Oregon Health Authority

Assignment location:
Portland, OR

Oregon Health Authority
Public Health Division

Primary Mentor: June Bancroft, MPH
Senior Epidemiology and Laboratory Capacity Epidemiologist
Oregon Health Authority

Secondary Mentor: Matthew Geniza, PhD
BioInformatics Scientist
Oregon Health Authority

Work Environment: Hybrid

Assignment Description

Agency Description:
Oregon Public Health is a division under the Oregon Health Authority. There are three centers in the Public Health Division - Center for Health Protection, Center for Prevention and Health Promotion, and the Center for Public Health Practice. The Acute and Communicable Disease Prevention (ACDP) program resides in the Center for Public Health Practice along with the Oregon State Public Health Laboratory, HIV, STD and TB programs, Center for Health Statistics, Emergency Preparedness and Response, and the Immunization Program. The ACDP staff have grown during the pandemic and now over 60 staff work in ACDP on four teams: Informatics, Preparedness Epi and Surveillance, Health Care Acquired Infections, and water and foodborne Disease. The ACDP Informatics Team, METIS (Merging Epidemiology, Technology, and Information Systems), designs data systems and ensures that data exchange initiatives are sound, secure, interoperable with other public health information systems, responsive to user needs and are nimble enough to adapt to emerging public health threats. This team serves as the translators and bridge builders between epidemiologists, research analysts, local public health professionals, information technologists, health information system vendors and the broader healthcare community. The mission of the Oregon Health Authority is lifelong health for all Oregonians and health equity by 2030. In 2016, we convened an ACDP health equity working group which continues to meet monthly. This group advances health for people in Oregon by identifying and implementing projects and priorities related to health equity in infectious disease and preparedness. Opening with racial equity as a goal will promote equity for all people in Oregon.
The Oregon State Public Health Laboratory (OSPHL) aids in the protection of public health by supporting state and local infectious disease control efforts (General Microbiology and Virology/Immunology), preventing metabolic disorders detectable at birth (Newborn Screening), and assuring the quality of testing in clinical and environmental laboratories (The Oregon Environmental Laboratory Accreditation Program (ORELAP)). In 2016, OSPHL transitioned to perform genetic sequencing on Foodborne Pathogens and Antimicrobial Resistance. In 2020, OSPHL began sequencing for respiratory surveillance (especially for COVID-19). Adding genetic sequencing to the capabilities of the lab increased the number of samples that could be tested, but also increased the amount of data produced after each test. The Informatics Team at OSPHL is the steward of data operations at the lab. This includes designing data systems and ensuring that data exchange initiatives are interoperable with other public health information systems. They are liaisons to laboratorians and epidemiologists to review and interpret results of genetics sequencing tests.

Describe Statistical and Data Analysis Support, Such as Databases, Software, and Surveillance Systems Available to the Fellow:

Our main surveillance databases are all Filemaker Pro, an Apple innovation platform. These databases are supported in house and contain current and historic data on disease outbreaks, all communicable diseases, all electronic laboratory reports, pesticide exposures and elevated blood level investigations. In addition, we have an Enterprise ArcGIS license and have recently connected our Communicable disease reporting systems Orpheus and Opera (copy of Orpheus housing COVID19 data only) to a secure Oregon state GIS portal. We are currently modernizing our systems to include SQL databases that house the surveillance data. Staff have access to tools they need, SQL Server Management Studio, SAS, R, Epi Info, STATA. Rhapsody is the integration engine used by our program. Rhapsody processes, validates, and transforms data received in HL7, eCR, and csv formats as well as submits data to other organizations. We will also be using Rhapsody as we develop the capacity to use FHIR. In addition to ArcGIS, we have licenses for Tableau and PowerBI for data visualization. Oregon uses Microsoft products, so staff may utilize Microsoft related applications. We also have access to Survey Monkey, REDCap, Smartsheet and Adobe products (Captivate).

Any additional information about the placement:

The majority of epidemiology staff work a hybrid work schedule. Slowly staff are returning to the office, but we are all set up to work remotely either via Citrix or a virtual private network. The majority of staff at the state lab work in person due to the nature of their work. A fellow would have the option to the type of work but will have access to our systems and resources including a computer and a cell phone for authentication. Matt is on site at the state lab 4 days a week, June one day a week. The ACDP soup club has recently been revived and meets on Tuesdays at the Portland state office building. The state public health lab is outside of Portland in Hillsboro. The max train does go near both locations, but a fellow would be able to decide where they would like to sit. Portland is a very bike friendly city and the max train stops at both PSOB and near the OSPHL.

Describe the Preferred Background and Skills the Ideal Fellow For This Site Would Have:

The ideal fellow will have a background in informatics and database management as well as experience with electronic data exchange systems, data security, and messaging design and configuration. It will be important to have solid knowledge of health information technology data standards, Health Level Seven
including Fast healthcare Interoperability Resources (FHIR), Systematized Nomenclature for Human and Veterinary Medicine (SNOMED), Logical Observation Identifiers Names and Codes (LOINC), International Classification of Diseases (ICD), and other standardized and proprietary codes. The fellow should have experience working with some database, analytic and visualization tools such as; R, FileMaker, GIS, SQL, SAS, STATA or SPSS, Tableau or Power Bi, Windows Desktop and Server; Sybase mapping and messaging applications; Orion Rhapsody Integration Engine; and file transfer protocol (FTP and sFTP). A fellow with Spatial-temporal analysis experience will integrate nicely into this project.

Projects

Project 1 Title: Visualization of Communicable Disease Data for Public Health Action

Project objectives and expected deliverables: This project will focus on data validation, analysis and visualization, specific to our disease surveillance and laboratory information systems. ACDP and OSPHL are leading the charge building an informatics workforce, and plan to host informatics fellows and interns to quickly respond to requests for information, integrate systems, share (when appropriate) complete and accurate data, and ultimately make the data we collect more accessible to health departments and the community. We plan to focus on designing and optimizing SQL views and tables to provide meaningful data for public health action using our Enterprise tools, a secured ArcGIS portal and internal/external tableau servers. This work will build upon our current systems using these products, incorporating more spatial analysis, hot spot detection, and alerting features. Additionally, data will provide the CD metrics to measure progress towards health equity for Oregonians by 2030. The team will develop methods to report on new Race, Ethnicity, Language and Disability (REALD) and Sexual Orientation and Gender Identity (SOGI) data that are required to be collected as part of a community initiative turned into senate bill.

Objectives:

Determine data to be used for public health action - Identify fields and create SQL views of Orpheus/Opera data for use in intervention/prevention activities

Learn how to engage stakeholders in a development project - Participate/facilitate a user-based workgroup to design reports and views of the data.

Increase proficiency in ArcGIS for cluster detection - Understand pros and cons of ESRI ArcGIS spatial cluster detection tools, compare use of different tools to epidemiologically identified clusters and outbreaks.

Determine parameters (time and space) for cluster detection for Salmonella, Shigella and Shiga-toxin producing E. coli.

Deliverables:
A performant database for viewing communicable disease data - Develop, test, optimize performance of SQL views

Reporting/Analysis of REALD and SOGI data on communicable disease - Tableau and or GIS

*Expected public health impact from this project:* Our data are rich, we summarize and report on risks and exposure data via data exports and external analyses. We want to analyze co-morbid conditions and develop multi-pronged interventions based on data we have, conditions affecting those unstably housed, persons who inject drugs, those who are not vaccinated, or we are unable to reach. Data on REALD, SOGI and housing status data can give granular data for identifying population risk, but with GIS we can use external data to explore additional relationships. Dashboards will be available to share these data with stakeholders.

Oregon is an emerging infections program site and visualization of active bacterial core surveillance (ABCs) data are used to understand the burden of these severe infections and to inform vaccine and other public health policies. For enteric pathogens, like Salmonella or E. coli, lab results can be delayed; by receiving information on ordered tests, investigators would be aware of cases in the pipeline.

**Project 2 Title: Informatics 101 Curriculum: Bridging Understanding**

*Project objectives and expected deliverables:* In the ‘Skilled Workforce’ section of the 2021 Acute and Communication Disease Prevention (ACDP) Informatics Assessment, it was determined that workforce development was needed to improve the program’s level of understand of informatics principles, concepts, and methods. Understanding the concepts of informatics is critical to being able to communicate to partners and to scope projects and expectations appropriately. The team used the Public Health Informatics Institute’s guide, ‘Building an Informatics-Savvy Health Department: A Self-Assessment Tool’, to guide the assessment.

A goal was set to create training materials for new and existing data system users to have the skills to effectively use information systems and tools, and the knowledge of how to identify and document needed system improvements

**Objectives:**

Seek guidance from the Oregon Health and Science University’s Informatics Department regarding a robust curriculum.

Impart the value of the informatics process/principles

Include information regarding role of a public health informatician to bridge IT, public health, epidemiology, health analytics, and policy

Raise user skill level of data systems by increasing understanding of data sources, data processing workflow and system capabilities.
Promote best practice use of the data and data systems.

Deliverable:

Training guide and materials

Expected public health impact from this project: Public health partners and program staff will more fully understand the importance of informatics work and be better able to articulate their needs regarding the data systems they are using and for the data sets to be utilized. This will assure that work in the data systems is being done most efficiently, effectively, and accurately.

Project 3 Title: Assessment of the relationship between Wastewater Genomic Surveillance and other community-level data sources throughout the SARS-CoV-2 Pandemic

Project objectives and expected deliverables: Throughout the SARS-Cov-2 Pandemic, genomic surveillance became a critical piece of virus surveillance. Clinical specimens provided patient-level surveillance and wastewater sequencing offers a perspective from community-level surveillance. During a defined period, studies show that there is a strong pairwise correlation (somewhat predictive) between statewide variant estimates in Oregon from both clinical and wastewater sequencing. A limitation of these studies is the availability of metadata associated with clinical samples and the ability to associate clinical samples with community-level surveillance.

The proposed project aims to address the question: Are there other community level data sources that may benefit from comparisons with wastewater surveillance?

Proposed work will compare wastewater surveillance data with other community-level data such as Case Counts or Hospitalizations. Expected outcomes are to assess the correlative power between wastewater data and other community-level data.

Resources


Kaya, Devrim; Falender, Rebecca; Radniecki, Tyler; Geniza, Matthew; Cieslak, Paul; Kelly, Christine; Lininger, Noah; Sutton, Melissa; Published Date : 9 2022. Correlation between Clinical and Wastewater SARS-CoV-2 Genomic Surveillance, Oregon, USA. Source : Emerg Infect Dis. 2022; 28(9):1906-1908. https://stacks.cdc.gov/view/cdc/121065

Expected public health impact from this project: Work performed will fulfill data modernization initiatives of strengthening data science workforce (through data wrangling and data modeling),
translating data into evidence-based recommendations, and predictive analytics and forecasting. The project will strengthen the body of knowledge for using wastewater for public health surveillance.

**Project 4 Title: Curation of NCBI Pathogen Detection Database for Oregon**

*Project objectives and expected deliverables:* Since 2016, Next Generation Sequencing (NGS) Technologies were utilized at the Oregon State Public Health Laboratory. OSPHL participates in federal programs such as Pulsenet (Foodborne Pathogen Testing), National Antimicrobial Resistance Monitoring System (NARMS), and Antimicrobial Resistance Laboratory Network (ARLN). Data generated from these programs are ultimately curated and deposited in a national database – the National Center for Biotechnology Information (NCBI).

The goal of this project has 3 phases. The first is to extract the curated sequence submissions that were performed at OSPHL from the NCBI database. The second phase is to transform the data to be used in a local database. The third and final phase is to load the transformed data into dashboards that may be used for reporting/showcasing the contributions that OHA makes to these federal programs. Expected outcomes will fulfill data modernization initiatives of making data sharing easier, strengthening the data science workforce (through Extract, Transform, Load process), and translating data into evidence-based recommendations (how often do we use NGS? How much data is generated annually? What pathogens are most prevalent in the region?)

*Expected public health impact from this project:* This activity will add to the body of knowledge base of use of molecular/genetic sequencing data to support disease surveillance and understand what particular sequences and organisms are prevalent in the pacific northwest.

**Project 5 Title: National Notification Diseases Surveillance System (NNDSS) Modernization**

*Project objectives and expected deliverables:* Objective: Continue implementation of HL7 Message Mapping Guides for NNDSS case reporting; The fellow will participate on team that is prioritizing implementation order of MMG work, collaborate with lead Epidemiologist for specific disease to create test cases, collaborate with Informatics staff to update scripts to produce properly formatted and populated messages, and engage with CDC to follow the step-by-step implementation plan for onboarding and production approval. Using MMG for reporting will be efficient and replace a more time intensive reporting process. Although CDC is moving away from onboarding new states with MMG, Oregon is in well on the road to production with all existing MMG.

Deliverable: MMG approved for production submission.

In further detail, this work involves conducting a gap analysis of Orpheus data to the CDC standardized fields, gaining knowledge and experience with CDC systems for notifiable infections, including the message validation processing and provisioning system (MVPS). This CDC sponsored system receives, processes, and provisions data for national notifiable diseases. The Message Evaluation and Testing Service (METS) allows jurisdictions to validate HL7 messages against required vocabulary and
programmatic standards. The CDC Secure Access Management Service (SAMS) manages user access to MVPS. Then building out the message using the CDC standard code sets. Once the messages are built, they need testing and validation in the production environment.

*Expected public health impact from this project:* Message mapping guides help modernize case surveillance and improve accuracy of reporting as well as reduce reporting burden.

NNDSS manages the case reports and in turn provides data on national notifiable disease to CDC programs responsible for national surveillance, prevention, and control of infectious and noninfectious conditions.

NNDSS receives, processes, and provides data on national notifiable diseases to programs across CDC to do the following: identify outbreaks; track disease at the state, regional, and national levels; identify geographic areas of concern and provide decision makers with data; identifying groups most at risk; fund disease control activities; and help state and local public health departments better control disease.