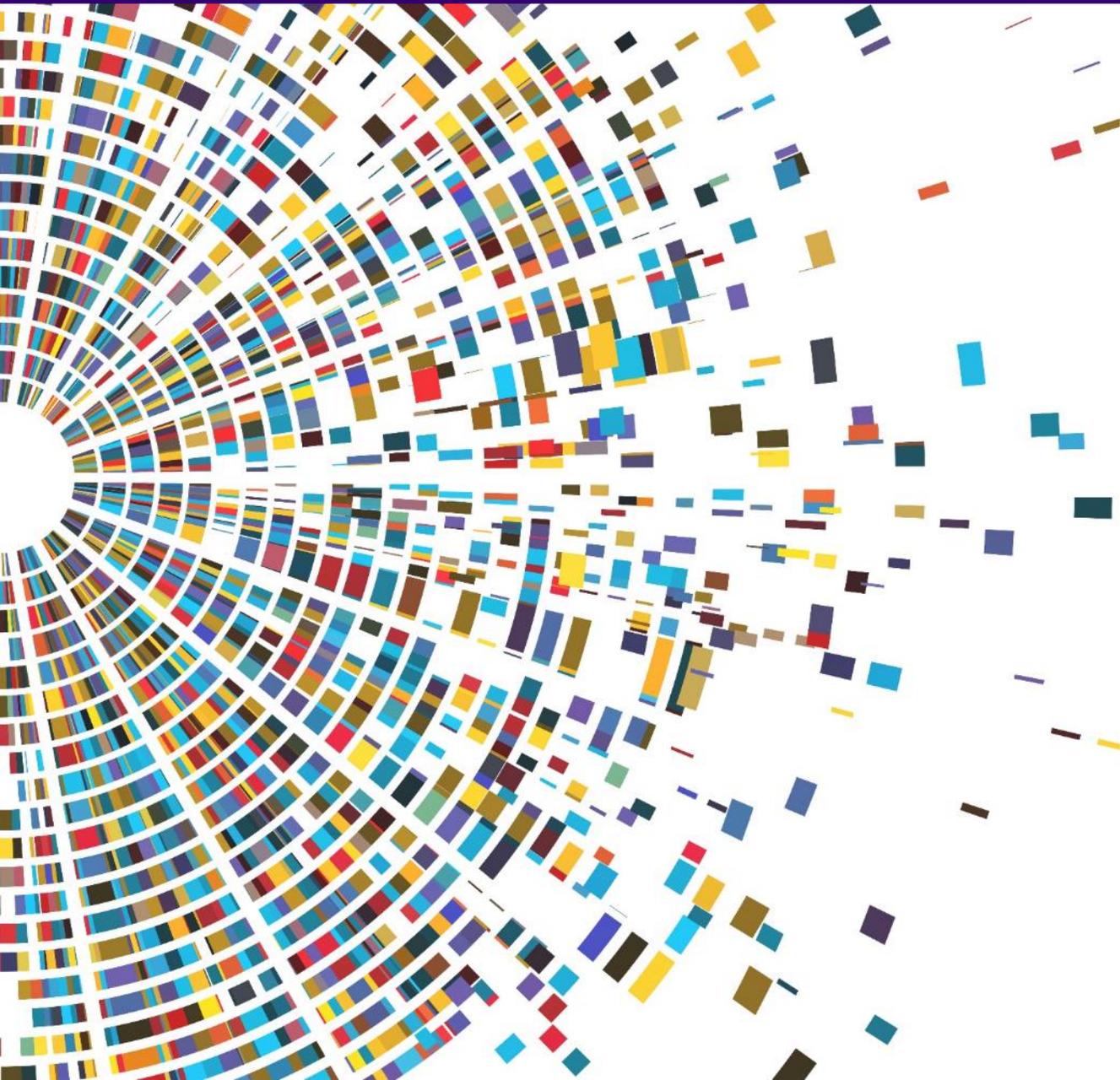
# Health Communication Defined



“...**influence, engage, empower**, and **support** individuals, communities, healthcare professionals, patients, policymakers, organizations, special groups, and the public so that they will **champion, introduce, adopt**, or **sustain** a health or social behavior, practice, or policy that will ultimately **improve** individual, community, and public health outcomes.”

(Renata Schiavo, 2014)

# Information Design Defined



“[Information design] helps users understand complex data by **organizing and simplifying data and information in ways they can quickly grasp.**”

(Society for Experiential Graphic Design)

# Making Sense of Data

“**Data sensemaking** is what we do to make sense of data... Helping people understand the world based on data is important work. Without understanding, we often make bad decisions.”

Successful data sensemaking requires **time** and **attention**.

(Stephen Few, 2019)



# Our Approach

- Know your Content
- Know your Audience
- Know your Purpose
- Show your Story



# Know Your Content

- Investigate
- Collaborate
- Iterate



# Know Your Audience



## How well do you know the audience?

- Culture, geography, ethnicity, age, gender context
- Perceptions, beliefs, attitudes, behaviors
- Friendly? Apathetic? Uninformed? Hostile?

Continued...

# Know Your Audience



- Familiarity – what do they already know about the topic?
- Time – how much time will they spend with the data?
- Preference – how do they like to receive information?
- Develop a persona for the target audience

# Know Your Purpose

## So What?

Single Overriding  
Communication Objective  
(SOCO):

- Target, primary audience
- 1 key message
- 3 supporting facts

Continued...



# Know Your Purpose

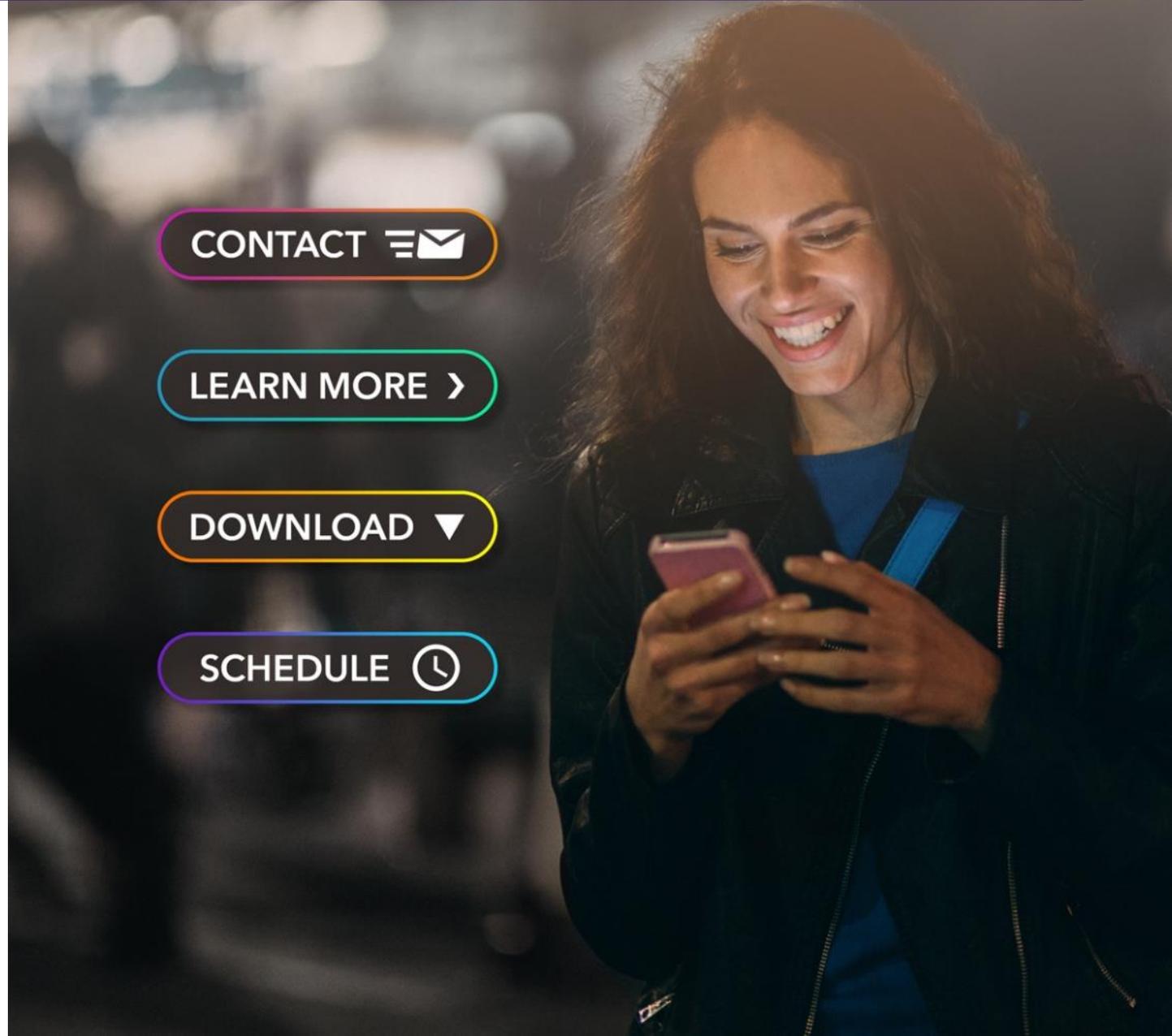
- What do you want people to DO?
- How do you want people to use the information you are delivering, and they are receiving?
- Is your call-to-action communicated clearly?

CONTACT 

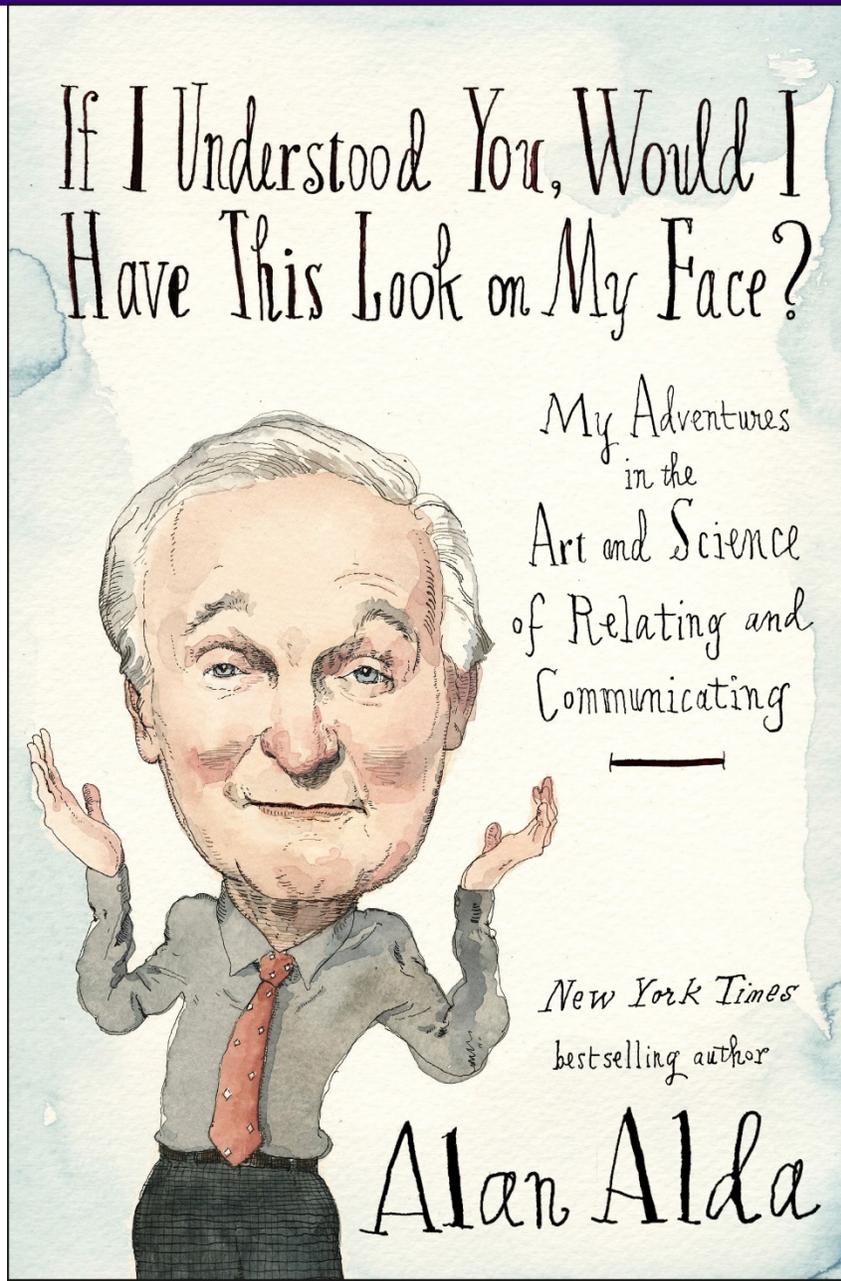
LEARN MORE 

DOWNLOAD 

SCHEDULE 



# Show Your Story



“The person who is communicating something is **responsible** for how well the other person follows him....If I tell you something without making sure you got it, **did I really communicate anything?**”

(Alan Alda, 2017)

“An effective data presentation may look pretty, but the true goal is to **support audience cognition.**”

(Stephanie Evergreen, 2017)

# DESIGN



# Visual Communication Definitions



## Graphic Design

Art with a purpose

Thoughtfully improving the appearance and function of messages and information

### ➤ Information Design

Discipline within graphic design

Efficient and effective display of concepts or information

### ➤ Data Visualization

Subset of information design

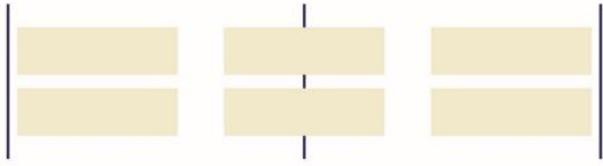
Graphical representation of data using visual elements like charts, graphs, and maps

### ➤ Infographic

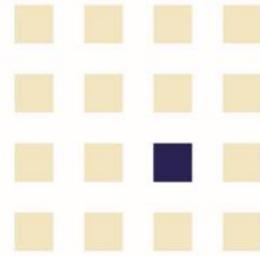
Product of information design and data visualization

Includes data, copy, or both

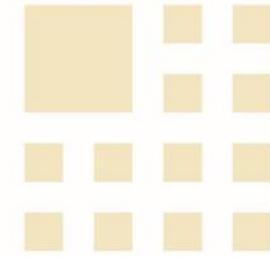
# Design Fundamentals



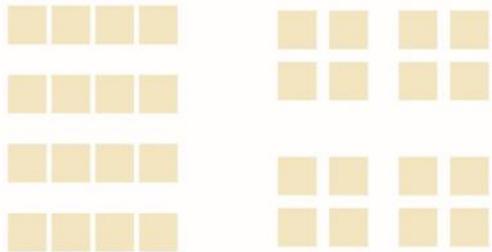
ALIGNMENT



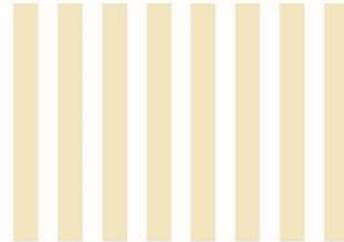
CONTRAST



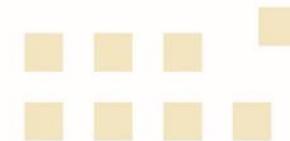
HIERARCHY



PROXIMITY



REPETITION



SPACE

# Data Visualization Function

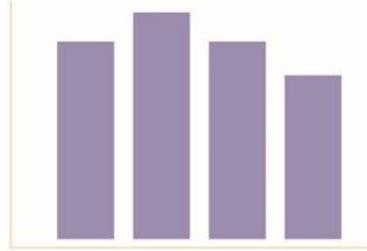
- Explain
- Explore
- Experience



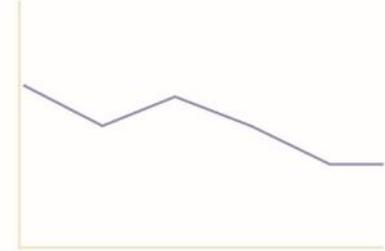
# Data Visualization Form

75%

SINGLE NUMBER  
Text



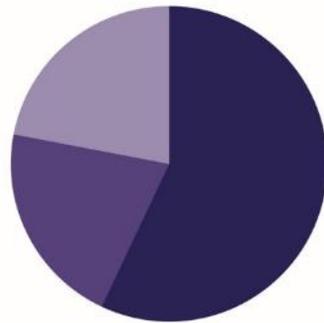
COMPARISON  
Bar chart



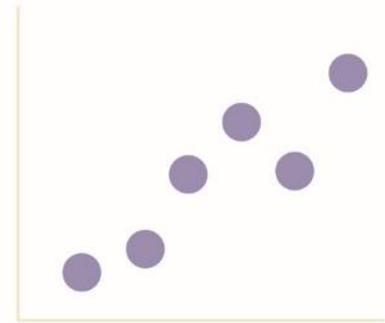
TIME  
Line chart



GEOGRAPHY  
Map



PART-TO-WHOLE  
Pie chart



RELATIONSHIP  
Scatterplot

# Question for the Viewers

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How do you typically present your data?

- A. Live presentation (*ex. PowerPoint*)
- B. Online publication (*ex. PDF*)
- C. Printed report or data brief (*ex. Paper*)
- D. Online dashboard (*ex. Tableau*)
- E. Other

# What is Changing



## **Data is big**

- Access to data
- Creation tools
- Data literacy

# What is Needed



## Effective data viz

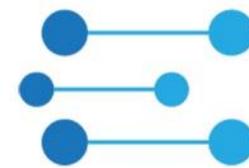
- Clear intention
- Critical thinking
- Good design —  
Form follows function

## Three teachers, three angles

- Alberto Cairo
- Stephanie Evergreen
- Cole Nussbaumer Knaflic

CAIRO



 **EVERGREEN DATA**  
INTENTIONAL REPORTING & DATA VISUALIZATION

storytelling  WITH data<sup>®</sup>

## Four principles of good data visualization

- Good visualizations are based on good data
- They attract your attention
- They represent the data accurately
- They show the right amount of data

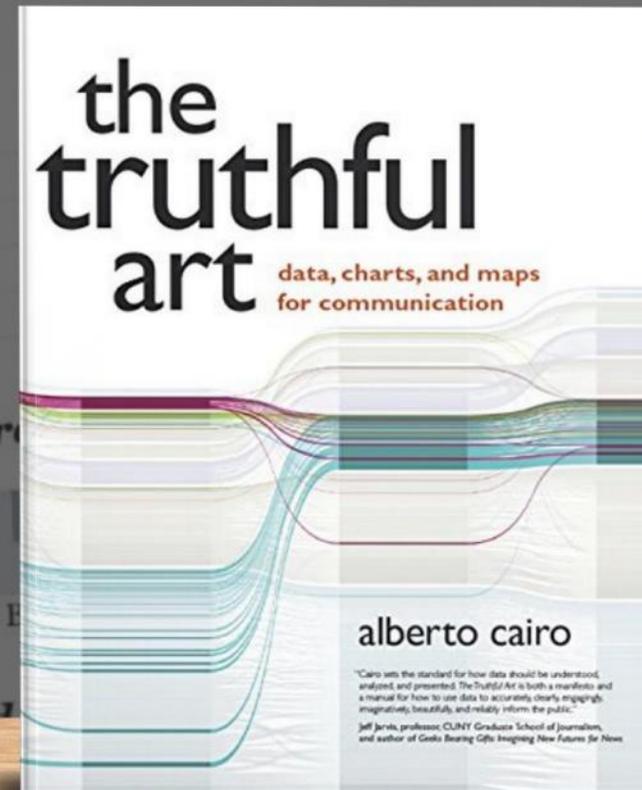
*Length or height*



*Position*

A  
B  
C  
D  
E

*Angle/arc*



## Four step visualization process

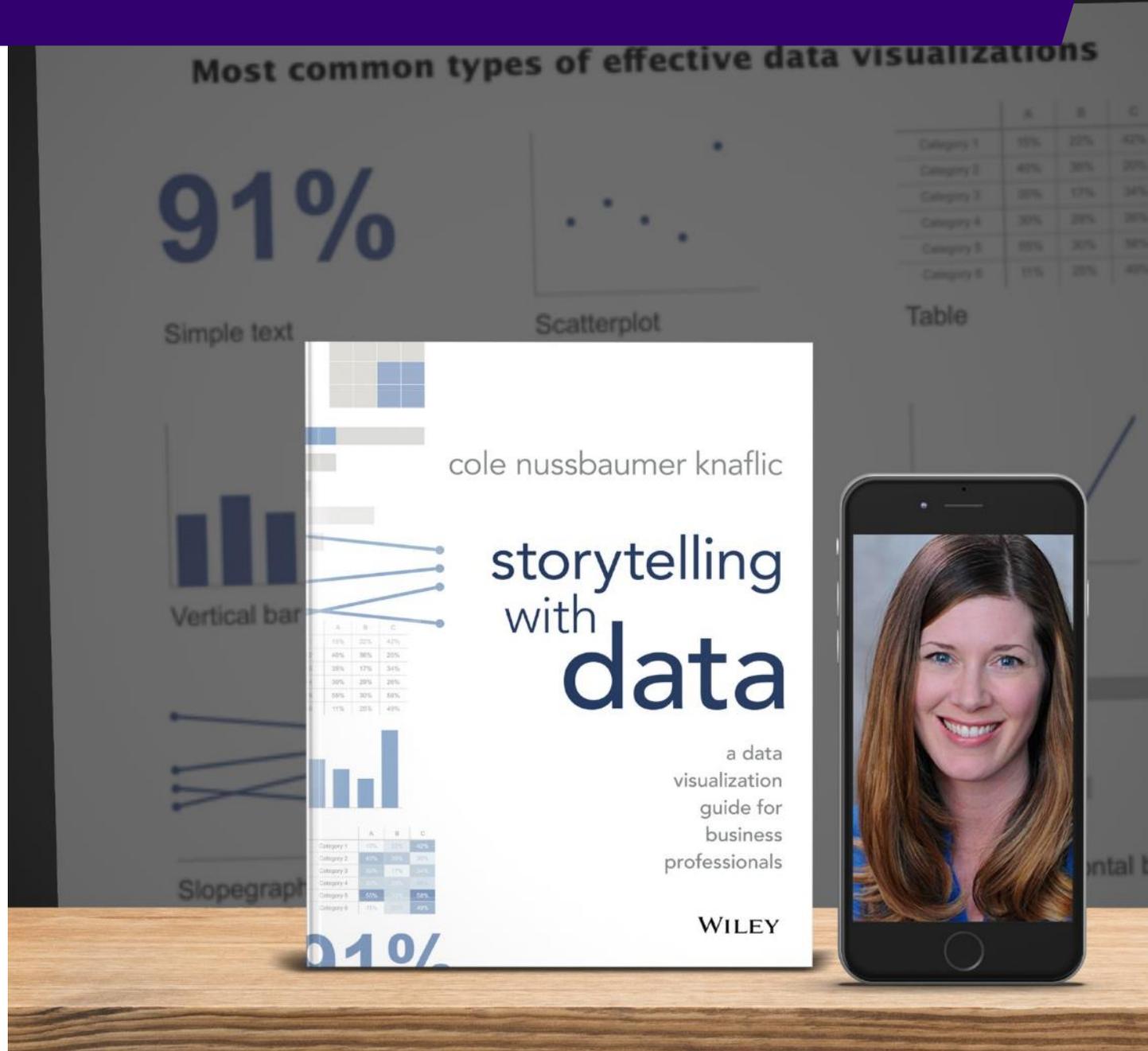
- What's the point?
- Who is the audience and how will it be delivered to them?
- What is the best chart type?
- How can you sharpen the point?



# Cole Nussbaumer Knaflic

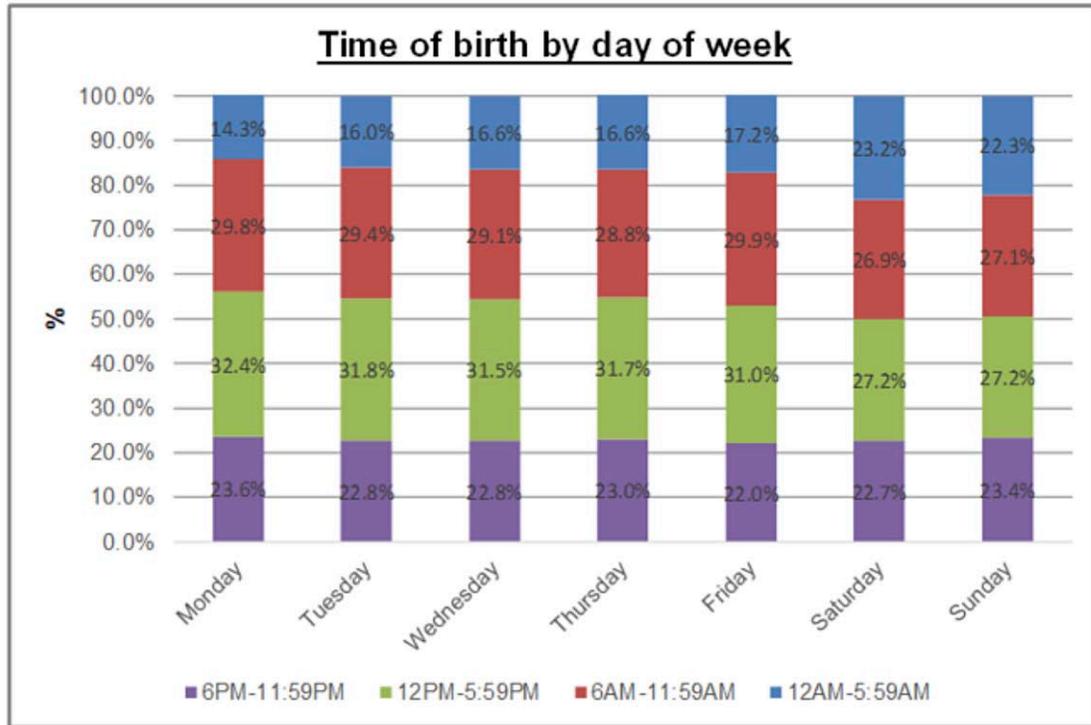
## Five key lessons

- Understand the context
- Choose an appropriate visual display
- Eliminate clutter
- Focus attention where you want it
- Tell a story



# How Cole Eliminates Clutter

## BEFORE

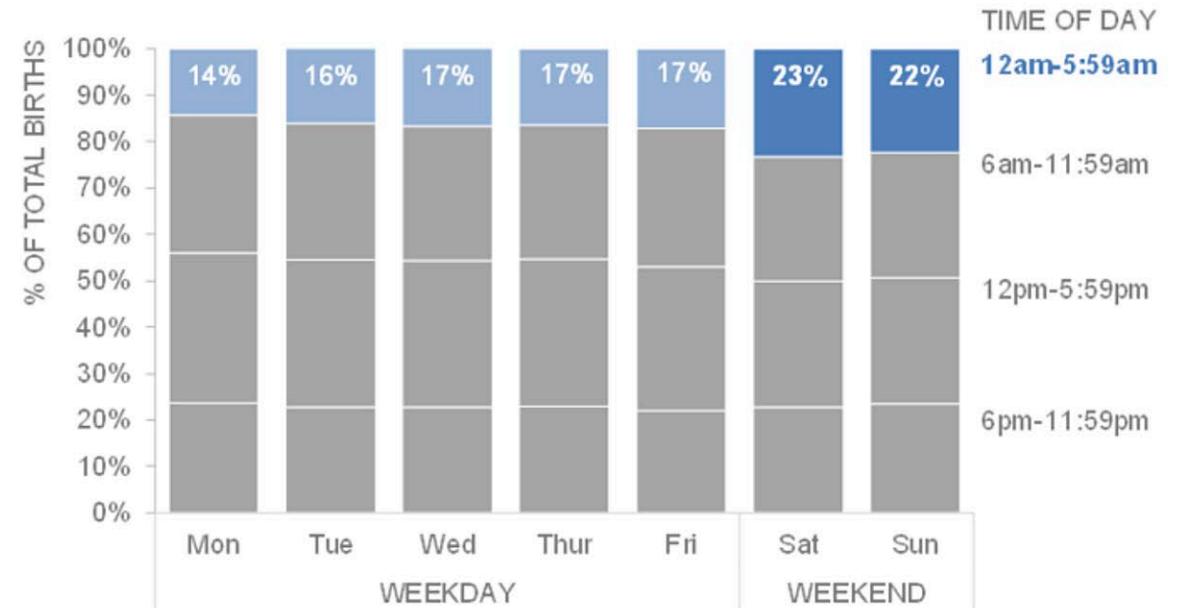


Data source: CDC (National Vital Statistics Reports, Vol. 67, No. 1, January 31, 2018)

## AFTER

### When babies are born

Weekend deliveries are more likely to be in early morning, compared to weekdays



Data source: CDC (National Vital Statistics Reports, Vol. 67, No. 1, January 31, 2018)

# How We Do It



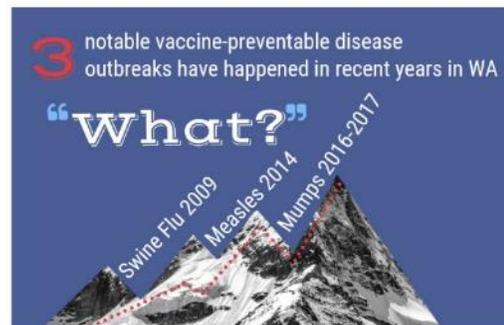
## Creative process

- Consultation:  
Pre-design questions
- Agreement:  
Creative brief or proposal
- Creation:  
Collaboration and iteration
- Review and approval
- Audience testing
- Publish or disseminate

# Creative Process Q&A with Julie Pawlowicz

## Background

Immunizations offer college students the best protection from vaccine-preventable diseases (VPD). Specifically, students living on campus are at higher risk of meningococcal disease. However, Washington does not have any statewide immunization requirements for college students.



## Purpose

For WA 4-year colleges and universities:

- ✓ Evaluate immunization requirements, policies and practices
- ✓ Convene stakeholders to review survey findings
- ✓ Use findings to explore the need for and effectiveness of immunization initiatives including statewide requirements and/or education

## Methods

- Conducted an online survey in 2016 of 24 four-year colleges in Washington
  - Project timeline August 2016 – March 2017
  - Survey participants- most knowledgeable about immunization policies and practices at their institution
- Conducted a policy scan of fifty states and the District of Columbia to determine what policies related to immunization are in place at the state level.
  - Statewide policies vary widely on a number of domains, including what actions are required (vaccination or education) and which schools or students are included.

## Survey Questions

- Presence of immunization requirements for students and faculty/staff
  - Required vaccines, sanctions for non-compliance, signed exemptions accepted, requirements for staff/health students
- Workplace exclusion for VPD exposure
- Immunization record keeping
  - Type of immunization record system used
- Presence of health services
- How vaccination services provided
- Presence of meningococcal and other VPD recommendations and educational materials

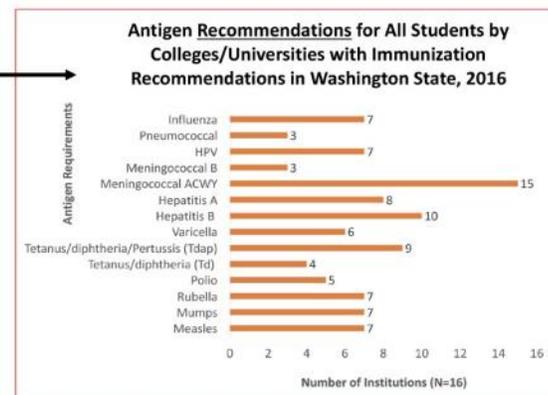
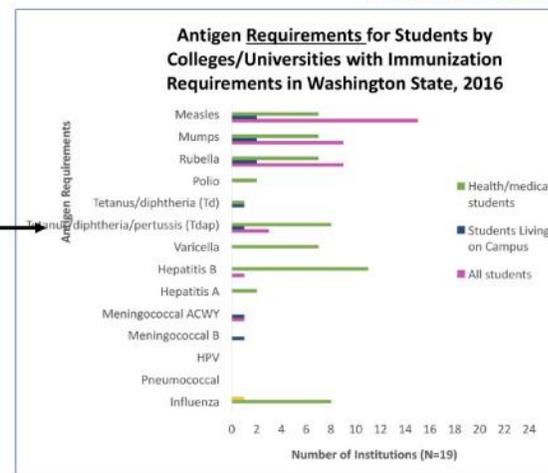
# Immunization Practices and Policies in Washington State Four Year Colleges and Universities 2016

M. Patricia deHart, ScD; Sara Jaye Sanford, MPH, CHES; Leigh Wallis, MPH; Todd Faubion, PhD



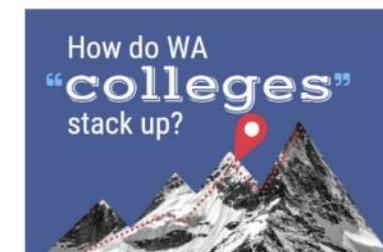
## Results

- **Survey Response Rate:**
  - 100% (N=24)
- **Type of Institution**
  - 8 Public & 15 Private
- **Size Range:**
  - 200-25,000 undergraduates
  - 15-14,000 graduate students
- **Housing:**
  - 21 have on-campus housing
- **Immunization Requirements:**
  - 19 (79%) of colleges had at least some immunization requirements (7 Public & 12 Private)
  - Measles was the most common requirement
  - Hepatitis B the second most common
  - None had HPV or Pneumococcal requirements
- **Signed Exemptions Accepted:**
  - Some accepted by 18 (95%) of the 19 institutions with requirements
  - All three types (medical, religious and personal/philosophical) accepted by 16 institutions (84%)
- **Sanctions for Non-Compliance:**
  - Imposed by 18 (95%) of the 19 institutions with requirements (68% more than one)
- **Workplace Exclusion for VPD Exposure:**
  - 7 (41%) of colleges with health/medical students or staff had clinical or workplace exclusions in outbreaks for those unimmunized
- **Immunization Recommendations:**
  - 16 institutions had some prematriculation immunization recommendations for all students
- **Immunization Record Keeping:**
  - 18 institutions accepted medically verified immunization records
  - 8 accepted student or parent provided immunization records
- **Type of Immunization Record System Used:**
  - 19 (79%) of institutions maintained student immunization/immunity information
  - 15 of these kept the records in computerized files
  - Only 4 reported using the IIS
- **Immunization Service Delivery:**
  - 17 (71%) of colleges had onsite health centers – all provided immunizations
  - 3 institutions without health centers provided referrals or mobile clinics for immunizations



## Conclusions

- There is a wide variety of immunization policies and practices among four-year colleges and universities in Washington and other states.
- With increasingly publicized outbreaks of vaccine-preventable diseases on campuses, increased effort is needed to diminish the risks of preventable and often serious diseases.



## Top 5 findings for WA colleges on immunizations

- 79% of WA's four year colleges have some immunization requirements
- 38% do not require measles vaccine leaving a sizeable at-risk population for this highly contagious disease
- Less than 60% of colleges maintain immunization information for all students
- Only 63% reported compliance with WA's meningococcal education mandate
- 79% of colleges think the State should require students entering colleges to receive vaccinations

## But so what? Now what?

1. Shared results of the college survey with our partners
2. Developed educational resources with college input
3. Another college immunization survey for Fall 2017

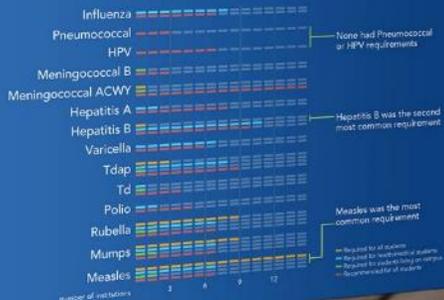


# Creative Process Q&A with Julie Pawlowicz

## SURVEY METHODS AND RESULTS

The survey of 24 Washington institutions had a 100% response rate.

- ✓ Project timeline: August 2016 – March 2017
- ✓ Online survey was conducted in 2016. Survey participants were the most knowledgeable about immunization policies and practices at their institution.
- ✓ Policy scan conducted of fifty states and the District of Columbia to determine what policies related to immunization are in place at the state level. Statewide policies vary widely on a number of domains, including what actions are required (vaccination or education) and which schools or students are included.



## 2016 Immunization Practices and Policies in Washington State Four-Year Colleges and Universities

M. Patricia deHart, ScD Sara Jaye Sanford, MPH, CHES Leigh Wallis, MPH Todd Faubion, PhD

Immunizations offer college students the best protection from vaccine-preventable diseases (VPDs). Specifically, students living on campus are at higher risk of meningococcal disease.

### PURPOSE

Evaluate immunization requirements, policies, and practices for Washington four-year colleges and universities.

Convene stakeholders to review survey findings.

Use findings to explore the need for and effectiveness of immunization initiatives including statewide requirements and/or education.

### HOW DO OUR COLLEGES STACK UP?

Washington does not have any statewide immunization requirements for college students.

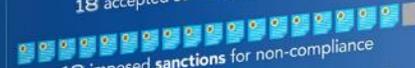
- 79% have some immunization requirements
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## MORE RESULTS

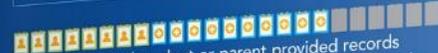
of the 19 institutions with immunization requirements

XXXXXXXXXXXXXXXXXXXX  
16 accepted all three types of signed exemptions (medical, religious and personal/philosophical)

18 accepted some signed exemptions



41% with health/medical students/staff had clinical or workplace exclusions in outbreaks for those unimmunized



18 accepted medically verified immunization records



15 kept the records in computerized files only 4 reported using the LIS

\*\*\*\*\*  
17 had onsite health centers providing immunizations

\*\*\*\*\*  
3 provided referrals or mobile clinics for immunizations

### YES BUT, SO WHAT?

- ✓ There is a wide variety of immunization policies and practices among four-year colleges and universities in Washington and other states.
- ✓ With increasingly publicized outbreaks of vaccine-preventable diseases on campuses, increased effort is needed to diminish the risks of preventable and often serious diseases.

3 notable vaccine-preventable disease outbreaks happened recently in WA



### NOW WHAT?

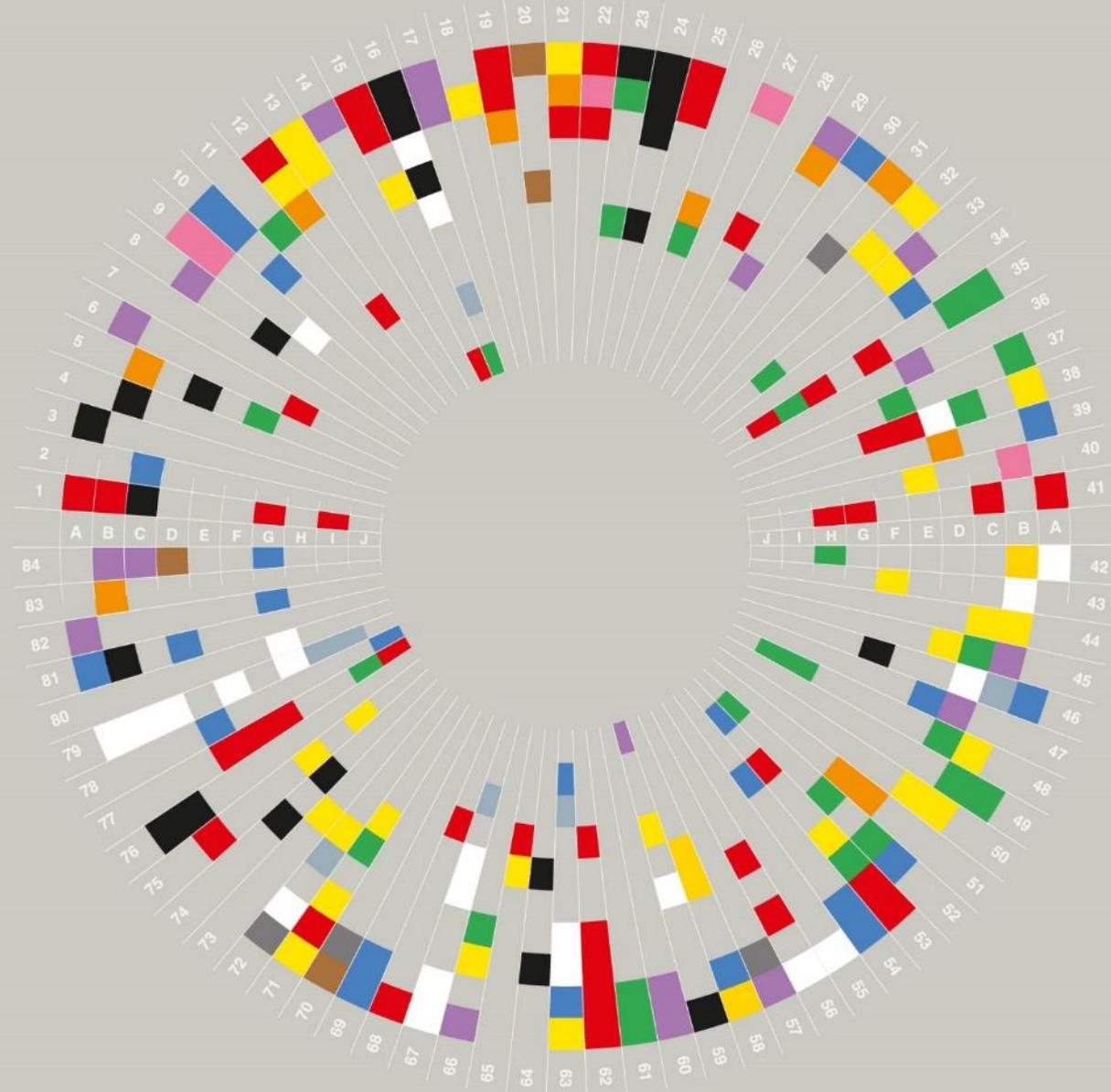
1. We shared the results of the survey with our partners.
2. We developed educational resources with college input.
3. We will do another survey in the Fall of 2017.
  - ✓ four-year colleges
  - ✓ technical schools
  - ✓ community colleges
  - ✓ vocational schools



# What You Can Do

- **Look** for examples of good data visualization and good design
- **Learn** more about the ideas presented here today
- **Ask** for help in areas that are not your expertise
- **Know** your content, audience, purpose, and explore more
- **Practice** creating effective data visualization
- **Help** raise the bar for data visualization in public health

(Colours in Culture – Information is Beautiful, 2009)



# Resources

- Renata Schiavo, *Health Communication: From Theory to Practice*, Second Edition, 2014
- Information Design, Society for Experiential Graphic Design:  
<https://segd.org/what-information-design>
- Stephen Few, 7/22/19 blog:  
<http://www.stephen-few.com/blog/2019/07/22/ethical-data-sensemaking/>
- SOCO template, CDC:  
<https://www.cdc.gov/healthywater/emergency/dwa-comm-toolbox/before/tools/SOCO-Worksheet.docx>
- Stephanie Evergreen, *Presenting Data Effectively: Communicating Your Findings for Maximum Impact*, Second Edition, 2017
- Alan Alda, *If I Understood You, Would I Have This Look on My Face? My Adventures in the Art and Science of Relating and Communicating*, 2017
- Storytelling With Data, 5/13/19 blog:  
<http://www.storytellingwithdata.com/blog/2019/5/13/declutter-and-question-defaults>
- Colours in Culture: <https://informationisbeautiful.net/visualizations/colours-in-cultures/>

# QUESTIONS?

To ask a question, please click the



icon in the Zoom toolbar to open your Q&A Pod.