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

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
...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] helps users understand complex data by organizing and simplifying data and information in ways they can quickly grasp.”

(Society for Experiential Graphic Design)
“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
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?
“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)
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

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
Emulate Modern Masters

Three teachers, three angles

- Alberto Cairo
- Stephanie Evergreen
- Cole Nussbaumer Knaflic
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
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?
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**

**Time of birth by day of week**

- Monday: 14.3%
- Tuesday: 16.0%
- Wednesday: 16.6%
- Thursday: 16.6%
- Friday: 17.2%
- Saturday: 22.2%
- Sunday: 22.3%

- 6PM-11:59PM: 23.6%
- 12PM-5:59PM: 32.4%
- 6AM-11:59AM: 22.8%
- 12AM-5:59AM: 28.8%


**AFTER**

**When babies are born**

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

- 12AM-5:59am: 23%
- 6am-11:59am: 22%
- 12pm-5:59pm: 17%
- 6pm-11:59pm: 17%


(Storytelling With Data blog, 2019)
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

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=13)
- Type of Institution:
  - 10 Public & 3 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 (86%) of the 19 institutions with requirements
  - All four types (medical, religious and personal/philosophical) accepted by 18 (86%)
- Sanctions for Non-Compliance:
  - Imposed by 18 (95%) of the 19 institutions with requirements
    (86% more than one)
- Workplace Exclusion for VPD Exposure:
  - 7 (41%) of colleges with health/medical students or staff had workplace exclusions for those who came in contact with any other student requiring exclusion
- Immunization Recommendations:
  - 18 institutions had some pre-enrollment 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:
  - 15 of the 18 institutions had electronic immunization records
- Immunization Service Delivery:
  - 17 (84%) of colleges had onsite health centers – all provided vaccinations
  - 9 institutions without health centers provided referrals or mobile clinics for immunizations

Antigen Requirements for Students by Colleges/Universities with Immunization Requirements in Washington State, 2016

<table>
<thead>
<tr>
<th>Antigens</th>
<th>Requirement</th>
<th>Students Using on Campus</th>
<th>Students Using off Campus</th>
<th>All Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measles</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mumps</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rubella</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Polio</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hepatitis A</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hepatitis B</td>
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<td></td>
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<tr>
<td>Influenza</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Pneumococcal</td>
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<td></td>
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<td></td>
</tr>
</tbody>
</table>

Antigen Recommendations for All Students by Colleges/Universities with Immunization Recommendations in Washington State, 2016

<table>
<thead>
<tr>
<th>Antigens</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meningococcal</td>
<td>103</td>
</tr>
<tr>
<td>Haemophilus influenzae Type b</td>
<td>100</td>
</tr>
<tr>
<td>Tetanus/Antitetanus/破伤风/白喉/破伤风/白喉</td>
<td>100</td>
</tr>
<tr>
<td>Haemophilus influenzae Type b</td>
<td>100</td>
</tr>
<tr>
<td>Pneumococcal</td>
<td>100</td>
</tr>
<tr>
<td>Polio</td>
<td>100</td>
</tr>
</tbody>
</table>

Conclusions

- There is a wide variety of immunization policies and practices among four year colleges and universities in Washington and other states.
- With increasing public awareness of vaccine-preventable diseases on campuses, increased effort is needed to diminish the risks of preventable and other serious diseases.
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
- Survey was conducted in 2016
- Survey participants were the institutions and immunization offices and programs that offered them
- Policy was reviewed by the UW and the State of Washington

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

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.

MORE RESULTS
- 79% have some immunization requirements
- Only 63% report compliance with Washington's meningococcal education mandate
- 38% do not require measles vaccines
- 60% maintain immunization information for all students
- 79% think the state should require students enrolling in courses to receive vaccinations
- 17% have created health centers providing immunizations
- 3 provided referrals or mobile clinics for immunizations

YES BUT, SO WHAT?
There’s more strategy in the study results and policy proposal.
- Four-year colleges and universities in Washington and other states.
- Many recently published outbreaks of vaccine-preventable diseases in outbreaks, increased efforts to track down the risks of preventable and other serious diseases.

NOW WHAT?
1. We shared the results of the survey with our audience.
2. We have developed educational resources and statewide requirements for meningococcal disease.
3. We will do another survey in the Fall of 2017.
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

- Information Design, Society for Experiential Graphic Design: https://segd.org/what-information-design
- SOCO template, CDC: https://www.cdc.gov/healthywater/emergency/dwa-comm-toolbox/before/tools/SOCO-Worksheet.docx
- 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.