

# Real World Complexity

---

Why public policy needs data science

# About Me

Hi! I'm Natalie!

- **Current:** Compliance Analyst at Mercari (“The Selling App”)



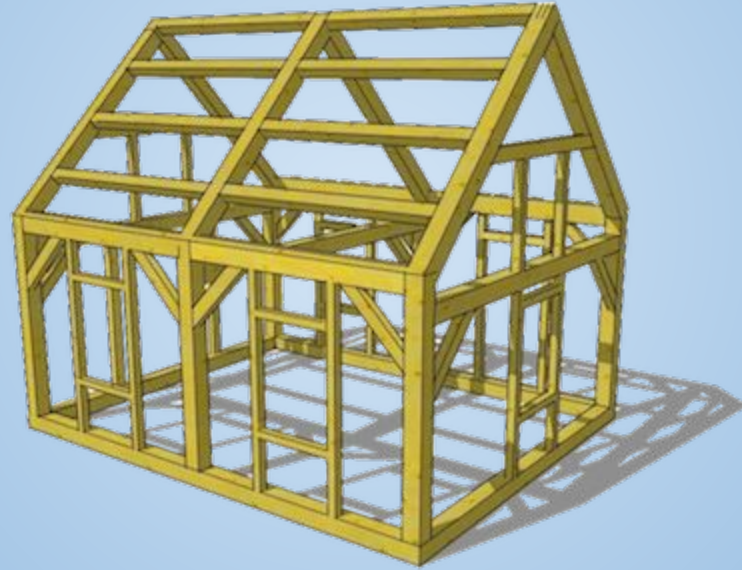
# About Me

Hi! I'm Natalie!

- **Current:** Compliance Analyst at Mercari (“The Selling App”)
- **Past:** M.A. in Public Policy at Northwestern University



# What is Public Policy?



# 2019 Measles Outbreak

- Affected Areas

## **New York Responsible for 75% of America's Measles Cases**

Measles outbreaks may have cost NY about \$2.6 million dollars in health-related expenses

# 2019 Measles Outbreak

- Affected Areas
- Statistics

HEALTH AND SCIENCE

**New York measles outbreaks worsen, bringing nationwide total to 839 cases so far this year, CDC says**

PUBLISHED MON, MAY 13 2019•9:47 AM EDT | UPDATED MON, MAY 13 2019•1:48 PM EDT

# Policy Initiative

**What can a government do to increase MMR vaccine intake?**

# Policy Initiative

**What can a government do to increase MMR vaccine intake?**

- Solutions-driven

but...



# Policy Initiative

## **What can a government do to increase MMR vaccine intake?**

- Solutions-driven

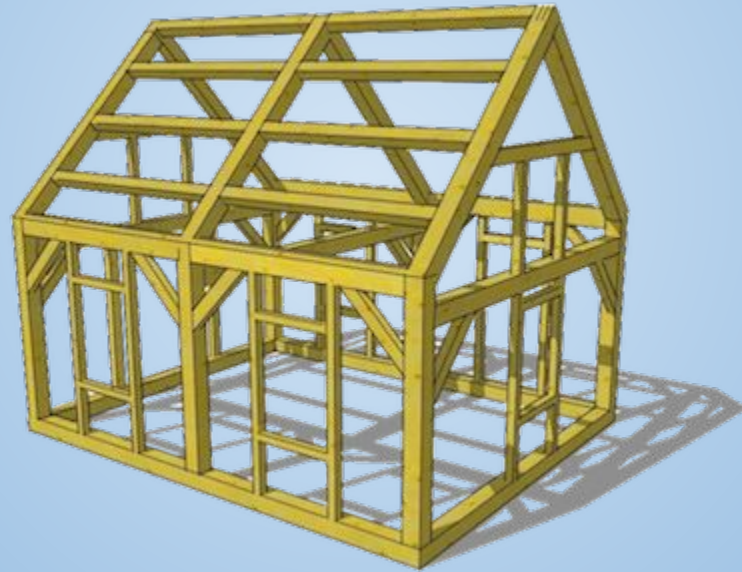
but...

- Can't address specifics without data

# Policymakers vs. Politicians

Are they the same thing?

# Policymakers vs. Politicians



# Policymakers vs. Politicians



# Policy Without Data

HEALTH

## **New York City orders mandatory vaccines for some amid measles outbreak**

*By* ASSOCIATED PRESS / APRIL 9, 2019

# What's wrong with this approach?

- Bad optics

US & Canada

**New York bans religious exemptions for vaccines amid measles outbreak**

# What's wrong with this approach?

- Bad optics
- Bias

Health

**Parents of 3 NYC children  
face \$1,000 penalty for  
violating measles order**

# What's wrong with this approach?

- Bad optics
- Bias
- Counterproductive



Politics

Anti-vaccine parents pull all-nighter  
in protesting vaccination bill



# Reframing The Question

**What can a government do to increase MMR vaccine intake?**

# Reframing The Question

~~What can a government do to increase MMR vaccine intake?~~

Why are vaccine opt-out rates increasing?

# Reframing The Question

## **Why are vaccine opt-out rates increasing?**

- Focused look at causes
- Use data to drive solutions

but...

# Reframing The Question

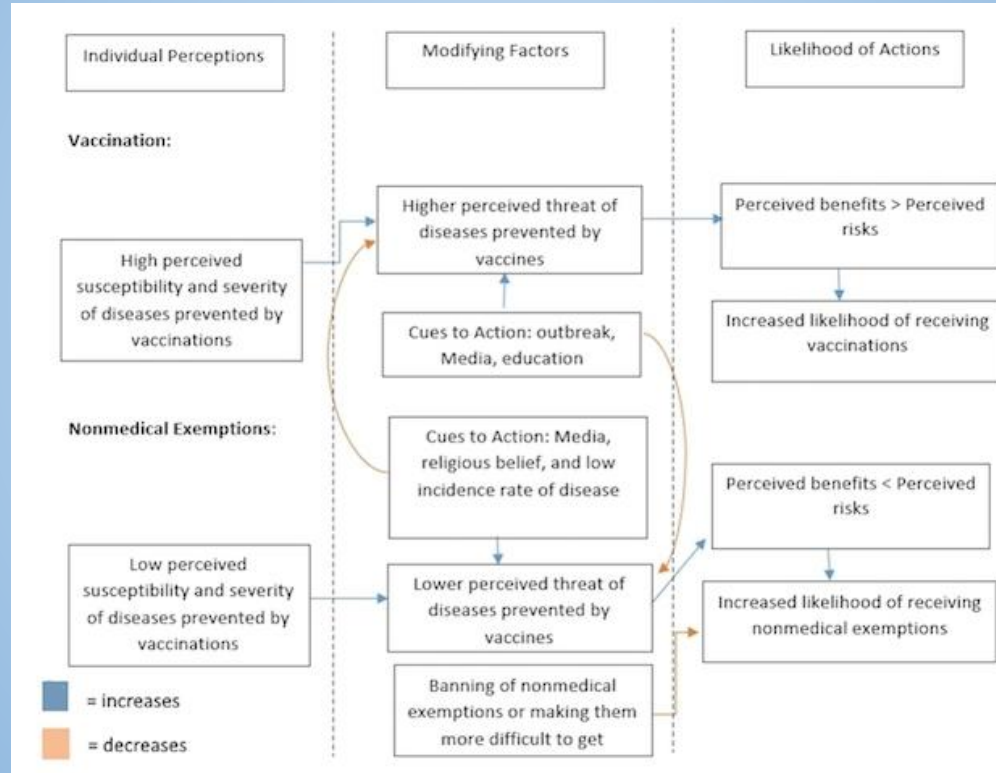
## **Why are vaccine opt-out rates increasing?**

- Focused look at causes
- Use data to drive solutions

but...

- Greater complexity

# Logic Model



*What does the data say?*

# Meta-analysis

***A systematic review of factors affecting vaccine uptake in young children (Smith et al., 2017)***

What factors are associated with vaccination?

# Meta-analysis

***A systematic review of factors affecting vaccine uptake in young children (Smith et al., 2017)***

What factors are associated with vaccination?

- Not believing vaccines to be harmful
- General positive attitude towards vaccines
- Trust in the healthcare profession
- (and more!)



# Data in Practice

**Use these findings to increase outreach in high-risk communities**

# Data in Practice

**Use these findings to increase outreach in high-risk communities**

- Educational literature
- Community outreach

# *Challenges with a Data-driven Approach*

# Challenges

- Incomplete or biased data

# Challenges

- Incomplete or biased data
- Stakeholders

# Challenges

- Incomplete or biased data
- Stakeholders
  - Different levels of government
  - American public
  - Corporations

# Measuring Outcomes

- Randomized Controlled Trials

# Measuring Outcomes

- Randomized Controlled Trials
  - Complexity
  - Budget
  - Ethics



# Measuring Outcomes

- Randomized Controlled Trials
  - Complexity
  - Budget
  - Ethics
- Correlations

# Measuring Outcomes

- Randomized Controlled Trials
  - Complexity
  - Budget
  - Ethics
- Correlations
  - Not causation!

# Measuring Outcomes

- Key Performance Indicators (KPIs)

# Measuring Outcomes

- Key Performance Indicators (KPIs)

## **Vaccination Rates**

# Measuring Outcomes

- Key Performance Indicators (KPIs)

**Vaccination Rates** 

# Measuring Outcomes

- Key Performance Indicators (KPIs)

**Vaccination Rates** 

**Opt-out Rates**

# Measuring Outcomes

- Key Performance Indicators (KPIs)

**Vaccination Rates** ↑

**Opt-out Rates** ↑

*How can data science help  
build strong policy?*



# Using data to drive policy

- Understand the problem

# Using data to drive policy

- Understand the problem
- Consider solutions

# Using data to drive policy

- Understand the problem
- Consider solutions
- Measure outcomes

# Using data to drive policy

- Understand the problem
- Consider solutions
- Measure outcomes
- Drive community support

# Thanks!

View my slides on Github: [nataliedenning/policytalk2020](https://github.com/nataliedenning/policytalk2020)