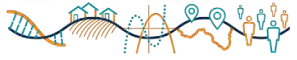


When Pandemic Strikes: Case Identification and Reporting in a Local Public Health Department



DEPARTMENT OF POPULATION AND QUANTITATIVE HEALTH SCIENCES

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Background

- I have been an intern at the Department of Epidemiology, Cleveland Department of Public Health through the CWRU-CDPH collaboration since March 2021.
- CDPH is the local public health agency for the City of Cleveland and is located in 75 Erieview Plaza, 2nd floor, Cleveland, OH 44114.
- The state of Ohio reported its first case of Covid-19 on March 9, 2020, which resulted in the Governor of Ohio declaring a State of Emergency in the state.
- COVID-19 is a respiratory disease caused by the SARS-CoV-2 virus and can result in serious illness or even death. To date, the world has seen over 251 million cases and over 5 million deaths.
- CDPH Department of Epidemiology has been working tirelessly to mitigate the crisis of the pandemic, collect, organize report data.
- City of Cleveland recognize racism as a public health crisis.
- I was hired to assist the epidemiologists with Covid-19 related work.

Learning Objectives

- To understand how a Local Department of Public Health creates and maintains case data during a pandemic and apply what I have learnt in the academic setting to a real life setting.
- To understand, assess, analyze and interpret disease trends.
- To assist in creating tools for ensuring completeness of data to the extent possible.

Activities

- Learning how to extract Covid-19 cases from the Ohio Department of Health's database, Ohio Disease Reporting System (ODRS), for the city of Cleveland to create the daily line list (CDPH Linelist) of cases. To make sure all parameters/variables were adequately filled.
- Update CDPH Linelist if case classification changed.
- To add variant information on the CDPH Linelist as those became available via ODRS.
- Link outbreak cases on ODRS as those information became available.
- Reconcile interview data on ODRS and CDPH Linelist.
- Perform data processing, data visualization and analysis for the 18 Month Report.

Deliverables

- Linelists for daily Covid-19 positive cases for the City of Cleveland. This was the main form for data collection/ reporting for the city.
- Visualization of cases, hospitalizations and deaths for the 18 Month Report (Internal) which is in the final stages of review. The visualization were created in R.
- Tables depicting cases, hospitalizations and deaths for the 18 Month Report (Internal) are in the final stages of review. The tables were created in R.
- Workflow for school case reporting.

CDPH #	Date Reported	Transfered	Case Classification	ODRS #	Last Name	First Name	DOB	Age	Gender	Race	Ethnicity	Address	City	State	Zip Code	Telephone	Interview Still Needed	Case	How Collected	Investigated	
			Confirmed	11111111	Dea	John A.	2/1/58	43	Male	White	Non-Hispanic	123 1st Ave, Apt A	Cleveland	OH	44114	(216)864-2197		1/2021	1/2/21		
			Confirmed	13945189	Dea	Lara B.	3/26/99	21	Female	Other	Hispanic	456 2nd Ave, Apt B	Cleveland	OH	44114	(216)864-2197		1/2021	1/2/21	yes	
			Confirmed	98794833	Dea	Aime C.	02/9/72	49	Female	Black	Non-Hispanic	111 3th Ave, Apt 1	Cleveland	OH	44114	(216)864-2197		4/18/21	1/2/21	yes	
			Probable	13379485	Dea	John D.	4.4.45	35	Male	Latino	Hispanic	789 4th Ave, Apt B	Cleveland	OH	44114	(216)864-2197				12/9/20	
			Probable	89743898	Dea	Aime E.	9/9/71	49	Female	Unknown	Unknown	75 Interview Place	Cleveland	OH	44114	(216)864-2197		1/3/2021	1/14/21		

Fig. 1—Daily CDPH Linelist of Covid-19 positive cases. This linelist was created from information obtained from ODRS. It was originally added to an MS Excel master dataset. In Spring 2021 the system was updated and daily lists were uploaded to an online database created through the CWRU-CDPH collaboration. Case Investigators directly entered their investigation findings on this Linelist. (this is a simulated data used as an example).

```

r
Race <- c("White", "Black", "Asian", "Other", "Unknown")
Cleveland_Total_Pop <- c(148235, 189865, 9408, 13543+2829+841, NA)
clepop <- tibble(Race, Cleveland_Total_Pop)
clepop
...
Race_counts <- a %>%
  filter(race_factor2 != "Multi-Racial") %>%
  group_by(eventdate_month, race_factor2) %>%
  summarise(Counts = n())
Race_counts
...
Race_incidence_rate <- left_join(Race_counts, clepop, by = c("race_factor2" = "Race")) %>%
  mutate(Incidence_Rate = round(Counts/Cleveland_Total_Pop * 10000)) %>% mutate_if(is.numeric, list(-na, if(.
  Race_incidence_rate
  ...
  
```

Fig. 2: Sample code in R to calculate incidence rate for the 18 Month Report

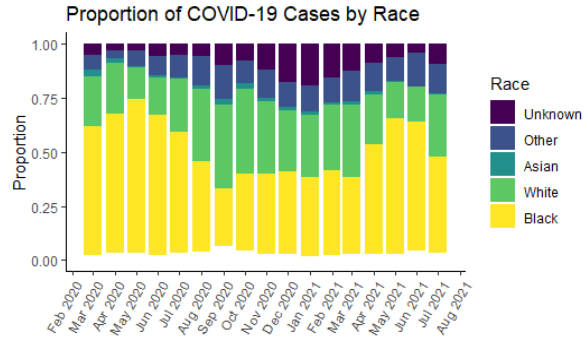


Fig. 3. Visualization produced for the 18 Month Report

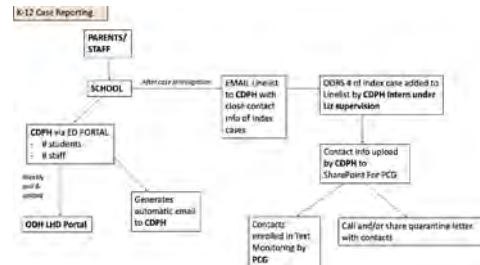


Fig. 4: Workflow for School Reporting of Covid-19 cases

Lessons Learned

- Things develop and change very quickly in a pandemic and keeping up with the changes is important for success. Understanding the rapid changes the health department had to adopt for accurate and timely reporting of cases, hospitalizations and deaths to the general public and policymakers.
- Learn how to collate data coming from disparate sources for reporting purposes with methods in place to remove redundancies and inaccuracies.
- Learn data handling of raw data for data cleaning and curating and tackle the reality of operating with data inconsistencies and incompleteness.
- Develop R codes and use visualization tools that cater to specific target audiences (tailoring the message).

Public Health Implications

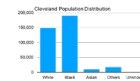
- CDPH has been at the forefront striving to achieve better health for the ~385,000 residents of Cleveland. Like any other public health department, pandemic triggered multiple changes at CDPH, such as:
 - organizational restructuring,
 - prioritization of departmental objectives,
 - mobilization and reassigning of internal resources
 - establishing collaborative efforts with outside institutions (CWRU, in this case)
- Going through this tumultuous time and the changes that pandemic brought with it was a wake up call for the public health departments to develop contingency plans that can be activated at a short notice. Knowledge and experience gained in managing COVID-19 pandemic will enable CDPH to retool its resources for rapid and timely reporting of cases in future outbreaks.
- Gaining public trust in the throes of pandemic is critically dependent on accurate and timely reporting of data in a way that can be easily understood. Any public intervention to be successful needs to gain the public's trust. The best way to address this is data management skills that allow rapid data collation with emphasis on accuracy, completeness, and use of optimal visualization tools.
- Public health departments have to invest in resource and personnel that can generate and convey high quality data for enhancing reporting standards, not just for pandemics but also for seasonal and endemic infections.

Acknowledgement

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References

- Ohio Executive Order 2020-01D (March 9, 2020) <https://governor.ohio.gov/wps/portal/gov/governor/media/executive-orders/executive-order-2020-01-d>
- WHO Covid dashboard. Nov 11
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Race distribution for the city of Cleveland.

