COVID-19 Evidence Accelerator Collaborative

Lab Meeting # 38

Thursday, August 5th, 2021, 3 - 4:00 pm ET

Call Summary

Overview of Lab Meeting 38

Lab Meeting 38 of the Vaccines & Therapeutics Accelerator featured three presentations on various sources of real-world vaccine data and the opportunities and challenges associated with each. First, Dr. Andrew Simms of AstraZeneca discussed how improvements to the Vaccine Adverse Event Reporting Systems (VAERS) and CDC's COVID Data Tracker could enable more granular exploration of real-world vaccine data. Next, we heard from Dr. Tamer Farag of Facebook Health about how the platform can be used to conduct large-scale surveys to help inform pandemic-related policy and research on vaccine acceptance. Finally, Mansi Kansal of Google and Rebecca Weintraub of Ariadne Labs spoke about some of the tools they developed to identify vaccine deserts and support decision making around vaccine access and distribution.

Leveraging Vaccine Adverse Event Reporting Systems (VAERS) Data for Vaccine Safety Analyses

Dr. Andrew Simms, AstraZeneca

Data Sources & Example Analyses

- **Sources:** Vaccine Adverse Event Reporting Systems (VAERS) & the CDC's COVID Data Tracker
- **Analyses/ Uses:**
    - Weekly surveillance of adverse events (AEs) for all COVID-19 products approved in the US
    - Hybrid Proportional Reporting Ratio (PRR) - Compares the frequency of AEs reported to AstraZeneca to the same events reported with other vaccines in VAERS
    - Ad hoc analyses leverage structured and unstructured fields

Future Analyses

- AE rates – stratified by vaccine, age, sex, race/ethnicity, location, and longitudinal analyses of vaccination (exposure) data
- Worldwide questions, aligning VAERS/CDC – working with EudraVigilance, ECDC and other Country/regional data sources

Exposure Limitations (CDC Data Tracker)

- Key Issues
    - Limited how administration data can be stratified – currently can only stratify by vaccine OR separately by *one* of sex, age group, race/ethnicity

    - No API access – forces complicated and time-consuming daily scraping of data for latest values
- Requests
    - Stratify and publish data by vaccine, sex, race/ethnicity, age group, and location
    - Extend the API used for allocation data (data.cdc.gov) to publish these data

VAERS Data Limitations

- Key Issues
    - A CAPCHA dialogue box blocks auto download of VAERS data
    - No participation and usage data for v-safe (after vaccination health checker)
    - V-safe reports are labeled in a multi-use field (SPLTTYPE) used for manufacturer or immunization project numbers
- Requests
    - Make VAERS data accessible via an API download (similar to data.cdc.gov)
    - More clearly annotate or create new columns for Active and Passive Surveillance

Data Quality Issues

- VAERS – Over 3000 incorrect vaccination dates, multiple v-safe strings used in SPLTTYPE field
- CDC Tracker – Non-stratified cumulative vaccinations sometimes do not equal the sum of totals by vaccine

Future Modeling Questions

- VAERS
    - How will AEs be captured in VAERS for patients receiving a booster dose with a 2nd vaccine?
    - Can the administered vaccine (VAX_NAME) be linked to RxNorm?
    - Concomitant medications appear in a free-text field (OTHER_MEDS), are structured links to RxNorm possible in addition to the free-text?
- CDC + VAERS
    - Alignment of exposure data and VAERS
        - Standardize names for COVID-19 vaccines – currently CDC and VAERS use different names
        - Is processed as of date the best date for alignment?
    - What about future vaccines, active surveillance, and exposure programs?

<u>COVID-19 Trends and Impact Survey (CTIS)</u>

Dr. Tamer Farag, Facebook Health

CTIS Overview

- Facebook created an opt-in survey for users to measure information on COVID-19 for public health decision makers.

- Partnered with Carnegie Mellon University and the University of Maryland implement it off-platform to ensure data collected is privacy protected – no for-profit companies or governments can access the microdata
- Large-scale – 70M+ responses since April and still ongoing with more than 170,000 responses per day
- Population-based, with survey weights provided by Facebook
- Data available with 1-2 days of latency
- Microdata available to academics/NGOs with data use agreement – government and for-profits must use publicly available aggregate data

Survey Measures

- Sociodemographic indicators such as age, gender, race/ethnicity, etc.
- Symptoms of COVID-19 for syndromic surveillance
- Testing and test demand
- Travel, social distancing and hygiene behaviors (e.g., mask wearing)
- Contacts outside the household
- Depression, anxiety, financial security
- COVID-19 vaccine acceptance, reasons for hesitancy, barriers to vaccination, trusted sources of information on COVID-19

Main Data Use Channels

- Institute for Health Metrics and Evaluation (IHME) – Date used by 87+ countries and institutions to inform COVID-19 forecasts and scenarios incorporate mask use, number of contacts outside the home, and vaccine acceptance.
- Direct (unmodelled) Insights – Countries and NGOs using insights to support pandemic policy, specifically for informing behavior change campaigns.
- Research Institutions – 53 research institutions, including Harvard, the Gates Foundation, and Johns Hopkins University, have access to survey microdata.
- Aggregate Data are publicly accessible through APIs and downloadable CSVs and the microdata are available for academic and NGO partners through a data use agreement.
- Insights from the survey are available through Direct Relief maps, dashboard by UMD and Facebook.

Current Uses of CTIS

- **IHME Vaccine Hesitancy Tool –** Used survey data to create a map of vaccine hesitancy in the US.
- **Surgo Ventures Vaccine Personas**
    - Psychometric survey across US used to develop seven indicators which identify a person's "vaccine persona." Characterizes different perspectives/influencing factors on vaccine hesitancy and uptake.
    - Use these to target and persuade people to get vaccinated.
- **Comparison of UK/US Cohort study vs. Israel cohort vs. CTIS published in Lancet Digital Health**
    - Study compared CTIS with Zoe cohort in UK and US with Israel Corona vs. National surveillance systems.

    - Survey-weighted Carnegie Mellon University/University of Maryland cohort data were more representative of the source population.
    - Facebook survey weighting accounts for non-response bias and leads to improved performance compared to other systems.
- **Household COVID Risk and In-person schooling**
    - Increased risk of COVID-19 related outcomes among households with children attending in-person school after adjusting for county-level incidence.
    - Found that school-based mitigation measures such as daily symptom screens, teacher masking, and cancelation of extracurricular activities, can substantially reduce the risk of COVID-19 related outcomes within a household.

Emerging CTIS Applications

- **Partnerships with Johns Hopkins Center for Communications Programs**
    - Hopkins creating a new dashboard to highlight knowledge/attitudes and practice data for all countries/states/provinces
    - Partner with WHO and GOARN to distribute insights
    - Direct engagement with countries, NGOs, and funders to interpret and advise actions
- **Partnerships Boston Children Hospital**
    - Syndromic surveillance data used to support low- and middle-income countries monitor the pandemic in real time.
    - Can be used to measure the impact of policy change on COVID-19 outcomes through direct partnerships with country governments.

Potential Applications

- Connect with biological sampling to track COVID-19 variants across space and time?
- Measure vaccine effectiveness
- Extend syndromic surveillance to more countries

<u>Identifying COVID-19 Vaccine Deserts and Implementing Interventions</u>

Mansi Kansal, Google Health

Rebecca Weintraub, Ariadne Labs, Harvard Medical School

Primary Care & Vaccination – Many (53% of those surveyed) prefer to receive their vaccine at their primary care doctor's office, far fewer would prefer to receive their vaccine elsewhere

Vaccine Equity Planner: Scenario Planning for Local Leaders

- The planner is used to identify and map vaccine deserts in an area
    - **Rural vaccine desert** – area with more than 15-minute drive to the nearest public vaccine site. (17 million living in rural vaccine deserts)
    - **Urban vaccine desert** – area with more than a 30-minute walk or public transit to the nearest public vaccine site. (50 million living in urban vaccine deserts)
- Displays counties by Social Vulnerability Index
- Shades counties by the # of people who intend to be vaccinated but are not yet

- Data can be used to identify potential sites within vaccine deserts such as:
  Primary health care sites or FQHCs
    - Pharmacies not currently offering COVID-19 vaccinations
    - Urgent care centers
    - Retail sites
    - Places of worship
    - Schools
- **Example Use Case: Local Response in Barbour County, Alabama**
    - Area with a high social vulnerability index, large areas of vaccine desert, >5,000 people not vaccinated but would like to be
    - Identified Clayton Family Health center as a potential site within this vaccine desert
- **Example Use Case 2: Tracking Weekly Desert Changes**
    - Data updated weekly and data can be examined overtime to identify new vaccine deserts and changing size/dimensions of existing deserts
    - Can be used to understand time availability and geographic availability of vaccines

Near-term Use Case: Pediatric Access to COVID-19 Vaccines

- The Vaccine Equity Planner has been adapted and used to plan for pediatric access to COVID-19 vaccines.
- Show potential vaccination sites that are geared toward this population – pediatric care sites, schools, day care providers, play spaces, etc.
- Redefine deserts by distance from pediatric vaccination sites
- Shade counties by number of children aged 5-12

Generating Actionable Data to Identify Vaccine Deserts

- Accurate metrics computed at small geocells relying on Maps' Navigation API
- Refreshed weekly with the latest vaccination site authoritative data
- Split by modes of transportation (how long it would take to get to x place by driving, public transportation, or walking)
- Actionable for decision making as part of the Vaccine Equity Planner

Uses Beyond COVID

- Our approach could be used to understand access to community resources more broadly
- Examine built and food environments, educational opportunities, and healthcare services to understand and improve:
    - Access to spaces for physical activity
    - Access to healthy food sources
    - Access to healthcare services
    - Access to education and childcare services