



State Laboratory at a Glance

The California Public Health Laboratory system plays an essential role in protecting the health of all Californians. Originally housed at U.C. Berkeley, the laboratory has been in existence since 1906 and was instrumental in testing and virtually eradicating diseases such as small pox, plague, polio, malaria and typhoid. In 1953, a new laboratory was built in Berkeley, and in 2001, it was relocated to Richmond to better accommodate updated equipment and services. The facility consists of six independent laboratories and is a nationally acclaimed site responsible for the research and control of emerging diseases such as influenza pandemics and difficult to diagnose diseases like rabies, West Nile virus, anthrax, and cholera. Since its relocation, the California Public Health Laboratory has successfully contained anthrax, H1N1, E. coli, salmonella, pandemic influenza and more. Following is a brief overview of each laboratory.

Drinking Water and Radiation Laboratory (DWRL)

The Drinking Water and Radiation Laboratory (DWRL) is the state's primary drinking water quality testing laboratory ensuring that the State's drinking water is free of harmful contaminants and safe for human consumption. DWRL measures all regulated contaminants as well as contaminants of emerging concern, such as chromium VI, perchlorate, nitrosodimethylamine, fuel oxygenates, pesticides, pharmaceuticals, personal care products, and disinfection by-products. DWRL's services impact water quality standards, certification of drinking water laboratories, protection of water sources, water recycling, desalination and many other urgent public health issues. DWRL also prepares for public health emergencies. DWRL is the only state laboratory capable of measuring environmental radiation. DWRL has provided new knowledge on naturally occurring radioactive substances in the California environment, and DWRL routinely monitors airborne radioactivity through a network of air sampling stations. DWRL provided information on the global impacts of Chernobyl Fallout, and the lab is active today searching for contamination which may result from the Japan tsunami.

Environmental Health Laboratory Branch (EHLB)

Originally the Air and Industrial Hygiene Lab until 1992, the Environmental Health Laboratory Branch was renamed to emphasize the role of forensic investigations to identify the sources of toxic environmental exposures and the associated chemical body burden. The mission is to determine the causes of emerging environmental disease and to identify ways to prevent human exposures to hazards, especially air pollutants, such as persistent organic pollutants, pesticides, asbestos, nanoparticles, lead and mercury. The laboratory conducts human exposure assessment, as well as community air quality surveillance during toxic release incidents. It has a multidisciplinary staff of 30 experts in physics, chemistry, microbiology, ventilation and environmental engineering, epidemiology, and statistics.

Food and Drug Laboratory Branch (FDLB)

Celebrating its centennial in 2007, the Food and Drug Laboratory Branch ensures the safety and integrity of the food and drug supply in California by identifying and quantifying chemical and microbiological contaminants in food and drugs. FDLB provides rapid and accurate isolation, identification, and characterization of bacterial and viral pathogens, toxins, and chemical contaminants from food, drugs, consumer products, and environmental samples from surveillance activities, food-borne outbreaks, and trace-back and recall investigations. FDLB provides regulatory services for forensic alcohol testing and substances of abuse laboratories, which has resulted in the removal of drug-impaired and drunk drivers from California's streets and highways. As a full service microbiological and chemical analysis facility, FDLB isolates, detects, and identifies chemical and biological agents of terrorist concern, toxic metals and organic compounds, and food-borne bacterial pathogens including *E. coli* O157/H7, *Salmonella* species, *Listeria monocytogenes*, *Campylobacter*, ricin, botulinum toxins, and staphylococcal enterotoxins. The laboratory has been responsible for several food recalls, preventing countless illnesses and deaths.

Genetic Disease Screening Program (GDSP)

The Genetic Disease Screening Program (GDSP) has two distinct parts: Newborn Screening and Prenatal Screening. GDSP screens approximately 1 million newborns and pregnant women annually. Screening for 78 genetic diseases, and providing comprehensive follow-up to affected newborns, the Newborn Screening program identifies approximately 750 affected newborns each year. The Prenatal Screening program screens pregnant women by integrating several markers in both the first and second trimester, identifying high- risk pregnancies. Both the Newborn Screening and Prenatal Screening programs have saved the lives of thousands of babies, and have reduced the burden of morbidity and mortality which dramatically reduces the cost of health care and improves pregnancy, birth and long-term health outcomes.

Because of the number and diversity of births in California, GDSP's Newborn Screening program was asked to participate in a pilot to develop a newborn screening tool for Severe Combined Immune Deficiency, also known as "Bubble Boy Disease." Babies born with this disease are not able to fight infection. They endure lengthy, expensive hospital stays, and eventually succumb to the disease. Babies who are identified early enough to begin treatment are given bone marrow transplants and are cured of the disease. Since the program began in August 2010, 12 babies have been diagnosed. Several have begun treatment and at least two are already making their own antibodies and appear to be cured.

Microbial Diseases Laboratory (MDL)

Celebrating its 106th anniversary, the Microbial Diseases Laboratory (MDL) is the state's oldest laboratory. It serves as a reference laboratory for 35 local public health laboratories, and these laboratories in turn serve as reference laboratories for hospitals, clinical and commercial laboratories in their jurisdictions. The reference work includes, among other tasks, performing specialized testing not widely available at other labs to identify infectious agents and epidemiological strain typing to assist in outbreak investigations.

The MDL has been designated as a reference laboratory for bioterrorism preparedness and response, and has the capacity to perform confirmatory laboratory assessment and provide epidemiological surveillance for the detection of bioterrorism agents. The Lab has molecular diagnostic facilities available that use state-of-the art DNA sequencers, thermal cyclers, and real-time polymerase chain reaction instruments for the development of molecular tools for rapid detection of infectious disease and threat agents. Molecular testing can detect and identify infectious agents of public health interest rapidly and accurately by detecting their specific DNA sequences. Additionally, MDL supports important state functions such as the typing of *Salmonella* strains, identification of sporadic cases of malaria, and detection and genotyping of drug-resistant cases of tuberculosis as well as participates in training the next generation of public health microbiologists and public health laboratory directors.

Viral and Rickettsial Disease Laboratory (VRDL)

Established as an Influenza Laboratory for the Pacific Coast in 1939, the Viral and Rickettsial Disease Laboratory is the oldest state public health *virus* laboratory in the United States. The VRDL participated in historic events such as the testing of polio virus vaccines and elucidating the role of HIV in AIDS. As the California state reference laboratory for viral diseases, the VRDL has a history of preparedness to respond to public health emergencies, developing and employing cutting-edge diagnostic technologies to support surveillance, investigation, and control of major viral diseases, ranging from new or emerging viral diseases such as 2009 pandemic influenza H1, avian influenza H5, West Nile, SARS and monkey pox. The VRDL is also a leader to support and assist the local public health virology laboratories and is on the forefront of training the next generation of public health microbiologists. This dedication to preparedness and outreach to our partners in local health departments enabled California to successfully meet the challenge of a huge surge of laboratory testing when the pandemic H1N1 swine influenza virus emerged in 2009.