

**ID: 86833245**

**Infectious Diseases, Infectious Diseases - Foodborne - Host Site Description  
Multnomah County Health Department**

**Assignment Location:** Portland, US-OR  
Multnomah County Health Department  
Communicable Disease Services

**Primary Mentor:** Russell Barlow, BS, MPH, MS  
Epidemiologist, Senior  
Multnomah County Health Department, Public Health Division

**Secondary Mentor:** Julie Maher, BS, MS, PhD  
Director, Program Design and Evaluation Services  
Multnomah County Health Department, Public Health Division, Oregon Health Authority  
Program Design and Evaluation Services

**Work Environment**

Hybrid

**Assignment Description**

This Fellow will be assigned to the Multnomah County Health Department's (MCHD) Communicable Disease Services (CDS) Investigations Team within the Public Health Division. Through this assignment, our CSTE Fellow can pursue diverse opportunities over the course of their fellowship. The position will be grounded in Communicable Disease work to assure the chance to participate in the fast-paced setting of disease and outbreak investigations. The fellow will also collaborate with the Community Epidemiology Services unit (CES), the central population and community epidemiology unit within the Public Health Division. The fellow will have the opportunity to integrate their CDS portfolio through activities that have touchpoints in other content or subspecialty methodology (e.g, ESSENCE surveillance). We consider fellows to be integral members of the team of epidemiologists and public health professionals who work on the frontlines of public health. Opportunities to collect, analyze, and interpret public health data in ways that directly affect disease control and prevention programs, and are used to advise public health policy abound. We have access to a broad range of data sources, ranging from communicable disease surveillance (for the entire Portland metropolitan area) and vital statistics to electronic health records and medical examiner data. We also work with partners to assess information from programs like ambulance transports and syringe exchanges. Options also exist to design and implement epidemiologic studies of one's own design.

The Fellow will develop the following competency areas: advanced applied epidemiologic research methods and techniques; biostatistical skills; evaluation and research design; quantitative and qualitative survey methodology; communication skills; scientific writing; departmental scientific and technical research/evaluation practices; principles of effective leadership; knowledge of scientific and technical management principles and practices for project management, strategic planning, facilitative leadership, data visualization, and other functions; and knowledge of regulations related to public health practice. We also encourage the sharing and learning and information through professional networks - for example, through attending meetings and conferences, and submitting to peer-reviewed journals.

**Day to day activities:**

MCHD will involve the Fellow in day-to-day activities and research projects that provide "hands on" applied epidemiology experience. Functional responsibilities will include:

- Communicable disease reporting and case investigation and medical record review
- Performing epidemiologic studies and analyzing data from public health surveillance systems
- Participating in or leading the response to public health events like outbreaks

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- Working with program managers and community partners to develop or modify health interventions, policies or programs based on epidemiologic findings
- Working with partners across the Health Department to explore the intersections between communicable disease and other aspects of public health (i.e., environmental health, chronic disease, etc.)
- Writing internal reports, data products, peer-reviewed journal articles and presentations
- Participating in internal and external meetings as needed to involve project stakeholders and to learn how public health systems operate

In addition, we support our fellows in responding to national opportunities that arise through CSTE and CDC requests.

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

- Key public health data systems are available, including communicable disease reporting (CD/TB/STD) data systems with data access to the entire Portland metropolitan area (~1.8 million individuals); ESSENCE data (syndromic surveillance); extensive vital statistics data (e.g., birth, death, induced terminations, fetal deaths); population census, with electronic data for the last 10-20 years depending on the system
- Population survey data, such as the Behavioral Risk Factor Surveillance system and the school-based surveys of youth (Student Health Survey)
- Multiple years of State Medical Examiner data
- Opportunities exist to have access to less traditional data like that for the county 911 system, law enforcement data for arrest and booking; juvenile justice data; housing; and other data sources including those available through the County's central Geographical Information Systems (GIS) group
- Primary software used for data management and analysis is SAS, STATA, SQL, Tableau, R, Qualtrics, and Atlas.ti. The county also has access to GIS (ESRI products) and mathematical modeling software

**Projects**

**Surveillance Activity Title: Assessing the role of CSTE case definition changes on Epidemic Bordetella Pertussis case counts 2012 vs. 2025.**

*Surveillance Activity Description:*

The Portland metropolitan area has been part of the CDC enhanced pertussis surveillance system (EPS, administered by Multnomah County), which collects detailed disease, risk factor, outcome, and immunization data for all reported cases of Bordetella Pertussis. During 2012 Oregon experienced the largest epidemic of pertussis since the acellular vaccines were first introduced. During this epidemic we identified many individuals with positive test results that failed to meet the clinical criteria for EPS case definitions (~17%) with an over representation of partially or completely immunized individuals. We also demonstrated that cases with previous immunizations (partial or full age-appropriate series) experienced reduced severity and illness duration compared to unvaccinated individuals. In 2020, the pertussis case definition was changed to include individuals without defined clinical criteria (less stringent clinical criteria). During 2024-2025 the Portland Metro area experienced the highest case counts since acellular vaccines were introduced. However, no comparisons have been undertaken to examine the impact of the case definition change on case status between the 2012 epidemic and the 2025 epidemic or to compare risks, immunization status, demographics, risk factors or outcomes.

*Surveillance Activity Objectives:*

For this project, the fellow will calculate the case fractions utilizing the prior and current CSTE case definitions to assess rates of pertussis within and across risk populations (predominantly age) as well as compare risk factors, immunization

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status and outcomes between the two epidemics. At present many other jurisdictions around the country are experiencing epidemic pertussis.

*Surveillance Activity Impact:*

Findings from this analysis will serve to provide guidelines for risk factors as well as provide a basis for comparing current case counts to those pre 2020 CSTE case definition change to better understand how or if their specific epidemic oscillations represent changing epidemiology or consistent epidemiologic features over time.

**Surveillance System Evaluation Title: Evaluating Surveillance for Deaths Due to Communicable Disease in Multnomah County**

*Surveillance System Evaluation Description:*

Deaths due to communicable disease are reportable in Oregon. The Oregon Health Authority links vital records death certificate data to communicable disease data for some diseases. However, no formal evaluation of this linkage has been performed to date. During the COVID-19 pandemic, Multnomah county epidemiologists performed linkages for COVID-19 cases to medical examiners data (which can be more robust than death certificate data) to improve death ascertainment, resulting in the identification of additional COVID-19 related deaths. Therefore, it is possible to assess the completeness of death certificate linkages for other communicable disease data using medical examiner data.

*Surveillance System Objectives:*

The Fellow will collaborate with Multnomah County epidemiology staff to perform probabilistic linkages from medical examiner/vital records data to select infectious disease data (e.g., Shigella, viral hepatitis A/B/C, Tuberculosis, etc) to evaluate the sensitivity of this reporting mechanism (e.g., deaths among known cases). Additionally, the fellow will evaluate if any communicable disease ICD10 codes are included in death certificate data but do not have a corresponding communicable disease report to identify any missing case reports.

*Surveillance System Impact:*

At completion of the project, the Fellow will share findings with relevant stakeholders. Findings from this project will help to improve the ascertainment of the true mortality burden of select infectious diseases in Multnomah County and illuminate opportunities to improve surveillance structures.

**Major Project Title: Integrating Reportable Communicable Disease and Syndromic Disease Data for Outbreak Detection, Message Evaluation, or Enhanced Prevention**

*Major Project Description:*

Oregon ESSENCE is a syndromic surveillance system that captures most emergency department and urgent care center visits in the State of Oregon. Health Departments use ESSENCE for “situational awareness” to monitor acute healthcare utilization for specific public health concerns by querying patient symptoms (chief complaints), nursing assessment (triage notes), and provider interpretation (discharge diagnosis). Ideally, these queries are able to detect healthcare utilization that is not captured by disease reporting or detect conditions before laboratory reporting (early identification).

Our team developed a methodology to link laboratory report data and ESSENCE data systems together. We used this linkage to rule out the use of ESSENCE for Cryptosporidiosis (inadequate acute care utilization). We also identified a mumps outbreak and performed extensive active case finding with health systems for vaccinated individuals with mumps who were misdiagnosed at their acute care visit.

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*Major Project Objectives:*

Based on the success of this approach, we have identified multiple possible CSTE fellow projects that can build upon this methodology:

1) ESSENCE-based machine learning query development: This project will merge reportable disease data with ESSENCE healthcare visit data to identify populations of true cases of infectious disease like Shigella or Pertussis. The ESSENCE patient characteristics (chief complaint, triage, discharge diagnoses) for these true case visits will then be used to train supervised machine learning algorithms to identify disease-like illness. These algorithms will be prospectively trained as new case reports are received (continuous learning). Thus, machine learning will be employed to search through ESSENCE visits to find individuals that presented to an ED or UC with symptoms that the algorithms statistically estimate are disease-like (ie Shigella, Pertussis, etc.). Once developed, these algorithms will be used to identify true cases, potential outbreaks, or provide situational awareness for ongoing outbreaks. Success of this approach will be prospectively evaluated during outbreak investigations by performing algorithm based active case finding with acute care systems.

2) Evaluate public health messaging during health events using ESSENCE: Since 2015, Multnomah County Health Department has had multiple public health events that have necessitated provider and public based messaging. However, the impact of provider based messaging on public health responses has not been evaluated. We are hoping to identify if there is evidence that public health messaging was received by acute care providers. If so, did this messaging positively or negatively impact the predictive ability of the ESSENCE query? For this project, the CSTE fellow will identify time points where communicable disease messaging was used during public health events. The fellow will then use ESSENCE and reportable disease merges to identify queries and terms to develop general disease specific ESSENCE queries. ESSENCE visits will be reviewed and scored to determine whether acute care provider diagnoses, clinical suspicion, testing, or patient chief complaints were significantly impacted after messaging (i.e., comparing pre and post messaging intervention ESSENCE terms for changes). This project will evaluate whether messaging influenced diagnoses (reached target population) as well as whether provider and public based messaging during a public health response biases the specificity of ESSENCE queries.

3) Estimating frequency of acute care utilization and missed diagnoses using ESSENCE: This project will involve merging reportable disease data from 2015-2024 with ESSENCE data from the same timeframe (e.g. for Hepatitis A, B, C). True case visits will be used to identify populations of key terms that can be used for parameterizing ESSENCE queries. The Fellow will also identify acute care visits that preceded diagnosis for true cases to determine clinical criteria for visits where true case diagnoses were missed. The goal would be to develop guidance for providers to aid in more timely diagnosis and potentially reduced illness severity or secondary spread (secondary and primary prevention respectively). Successful completion of this project will involve estimating the frequency of acute care utilization for disease diagnosis and identifying ESSENCE visits that precede diagnosis with associated clinical, behavioral, or demographic features with delayed disease diagnoses.

*Major Project Impact:*

At completion of the this project, depending on the methodology will have pursued, public health will have better tools or queries to identify trends in disease presentation and healthcare utilization, the impact of different public health messages on syndromic surveillance, health seeking, clinical suspicion, and documentation. These findings will serve to inform public health practice for both the interpretation of syndromic surveillance data during infectious disease events, understanding where patients are accessing healthcare for diagnoses, and how well public health messaging to the public or providers impact population health seeking and provider clinical interpretation.

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**Additional Project #1 Title: Supporting populations disproportionately impacted by communicable diseases**

**Project #1 Type: Major Project**

*Project #1 Description:*

Communicable disease case and outbreak investigations in Multnomah County can impact certain population groups disproportionately. For example, Multnomah County has worked on outbreaks of Measles and Pertussis among vaccine hesitant Slavic communities, Tuberculosis and Mumps among Micronesian communities, Shigella and Mpox among men who have sex with men (MSM), as well as Hepatitis A, HIV, Syphilis, Shigella, and Hepatitis C among persons experiencing homelessness and substance use disorders. Therefore, there is a need for tailored public health work to effectively reach and understand the health needs of these groups.

This public health work needs to be based in cultural competency, trusting relationships, with an understanding of health equity and data decolonization.

*Project #1 Objectives and Expected Deliverables:*

For this project the CSTE fellow will work with the MCHD community partnership team to identify population specific health disparities and develop a community engagement plan employing semi-quantitative and qualitative methods via surveys, focus groups, and/or systematic key informant interviews to directly engage with these populations to achieve the above objectives.

*Project #1 Impact:*

Successful completion of this project will result in workflows for public health to successfully engage with and communicate to diverse populations. Examples include:

- Working to support health communication with Slavic communities
- Communicating risk and prevention of intimacy/sexually transmissible diseases among MSM
- Engagement with the Micronesian community for effective communicable disease outreach
- Others as identified by CSTE fellow or community partners

**Additional Project #2 Title: Evaluating Giardiasis disease reporting and local epidemiology: Is Giardia a sexually transmissible enteric infection (STEI)?**

**Project #2 Type: Surveillance Activity**

*Project #2 Description:*

Giardiasis is a diarrheal illness caused by the parasite *Giardia lamblia*. Infections are acquired through the fecal-oral route where individuals inadvertently consume fecally contaminated water or direct contact with infected animals or persons. Giardiasis is a reportable condition in Oregon with >150 cases reported each year in the Portland metropolitan area. Formal investigation is not routinely performed for Giardia.

In recent years, Multnomah County has employed novel methods to estimate sexual transmission of enteric infections among men who have sex with men (MSM) by utilizing person-centric age and gender distributions in conjunction with historical sexually transmitted infection (STI) disease reporting data. Using this methodology, we estimate that propagated sexual transmission commonly occurs for Shigella and possibly Giardia. Specifically, about 20% of adult giardiasis cases have historical STIs compared to the expected baseline of 6-9%. Thus, sexual or intimate transmission of Giardia may have an unappreciated public health impact resulting in morbidity. Therefore, there is a need to understand common sources of giardiasis and to estimate the population attributable fractions (PAF) for relevant exposures and possible sexual transmission among adults.

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*Project #2 Objectives and Expected Deliverables:*

For this project, the Fellow will have the opportunity to capture relevant clinical, behavioral, and demographic features of the population with positive Giardia test results. This project will involve performing a power and sample size analysis, developing an enhanced Giardia case interview, reviewing and abstracting case medical charts, performing primary case interviews, and employing a matched nested case-case analysis methodology. This project will serve to estimate the Giardia PAF for high risk exposures including sexual activity, and compare demographic and behavioral risk factor prevalence for Giardiasis relative to Shigellosis and/or Syphilis cases. At completion of this project, the Fellow will have identified clinical features of adult Giardiasis cases, estimated PAF for different high risk exposures, provided foundational evidence around the frequency of sexual transmission, and identified behavioral and demographic factors that overlap or differentiate Giardia relative to Shigella or Syphilis.

*Project #2 Impact:*

The public health impact of this study will be to define risk behaviors for giardiasis with social and behavioral intersections within the Portland area. Messaging health education to community and healthcare providers can help to engagement and awareness can help improve diagnoses, treatment, and prevention while strengthening the the local surveillance system to better identify epidemiologic shifts in disease burden.

**Please Describe the Fellow's Anticipated Role in Preparedness and Response Efforts – Include Activities and Time Allocation (Required Competency of Fellowship)**

The Fellow will have the opportunity to participate in emergency preparedness and response activities, both within Communicable Disease Services and in the wider health department. The fellow will complete Incident Command training. The Fellow may be called upon to represent the Multnomah County Health Department at the local, state, and national level in matters affecting multi-agency public health emergency preparedness planning and response activities.

**Please Describe the Fellow's Anticipated Role in Cluster and Outbreak Investigations – Include Activities and Time Allocation (Required Competency of Fellowship)**

Epidemiology projects on other topics are limited only by the imagination of the applicant. Pertussis disease modeling, altered clinical presentation, and transmission is a particular area of opportunity, as Multnomah County is a participant in a Centers for Disease Control and Prevention (CDC) national enhanced surveillance system (called MAPS). Other areas of interest include but are not limited to: Shigella and Hepatitis A disease modeling; Shigella clinical outcomes and disease presentation; Hepatitis C epidemiology surveillance, re-infection, and treatment outcomes; baseline information on TB screening and LTBI treatment in primary care settings (related to recent recommendation for TB screening by US Preventive Health Taskforce); TB outbreak investigations; Campylobacter epidemiology and surveillance; Hepatitis B in persons from endemic countries; case-case analyses to compare risk or behavioral factor overlap between diseases to define populations disproportionately impacted by multiple diseases; the epidemiology of conditions affecting recently-arrived refugees; suicide surveillance; homelessness and displacement; firearm related injuries; cost-effectiveness of respite care for homeless persons ill with a reportable infectious disease; and cancer cluster investigations or other chronic disease projects.