ID: 88021623
Infectious Diseases, Injury - Drug Overdose - Host Site Description
County of Marin

Assignment Location: San Rafael, US-CA
County of Marin
Health and Human Services/Public Health Division

Primary Mentor: Lee Ann Prebil, PhD, MPH
Epidemiology Program Manager
County of Marin, Department of Health and Human Services, Public Health Division

Secondary Mentor: Karina Arambula, MPH
Epidemiologist
County of Marin, Department of Health and Human Services, Public Health Division

Work Environment
Hybrid

Assignment Description

The Fellow will be placed in the Epidemiology Program of the Marin County Department of Health and Human Services (HHS), located in the San Francisco Bay Area. The Epidemiology Program is a generalist program that includes both communicable and non-communicable disease epidemiologists working within a dynamic local public health jurisdiction. Fellows are fully integrated into the Epidemiology Program and are treated as members of the epidemiology staff, with responsibilities and opportunities comparable to those of regularly hired epidemiologists, alongside structured mentorship and support.

The Epidemiology team functions as a close-knit, collaborative group that meets regularly to coordinate work, share progress, and problem-solve together. Weekly team meetings provide an opportunity for staff, including the Fellow, to set priorities, discuss ongoing surveillance and analytic work, and coordinate next steps. These meetings are typically held in person, with seamless virtual participation for remote team members. Remote fellows are fully incorporated into all aspects of team life, including meetings, presentations, and informal team activities.

In addition, monthly Epidemiology Program meetings with the Health Officers provide exposure to organizational priorities and offer regular opportunities for epidemiology staff, including fellows, to present analyses and project updates. Fellows and interns also participate in dedicated monthly meetings with the Epidemiology Program Manager and Health Officers, during which fellows deliver more in-depth presentations on their work and receive feedback from leadership. Fellows may also participate in other high-impact divisional activities, such as cross-cutting data and analytics initiatives, providing additional exposure to applied public health decision-making.

The Fellow will work on project teams with epidemiologists and colleagues across HHS and will collaborate with programs such as Communicable Disease, Community Health & Prevention, Behavioral Health, Suicide Prevention, Healthy Eating Active Living, and the Division of Aging. Fellows participate in both core public health surveillance activities and innovation-oriented work, including pilots, analytic improvements, and learning initiatives, allowing them to balance foundational applied epidemiology with opportunities to test new approaches. As a relatively small, close-knit generalist epidemiology program, the Fellow's work is mission-critical to departmental operations and directly contributes to priority public health functions. Team members rely on and support one another, enabling fellows to gain hands-on experience across a wide range of topic areas rather than being limited to a single program.

The Fellow will meet regularly one-on-one with one or both mentors throughout the fellowship, typically on a weekly cadence consistent with supervision provided to all Epidemiology Program staff. Additional meetings occur frequently

through project teams and cross-program collaborations. Day-to-day activities include both independent and team-based applied epidemiology work, with responsibility for the full analytic lifecycle, including literature review; data collection, cleaning, and management; data analysis; development of dashboards and other data products; and oral and written communication of findings to technical, non-technical, and community audiences. Fellows are encouraged to take ownership of projects aligned with divisional priorities while also pursuing areas of individual interest within the scope of applied public health practice.

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

The Fellow will have project-specific access to a wide range of local and state data sources routinely used by the Epidemiology Program. These include vital records (birth and death data), emergency department and hospitalization data, Emergency Medical Services (911) data, reportable communicable disease data, vaccination registry data, wastewater surveillance data, population-based survey data (e.g., California Health Interview Survey and California Health Kids Survey), and Health Information Exchange (HIE) population health management data. The program also accesses additional state-level data resources made available through the California Department of Public Health, including cloud-based data environments.

The Epidemiology Program uses R as its primary analytic environment and emphasizes reproducible, team-based analytic workflows. As part of ongoing data modernization efforts, the program is establishing shared analytic infrastructure, including an R server and a GitHub-based code repository, to support collaboration, version control, and sustainability of analytic work. Fellows will contribute to and benefit from these evolving practices as they are implemented.

Data visualization and translation for internal leadership, community partners, and the public are supported primarily through Power BI and ArcGIS. Fellows regularly contribute to the development and maintenance of internal and external dashboards and other analytic products that inform public health decision-making.

Fellows receive day-to-day technical support and mentorship from experienced epidemiologists within the program. While fellows may bring experience with additional analytic tools or languages, analytic approaches are selected intentionally to align with team standards and reproducibility goals, ensuring that work products can be maintained and extended by the broader team over time. Fellows are also encouraged to surface new technologies or systems for consideration to enhance operations on the team.

Projects

Surveillance Activity Title: Development and Use of Syndromic Surveillance for Local and Regional Public Health Action

Surveillance Activity Description:
The Epidemiology Program is developing and operationalize a local syndromic surveillance activity to support timely detection, monitoring, and interpretation of priority public health conditions in Marin County. Syndromic surveillance activities will be conducted within the framework of the California Department of Public Health's CalSyS program, which is currently an area of active development and coordination across California.

Current syndromic surveillance participation in Marin includes one of the three emergency departments submitting real-time data through CalSyS. Our Epidemiology Program also receives more limited lagged emergency department data from the county's other hospitals. These data sources provide a realistic foundation for developing analytic workflows,

syndrome definitions, and interpretation guidance while accounting for differences in timeliness, coverage, and representativeness.

The Fellow will work with Epidemiology Program staff to identify and refine priority syndromes of local and regional interest (e.g., respiratory illness, injury, overdose, heat-related illness, toxic exposures), informed by routine surveillance needs, emerging public health concerns, and coordination with regional partners. Priority syndromes will be defined and may evolve over the course of the fellowship based on current public health priorities, seasonal patterns, emerging issues, and regional or state guidance at the time the work is being conducted.

Using emergency department syndromic data, the Fellow will develop and validate locally relevant syndrome definitions aligned with state and national guidance where applicable, assess data quality and limitations, and interpret findings in context through triangulation with complementary data sources. Analytic workflows will be designed to be reproducible and scalable, supporting future expansion and integration with related surveillance initiatives.

Surveillance Activity Objectives:
Project Objectives

- Develop and refine locally relevant syndromic surveillance definitions for 1-2 priority public health conditions, informed by state and national guidance and local context.
- Establish routine, reproducible analytic workflows for syndromic surveillance using emergency department data available through CalSyS and complementary lagged emergency department data.
- Assess and document data quality, timeliness, coverage, and representativeness of syndromic surveillance data, explicitly accounting for partial facility participation.
- Interpret syndromic surveillance findings in context through triangulation with other available data sources (e.g., EMS, hospitalization, mortality, reportable disease, wastewater, and, as available, HIE data).
- Support operational use of syndromic surveillance for situational awareness, preparedness, and emerging public health issues, including those related to large-scale events or unusual exposures.
- Create sustainable documentation and analytic products that can be maintained and adapted as surveillance priorities and data availability evolve.

Expected Deliverables

- A set of documented syndrome definitions and analytic specifications for selected priority conditions, including rationale, inclusion/exclusion criteria, and known limitations.
- Reproducible analytic workflows and code to support routine syndromic surveillance of selected priority conditions, designed for ongoing use and future expansion.
- Routine analytic outputs (e.g., weekly or monthly summaries, internal dashboards, or briefing materials) describing trends, notable signals, and interpretive considerations.
- A written methods and interpretation guide outlining data sources, timeliness considerations, representativeness, limitations, and appropriate use of syndromic surveillance findings for decision-making for selected priority conditions.
- Briefings or presentations to Epidemiology Program staff, Health Officers, and relevant program or preparedness partners summarizing findings, methods, and implications for public health action.
- Recommendations for future enhancements or integration of syndromic surveillance as additional emergency departments or clinical data sources participate.

Surveillance Activity Impact:
This surveillance activity will strengthen Marin County's capacity for timely, informed public health decision-making by establishing a sustainable and well-documented syndromic surveillance function grounded in local context and aligned with statewide practices. By developing locally relevant syndrome definitions and reproducible analytic workflows, the

project will improve situational awareness for emerging health issues and support more effective monitoring of priority conditions over time.

The explicit assessment of data quality, timeliness, and representativeness, and the triangulation of syndromic findings with complementary data sources, will promote responsible interpretation and communication of syndromic signals. This approach reduces the risk of misinterpretation while increasing the practical utility of syndromic surveillance for preparedness, response, and prevention activities, including those related to large-scale events and unusual or emerging exposures.

Over the longer term, this work will create a scalable foundation for expanding syndromic surveillance that can evolve as additional emergency departments or clinical data sources participate. By aligning local practice with California's statewide syndromic surveillance system (CalSyS) and contributing to shared learning across jurisdictions, the project supports regional consistency, collaboration, and workforce development. Collectively, these impacts will enhance Marin County's readiness to detect and respond to public health threats and contribute to broader efforts to modernize and integrate public health surveillance systems in California.

Surveillance System Evaluation Title: Evaluation of a Regional Public Health Laboratory Surveillance and Reporting System During a Period of Data Modernization

Surveillance System Evaluation Description:
The Epidemiology Program will conduct an applied evaluation of a regional public health laboratory surveillance and reporting system that serves multiple local health jurisdictions in the San Francisco Bay Area. The public health laboratory supports communicable disease surveillance and response across participating counties and is a key component of the broader surveillance infrastructure linking laboratory testing, case reporting, and public health action.

At the time of this evaluation, the regional public health laboratory-based disease reporting relies primarily on fax-based workflows to local communicable disease programs, with plans to transition to electronic laboratory reporting (ELR) to the California Reportable Disease Information Exchange (CalREDIE). This period of transition provides an opportunity to document current-state surveillance practices, assess system attributes, and identify considerations relevant to data modernization efforts, regardless of the specific timing of ELR implementation.

The evaluation will be led by the Fellow, with guidance and support from Epidemiology Program mentors as needed. Guided by CDC surveillance system evaluation principles, the Fellow will assess selected attributes of the laboratory surveillance system, such as data flow, timeliness, data quality, completeness, acceptability, and usefulness for public health practice. The evaluation will focus on understanding how laboratory data are generated, transmitted, received, and used, as well as the implications of current reporting methods for surveillance efficiency and workload.

The scope and depth of the evaluation will be refined based on feasibility, data availability, and stakeholder engagement. Findings will be documented to support shared understanding of the system's strengths, limitations, and opportunities for improvement, and to inform future planning related to ELR adoption and modernization of related workflows.

Surveillance System Objectives:
Project Objectives

- Document the current-state structure and functions of regional public health laboratory testing and reporting.
- Describe laboratory reporting workflows, including data flow from referral and testing through reporting to local health departments, and assess implications for timeliness, data quality, and workload.

- Evaluate selected attributes of the surveillance system (e.g., usefulness, timeliness, data quality, completeness, acceptability, and simplicity) using CDC surveillance system evaluation principles.
- Assess readiness and considerations for transition from fax-based reporting to electronic laboratory reporting (ELR) to CalREDIE, as applicable during the fellowship period.
- Identify strengths, limitations, and opportunities for improvement related to laboratory-based communicable disease surveillance and inter-jurisdictional coordination.

Expected Deliverables

- A written surveillance system evaluation report documenting system purpose, data flows, participating entities, selected evaluation attributes, and key findings.
- Visual or schematic documentation (e.g., workflow diagrams) illustrating laboratory reporting pathways and points of data handoff across jurisdictions.
- A summary of findings highlighting implications for communicable disease surveillance practice, reporting efficiency, and data modernization efforts.
- A set of practical considerations or recommendations to inform future planning related to ELR adoption, CalREDIE reporting, and regional coordination (as appropriate).
- Presentation or briefing of evaluation findings to Epidemiology Program leadership, Communicable Disease team leadership, and relevant stakeholders.

Surveillance System Impact:
This evaluation will strengthen communicable disease surveillance in Marin County by providing a clear, documented understanding of how public health laboratory-based reporting currently functions within the regional public health laboratory system from the Marin County perspective. By examining data flows, reporting pathways, and selected system attributes relevant to Marin, the project will improve situational awareness of strengths, limitations, and operational realities that affect the timeliness and usefulness of laboratory data for local public health action.

The evaluation will support more informed planning and decision-making during a period of data modernization by identifying considerations relevant to the transition from fax-based reporting to electronic laboratory reporting (ELR) to CalREDIE. Even in the absence of immediate system changes, the findings will serve as a baseline reference for Marin County to support future modernization efforts and to anticipate impacts on workload, data quality, and surveillance practice.

While the evaluation will focus on Marin County data and workflows, the work will be informed by collaboration and discussion with regional partners as feasible, helping situate Marin's experience within a broader regional context. Collectively, these impacts will enhance the effectiveness and resilience of communicable disease surveillance in Marin County and contribute to workforce development by strengthening applied epidemiologic and informatics-informed evaluation capacity.

Major Project Title: Analysis of Clinical Outcomes Following Emergency Medical Services Responses to Opioid Overdose

Major Project Description:
The Major Project will focus on characterizing emergency department (ED) clinical outcomes following Emergency Medical Services (EMS) responses to suspected overdose events in Marin County. Overdose surveillance is a priority area for the county, and the Epidemiology Program has a longstanding, well-established surveillance definition for opioid-related 911 calls. While EMS data provide timely identification of suspected overdose events, they have historically lacked confirmation and information on additional downstream clinical outcomes after patient handoff to the hospital.

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Through newly available ED outcome data linked to EMS encounters within the ImageTrend system, the Fellow will analyze what happens to patients after transport to the emergency department, including outcomes such as diagnostic information, ED disposition (e.g., discharge, admission, transfer), repeat encounters, and other clinically relevant indicators available in the linked data.

The primary analytic focus will be on opioid overdose events identified using the existing EMS surveillance definition, enabling the program to better understand clinical trajectories and outcomes associated with these events. As a secondary and exploratory component, the project may examine non-opioid overdose events (e.g., methamphetamine- or benzodiazepine-related events), recognizing greater uncertainty in classification when relying solely on pre-hospital data. In these cases, ED outcome data may be explored as an alternative or complementary source for identifying and characterizing non-opioid overdose events, providing an opportunity to assess strengths and limitations of different case-finding approaches.

As ED outcome data become available from additional hospitals over the course of the fellowship, analyses may be refined to incorporate broader clinical coverage as feasible. Findings from this project will inform local overdose prevention and response efforts, support collaboration with EMS, healthcare, and community partners, and contribute to a deeper understanding of how pre-hospital overdose events translate into clinical outcomes. The project is designed to be substantial yet flexible, allowing analytic questions to evolve based on data availability and emerging needs while remaining grounded in a high-priority applied public health use case.

Major Project Objectives:
Project Objectives

- Characterize clinical outcomes associated with EMS responses to suspected opioid overdose events using linked EMS and emergency department (ED) data.
- Quantify ED disposition patterns (e.g., discharge, admission, transfer), repeat encounters, and other available clinical indicators following EMS transport for suspected overdose.
- Assess patterns and variation in outcomes by demographic characteristics, geography, and event characteristics to inform prevention and response strategies.
- Compare EMS-based overdose case identification with ED outcome data to evaluate concordance, strengths, and limitations of different case-finding approaches.
- Conduct exploratory analyses of non-opioid overdose events (e.g., methamphetamine- or benzodiazepine-related events) as feasible, recognizing differences in classification certainty and data limitations.
- Translate analytic findings into practical insights for surveillance methodology, as well as local overdose prevention, EMS collaboration, and public health planning.

Expected Deliverables

- A documented analytic plan outlining case definitions, inclusion criteria, key variables, and analytic methods.
- Reproducible analytic code and workflows for linked EMS-ED data analysis.
- A comprehensive analytic report summarizing findings, including outcome distributions, subgroup analyses, and interpretation of results and limitations.
- Data visualizations or dashboard components suitable for internal use by Epidemiology Program staff and leadership as needed.
- A briefing or presentation of findings to relevant stakeholders (e.g., Health Officers, EMS partners, overdose prevention coalition members).
- A summary of methodological considerations and recommendations for future analytic refinement for overdose surveillance as additional ED outcome data become available.

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Major Project Impact:
This project will strengthen Marin County's overdose surveillance and response capacity by advancing understanding of clinical outcomes following EMS responses to suspected overdose events. While EMS data provide timely identification of suspected overdose incidents, the addition of emergency department outcome information allows the opportunity to assess and potentially refine the sensitivity and specificity of our surveillance definition. In addition, these data will allow for a more complete understanding of what happens to patients after transport, including patterns of discharge, admission, repeat encounters, and potential indicators of ongoing risk.

By characterizing these clinical trajectories, the project will provide local public health, EMS, and healthcare partners with actionable insights to inform prevention, referral, and post-overdose engagement strategies. Understanding which patients are discharged, admitted, or experience repeat encounters can help identify opportunities for improved linkage to care, harm reduction services, and targeted interventions.

The project will also enhance methodological rigor in overdose surveillance by examining concordance and differences between EMS-based case definitions and ED outcome data. This work will clarify strengths and limitations of existing surveillance approaches and inform future analytic strategies as additional ED outcome data become available.

Collectively, these impacts will support more informed, data-driven decision-making in overdose prevention efforts and contribute to sustainable analytic capacity within the Epidemiology Program. Over time, this enhanced understanding of overdose outcomes will improve Marin County's ability to respond effectively to substance use-related morbidity and mortality.

Additional Project #1 Title: Community-Engaged Population Health Analysis Focused on Structural, Environmental, and Social Determinants of Health
Project #1 Type: Other

Project #1 Description:
The Additional Project will involve participation in a community-engaged data collaboration focused on understanding and addressing priority population health issues in Marin County. This work will emphasize analysis of climate- and environment-related health impacts, chronic disease and mortality patterns, and health disparities across demographic and geographic subgroups.

The Fellow will work with Epidemiology Program staff and community partners to analyze and interpret quantitative and, as appropriate, qualitative data related to environmental exposures (e.g., extreme heat, wildfire smoke, flooding or sea level rise), chronic disease outcomes, premature mortality, and other equity-relevant health indicators. Analytic approaches may include trend analysis, stratification by race/ethnicity and geography, survey analysis (including weighting where appropriate), and integration of multiple data sources to inform community priorities.

This project will support collaborative discussions with community stakeholders, helping translate analytic findings into accessible formats and informing planning, prevention, and policy efforts. The scope of the work will be refined based on ongoing community priorities and available data, allowing flexibility while remaining grounded in applied public health practice.

Project #1 Objectives and Expected Deliverables:
Project Objectives

- Analyze selected population health indicators related to climate, environmental exposures, chronic disease, or mortality, with attention to equity and disparities.
- Conduct stratified analyses by race/ethnicity, geography, age, or other relevant demographic factors.

- Integrate findings from multiple data sources and, as appropriate, incorporate qualitative insights from community engagement activities.
- Translate analytic findings into formats suitable for community partners and policy audiences.

Expected Deliverables

- An analytic report or summary document describing methods, findings, disparities, and interpretive considerations.
- Data visualizations, maps, or summary tables suitable for use in community-facing presentations or planning documents.
- A presentation or briefing to community stakeholders and Public Health leadership summarizing key findings and implications.
- Documentation of methodological considerations (e.g., survey weighting, small-area analysis, or integration of qualitative context) to support future work.

Project #1 Impact:
This project will strengthen Marin County's ability to use data collaboratively with community partners to address climate-related health impacts, chronic disease burden, and health inequities. By analyzing and clearly communicating disparities in environmental exposures and health outcomes, the work will support more targeted prevention strategies, community-informed planning, and equitable allocation of resources.

The integration of quantitative and, where appropriate, qualitative data will enhance understanding of how structural and environmental factors contribute to health outcomes. Over time, this work will support more responsive and equity-centered public health decision-making and strengthen relationships between the Epidemiology Program and community stakeholders.

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

The Fellow will participate in emergency preparedness and response activities as part of the Epidemiology Program's ongoing responsibilities within the Marin County Public Health Division. Approximately 5-10% of the Fellow's time over the course of the fellowship will be dedicated to preparedness planning, training, exercises, and response activities, with increased engagement during active response periods.

The Fellow will complete Incident Command System (ICS) training and participate in tabletop and functional exercises conducted through the County's Emergency Operations Center. During exercises and real-world events, the Fellow will serve in an epidemiology or surveillance support role, contributing to data collection, monitoring, analysis, and interpretation relevant to the incident.

Preparedness activities may include:

- Supporting syndromic surveillance monitoring during large-scale events or emergencies
- Analyzing data related to infectious disease detection, injury, environmental exposures (e.g., wildfire smoke, extreme heat), or vaccination efforts
- Assisting with shelter-based surveillance or outbreak detection during displacement events (e.g., Public Safety Power Shutoffs or wildfires)
- Contributing to rapid assessments such as CASPER-type surveys, as appropriate

In the event of an active public health emergency, the Fellow will function as part of the Epidemiology Program's response team, with responsibilities appropriate to their level of training and experience. All Public Health staff serve in

disaster response roles as needed, and the Fellow will gain direct experience in how surveillance and analytic functions operate within an incident command structure.

Through these activities, the Fellow will develop practical skills in emergency epidemiology, situational awareness, rapid data analysis, and communication under time-sensitive conditions.

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

The Fellow will participate in cluster and outbreak investigations as part of the Epidemiology Program's collaboration with the Communicable Disease (CD) team. Approximately 5-10% of the Fellow's time over the course of the fellowship will be dedicated to outbreak and cluster investigations, with increased engagement during active investigations.

While the frequency and scope of outbreak investigations vary from year to year, the Fellow will contribute to analytic and epidemiologic components of investigations as appropriate to their level of training. Historically, epidemiologists in Marin have supported gastrointestinal and respiratory virus outbreak investigations, and the Fellow may have the opportunity to co-lead or support such investigations under mentor supervision. For outbreaks in facilities, schools, congregate settings, or other group environments, the Fellow will work closely with CD nurses and disease investigators to define cases, construct line lists, analyze descriptive epidemiology, and interpret findings to inform control measures.

Through participation in cluster and outbreak investigations, the Fellow will gain hands-on experience in case definition development, line listing, descriptive and analytic epidemiology, epidemic curve construction, hypothesis generation, and communication of findings to internal teams and affected facilities. These activities will reinforce applied epidemiologic skills and collaboration across disciplines within the Public Health Division.