WALLA WALLA COUNTY NOTIFIABLE CONDITIONS ANALYSIS

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METHODOLOGY

CASE COUNTS

WASHINGTON STATE

- Primarily WDOH Annual Communicable Disease Reports
- Child blood lead levels from Washington Tracking Network data portal – pre-suppressed
- Supplemented with National Notifiable Diseases Surveillance System data (viral hemorrhagic fever, anthrax)
- Seasonal influenza deaths via WDOH Influenza Surveillance Season Summaries

WALLA WALLA COUNTY

- Primarily WDRS data by request from WDOH
- STI and foodborne data by request and stratified by sex, race, ethnicity, and age
- Child blood lead levels from WTN – pre-suppressed
- WDOH Annual Communicable Disease Reports for 2010 – 2013
- CDC National Center for HIV, Viral Hepatitis, STD, and Tuberculosis Prevention

INCIDENCE RATES

- Population data per year is sourced from the Population Interim Estimates by Public Health – Seattle & King County
- All incidences are per 100,000 population
- Suppression:
  - For STIs where $n \leq 16$
  - For GCDs when $n \leq 5$

DATA STRUCTURE

- 'Brucellosis' and '*Burkholderia* infection' were originally combined – separated these
- 'Arboviral diseases' does not include WNV or Yellow Fever
- 'Tickborne diseases': anaplasmosis, babesiosis, ehrlichiosis, spotted fever rickettsiosis, tick paralysis
- 'Poliomyelitis' and 'polio' combined
- Some data holes remain

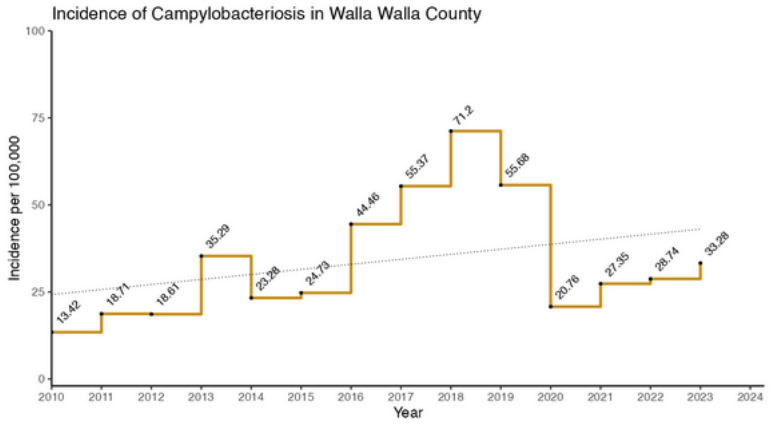
DATA ANALYSIS

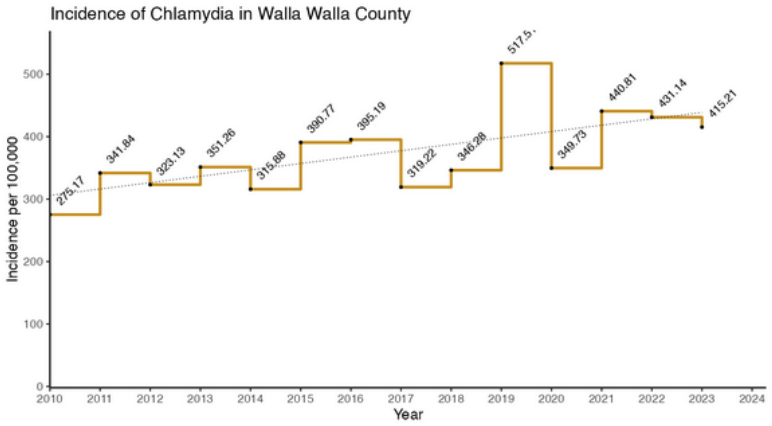
- R Project + Github for reproducibility
  - Data is not available via Github for privacy and compliance purposes
- Report + interactive data visualizations available within this repository
- Sustainable – should update seamlessly whenever new data is added
- Analysis focused on Walla Walla incidence rates historically and in last five years of data availability
- Stratified analyses available for foodborne illnesses and STIs, with limitations

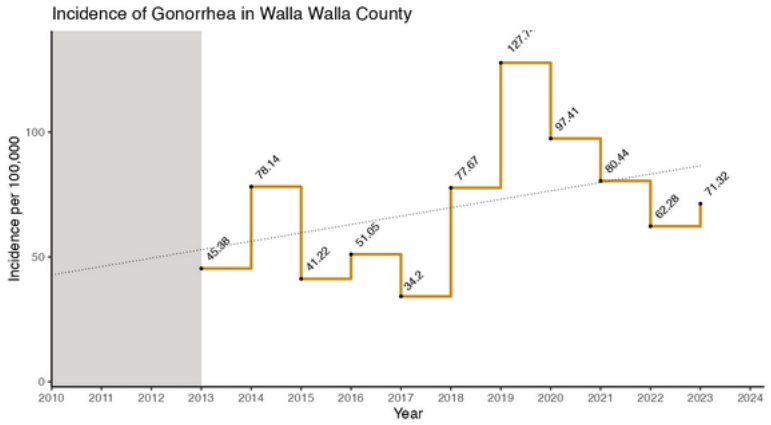
ANALYSIS

BIG QUESTIONS

1. How has the incidence of each notifiable condition changed over time in Walla Walla County?
2. Which notifiable conditions have the highest incidence in Walla Walla County?
3. Which notifiable conditions are disproportionately represented in Walla Walla County, as compared to Washington State? Highest and lowest relative rates.
4. How are foodborne illnesses and STIs distributed amongst the population in WW County?
5. Who holds a disproportionate burden of disease for foodborne illnesses and STIs?





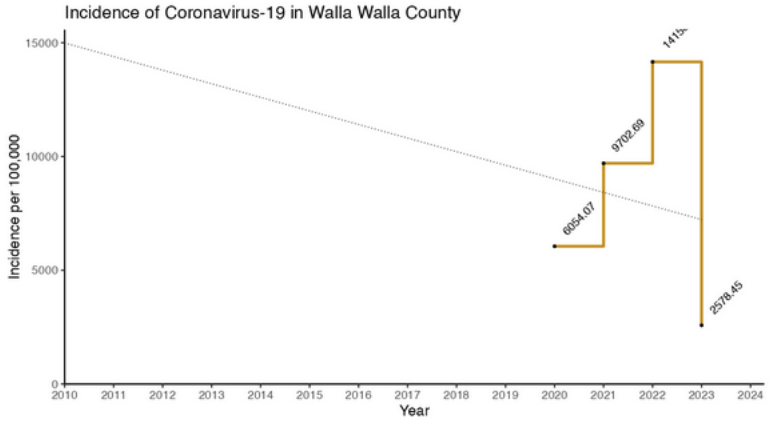


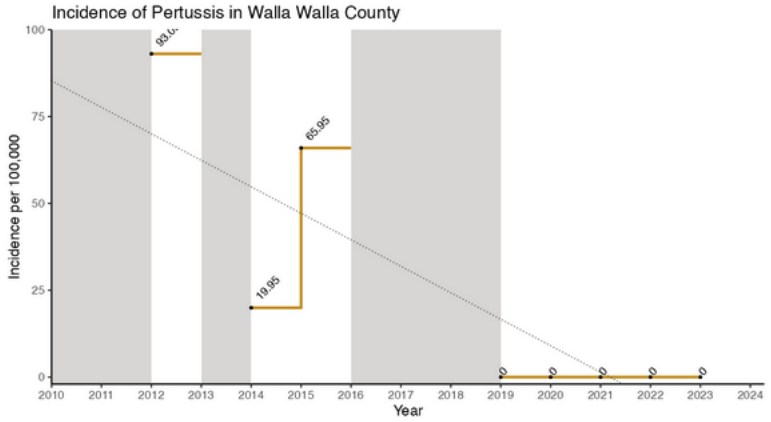
1.

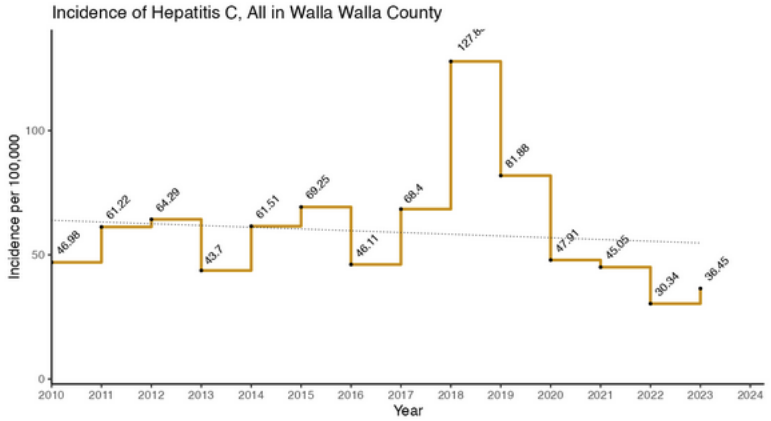
HOW HAS THE INCIDENCE OF EACH NOTIFIABLE CONDITION CHANGED OVER TIME IN WALLA WALLA COUNTY?

- Incidence rates are generally low. Only sixteen conditions with non-zero trends
- Rise in incidence for:
  - Chlamydia
  - Gonorrhea
  - Campylobacteriosis

  with less pronounced increases for:
  - Syphilis
  - HIV*
  - STEC
  - Salmonellosis







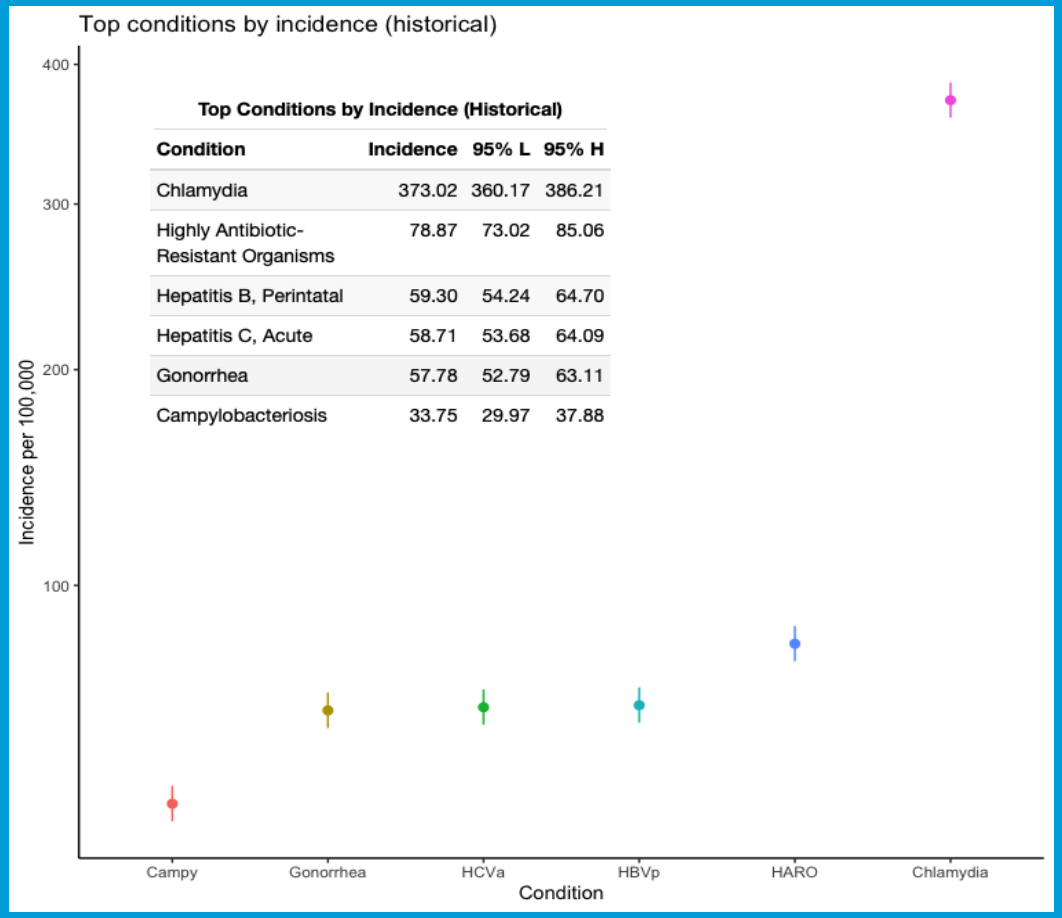
1.

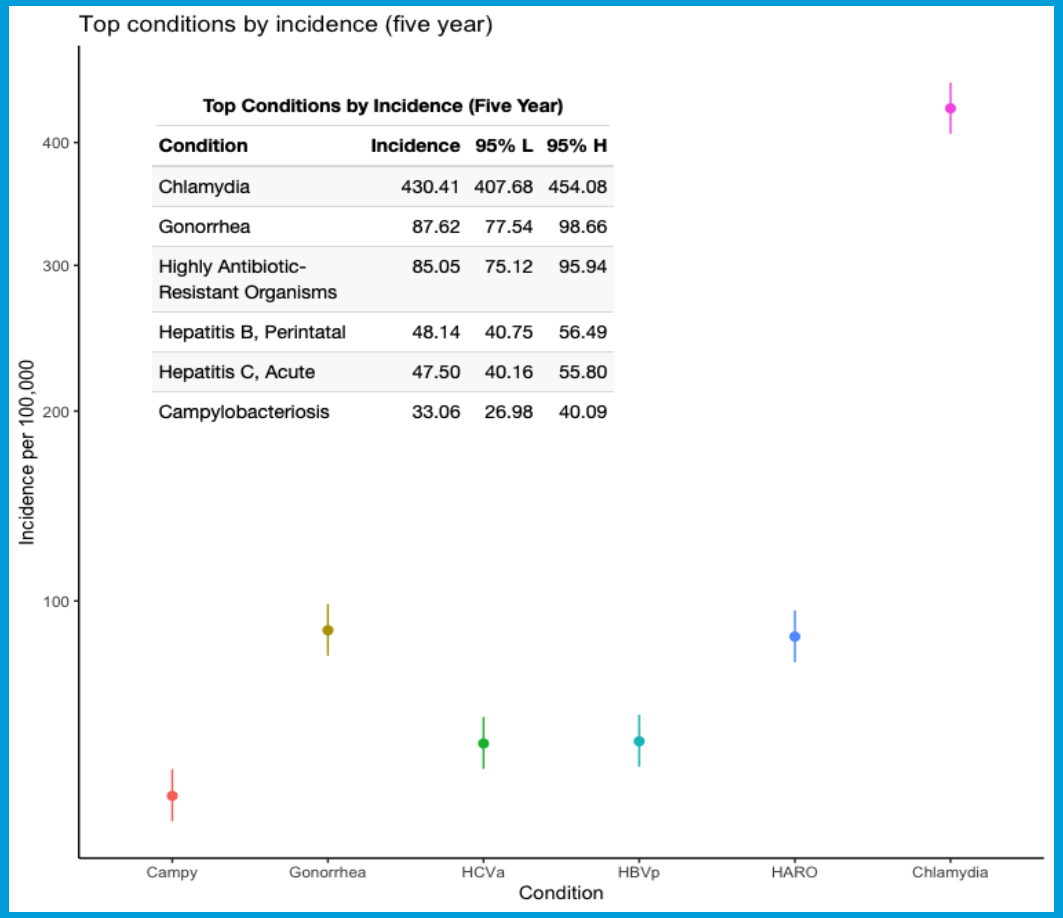
HOW HAS THE INCIDENCE OF EACH NOTIFIABLE CONDITION CHANGED OVER TIME IN WALLA WALLA COUNTY?

- Lowered incidence for:
  - Covid*
  - Pertussis
  - Hepatitis C (chronic + aggregate)

  with less pronounced decreases for:
  - Giardiasis
  - Lead

II.
WHICH NOTIFIABLE CONDITIONS HAVE THE HIGHEST INCIDENCE IN WALLA WALLA COUNTY?





Top & Bottom 5 Incidence Rate Ratios (Historical)

Condition	WW Incidence	WA Incidence	IRR	95% L	95% H
Coccidioidomycosis	1.05	0.72	1.47	0.76	2.84
Salmonellosis	14.65	10.67	1.37	1.15	1.64
Campylobacteriosis	33.75	24.73	1.36	1.21	1.53
Pertussis	13.83	11.99	1.15	0.96	1.38
Cryptosporidiosis	2.34	2.06	1.14	0.73	1.77
Syphilis, Early non-primary non-secondary	2.11	6.89	0.31	0.19	0.49
Tuberculosis	0.82	2.82	0.29	0.14	0.61
Hepatitis A, acute	5.86	20.42	0.29	0.22	0.38
Hepatitis B, Acute	5.63	19.89	0.28	0.21	0.38
Herpes Simplex	1.17	6.17	0.19	0.10	0.35

- IRR: Incidence rate ratio, usually equivalent to a relative risk
- Several confidence intervals crossing null value of one, indicating significant uncertainty. Small numbers
- Note campylobacteriosis, also in top conditions for WW County

III.
WHICH CONDITIONS ARE DISPROPORTIONATELY REPRESENTED IN WALLA WALLA COUNTY?

Top & Bottom 5 Incidence Rate Ratios (Five Year)

Condition	WW Incidence	WA Incidence	IRR	95% L	95% H
Salmonellosis	21.50	9.88	2.18	1.71	2.77
Vibriosis	2.25	1.61	1.39	0.66	2.93
Campylobacteriosis	33.06	24.59	1.34	1.11	1.63
Coccidioidomycosis	1.60	1.22	1.31	0.54	3.17
Shiga toxin-producing E. coli	6.42	5.96	1.08	0.69	1.67
Hepatitis A, acute	8.99	20.68	0.43	0.30	0.63
Giardiasis	1.28	3.18	0.40	0.15	1.08
Syphilis, Early non-primary non-secondary	4.17	10.90	0.38	0.22	0.66
Tuberculosis	0.96	2.71	0.36	0.11	1.10
Herpes Simplex	0.96	5.12	0.19	0.06	0.58

- Most recent five years of data (2018 – 2023)
- Campy joined by salmonellosis, STEC
- Hepatitis A, syphilis*, tuberculosis, and HSV remain strong points for WW County relative to the state
- Note what's **not** here (good news?):
  - Chlamydia
  - Gonorrhea
  - HARO

III.
WHICH CONDITIONS ARE DISPROPORTIONATELY REPRESENTED IN WALLA WALLA COUNTY?

IV.
HOW ARE FOODBORNE ILLNESSES AND STIS DISTRIBUTED AMONGST THE POPULATION?

	Enteric illness			
	Campylobacteriosis	Salmonellosis	Shigellosis	Total
Sex				
Male	43%	50%	31%	45%
Female	57%	50%	69%	55%
Total	100%	100%	100%	100%

	Enteric illness				
	Campylobacteriosis	Salmonellosis	Shigellosis	STEC	Total
Age category					
0 to 9	11%	14%	38%	24%	14%
10 to 19	8.0%	11%	19%	24%	11%
20 to 29	11%	17%	6.3%	15%	13%
30 to 39	12%	5.6%	13%	5.9%	9.9%
40 to 49	13%	7.5%	13%	2.9%	11%
50 to 59	13%	19%	0%	2.9%	13%
60 to 69	13%	11%	6.3%	5.9%	12%
70 to 79	11%	10%	6.3%	12%	11%
> 80	7.6%	4.7%	0%	8.8%	6.6%
Total	100%	100%	100%	100%	100%

IV.
HOW ARE FOODBORNE ILLNESSES AND STIS DISTRIBUTED AMONGST THE POPULATION?

STIs Proportion by Sex

Sex	Chlamydia	Gonorrhea	HCV	HIV (prev.)
Male	23.91	48.28	57.31	74.74
Female	58.31	47.26	38.93	18.28

STIs Proportion by Age Group

Age group	Chlamydia	Gonorrhea	HCV	HIV (prev.)
0 To 9	0.06	0.41	0.59	0.00
10 To 19	23.81	8.72	0.40	0.89
20 To 29	43.89	47.67	9.68	2.53
30 To 39	10.74	25.56	14.43	11.44
40 To 49	2.42	9.13	18.18	20.95
50 To 59	1.01	2.84	33.00	36.85
60 To 69	0.28	0.81	18.58	15.60
70 To 79	0.19	0.20	4.55	3.42
80+	0.03	0.00	0.20	1.34

LIMITATIONS WITH RACE AND ETHNICITY DATA

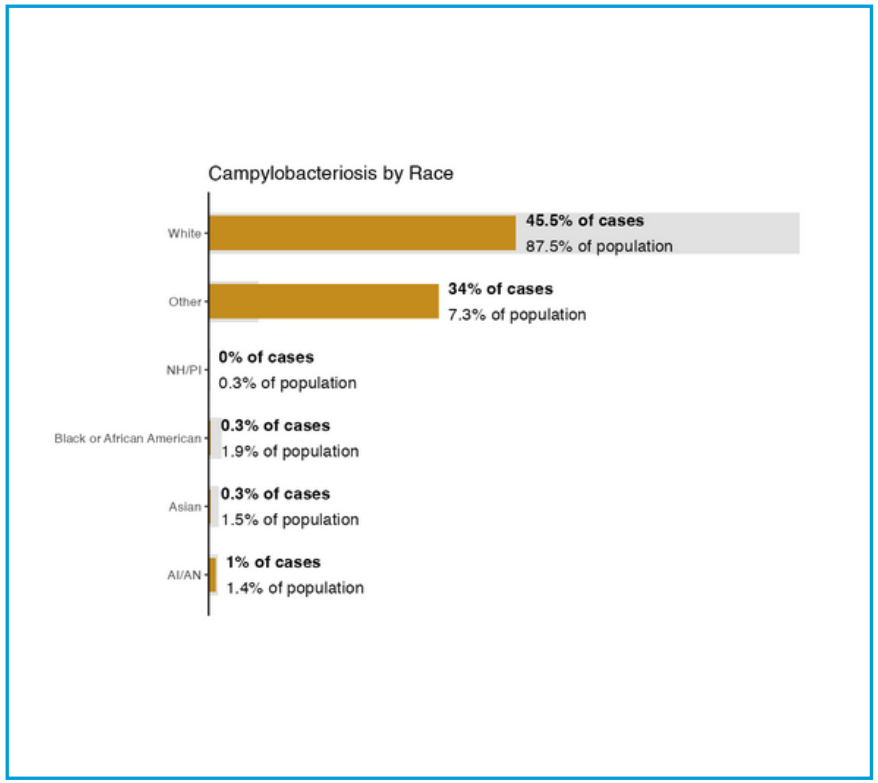
- Lots of missingness in this data
- Different data practices for racial category based on source – some more aggregated than others
- Very high proportion of "other race" as compared to census data. This is indicative certainly of inequities in health outcomes, but also a lack of appropriate response options for many individuals
  - No options to combine ethnicity and race, e.g. ("Black, Hispanic" vs. "Black, non-Hispanic"). This may have driven uptake of the "other race" category
- Not all data sources utilized a "multiple races" option, so collapsing those that did into "other" became necessary

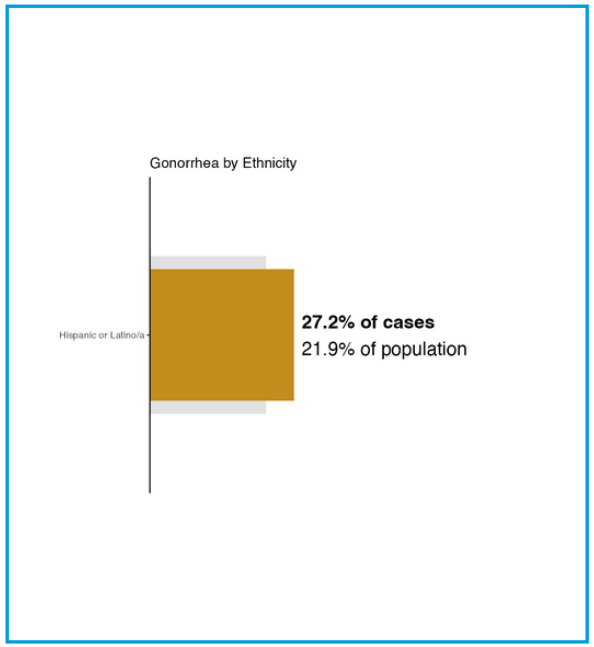
IV.
HOW ARE FOODBORNE ILLNESSES AND STIS DISTRIBUTED AMONGST THE POPULATION?

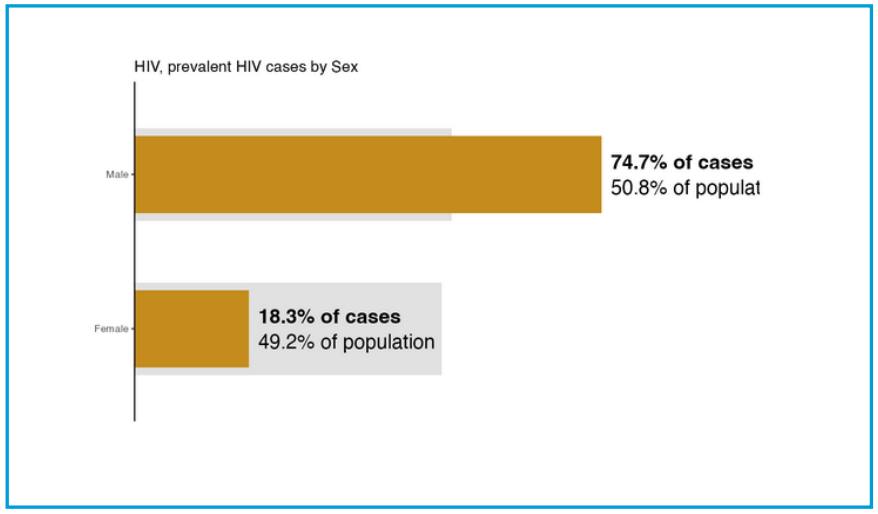
STIs Proportion by Race

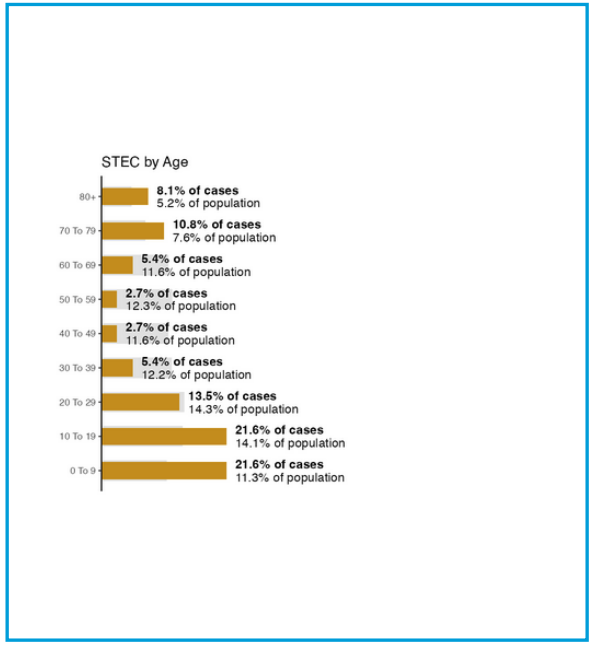
Race	Chlamydia	Gonorrhea	HCV	HIV (prev.)
White	36.91	47.67	33.79	25.41
Black or African American	1.73	3.04	0.99	0.74
AI/AN	0.60	0.00	0.59	0.45
Asian	0.28	0.41	NA	NA
NH/PI	0.28	0.41	0.20	0.15
Other	29.50	32.05	3.95	2.97

- Note that these do not total 100%
- Heavily bimodal between "White" and "Other race", except for HCV and HIV
  - Likely due to data format from DOH, not truly representative
- **Ethnicity:** those indicating "Hispanic or Latino/a":
  - Chlamydia: 24.91%
  - Gonorrhea: 27.18%
  - HCV: 2.77%
  - HIV prevalence: 23.48%









V.
WHO HOLDS A DISPROPORTIONATE BURDEN OF DISEASE FOR FOODBORNE ILLNESSES AND STIS?

CHALLENGES

CHALLENGES

- Disparate data sources often disagreed, not all information was available
- Formatting was wildly inconsistent, so cleaning + data wrangling was a big task
- Modular design of a large project in R, prioritizing reproducibility
- Integrating interactive data tools into a static document
- Therea are so many options / approaches for analysis: what to focus on?

THANK YOU ALL!