Assignment Description

The Fellow will be assigned to the Division of Occupational and Environmental Disease Control (DEODC) of the California Department of Public Health. This Division is the largest state-based program for the study and prevention of occupational and environmental health problems through environmental epidemiology, occupational health tracking and investigations, toxicology, childhood and adult lead poisoning prevention, asthma surveillance, chemical terrorism prevention, biomonitoring, and extensive laboratory capabilities. More information about the Division can be found at http://www.cdph.ca.gov/programs/deodc.

Our offices are located on the San Francisco Bay at the Department's Richmond Laboratory Campus, along with the Department's many public health laboratories (environmental, genetic, food and drug, viral, etc.). A short video about our state-of-the-art green office building can be found at https://youtu.be/s0se3BJRPII

A culturally rich and diverse region, the San Francisco Bay area is home to the University of California campuses at Berkeley and San Francisco, and Stanford University, and is 70 miles from the state capitol, Sacramento.

The Fellow's time will be divided between two of the programs: the Occupational Health Branch (OHB), and Environmental Health Investigations Branch (EHIB). These two programs have a broad public health practice that encompasses investigations of outbreaks, surveillance, emergency response, analysis of big datasets, and working with interdisciplinary teams. Extensive information about these programs and their many projects can be found at http://www.cdph.ca.gov/programs/ohb, and at http://www.ehib.org.
**Day-to-Day Activities**

At the beginning, Fellows are invited to attend various project meetings to learn about the many ongoing activities. Depending on project need and interest of the Fellow, they can be integrated into the effort. Most projects in the branches are multidisciplinary, and may involve epidemiology, toxicology, community participation, etc., so that staff typically works in teams.

There are approximately 60 staff members within OHB, comprised of occupational medicine physicians, epidemiologists, health educators, industrial hygienists, and toxicologists. EHIB also has approximately 60 staff members, including epidemiologists, toxicologists, environmental health specialists, health educators, geographic information specialists, and community relations specialists. Three former CSTE Applied Epidemiology Fellows are also on staff to help orient the new Fellow. Working with their preceptors, Fellows map out a plan of activities to meet their needs and the needs of the programs for the two-year cycle. Usually during the first year, a topic for a major project emerges, and the second year is devoted mainly to that, involving data collection, statistical analysis, and report writing.

The Branches have extensive computer support, ranging from notebook computers for fieldwork to higher-level workstations, including GIS (Geographical Information Systems), and staff members experienced in the use of GIS software. We also have epidemiologists and data analysts proficient in the use of SAS, Stata, and R for complex statistical analysis of epidemiologic surveys, environmental monitoring data, census data, vital records, etc.

Throughout their tenure, Fellows attend regular staff meetings in both Branches, learning about and understanding the administrative and political issues in a large state health department. In addition, there are frequent opportunities to attend presentations, seminars, brown bag lunches, etc., on various topics, both in the Division and elsewhere on the Richmond Laboratory Campus, where staff members and outside guest speakers present new work or emerging issues. Fellows are also encouraged to share their work by giving presentations and seminars.
**Potential Projects**

**Surveillance Activity**

Work-related injuries and diseases

A major surveillance project will be selected from a range of potential data sources on work-related injuries and diseases available for analyses in the OHB. Over the past 25 years, CDPH has gained access to hospital discharge, ambulatory surgery, physician reports, poison control center, electronic death certificate and workers compensation data sets; these rich sources of information that can be used for a surveillance project.

Previous CSTE-funded projects have focused on pesticide illness, asthma and other respiratory diseases (silicosis, asbestosis, mesothelioma), acute traumatic fatalities, and musculoskeletal disorders. A major surveillance project can be selected from these endpoints, or from other conditions such as heat-related illness, acute traumatic hospitalizations, occupational infectious disease, amputations, and lead poisoning.

In addition, in recent years, California has promulgated standards for aerosol transmissible diseases, safe patient handling and work-related violence, and aforementioned databases can also be used to evaluate the public health impact of these standards. Working with these large, administrative datasets provides a valuable addition to any epidemiology toolkit, and assistance with this type of programming is available.

**Surveillance Evaluation**

Occupational health surveillance evaluation

One of our major surveillance systems for work-related injuries and illnesses will be used as an evaluation project. This will be of practical significance to our ongoing work in OHB to improve and sustain our data systems to identify trends and target high-risk occupations and industries for prevention activities. In recent years, we have pilot-tested surveillance of work-related acute traumatic hospitalizations, carpal tunnel syndrome, valley fever (coccidioidomycosis), heat-related illness, and musculoskeletal disorders. These could be further evaluated and codified into routine surveillance. We also perform routine surveillance for pesticide poisoning, asthma, lead, and fatalities, and these could also be used for a surveillance evaluation project.
**Major Project** Exploring the use of electronic health records in Autism Spectrum Disorders

Autism spectrum disorders (ASD), or “autism,” are developmental disabilities that cause significant impairments in social communication and interaction, language and behaviors, which can pose lifelong problems. ASDs pose major challenges to families both emotionally and financially. Scientific and public concern about a 50 to 100-fold increase in the reported occurrence of ASD in the last 25 years continues because so little is known about what causes autism.

Previously, staff from EHIB have successfully partnered with the statewide Department of Developmental Disabilities (DDS) to use their data as the foundation for an autism surveillance system by linking it to vital statistics records. Differences in the prevalence of ASD by gender, race/ethnicity, as well as other aspects of socioeconomic status such as parental education have been reported, but not fully explored, and these differences are not well understood. California monitoring data could be used to examine health disparities in diagnosis of autism or access to services versus risk factor differences, as minorities often bear disproportional exposure to environmental chemicals. The use of other data sources will also be explored to obtain a clearer picture of autism.

**Major Project** Population effects of large wildfires

An area of active study within EHIB is to characterize the burden of large wildfires on public health, assessing respiratory, cardiovascular, and other health outcomes in vulnerable populations and impacts to the public health care system in outpatient visits, emergency and urgent care visits, and hospitalizations, based on modeled smoke concentrations. More detailed planned analyses include study of subpopulation cohorts with pre-existing conditions that could make them especially vulnerable to wildfire health effects.

**Major Project** Using life course data for studying the effects of environmental exposures

EHIB is conducting research into the social and environmental determinants of health. A new California-wide, client based, life course database is being used to conduct cross generational studies, studies across the individual, woman and family units, and to conduct geographic analyses based on residential geocodes.

We welcome creative ideas that can maximize the benefits of this new database in understanding trends in and influences of environmental factors on sensitive health endpoints. We have a particular interest in factors such as very fine air pollutants, contaminated water, radiation and large wildfires, and outcomes such as asthma, autism, cancer and reproductive outcomes like fetal growth and gestational duration.
**Preparedness Role**

DEODC maintains a multi-disciplinary Division-wide Emergency Preparedness Team (EPT), which is integrated with the Department's emergency preparedness and response infrastructure. Among many tasks, the EPT mobilizes DEODC resources in the event of an occupational or environmental emergency, provides technical support to other agencies, conducts surveillance of chemical releases in California, and carries out public health investigations of hazardous material incidents. OHB and EHIB staff participate in EPT activities, including serving as rotating Duty Officers, members of Incident Response Groups, and Subject Matter Experts for environmental and occupational emergencies and other disasters.

Some of the current EPT activities include assessment of community vulnerabilities to chemical threats through identification of high hazard facilities and nearby population demographics; ongoing statewide surveillance of chemical incidents; application of GIS to understanding of chemical incidents and their burdens on human health; public health investigations of hazmat releases; and first responder health and safety. Previous CSTE Fellows have created databases for capturing incident information, conducted surveys of local capacity, participated in drills and exercises, served as Duty Officers triaging emergency calls, and taken part in Community Assessment for Public Health Emergency Response (CASPER) and Assessment of Chemical Exposures (ACE).

In a large diverse state like California, CSTE Fellows may have the opportunity to serve in a variety of emergency situations. In the Department-wide response to the 2009 H1N1 influenza outbreak, our CSTE Fellow participated in several phases of California's effort. Another CSTE Fellow took a major role in response to the 2012 hantavirus outbreak at Yosemite National Park. Our current CSTE Fellow joined the EPT in the field for a CASPER assessment of the 2014 Napa earthquake, creating survey instruments, training and supervising interviewers, and conducting data analysis. She co-authored results recently published in the Morbidity and Mortality Weekly Report.

The EPT has a number of potential projects for CSTE Fellows, including public health investigations following acute hazmat incidents, evaluation of the ongoing chemical spill surveillance system, data mining the incident data base to create consistent coding and categorization of chemical reports, Duty Officer Program participation; geographic analysis of hazardous material releases; and demographic analysis of communities proximal to high hazard facilities.

**Mentors**

**Primary**
Robert Harrison, MD, MPH  
Chief, Occupational Health Surveillance and Evaluation Program

**Secondary**
Martin Kharrazi, PhD, MPH  
Chief, Environmental Epidemiology Section