ID: 74346880
Chronic Disease, One Health - Host Site Description
Pima County Health Department

Assignment Location: Tucson, US-AZ
Pima County Health Department
Epidemiology

Primary Mentor: Lindsay Kohler, PhD, MPH, BS
Epidemiology Division Manager
Pima County Health Department

Secondary Mentor: Ellen Santos, PhD, MS, BS
Epidemiology Program Manager
Pima County Health Department

Work Environment
Hybrid

Assignment Description

The CSTE Applied Epidemiology Fellow will be placed within the Epidemiology Division of the Pima County Health Department (PCHD). This division is responsible for infectious disease surveillance, outbreak investigations, epidemiologic data analysis, and public health response efforts across Pima County. The fellow will work closely with experienced epidemiologists, public health nurses, and key partners at the Arizona Department of Health Services (ADHS), the University of Arizona (UA), and local healthcare systems.

The fellow will be fully integrated into the Epidemiology Division, supporting routine and emerging public health priorities. Their key responsibilities will include:

- Conducting disease surveillance and outbreak investigations for communicable diseases, foodborne illnesses, and respiratory infections (e.g., norovirus, influenza, COVID-19).
- Analyzing syndromic surveillance and case investigation data to identify trends and inform public health interventions.
- Assisting with One Health initiatives, including zoonotic disease surveillance and the Healthy Companions Clinic.
- Engaging in community outreach and health education efforts, including collaboration with schools, congregate settings, and vulnerable populations.
- Supporting emergency preparedness efforts, including disease modeling, after-action reviews, and response planning.
- Contributing to grant writing and program evaluation to support epidemiologic projects.
- The fellow's daily work will be a mix of data analysis, field investigations, team meetings, and professional development.
- Reviewing and analyzing new case reports, attending daily/weekly epidemiology team meetings, and coordinating with state and local partners.
- Working on data analysis, outbreak response reports, or surveillance summaries, and engaging in field visits when necessary.
- Participating in public health investigations, community outreach activities, or grant-funded projects, along with mentorship meetings and professional development training.

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

Statistical Analysis Software: R, Stata, SAS, ESRI: ArcGIS, Survey123, Qlik, others as needed

Databases: Multiple databases will be available to the CSTE Applied Epidemiology Fellow including:

- Vital records
- Arizona State Immunization Information System (ASIIS)
- Pima County Office of the Medical Examiner data
- Electronic Health Information Exchange (HIE)
- Hospital Discharge Data
- Hospital medical records systems through major regional providers including Banner and Tucson Medical Center

Surveillance Systems: The CSTE Fellow will have access to multiple surveillance systems including:

- Medical Electronic Disease Surveillance Intelligence System (MEDSIS) through the Arizona Department of Health Services. Reportable diseases in Arizona are submitted through the MEDSIS system.
- Patient Reporting Investigation Surveillance Manager (PRISM) system for sexually transmitted infections
- Internal rabies exposure surveillance system
- Electronic Surveillance System for the Early Notification of Community-based Epidemics (ESSENCE) for syndromic surveillance
- Behavioral Risk Factor Surveillance System (BRFSS)

Projects

Surveillance Activity Title: Real-Time Syndromic Surveillance of Heart Disease Indicators in Pima County Using ESSENCE

Surveillance Activity Description:
This project will utilize ESSENCE (Electronic Surveillance System for the Early Notification of Community-based Epidemics) to monitor trends in heart disease-related emergency department (ED) visits across Pima County. The CSTE fellow will analyze syndromic surveillance data to identify seasonal patterns, geographic disparities, and potential acute events (e.g., extreme heat-related cardiac incidents). The fellow will also assess how real-time heart disease indicators correlate with social determinants of health and environmental exposures. Findings will be used to enhance early warning systems and targeted public health interventions.

Surveillance Activity Objectives:
1. Develop a Heart Disease Syndromic Surveillance Dashboard

- Configure ESSENCE queries to track ICD codes, chief complaints, and free-text terms related to heart disease.
- Create a dashboard with key metrics (e.g., trends, geographic distribution, age/gender disparities).
- Automate alerts for significant spikes in cardiovascular-related ED visits.

2. Analyze Temporal and Geographic Trends

- Conduct time-series analyses to detect seasonal trends and high-risk time periods (e.g., extreme heat, air quality events).
- Identify hotspot areas with high rates of cardiovascular-related ED visits.
- Compare data across urban, rural, and border communities.

3. Investigate Environmental and Behavioral Triggers

- Overlay temperature, air quality, and social determinants data with heart disease ED visit trends.
- Assess associations between extreme heat events and cardiovascular outcomes.
- Examine the impact of social factors (e.g., food deserts, healthcare access) on cardiovascular outcomes.

4. Disseminate Findings and Develop Public Health Action Plans

- Present findings to PCHD leadership, emergency preparedness teams, and chronic disease programs.
- Draft a briefing report with recommendations for targeted interventions (e.g., extreme heat advisories, community education).
- Share findings with Arizona Department of Health Services (ADHS), regional health partners, and other regional meetings such as the Southern Arizona Heat Summit.

Surveillance Activity Impact:
Enhanced Early Detection: Real-time syndromic surveillance will enable faster identification of heart disease trends and acute events, improving response times.

Data-Driven Interventions: Findings will inform targeted prevention strategies, such as extreme heat advisories and cardiovascular health education in high-risk areas.

Resource Allocation: Identifying geographic disparities will help prioritize healthcare resources and community outreach in vulnerable populations.

Policy Implications: The project will support local policymakers with data-backed recommendations for addressing cardiovascular health disparities.

By leveraging ESSENCE for syndromic heart disease surveillance, this project will enhance PCHD's ability to monitor cardiovascular health in real time, improving public health response and prevention efforts.

Surveillance System Evaluation Title: Evaluation of Community-Acquired Pneumonia and Coccidioidomycosis Surveillance Systems in Pima County

Surveillance System Evaluation Description:
This project will assess the effectiveness of three surveillance systems in capturing and characterizing community-acquired pneumonia (CAP) and coccidioidomycosis (Valley fever) cases in Pima County:

1. ESSENCE - syndromic surveillance data for CAP-related emergency department (ED) visits.

2. MEDSIS - Arizona's infectious disease reporting system for confirmed coccidioidomycosis cases.

3. In-Depth Cocci Investigations - a subset of 10% of cases with detailed interviews for enhanced epidemiologic data.

The evaluation will examine data completeness, timeliness, representativeness, and utility of each system, comparing case detection and characterization across platforms. Findings will inform data integration strategies and improvements in Valley fever surveillance.

Surveillance System Objectives:
1. Assess Data Quality and Completeness
- Compare ESSENCE CAP cases vs. laboratory-confirmed cocci cases in MEDSIS to determine overlap and missed cases.
- Evaluate missing or incomplete fields in MEDSIS and in-depth interview datasets.
- Assess the timeliness of case reporting from initial healthcare visit to diagnosis and data entry.

2.Analyze System Sensitivity and Representativeness
- Estimate the proportion of cocci cases that initially present as CAP in ESSENCE but do not get confirmed in MEDSIS.
- Examine demographics, geographic distribution, and comorbidities to identify potential underrepresented groups.
- Evaluate whether the 10% subset of in-depth interviews is representative of all reported cocci cases in Pima County.

3. Evaluate Surveillance Utility for Public Health Action
- Determine how well each system supports outbreak detection, trend analysis, and resource allocation.
- Identify gaps in early identification and reporting delays that could impact prevention efforts.
- Assess whether in-depth interviews provide critical information beyond what is captured in routine surveillance.

4. Develop Recommendations for System Integration and Improvement
- Propose strategies to better link ESSENCE, MEDSIS, and in-depth interview data for a more comprehensive surveillance approach.
- Identify potential system modifications or enhancements to improve data quality and public health utility.
- Draft a surveillance evaluation report with actionable recommendations for PCHD leadership and the Arizona Department of Health Services (ADHS).

Surveillance System Impact:
Improved Case Detection: Identifying gaps between syndromic surveillance (ESSENCE) and confirmed cases (MEDSIS) will help refine case definitions and enhance early detection of Valley fever.

Better Data for Prevention Efforts: Evaluating in-depth interviews will determine if they contribute unique insights that could inform risk factor identification and public awareness campaigns.

Enhanced Public Health Response: Findings will support more timely and targeted interventions, particularly in high-risk areas or populations with delayed diagnoses.

Strengthened Surveillance Infrastructure: Recommendations will guide future system improvements, fostering more integrated and efficient disease monitoring in Pima County.

This evaluation will ultimately help PCHD and state partners enhance Valley fever surveillance, improve case reporting, and optimize data-driven public health responses.

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Major Project Title: Geospatial and Temporal Trends of Uncontrolled Diabetes in Pima County

Major Project Description:
This project will analyze hospital discharge data, ESSENCE ED visits, and BRFSS survey responses to identify geographic, demographic, and temporal trends in uncontrolled diabetes cases in Pima County. The fellow will examine trends in diabetic ketoacidosis (DKA) hospitalizations, diabetes-related amputations, and emergency visits due to severe hyperglycemia or hypoglycemia.

Major Project Objectives:
1. Assess the burden of uncontrolled diabetes in Pima County
    - Analyze trends in ESSENCE emergency visits and hospital discharge data for diabetes-related complications.
    - Identify high-risk populations based on age, race/ethnicity, and socioeconomic status using BRFSS and census data.
    - Map hotspots of uncontrolled diabetes at the census tract-level.

2. Evaluate Access to Care and Social Determinants of Health
    - Examine geographic disparities in healthcare access, including distance to endocrinologists and diabetes care providers.
    - Assess the role of food insecurity and insurance status in diabetes control using available local surveys/intake forms.

3. Develop a data dashboard for PCHD
    - Create an interactive Qlik dashboard tracking diabetes burden and trends over time.
    - Provide policy recommendations based on findings.

Major Project Impact:
Identifying high-risk areas can inform targeted diabetes prevention and management programs.

Understanding barriers to care can help PCHD support policy initiatives and partnerships with community clinics.

Improving real-time surveillance of diabetes-related ED visits can aid in early intervention efforts.

Additional Project #1 Title: One Health Clinic Database Management System
Project #1 Type: Major Project

Project #1 Description:
The One Health Clinic Database Management project aims to streamline data entry, enhance tracking, and integrate with County electronic medical records (EMRs) to improve care coordination for clients of the Healthy Companions program. By developing a comprehensive database system integrating human and veterinary health, the project will enable efficient record-keeping, facilitate real-time linkage of clinic participants' health data, and support seamless follow-up and outreach efforts. This integration will ensure that participants receive holistic care, allowing healthcare providers to address both veterinary and human health needs while improving outcomes for the County's unhoused and unstably housed population.

Project #1 Objectives and Expected Deliverables:
Enhance Data Entry and Management Efficiency:
- Objective: Develop a user-friendly database system to streamline data entry for clinic staff, ensuring accurate and timely recording of patient and animal health data.

- Deliverable: A fully functional database interface for clinic staff, with training materials and documentation for ease of use and efficient data input.

Seamless Integration with County EMRs:

- Objective: Link the One Health Clinic Database with County electronic medical records to ensure a comprehensive view of both human and veterinary health data.
- Deliverable: An integrated system that automatically synchronizes clinic data with the County EMRs, along with a secure data-sharing protocol for seamless communication between systems.

Support Follow-up and Outreach for Holistic Care:

- Objective: Develop integrated care plans for clinic clients in alignment with One Health Clinic standards.
- Deliverable: A care plan form within the electronic medical record that allows for integration of human and veterinary care and that is visible to healthcare providers, detailing follow-up and referral recommendations.

Project #1 Impact:
The One Health Clinic Database Management project is designed to improve the coordination and delivery of healthcare services to vulnerable populations, particularly the unhoused and unstably housed. By creating an integrated system for tracking both human and veterinary health, the project will:

Improve Healthcare Access and Continuity:

The database will allow healthcare providers to track health data across both human and animal health needs, ensuring that clinic participants, including those without stable housing, receive consistent and comprehensive care. This will enhance the ability to provide follow-up services and early interventions.

Address Long-Term Healthcare Issues:

The integrated system will support better monitoring of chronic health conditions, both for individuals and their pets, allowing for earlier identification of health trends. For the unhoused population, this could include managing chronic diseases such as diabetes, hypertension, mental health issues, and substance use, and understanding how owning a pet may motivate self-care. The ability to track both human and animal health holistically allows providers to intervene in more effective ways, improving long-term health outcomes.

Support Social Determinants of Health (SDOH):

By focusing on unstably housed individuals, the project will improve the identification of social determinants of health, such as housing stability, food security, social connectedness, and access to healthcare. It will help facilitate targeted interventions that address these underlying factors, promoting better health outcomes and social stability. Furthermore, the outreach component will enable the provision of resources beyond medical care, such as social services and housing support, which are crucial for addressing the broader health and social challenges faced by this population.

Ultimately, the project will enhance the ability to monitor and respond to the healthcare needs of a highly vulnerable group, enabling more comprehensive, timely, and tailored interventions that address both immediate and long-term health and social issues.

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

During onboarding, the Fellow will complete four online FEMA trainings related to Incident Command Systems. Furthermore, the Fellow is invited to participate in regular monthly meetings between the PCHD Epidemiology Division and the PCHD Public Health Emergency Preparedness team. During these meetings, teams collaborate on updating plans, practicing/exercising, and reviewing any joint investigations/responses.

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

The Fellow will have opportunities to assist and/or lead outbreak investigations within the Epidemiology team, with a focus on respiratory outbreaks in congregate care settings and schools, as well as foodborne or gastrointestinal outbreaks.

Activities:

Outbreak Investigation Assistance: The fellow will assist in investigating outbreaks, including tasks such as case identification, data collection, and analysis. They will support the Epidemiology team by helping to gather and organize relevant information, conduct interviews, and track the progression of the outbreak.

Leading Outbreak Investigations: Depending on the level of leadership the fellow assumes, they may be tasked with leading investigations. In this capacity, the fellow will coordinate response efforts, manage resources, and make critical decisions related to data collection, risk assessment, and communication with stakeholders.

Data Analysis and Reporting: The fellow will contribute to analyzing data from the outbreak, including reviewing case definitions, interpreting findings, and identifying trends or potential sources of transmission.

Collaboration with Stakeholders: The fellow will engage with local health department teams, healthcare facilities, schools, or other relevant organizations during an outbreak investigation. They will work to ensure that necessary protocols are followed, and that data is accurately reported and shared.

Time Allocation:

The amount of time dedicated to these activities will vary depending on the level of responsibility the fellow assumes during each investigation. For instance, if the fellow is leading the investigation, they will likely spend more time coordinating efforts, making decisions, and preparing reports, which could account for a larger portion of their time. Conversely, if the fellow is assisting with the investigation, they may focus more on data collection, analysis, and supporting communication efforts, requiring less time compared to a leadership role.

Overall, the fellow's role will be integral in both supporting and potentially leading outbreak investigations, gaining hands-on experience in public health response, data analysis, and collaboration with various stakeholders.