ID: 60499545
Infectious Diseases, Injury - Drug Overdose - Host Site Description
Multnomah County Health Department

Assignment Location: Portland, US-OR
Multnomah County Health Department
Public Health Division

Primary Mentor: Emily Mosites, PhD MPH
Epidemiology Manager
Multnomah County Health Department

Secondary Mentor: Russell Barlow, BS MPH MS
Epidemiologist
Multnomah County Health Department

Work Environment
Hybrid

Assignment Description

The fellow will be assigned to the Multnomah County Health Department's (MCHD) Community Epidemiology Services (CES) and 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. By also positioning the fellow with CES, the central community epidemiology unit, the fellow will have the opportunity to integrate their portfolio through activities that have touchpoints in other content or subspeciality methodologies. In addition to infectious disease epidemiology, the CES team works on chronic disease, injury (overdose), maternal and child health, socio-behavioral health, and mortality. We consider fellows to be integral members of the team of epidemiologists and public health professionals who work on the frontlines of public health. There are numerous 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. We have access to a broad range of data sources, ranging from communicable disease surveillance (for the entire Portland metropolitan area) to vital statistics to 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.

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.

We intend to involve the fellow in day-to-day activities and research projects that provide "hands on" applied epidemiology experience. Daily responsibilities may include:

- Performing epidemiologic studies and analyzing data from public health surveillance systems
- Participating in or leading the response to public health events like outbreaks
- 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 Pregnancy Risk Assessment Monitoring System (PRAMS) and Behavioral Risk Factor Surveys; and Multiple years of State Medical Examiner data. Additionally, opportunities exist to access 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.

Software used for data management and analysis include SAS, STATA, SQL, Tableau, R, Qualtrics, and Atlas.ti. The county also has access to GIS (ESRI products) and mathematical modeling software.

CES includes highly skilled analysts who work in a collaborative environment and would support the fellow with data analysis plan development and other analytic needs.

Projects

Surveillance Activity Title: Evaluating Giardiasis disease reporting and local epidemiology: Is Giardia a sexually transmissible enteric infection (STEI)?

Surveillance Activity 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.

Recently, 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.

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.

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At completion of this project, the fellow will have identified clinical features of adult Giardiasis cases, provided understanding of the possibility of sexual transmission, and identified behavioral and demographic factors that overlap or differentiate Giardia relative to Shigella or Syphilis.

Surveillance Activity Objectives:
Objective: To determine the most common sources of Giardia in Multnomah County and identify whether sexual transmission may occur among adults.
Expected Deliverables: Data analysis plan, results presentation, written report/possible publication

Surveillance Activity Impact:
Identifying contributing exposure pathways for giardiasis will support effective messaging for groups at disproportionate risk.

Surveillance System Evaluation Title: Evaluating Surveillance for Deaths due to Communicable 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.

The Fellow will collaborate with Multnomah County injury epidemiology staff to perform probabilistic linkages from medical examiner/vital records data to select infectious disease data (eg. Shigella, viral hepatitis A/B/C, Tuberculosis, etc) to evaluate the sensitivity of this reporting mechanism (eg 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.

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.

Surveillance System Objectives:
Objective: To evaluate the comprehensiveness of linkages between communicable disease data and vital records death certificates to identify deaths due to communicable disease
Deliverables: Evaluation plan, results presentation

Surveillance System Impact:
This activity will support an understanding of the true burden of communicable diseases in Multnomah County and allow for developing solutions to ensure comprehensive surveillance of deaths due to communicable disease.

Major Project Title: Integrating Reportable Communicable Disease Data and Syndromic Disease Data for Effective Public Health Action

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.

Based on the success of this approach, we have identified multiple 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 there 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 useESSENCE 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 Objectives:
Possible objectives include:

1) To develop machine-based learning queries in ESSENCE for select communicable diseases

2) To evaluate public health messaging during health events using ESSENCE
3) To estimate the frequency of acute care use and missed diagnoses of communicable diseases using ESSENCE

Deliverables: Analytic plans, presentations, possible publication

Major Project Impact:
This project area has numerous possible public health impacts, including more effective querying in ESSENCE, supporting effective health messaging during outbreaks, and gaining an understanding of the limitations of laboratory-based surveillance.

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 the Micronesian community, 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, and an understanding of health equity.

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

- Supporting 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.

Project #1 Objectives and Expected Deliverables:
Objective: Identify community groups disproportionately affected by communicable disease and developing community engagement plans
Expected Deliverables: Communicable disease community engagement plan (as a presentation)

Project #1 Impact:
This project will improve public health action and response to communicable disease events for particular community groups, thus promoting health equity in Multnomah County.

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 have access to online incident command trainings. The fellow may be able 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. Multnomah County recently has declared emergencies for winter storms and to respond to fentanyl overdoses; the fellow would have the opportunity to support responses like these. The fellow can dedicate at least 10% of their time to emergency response.

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

We anticipate that the fellow will be very involved in cluster and outbreak investigations in coordination with the Communicable Disease Services team. This may include supporting interviews, designing studies, and leading analyses for foodborne outbreaks, measles cases, shigella clusters, and other infectious disease events. We expect this will comprise 20-30% of the fellow's time, depending on events that are occurring.

Please Describe the Fellow's Anticipated Role in the COVID-19 Response – Include Activities and Time Allocation

Our agency is not currently activated for the COVID-19 response. If we were to increase work on COVID-19 activities, the fellow would have the opportunity to join that work as with the cluster or outbreak responses described above.

Please Describe Opportunities for Fellows to Work in Health Equity as well as Incorporating Diversity, Equity, and Inclusion into their Work

The CES team is in the process of developing a data modernization framework rooted in data equity and community connectedness. In the course of this, the team is creating an overarching infrastructure for community engagement. We anticipate this equity-based work to inform all of the fellow's work and community interactions. The fellow will be able to use the equity and community-connected framework to motivate analysis, contextualize any disparities identified in their analyses, and provide considerations for strength-based communication of findings.