



Laboratory Services Division Annual Report 2009-10



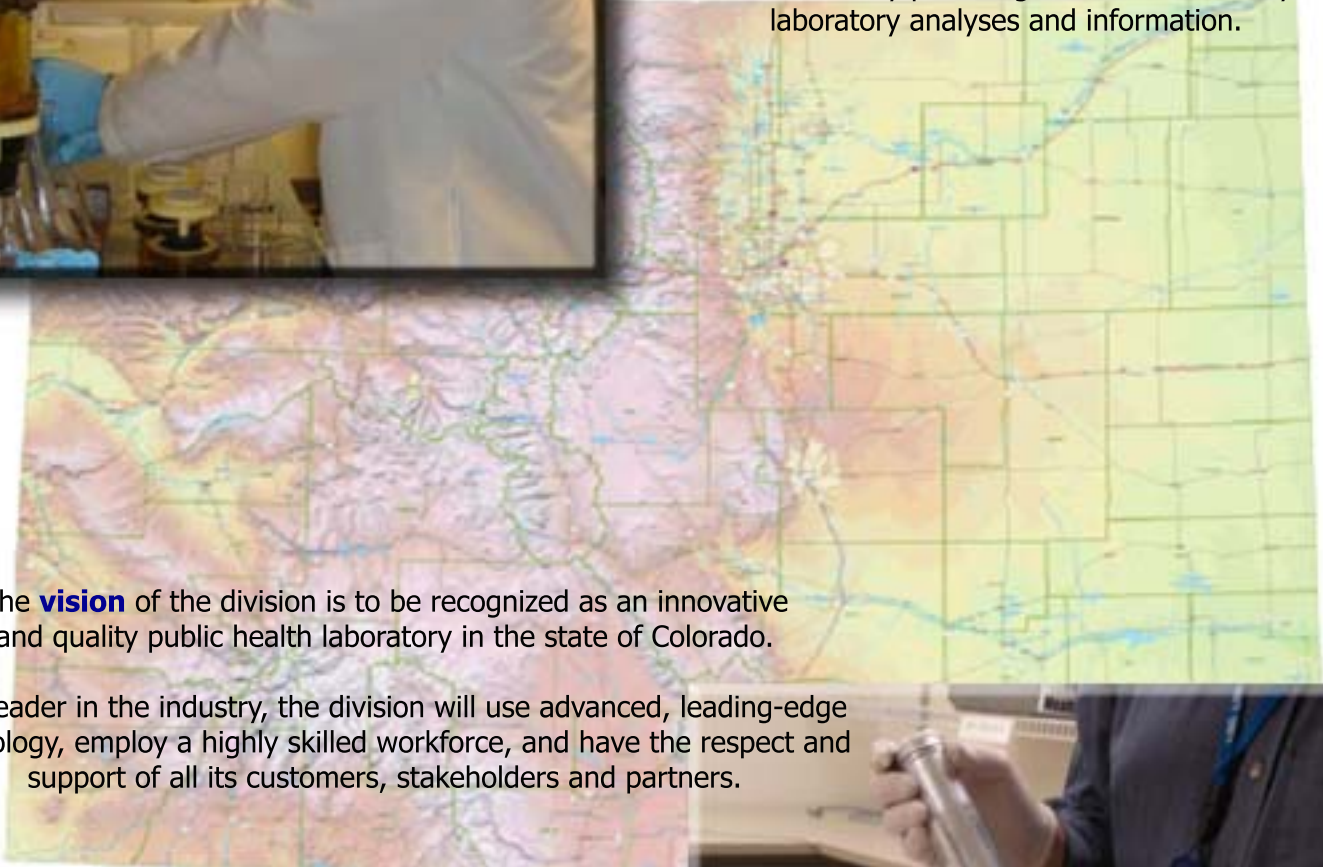
Colorado Department
of Public Health and
Environment



Rapid Detection
for the Public's Protection

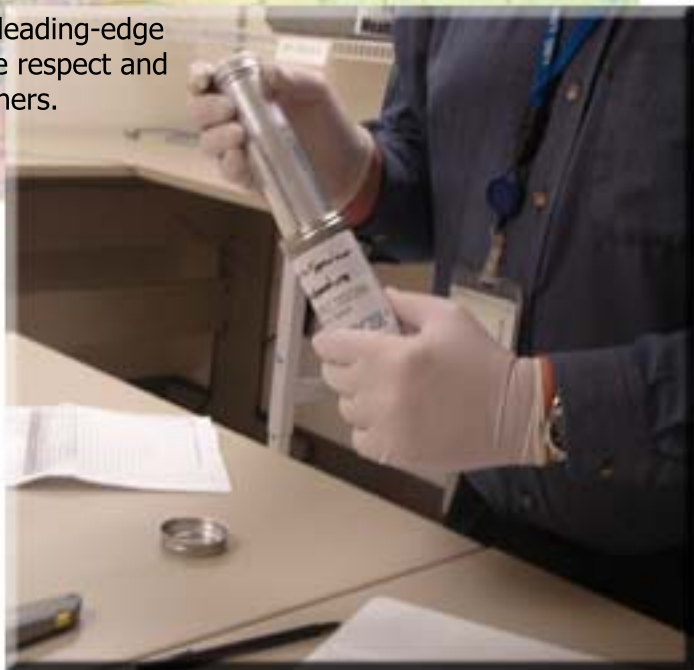


The **mission** of the Laboratory Services Division is to protect the health, safety and environment of all Coloradans by providing accurate and timely laboratory analyses and information.



The **vision** of the division is to be recognized as an innovative and quality public health laboratory in the state of Colorado.

As a leader in the industry, the division will use advanced, leading-edge technology, employ a highly skilled workforce, and have the respect and support of all its customers, stakeholders and partners.



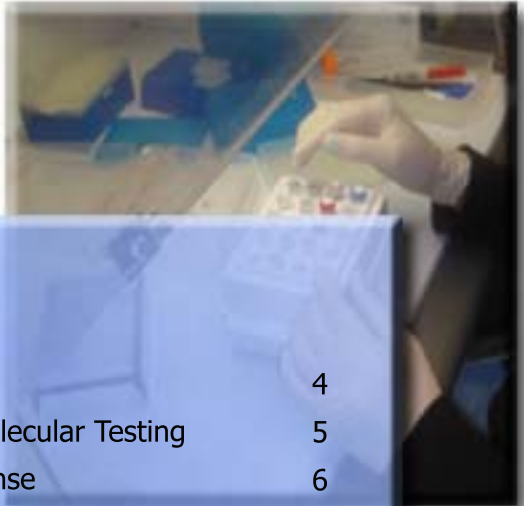
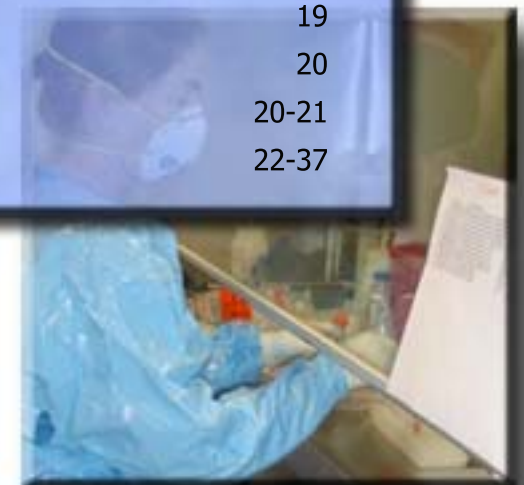


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A Message from the Director



Dear Customers and Stakeholders,

I am pleased to present the division's annual report for the fiscal year ending June 30, 2010.

This past fiscal year, the division experienced a more stable cash flow with the addition of significant grant funding and restoration of state general fund resources. Grant funding from the Food and Drug Administration was secured to support the Chemistry Laboratory testing and from the Food Emergency Response Network to support the Microbiology Laboratory testing. State general funding was allocated for epidemiological surveillance activities and for radiochemistry testing. This additional funding was instrumental to our State Laboratory ending the fiscal year with no budgetary over expenditures.

A change you will notice in this year's annual report is the addition of a more analyte-specific workload reporting. This was done in an effort to more accurately illustrate our testing activity in all laboratory areas.

Improvements were made to the facility systems this year that will contribute to better service, namely a new Cisco telephone system that is compatible with the main Colorado Department of Public Health campus and a new newborn screening data server configuration and equipment which has reduced downtime and enhanced data processing speed.

Thank you for your continued support.

Sincerely,

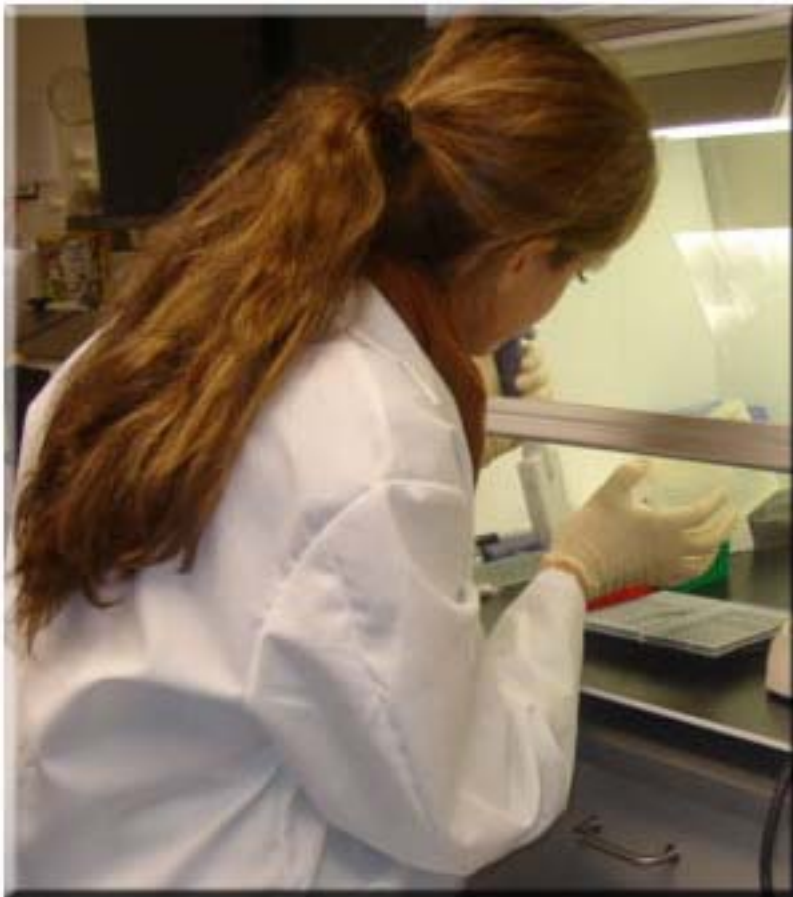
David A. Butcher, MBA, MLS (ASCP) SM
Laboratory Services Division Director
Colorado Department of Public Health and Environment

Enhancing Detection Capabilities Through Molecular Testing

Molecular-based test methods such as polymerase chain reaction (PCR), pulsed-field gel electrophoresis (PFGE), multilocus variable number of tandem repeat analysis (MLVA), DNA sequencing, and high throughput testing protocols are used to provide crucial support to other programs within the Colorado Department of Public Health and Environment. The speed and sensitivity provided by molecular testing methods ensure early detection of infectious agents and allow multiple agencies a solid basis from which to mount a public health response sooner than could be done in the past.

In years past, the focus of the Molecular Science Laboratory has been the development of new testing methods that detect the genetic material of bacteria or viruses. Additional test offerings were the result of new technology that was transferred from the Centers for Disease Control and Prevention (CDC). While testing capabilities continued to grow in support of public health needs, the laboratory concentrated on expanding testing capacity that could ensure a more robust and sustained response to public health emergencies.

The most prominent demonstration of the Molecular Laboratory's enhanced capabilities came with the emergence of a novel strain of Influenza virus, H1N1. After completing over 1,000 tests during the seasonal Influenza surveillance program, this new variant of Influenza appeared in Colorado in late April 2009. New test methods were rapidly deployed and within two days the work unit was certified by the CDC to analyze patient samples for the new H1N1 virus. Over 500 samples were tested in May 2009, and all test results were available within 24 hours, supporting public health decisions related to event scheduling and school closures. The work unit now performs year-round surveillance for Influenza viruses. Over the past year the Molecular Laboratory has performed testing on over 7,500 patient specimens, representing a seven-fold increase in the number of specimens tested in the previous Influenza season. The increase was more than all previous seasons combined, since the deployment of rapid, molecular-based testing.



Negative-stained transmission electron micrograph (TEM) of an influenza virus particle.

Molecular Testing and Rapid Outbreak Response

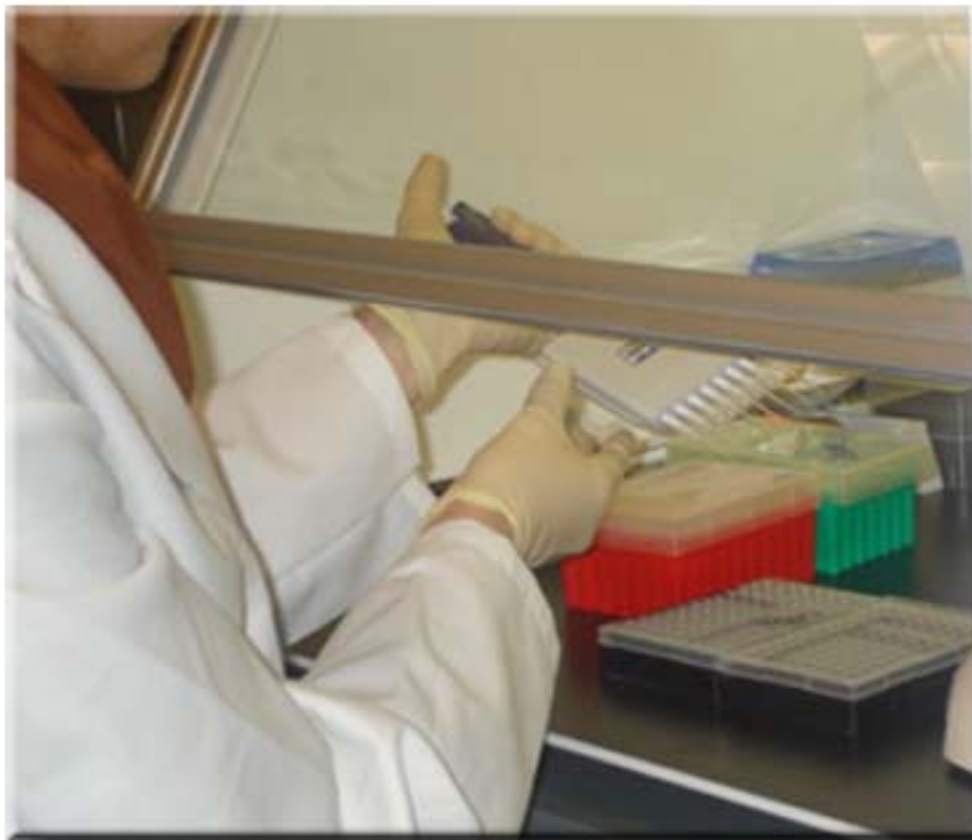
Enhanced Molecular Laboratory testing capabilities are used to identify clusters of patients with gastrointestinal symptoms caused by similar bacteria or viruses, thereby suggesting that a contaminant may be present in a food product consumed by all of the affected people.

A result from laboratory testing usually initiates a public health investigation to determine the source of the problem and mount a response. In collaboration with the division's Public Health Microbiology Laboratory, Colorado has been at the center of a number of national foodborne illness outbreaks.



The work unit has played a significant role in each by using combinations of these molecular methods to identify the disease-causing agent and establish a link to the contaminated food source.

Most recently, the laboratory was one of only three states to establish a clear link between *Salmonella* infection and the consumption of eggs. Over the past year, these techniques have been applied to outbreaks of meningitis, *E. coli* and Norovirus. The Molecular Science laboratory is one of 17 in the country that is certified to perform enhanced analyses of Norovirus, which means a more informed and rapid response to these types of outbreaks. Early detection and intervention resulted in a reduced burden of illness among Coloradans throughout the 2009-10 fiscal year.



Testing Food and Water for Bacterial Contamination

The Environmental Microbiology laboratory performs testing for both routine food monitoring and for outbreak response to foodborne illness. Additionally, staff test water samples from a variety of sources for bacterial contaminants and monitor the quality of milk produced or consumed within the state.



In this capacity, the laboratory performs analyses on a large numbers of food samples suspected as being the source of foodborne or waterborne illness.

The work unit participates in a number of programs initiated by the CDC to monitor the quality of retail food products. Currently, this includes a study of contamination of retail chicken with the bacterium *Campylobacter*.

The laboratory routinely works with the Consumer Protection division to obtain food samples for testing related to identified outbreaks. Staff have isolated agents such as *Salmonella* or *E. coli* O157 from foods and linked these contaminated sources to the patients suffering from associated illness.

The Food and Drug Administration (FDA) awarded the Environmental Microbiology laboratory with a three-year grant to support enhanced investigative capabilities in the area of foodborne disease.

A number of new instruments were included with this award and provide staff with superior technology compared to what was available previously to identify and characterize contaminants present in food products.

As the primary site in Colorado for milk testing, a number of analyses are performed on all milk samples to ensure a safe and quality product is available to consumers. The laboratory was issued a renewed certification by the FDA as a fully accredited milk testing laboratory in 2009.

In collaboration with division's Chemistry Laboratory, the Environmental Microbiology Lab performs water testing from various sources within the state including surface, rivers and streams, municipal and private systems. The large number of water samples tested each year supports a sustained safe source of drinking water for Colorado.



Skunk Rabies Reemerge in Colorado

In 2008, skunk rabies reemerged in eastern areas of Colorado and began to spread west toward the Front Range, resulting in skunk rabies epizootic (outbreak among animals). The establishment of endemic rabies in a terrestrial wildlife reservoir, especially in the urban Front Range, has enormous public health repercussions. In Colorado instances of rabies in wild and domestic animals is rare. Prior to 2008, almost all identified rabies virus infections were in bats, or in animals infected with the bat strain of rabies virus.

Rabies virus infects the central nervous system, causing encephalopathy and ultimately death. Symptoms of rabies in humans are initially nonspecific, consisting of fever, headache and general malaise. As the disease progresses, neurological symptoms appear and may include insomnia, anxiety, confusion, slight or partial paralysis, excitation, hallucinations, agitation, hypersalivation, difficulty swallowing and hydrophobia (fear of water). Death usually occurs within days of the onset of symptoms.

There is no treatment for rabies after symptoms of the disease appear. However, an extremely effective rabies vaccine can provide immunity to rabies when administered after an exposure

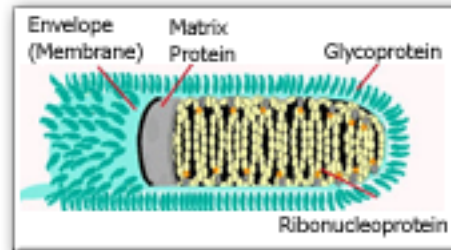


Illustration of rabies virus in cross section.

The Serology Laboratory has seen both an increase in the number of specimens submitted for rabies testing and in the number of specimens positive for rabies virus. In 2008, the laboratory received 664 specimens for rabies testing, with a positivity rate of 6.8 percent (45 positive). In 2009, the number of specimens increased to 739 with a positivity of 10.6 percent. More importantly, in 2009 the diversity of animals positive for rabies virus, and more significantly the skunk strain of rabies virus, included 14 skunks, a fox, a cow, a horse and a mountain lion. Testing volumes continued to climb in 2010 as did the number of infections due to the skunk strain of rabies virus. The Serology Laboratory continues to expand its rabies virus testing capabilities, working toward the implementation of a Polymerase chain reaction molecular confirmatory test for rabies virus infection and the implementation of variant typing to identify the strain of rabies virus present in an infected animal.



Human Immunodeficiency Virus (HIV) Testing of Oral Fluids

In 2009, the Food and Drug Administration approved an assay for the detection of antibodies to HIV-1 in oral fluids. Although blood remains the optimal specimen type for HIV testing, oral fluids allow for testing individuals at high risk for HIV infection that may not otherwise be tested. The Serology laboratory completed verification of the Avioq HIV-1 EIA and has implemented testing on oral fluids received from public health partners and other medical centers involved in outreach testing and surveillance.

Verification and Implementation of a New Culture System for the Detection of *Mycobacterium tuberculosis*

In 2009, the public health Microbiology Laboratory completed an in-depth verification study of the BACTEC™ MGIT 960™ TB System. Implementation of this culture system will aid in the diagnosis of *Mycobacterium* infection and drug susceptibility testing for *Mycobacterium tuberculosis* isolates, in a more timely fashion than previous methodologies. Implementation of this system has enabled the laboratory to discontinue the use of radioactive material and needles, greatly increasing safety in the lab. The MGIT 960 System is designed for the rapid detection of *Mycobacteria* in all types of clinical specimens except blood and urine.

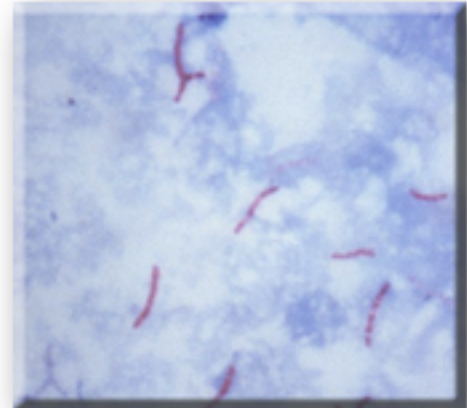
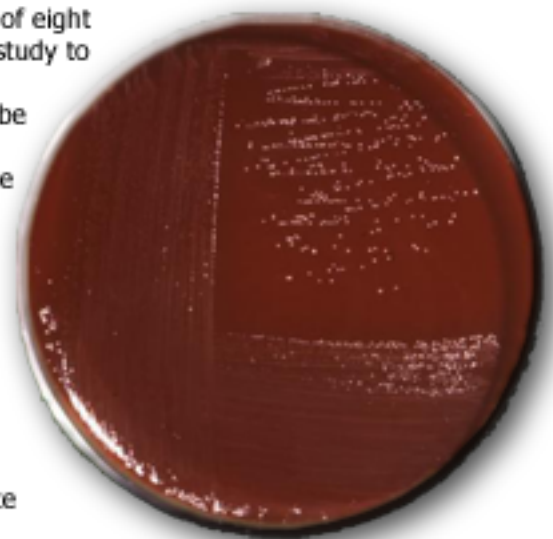


Photo of *Mycobacterium tuberculosis* bacteria stained with acid-fast Ziehl-Neelsen stain; Magnified 1000X.

Campylobacter Evaluation Study

In 2010, the Public Health Microbiology Laboratory was one of eight sites in the country selected to participate in a multi-center study to evaluate diagnostic methods for detection and isolation of *Campylobacter* from stool. Data generated in this study will be used to develop clinical and public health laboratory best practice guidelines for *Campylobacter* testing and will provide the necessary scientific data to enable CDC and other public health entities to reassess current *Campylobacter* case definitions.

Campylobacter is one of the most common foodborne pathogens, yet diagnosis can be difficult because the organism is difficult to isolate, grow and identify. There are a growing number of diagnostic methods available for detection and/or isolation of *Campylobacter* from stool, but there are currently no national clinical or state public health testing guidelines. There is an urgent need for best practice guidelines for *Campylobacter* testing. Two commercially available non-culture methods for *Campylobacter* diagnosis were FDA approved in 2009. It appears that the use of non-culture methods as standalone tests for the direct detection of *Campylobacter* in stool is increasing, which may have important implications for both patient management and public health surveillance efforts. There is currently limited data available about the performance characteristics of these assays. Better information about assay performance characteristics is urgently needed to reassess these case definitions to assure the validity of public health surveillance data.



Campylobacter fetus (*C. fetus* ss. *jejuni*) culture.

Emergency Preparedness and Response at the State Laboratory

The Laboratory Services Division (LSD) serves the state of Colorado with three main roles in promoting public health through emergency preparedness: training, testing and incident response. During the 2009-2010 fiscal year all of these roles expanded. New partnerships with state and national organizations not only improved services within Colorado, but resulted in regional and national benefits as well.

Expansion of Training Activities

Training is a continuous process to address turnover of laboratory personnel, improve skill levels and to communicate new testing methods. It also serves as a means of maintaining close communications with clinical and local public health laboratories within the state. Several training tools have been developed, including hosted webinars, online courses and wet workshops. During the past year training was expanded to first responders who are tasked with collecting specimens for testing at the laboratory.

The Laboratory Services Division continued its role of outreach to laboratorians across the state. In the area of training, its website lists upcoming training opportunities hosted by the LSD and provides links to other training and reference sites. A record number of nearly 70 students attended wet workshops that provided hands-on experience working with attenuated (safe) strains of bacteria that are on the U.S. Select Agent Program list.



This includes the bacteria responsible for such diseases as anthrax, plague, tularemia and brucellosis. Students examined cultures and performed testing to determine whether they would either rule out the presence of these bacteria, or to refer them to the LSD Laboratory for identification and confirmation in a real-life scenario. These "sentinel" laboratorians who work at either hospital or local public health laboratories are the first line of defense in detecting a naturally occurring outbreak or a bioterrorism event. Two of these wet workshop presentations were delivered on-site at individual hospital laboratory settings: at the Kit Carson County Community Hospital in Burlington and the Penrose Medical Center in Colorado Springs. These outreach workshops allowed employees to participate in regions of the state where travel or laboratory staffing needs would otherwise limit access to such training.

Webinars were presented throughout the year at the LSD, covering a wide range of topics of interest to clinical laboratorians, including updates on the H1N1 pandemic, safe laboratory practices and updates on emerging infectious diseases. A comprehensive online training course covering bacterial agents and safe laboratory practices was developed with participants' schedules in mind. Students are now able to proceed through the course at their own pace and when their schedules allow. Upon successful completion of the course and passage of a final exam, a continuing education certificate is awarded with credits that enable the participants to renew their professional licensure.

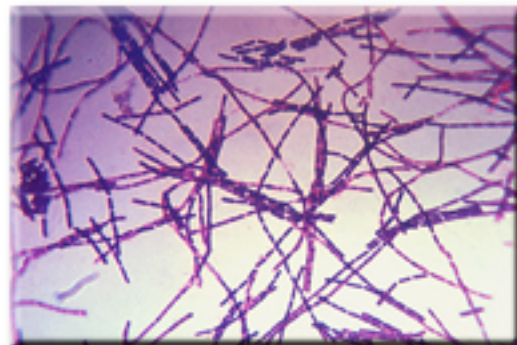


Photo of *Bacillus anthracis* (anthrax) bacteria using Gram-stain technique.

First responder training was introduced to members of the Colorado State Patrol Hazmat Response Teams in 2009. The teams are based in 12 regions across Colorado to respond to biological, chemical and radiological hazards. Members of the LSD Chemistry and Microbiology laboratories provided orientation training on the laboratory's testing capabilities, specimen submission requirements and chain of custody procedures.

In 2009, the LSD expanded into a national training role. The Laboratory Response Network of the Centers for Disease Control and Prevention designated the LSD Laboratory as a national training site for its Rapid Testing Methods course. The newest test methods in detecting select agent bacteria and toxins are taught in this course. The use of DNA and antibodies allows for rapid identification of these agents in two to four hours instead of days required for traditional bacterial growth culturing. In June 2010, 16 students from 14 states participated in the four-day, hands-on workshop. Because of the success of the workshop, the laboratory facilities and Denver's location, the LSD will be used as an annual training site, with the next workshop scheduled for February 2011.

Proficiency Testing Programs

To assess the effectiveness of training, proficiency testing has proven to be a valuable tool. The LSD participated in national proficiency testing programs as well as developed and administered its own programs:

- Approximately 35 clinical and local public health laboratories participate in proficiency testing provided at no cost by the LSD through the Colorado Laboratory Forum. Up to twice a year, a test kit is delivered to each participating laboratory with three case studies and unknown specimens for the Sentinel laboratory to perform screening tests to either rule out the presence of bacterial select agents or refer the sample on to the LSD for confirmation of a suspect organism.
- Quarterly proficiency test kits were sent to the Colorado regional local public health laboratories located in El Paso, Mesa, Pueblo and Weld counties.
- The LSD participated in the semi-annual LPX testing program sponsored by the Association of Public Health Laboratories and College of American Pathologists. The State Laboratory also served as the contact point for 16 other Colorado laboratories, testing their communication response, collecting and forwarding results to the testing program headquarters.
- The LSD prepared and administered monthly proficiency testing for the state Biowatch program. The Biowatch Program monitors air samples daily in the Denver metropolitan area for the presence of airborne biological select agents.
- Both the Chemistry and Microbiology sections of the LSD participated in periodic testing for select agents through proficiency testing administered by the Laboratory Response Network of the CDC.
- Unknowns were provided to the 8th Civil Support Team of the Colorado National Guard for proficiency testing exercises.



Emergency Response to Biological Incidents and Threats

Emergency response training and testing efforts were validated by successful responses to naturally occurring and bioterrorist threat incidents encountered during the fiscal year 2009-10, to include:

- The LSD Laboratory successfully identified human cases of infant botulism, tularemia and brucellosis to enable prompt treatment by health care professionals. Additionally, plague and tularemia were identified in domestic pets and wildlife, leading to efforts in those areas to minimize the disease threats to humans.
- Signs of unauthorized entry into a municipal water treatment facility in a Wyoming community prompted calls from state and federal responders for technical advice from the LSD. Recommendations from the laboratory assisted in the response and allayed concerns of potential adverse effects on the water supply.
- Laboratory chemists confirmed the presence of cyanide in specimens that had been suspiciously obtained by a Boulder resident. This assisted the FBI in their investigation of the incident.
- Several threat letters containing unknown powders were tested for the presence of biological select agents during the past year. The laboratories ruled out the presence of these agents. It appeared that a suspect in the Denver metropolitan area had mailed these letters to locations across the country and overseas. Thus the laboratory's testing contributed to an international investigation.



Outreach

In addition to training and testing, other outreach efforts included:



- The LSD hosted an open house to the public during National Laboratory Week April 23, 2010. Laboratory staff gave presentations describing the types of services performed at the laboratory, followed by a reception and tour of the facilities.
- A presentation was given at the National BioWatch Convention in Denver August 18, 2010, to discuss the role of planning and communications in laboratory preparations for a large-scale event, such as the 2008 Democratic National Convention in Denver.
- Site visits to the 8th Civil Support Team of the Colorado National Guard at Buckley AFB and the USDA and Colorado State University research facilities in Fort Collins.

Tours of the laboratory facilities were given to over 150 visitors from high schools, colleges, medical schools, state and federal organizations.

Water Testing and Environmental Protection

In collaboration, the Organic Chemistry, Inorganic Chemistry, Radiochemistry and Environmental Microbiology laboratories perform water testing from various sources within the state including surface water, rivers and streams, municipal, and private water systems. The large number of water samples tested supports a sustained safe source of drinking water for Colorado.



Highlights in water and environmental testing during the 2009-10 fiscal year include the following accomplishments by the Chemistry labs included:



Conducted testing on the flood waters in Tennessee for pesticide and fertilizer pollution.



Provided assistance to a Kiowa Police investigation of a suspected tampering/poisoning of a pizza with an ammonia-based cleaning compound. Staff also provided statistical analysis of the results, toxicology effects and other case histories.



Developed a new method of analyzing gross alpha in fruit juice was tested using digestion method. A 110 % recovery was obtained. This was compared with the gross alpha by coprecipitation method yielding low recovery because of interference from the sugar.



Became validated by the CDC to test for tetramine in humans. Tetramine was found in pet foods causing kidney failure and has been found in milk products and baby formula.



Completed validation for blood VOC analytes per the CDC protocol, CN and VOC proficiencies were performed, and CN7 QC validation batch in is progress currently.



Radiation Counting Facility preformed ten Whole Body Counts for the 8th WMD Civil Support Team at Buckley Air Force Base.



Ran samples for a science fair student in Weld County - found uranium above the drinking water standards in wells and their public water supply. Assisted two State science fair students by analyzing water for uranium in Weld county and analyzing sulfates in plants and soil near a large livestock operation.



Air Resources Laboratory processed high volume filters for the Air Pollution Control Division.



Analyzed an infant formula sample for poisons using the FDA FERN GC/MS method for Boulder County Sheriff's Department. This analysis demonstrated a growing capability in analyzing foods. No poisons were detected in the infant formula sample tested.



Continued Commitment to Our Citizens

A number of additional programs at the Laboratory Services Division provide ongoing services which are paramount in protecting the health and safety of Colorado citizens and the environment in which they live. These programs include Newborn Screening, Toxicology, Evidential Breath Alcohol Testing and Certification.

Screening Newborns for Disorders

The Newborn Screening laboratory is the designated laboratory in the state to conduct tests for 30 metabolic conditions in newborns. This program is supported through fees for testing and follow-up.

Newborn screening is done shortly after birth by collecting a few drops of blood from the baby's heel on a special piece of filter paper. Colorado infants receive a second newborn screening, usually at the first well-baby checkup (at 8 to 14 days old).

A second screen is performed because some conditions may not manifest until later, following discharge from the hospital or birthing center.



The medical conditions that are detectable by this screen may show no obvious symptoms in newborns, but can cause severe illness, mental retardation and, in some cases, death if not found and treated very early in life.

The Newborn Screening uses tandem mass spectrometry technology, or MS/MS, to screen for these metabolic disorders and the lab works in conjunction with metabolic physicians from The Childrens Hospital of Denver, refining the standards used to define abnormal MS/MS findings, and reducing the number of abnormal calls that did not result in the diagnosis of a true case of illness.



Drug and Alcohol Testing

The Toxicology laboratory routinely analyzes blood and urine specimens for ethyl alcohol, drugs of abuse and volatile substances to assist law enforcement agencies in administering drinking and drugged driver laws. The Toxicology Laboratory provides testing for the forensic community that is sensitive and conclusive for drugs in blood, urine or solid dose materials (pills, powders, etc.). Customers served by the Toxicology Laboratory include professionals from law enforcement, drug treatment centers, youth facilities, community corrections, individuals, hospitals, and public and private attorneys.

Blood Alcohol Testing

Blood alcohol specimens are analyzed by headspace/gas chromatography. All samples are analyzed in duplicate by dual columns.



Blood and Urine Drug Testing

The laboratory uses a range of carefully controlled chromatographic and immunoassay techniques for detecting and confirming the presence of drugs of abuse in blood and urine specimens.

Blood samples are screened by Enzyme-Linked ImmunoSorbent Assay (ELISA) and urine samples are screened by Enzyme Multiplied Immunoassay Technique (EMIT). Confirmations are performed using gas chromatography mass spectrometry (GC/MS).



The standard 10 drug panel identifies the following drugs:

- Alcohol**
- Amphetamines**
- Barbiturates**
- Benzodiazepines**
- Cannabinoids (THC)**
- Cocaine**
- Methadone**
- Opiates**
- Phencyclidine (PCP)**
- Propoxyphene (Darvon)**

Certifying Laboratories

Federal and state authoritative agencies establish regulations pertaining to quality standards of performance to ensure the accuracy, reliability and timeliness of laboratory testing required for labs to gain certification. Administration of these regulations is accomplished through the Laboratory Services Division's Certification Program.

The Certification Program conducts on-site inspections to ensure that testing laboratories meet established certification standards in the following 12 essential areas: personnel qualifications; standard operating manuals; analytical processes; proficiency testing; quality control; security; chain of custody processes; specimen retention; work and storage space; records; results reporting; quality assurance.

Certification by Laboratory Type

Clinical Laboratories

Under the Clinical Laboratory Improvement Amendments (CLIA), a clinical laboratory is defined as any facility that performs testing on specimens derived from humans for the purpose of providing information for the diagnosis, prevention or treatment of disease; or impairment or assessment of health.

The U.S. Congress passed CLIA in 1988, establishing quality standards for all clinical laboratory testing and placing all clinical laboratories under the authority of the amendments. The Centers for Medicare and Medicaid Services administer CLIA at the federal level.



Clinical laboratories that receive Medicare or Medicaid payments must be CLIA-certified. Colorado provides CLIA certification for in-state clinical laboratories. As part of the certification process, CLIA clinical laboratories are required to analyze proficiency-testing samples three times per year in the same manner and by the same individuals as those performing the patient testing.

The Certification Program conducts required on-site inspections every two years to ensure sustained compliance with CLIA requirements.

Drinking Water Laboratories

The Safe Drinking Water Act is the main federal law that ensures the quality and safety of drinking water for Americans. Either the Environmental Protection Agency or the state in which testing is performed must certify laboratories that analyze drinking water samples for compliance with the Safe Drinking Water Act.

The Certification Program conducts on-site inspections every two years for in-state drinking water testing laboratories and select out-of-state laboratories.



Milk Laboratories

The FDA promotes and helps ensure compliance with the model Laboratory Quality Assurance Branch, Grade A Pasteurized Milk Ordinance (PMO), a document that is recommended for legal adoption by states, counties and municipalities to encourage a greater uniformity and a higher level of excellence of milk sanitation practice in the United States.

In the state Certification Program, a milk laboratory evaluation officer (LEO) evaluates and certifies dairy testing laboratories to ensure compliance with the FDA's Laboratory Quality Assurance Branch, Grade A PMO. The LEO reviews the quality systems used by laboratories testing raw and finished milk products as well as dairy plants that perform antibiotic screening of bulk milk tankers.

Alcohol and Drug/Toxicology Laboratories

Under the Colorado Department of Public Health and Environment's Rules and Regulations Concerning Testing for Alcohol and Other Drugs, the Certification Program annually inspects all law enforcement intoxication and drug laboratories that perform tests on subjects arrested under substance abuse laws as they relate to driving and issues certifications when facilities demonstrate compliance with department standards.

Forensic toxicology laboratories are certified for one or more of the following testing categories:

- blood alcohol
- blood drugs
- urine drugs
- post-mortem

As part of the certification process, alcohol and drugs/toxicology laboratories are required to analyze proficiency-test samples from commercial vendors three times per year.



Certifying Intoxilyzers, Operators and Instructors

The Intoxilyzer 5000EN is the evidential breath alcohol testing instrument used by law enforcement agencies in Colorado to determine whether a person is driving under the influence of alcohol. The results from the Intoxilyzer 5000EN have been proven to be scientifically accurate and precise. Results generated by the Intoxilyzer 5000EN are the only breath testing results that are allowed as evidence in Colorado courts.

The rules governing the DUI/DWAI program in Colorado are the Rules Pertaining to Testing for Alcohol and Other Drugs (5 CCR 1005-2). These rules are established by the Colorado Department of Health and Environment and approved by the Colorado Board of Health.



Maintaining and Certifying Equipment

The division's Evidential Breath Alcohol Testing (EBAT) program routinely maintains, repairs, calibrates and annually certifies the Intoxilyzer 5000EN instruments for use by state law enforcement officers. The EBAT program also conducts on-site inspections annually to ensure instruments are being operated in an adequate environment.

Additionally, the EBAT program approves preliminary breath testing devices and ignition interlock devices. Law enforcement officers use preliminary breath testing devices to establish "probable cause" for arrest for driving under the influence of alcohol. However, the results generated by these devices are not considered of evidentiary quality and are not admissible as evidence in Colorado courts.



Training and Certifying Law Enforcement Officers

The EBAT program is responsible for certifying law enforcement officers operating the Intoxilyzer 5000EN to perform DUI testing on suspected drunk drivers. It is responsible for certifying those law enforcement officers who act as instructors, verifying their competency as qualified to teach their staff how to operate the equipment.

Intoxilyzer 5000EN operators undergo an initial certification process with the EBAT program and are subsequently re-certified by a qualified instructor at an approved law enforcement facility using the equipment.

All records of certification for each instructor and operator are maintained at the law enforcement agency.



Quality Assurance

During the time period from July 1, 2009 through June 30, 2010, the Quality Assurance (QA) Officer reviewed 75 proficiency tests, conducted 22 in-house audits, oversaw 2 Environmental Protection Agency (EPA) audits, initiated a new thermometer validation system, and began validating shipping temperatures for the courier.

Two pairs of eyes always look at final test results before they are reported to the customer, but the QA process is an even more vigorous examination of the test performed. To conduct an in-house audit, the QA officer begins by selecting a single test or analyte in the lab to be audited. Then he follows it through the entire testing process, from when the specimen or sample enters the building at receiving and accessioning through the testing process and to generation of the final report to the customer.

This process includes the following:

- making sure the correct customer/patient name is on the report,
- checking that the test that was ordered is the test that is performed,
- ensuring the test was done correctly,
- making sure the refrigerator or freezer used is at the right temperature,
- checking that the pipettes are properly calibrated,
- verifying that reagents and supplies used are within the usable date,
- checking the reports that come out of the piece of equipment used for testing,
- verifying the result in the laboratory computer system (LITS+), and
- making sure the results go out in a timely manner.



If the auditor finds any error anywhere in the process, the error is documented in a report. The testing personnel in the laboratory in question review their processes and respond to why the error occurred, what was done to correct it and what process will be implemented to prevent the error in the future.

During the 2009-10 fiscal year the EPA audited the new filters lab. Auditors commented that some of the things that routine in-house audits performed throughout the year corrected errors and improved the outcome of the EPA audit.

The lab also performs in-house CLIA audits, improving CLIA audit results for the government CLIA auditors.

Every laboratory test has to have one or two proficiency tests a year to demonstrate that the lab can correctly identify an unknown substance. The Laboratory Services Division tested 1,199 samples and correctly identified 1,167 for a result of 97.33 percent accuracy rate, well above the 80 per cent rate that government agencies monitoring proficiency require.

Information Technology Advancements

With the purchase and set-up of a new server, the IT unit moved closer to launching web-based applications for the fiscal unit and the Evidential Breath Alcohol Testing (EBAT) program. An internal purchasing intranet site to streamline processes has been completed and is in the testing phase. Two members of the IT unit completed advanced classes that will enable them to set up the databases required to allow customers to pull results instead of waiting to receive them electronically or by hard copy. The unit will finalize this process in fiscal year 2010-2011.

The IT staff has made enhancements to the Laboratory Information Tracking System, or LITS +, to improve the transfer of data to the Integrated Data Repository (IDR) quicker and more efficiently. Completed testing results are posted to the IDR, allowing other divisions to access the data as needed.

Division IT personnel are working with IT staff from outside facilities to design and implement electronic transfer of data, such as with Perkin Elmer, which provides the Newborn Screening testing and database application.

During the last year 50 new computers were installed in the division. In the upcoming fiscal year, the division will upgrade all computers to Microsoft 2007.

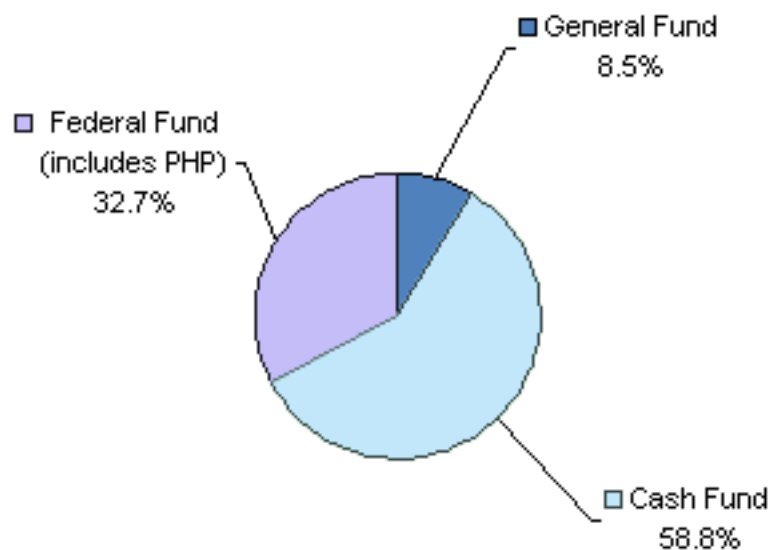
Overview of Fiscal Year 2009-10 Laboratory Funding

Federal grant funding and cash revenues, generated through fees for laboratory services, represent the main sources of funding for the operation of the Laboratory Services Division's programs.

Grants Received - Fiscal Year 2009-10
Public Health Emergency Preparedness
Consumer Protection Division (CPD) - Food and Drug Administration Grant
Epidemiology and Laboratory Capacity
Tuberculosis Elimination and Laboratory Program
Emerging Infections Programs
H1N1 Influenza Grant
Refugee Preventive Health Grant
Preventive Health and Health Services Block Grant
Clinical Laboratory Improvement Amendments
Disease Control and Environmental Epidemiology Division (DCEED) - Hepatitis C Serosurveillance Testing
DCEED - Syphilis Serology Grant
DCEED - Human Immunodeficiency Grant
Food Safety and Security Monitoring Project (Chemistry)
Food Safety and Security Monitoring Project (Microbiology)
Prevention Services Division (Fluoride)
Colorado Division of Criminal Justice (DOJ) - Paul Coverdell
National Forensic Sciences Improvement

Cash Revenues by Program - Fiscal Year 2009-10	
Certification	\$ 69,611
Public Health Micro (includes Serology and Molecular)	\$ 666,437
Zoonosis (rabies/plague)	\$ 4,482
Toxicology	\$ 778,466
Chemistry	\$ 405,752
EBAT	\$ 14,836
Env Micro	\$ 139,592
NBS	\$ 4,541,441
Total Fee Revenues	\$ 6,620,617
Other Cash Revenues by Source	
LEAF	\$ 837,476
WQCD	\$ 469,534
APCD (Odor School)	\$ 7,585
Training	\$ 792
Total Other Cash	\$ 1,315,387
Total Cash Revenues	\$ 7,936,004

**LSD FY2010
FUNDING SPLITS - Total Budget
\$12,725,511**



Expenditures - Fiscal Year 2009-10	
Total Indirect Paid	\$ 1,566,647
Total Personal Services	\$ 5,912,857
Total Operating	\$ 4,190,528
Total Expenditures	\$ 11,670,032

Workload Report - Inorganic Chemistry

INORGANIC CHEMISTRY	FY10	INORGANIC CHEMISTRY	FY10
Alkalinity, Phenolphthalein	155	Lead	963
Alkalinity	1,667	Lithium	1
Aluminum	232	Magnesium	289
Antimony	88	Manganese	1,768
Arsenic	902	Mercury	224
Arsenic III	5	Molybdenum	83
Arsenic V	5	Nickel	189
Atrazine	61	Nitrogen	3,264
Barium	172	Nitrogen, Nitrate	637
Barium - XRF	1	Nitrogen, Nitrate/Nitrite	1,978
Beryllium	159	Nitrogen, Nitrite	202
Bicarbonate	56	pH	449
BOD	401	pH*	49
BOD, Carbonaceous	28	Phenol	7
Boron	4	Phosphorus, Ortho-Phosphate	7
Bromate	95	Phosphorus, Phosphate	1,469
Bromide	27	Potassium	118
Cadmium	1,814	Selenium	1,711
Cadmium - XRF	1	Silicon, Total	13
Calcium	322	Silver	1,495
Carbaryl	58	Sodium	371
Carbofuran	30	Solids, Dissolved	321
Carbonate	47	Solids, Settleable	25
Chlorate	1	Solids, Suspended	598
Chlordane	29	Solids, Total	17
Chloride	470	Solids, Volatile	4
Chlorine	22	Special Procedure	4
Chlorite	33	Sulfate	1,800
Chloroform	144	Sulfate, Dissolved	6
Chlorophyll - a	59	Sulfide	28
Chromium	198	Sulfite	4
Chromium, Hexavalent	10	Sulfur	74
Cobalt	5	Thallium	80
OOD	30	Tin, Total	1
Conductivity	208	Titanium	1
Copper	2,263	Tungsten	1
Cyanide, Direct	13	Turbidity	68
Cyanide, Distilled	11	Uranium	843
Cyanide, WAD	25	Uranium, Total Recoverable	19
Fluoride	1,172	Vanadium, Total	5
FTIR Scan*	1	Vinyl Chloride	72
Hardness	1,854	Water Activity	3
Iron	3,426	Water Activity*	3
Lead	1,432	Zinc, Dissolved	1,701

Workload Report - Organic Chemistry

ORGANIC CHEMISTRY	FY 10	ORGANIC CHEMISTRY	FY10
1,1,1-Trichloroethane	72	Heptachlor	32
1,1,2-Trichloroethane	72	Heptachlor epoxide	31
1,1-Dichloroethylene	72	Hexachlorobenzene	31
1,2,4-Trichlorobenzene	72	Hexachlorocyclopentadiene	32
1,2-Dichloroethane	72	Methoxychlor	31
1,2-Dichloropropane	72	Methyl Methacrylate	25
2,4,5-TP	1	Methyl Methacrylate*	3
2,4,5-TP (Silvex)	31	Monobromoacetic acid	111
2,4-D	43	Monochlorobenzene	72
2,4-D*	2	Oil & Grease	26
Alachlor (Lasso)	31	Oil & Grease*	1
Aldicarb	30	ortho-Dichlorobenzene	72
Aldicarb Sulfone	30	Oxamyl	30
Aldicarb Sulfoxide	30	para-Dichlorobenzene	72
Benzene	83	Pentachlorophenol	33
Benzo(a)pyrene	32	Permethrin	54
BHC Gamma (Lindane)	32	Pidoram	31
Bifenthrin	47	Piperonyl Butoxide	47
Bromodichloromethane	143	Poisons (Screen)	1
Bromoform	143	Polychlorinated biphenyls	31
Carbon Tetrachloride	72	Simazine	31
cis-1,2-Dichloroethylene	72	SOCs	25
Di(2-ethylhexyl)phthalate*	1	SOCs*	4
Di(2-ethylhexyl)adipate	31	Styrene	72
Di(2-ethylhexyl)phthalate	32	SVOC (Screen)	12
Dibromoacetic acid	111	SVOC(Screen)*	4
Dibromochloromethane	144	Tetrachloroethylene	72
Dibromochloropropane	65	TOC	26
Dichloroacetic acid	111	TOC*	4
Dichloromethane	72	Total HAA5s	111
Dalapon	31	Toluene	80
Dinoseb	34	Toxaphene	29
Dinoseb*	1	trans-1,2-Dichloroethylene	72
Diquat	29	Trichloroacetic acid	111
Diquat*	1	Trichloroethylene	72
Dissolved Oxygen*	1	TTHMs	143
DMSOC	773	Uranium, Dissolved*	30
Endothall	29	VOC (Regulated)*	8
Endrin	32	VOC (Screen)	45
Ethylbenzene	79	VOC (Screen)*	2
Ethylene dibromide	65	VOCs	63
Glyphosate	29	Xylenes (total)	80
HAA5s	4		

Workload Report - Radiochemistry

RADIOCHEMISTRY	FY10	RADIOCHEMISTRY	FY10
Americium-241	19	Manganese-54	10
Barium-133	4	Nickel-63	5
Carbon-14	40	Plutonium-238	22
Carbon-14*	2	Plutonium-239+240	25
Cesium-134	10	Potassium-40	15
Cesium-137	22	Radium-226	102
Cobalt-57	11	Radium-226*	22
Cobalt-60	21	Radium-228	84
Gamma Spectrometry	42	Radium-228*	2
Gross Alpha	131	Radon-222	42
Gross Alpha (Water)*	8	Radon-222*	15
Gross Alpha Wipe*	6	Strontium 90	4
Gross Beta	178	Thorium, Total*	2
Gross Beta (Water)*	8	Tritium	36
Gross Beta- Wipe	6	Uranium, Isotopic	19
Iodine-131	3	Uranium-234	41
Isotopic Uranium Package*	15	Uranium-235	37
Lead-210	1	Uranium-238	47
Lead-212	1	Uranium-238*	2
Lead-214	1	Zinc-65	10

Workload Report - Filter Weighing

Filter Weighing Program	FY10
P10_Gross Weight	11,514
P10_Tare Inspection	11,553

Workload Reports - Environmental Microbiology

ENVIRONMENTAL MICROBIOLOGY	FY 09	FY 10
<i>Water Analyses</i>		
Drinking Water Specimens		
Private Specimens	2,279	2,417
Municipal Specimens	3,863	3,725
Miscellaneous Tests in Drinking Water (Confirmation, Fecal, Strep, Coliform)	0	146
Waste Water		
Sewage Effluents Analyses	28	31
Stream Pollution Study Specimens	739	989
Miscellaneous Analyses (Confirmation, Fecal, Strep, Coliform, Legionella)	177	144
Total	7,086	7,452
QA/QC	104	104
Total Water Analyses	7,190	7,556
<i>Food Analyses¹</i>		
Food Samples	523	1,475
Total Food Analyses	1,307	3,078
QA/QC	388	144
Total Food Analyses	1,695	3,222
<i>Milk Analyses²</i>		
Finished Milk	1,138	1,145
Raw Milk	215	208
Coliform (Plate count for total coliform bacteria)	1,411	1,240
DMSOC (Direct Microscopic Cell Count)	409	215
Freezing Point (test for added water)	232	228
Inhibitors (test for antibiotics in milk)	1,151	1,051
Phosphatase (test for complete pasteurization)	1,150	1,079
Standard Plate Count (total bacterial content of milk)	1,362	1,194
%Fat	1,148	1,073
Total Milk Tests	6,863	6,080
QC	540	525
Total Milk Analyses	7,403	6,605

1Section received funding for additional food testing from the CDPHE Consumer Protection Division in FY2010 resulting in an increased workload in food analyses.

2Milk testing decreased in FY2010 as there were fewer dairies and an overall reduction in production due to the economic environment.

Workload Report - Molecular Science

MOLECULAR SCIENCE	FY 09	FY 10
<i>Molecular Typing</i>		
Pulsed Field Gel Electrophoresis		
<i>Burkholderia cepacia</i>	0	0
<i>E. coli</i> O157	176	60
other <i>E. coli</i> STEC	66	109
<i>Legionella pneumophila</i>	0	0
<i>Listeria monocytogenes</i>	12	9
Methicillin-resistant <i>Staphylococcus aureus</i>	70	109
<i>Salmonella</i>	649	631
<i>Shigella sonnei</i>	120	55
<i>Shigella flexneri</i>	34	41
<i>Shigella boydii</i>	3	2
<i>Streptococcus</i>	2	4
Other	50	34
Total Molecular Typing	1,182	1,054

MOLECULAR SCIENCE	FY 09	FY 10
<i>Polymerase Chain Reaction</i>		
Anthrax	4	0
Positive	0	0
<i>Brucella spp.</i>	14	12
Positive	0	0
<i>Burholderia spp.</i>	3	1
Positive	0	0
<i>Coxiella Burnetti</i>	4	2
Positive	0	0
H ₁ N ₁ Influenza A	589	7,817
Positive	261	1,832
Influenza A	1,009	7,817
Positive	490	1,936
Influenza B	656	2,749
Positive	32	0
Mumps	3	2
Positive	0	0
Norovirus	1,761	927
Positive	483	241
Orthopox	3	0
Positive	0	0
Pertussis	438	240
Positive	13	2
Plague	19	70
Positive	2	0
Ricin	3	0
Positive	0	0
RSV	13	3
Positive	7	3
<i>Shigella</i>	0	0
Positive	0	0
St Louis Encephalitis	590	100
Positive	0	0
Tularemia	10	45
Positive	1	1
Varicella-Zoster Virus	1	0
Positive	0	0
Variola	0	0
Positive	0	0
West Nile, RT-PCR		
Bird/Mosquito Specimens	3,713	3,080
Positive	36	0
Human	0	0
Positive	0	0
Western Equine Encephalitis	490	100
Positive	0	0
Total Polymerase Chain Reaction	8,734	15,148
Total Polymerase Chain Reaction Positives	1,325	4,015
DNA Sequencing	9	1

Workload Report - Public Health Microbiology

PUBLIC HEALTH MICROBIOLOGY	FY 09	FY 10
<i>Campylobacter</i> Cultures ¹	147	NA
Isolates: ¹	73	NA
<i>Campylobacter</i> Confirmations ¹	48	NA
Isolates: ¹	22	NA
Chlamydia and Gonorrhoea Tested by Aptima		
Positives		
GC (Gonorrhoea) Positive	26,253	22,099
CT (Chlamydia) Positive	1,479	1,635
CT & GC Positive	20	47
<i>Trichomonas Vaginalis</i> Cultures/Identification	NA	838
Positives	NA	84
Enteric Culture Specimens	2,081	2,009
Isolates:		
<i>Salmonella</i> Positive	638	585
STEC Positives:		
<i>Shigella</i>	157	81
<i>E. coli</i> 0157	266	157
<i>Campylobacter</i> Positive ¹	NA	106
Fungus	3	0
Positives	1	0
<i>Neisseria</i> Specimens	37	26
Isolates:		
<i>N. gonorrhoeae</i>	22	26
<i>N. meningitidis</i>	7	30

Workload Report - Public Health Microbiology

PUBLIC HEALTH MICROBIOLOGY	FY 09	FY 10
Ova and Parasite Testing		
Specimens Examined	2,060	4,141
Positives	676	1,385
Reference Bacteriology		
Miscellaneous Cultures	808	303
<i>Y. pestis</i> (Plague)	14	13
<i>Yersinia</i> (other)	12	12
<i>V. cholerae</i> (Vibrio)	15	17
<i>Franciscella tularensis</i> (Tularemia)	8	5
<i>B. anthracis</i> (Anthrax)	33	25
Total Reference Identifications	890	375
Positives	229	93
Specimens Sent to the Centers for Disease Control ²		
Specimens Submitted	60	283
Positives	37	NA
<i>Streptococcus</i> Culture		
Specimens (Group A, Group B, <i>Strep pneumoniae</i>)	1,572	802
Positives	185	0
Tuberculosis Specimens	1,238	1,113
Isolates:		
<i>M. tuberculosis</i> Complex	28	14
Avium Complex	19	16
Smear Positive	37	24
Culture Positive	47	67

Workload Report - Serology

SEROLOGY	FY 09	FY 10
<i>ELISA Serology</i>		
Measles IgM	6	2
Positive	0	0
Mumps IgM	2	0
Positive	0	0
West Nile Virus	24	2
Positive	3	0
Hantavirus		
Human IgG	54	58
Reactive	0	0
Human IgM	68	58
Reactive	2	3
Total ELISA Analyses	154	120
Total ELISA Positives	5	3
<i>Febrile Serology</i>		
Brucella	1	5
Positive	0	4
Tularemia	3	4
Positive	0	3
Total Febrile Analyses	4	9
Total Febrile Positives	0	7

Workload Report - Serology

SEROLOGY	FY 09	FY 10
<i>Hepatitis Serology</i>		
Hepatitis A	11	6
Reactive	3	1
Hepatitis B Surface Antigen (HBsAG)		
Refugee sera	1,014	1,063
Reactive ¹	43	58
Non-refugee sera	28	2
Reactive	0	0
Anti-Hepatitis B Surface Antibody (Anti-HBs)		
Refugee sera	1,013	1,063
Reactive ¹	288	308
Non-refugee sera	50	4
Reactive	26	0
Hepatitis B Surface Antigen (HBsAG), Neutralization		
Refugee sera	41	58
Reactive ¹	39	55
Non-refugee sera	0	0
Reactive	0	0
Hepatitis C	419	1,398
Reactive	70	370
Total Hepatitis Analyses	2,576	3,594
Total Hepatitis Reactives	99	371
<i>Human Immunodeficiency Virus</i>		
HIV-1 RNA, TMA (pooled)	7,516	417
HIV-1 RNA, TMA (non-pooled)	189	18
Reactive	19	3
HIV-1, 2 plus O EIA	4,533	3,769
Total Reactive	123	98
Serum	423	3,423
Oral Fluid	353	346
HIV-1/2 Multispot	32	0
Reactive	0	0
HIV-2	0	0
HIV reactive	0	0
Western Blot	441	245
Total WB positive	371	207
Total HIV Analyses	13,487	4,449
Total HIV Reactive	1,289	308

Workload Report - Serology

SEROLOGY	FY 09	FY 10
<i>IFA Serology</i>		
Rocky Mountain Spotted Fever	0	0
Positive	0	0
<i>Legionella pneumophila</i>	0	2
Positive	0	0
<i>Coxiella burnettii</i> (Q Fever)		
Phase I	1	1
Phase I Positive	1	0
Phase II	1	0
Phase II Positive	0	0
Total IFA Serology Analyses	2	3
Total IFA Serology Positives	1	0
<i>Plague - Animal</i>		
Total Plague specimens	3	18
Testing Positive	0	3
<i>Plague - Human</i>		
Total Plague specimens	1	0
Testing Positive	0	0
<i>Rabies</i>		
Specimens Examined	651	907
Specimens with bite exposure	125	330
Specimens testing positive	70	121
<i>Specimens Sent to the Centers for Disease Control</i>		
Specimens Submitted	47	69

Workload Report - Serology

SEROLOGY	FY 09	FY 10
<i>Syphilis Serology</i>		
Routine RPR	12,577	6,306
Reactive	371	311
VDRL (Spinal Fluid)	224	210
Reactive	5	2
VDRL (non-Spinal Fluid)	9	1
Reactive	5	1
FTA	290	35
Reactive	96	11
Syphilis TPPA	1,129	995
Reactive	414	384
Titer	371	0
Reactive	371	0
Total Syphilis Analyses	14,600	7,547
Total Syphilis Reactive	1,219	325
<i>Virus Complement Fixation</i>		
Number of Specimens		
Paired sera	0	0
Single sera	0	0
Total VCF Analyses	0	0

Workload Report - Newborn Screening

NEWBORN SCREENING

Submitter State	FY 09			FY 10		
	Specimen Totals	2nd Screens	Total Analyses	Specimen Totals	2nd Screens	Total Analyses
Colorado						
Initial	69,322	63,486	2,454,740	67,290	62,289	2,387,433
Wyoming	7,154	6,261	251,293	6,924	6,054	243,174
Other States/Territories	3,394	1,490	108,856	3,231	1,421	103,646
Total	79,870	71,237	2,814,889	77,445	69,764	2,734,253
QA/QC	4,400	4,000	8,400	4,400	4,000	8,400
Total Analyses	84,270	75,237	2,823,289	81,845	73,764	2,742,653

Total Abnormals	FY09	FY10
Congenital Adrenal Hyperplasia ¹	721	379
Hemoglobin Abnormals	2,828	2877
Phenylketonuria Abnormals	76	45
Biotinidase Deficiency Abnormals	352	465
Hypothyroidism Abnormals	1,255	1153
Cystic Fibrosis Abnormals ¹	1,975	1338
Galactosemia Abnormals	1	2
MS/MS	504	694
Total Abnormals	7,712	6,953

Workload Report - Toxicology

TOXICOLOGY	FY 09	FY 10
<i>Analytical Services</i>		
Blood Alcohol	6,059	6,463
Methamphetamine Wipes	0	0
Blood Drug Analyses*	7,063	12,473
Confirmations	1,240	2,171
Urine Analyses	15,040	10,235
Confirmations	3,155	2,177
Total Specimens Received	8,498	9,455
Total Analyses (includes confirmations)	32,557	33,519
QA/QC	15	14
Total Analyses	32,572	33,533
<i>Other</i>		
Court Appearances	140	124
Litigation Packages	323	532

Workload Report - Evidential Breath Alcohol Testing

EVIDENTIAL BREATH ALCOHOL TESTING	FY 09	FY 10
<i>Alcohol Test Program (LEAF)</i>		
Alcohol standard solutions	2,240	2,360
Breath test operator/instructor certification	1,575	1,875
<i>Certification of EBAT Instructors</i>	<i>N/A</i>	<i>494</i>
<i>Certification of EBAT Operators</i>	<i>N/A</i>	<i>1,381</i>
Instrument Certification	320	403
Facility on-site inspections	133	195
Number of facilities cited for deficiencies	53	60
Proficiency Testing/QA	<i>N/A</i>	<i>N/A</i>
Certified record requests and subpoenas processed	1,190	1,058
Alcohol Class Kits Prepared	212	196
Technical and Court Assistance/Expert Testimony	645	887
<i>Subpoenas Processed</i>		<i>250</i>
<i>Legal Testimony (Court Appearances/Affidavits/Opinions)</i>	<i>N/A</i>	<i>37</i>
<i>Stakeholder Contacts (Technical/Regulatory Assistance)</i>	<i>N/A</i>	<i>600</i>
Number of law enforcement officers trained annually in the proper usage and maintenance of breathalyzer equipment.	1,575	1,875

Workload Report - Branch Lab, Grand Junction

BRANCH LAB - Grand Junction Laboratory*	FY 09	FY 10
<i>Environmental Microbiology</i>		
<hr/>		
Water Bacteriology		
Samples Tested	4,716	1,500
QA/QC	142	N/A
Milk Bacteriology		
Samples Tested	886	0
QA/QC	380	0
Total Environmental Microbiology	6,124	1,500
<hr/>		
<i>Public Health Microbiology</i>		
<hr/>		
<i>Streptococcus</i> Cultures		
Specimens	2,157	N/A
Positives	567	N/A
Plague DFA		
Specimens	0	0
Positives	0	0
Plague PCR		
Specimens	0	0
Positives	0	0
Syphilis Serology (RPR)		
Specimens	149	N/A
Positives	0	N/A
Tularemia Culture		
Specimens	0	0
Positives	0	0
Tularemia PCR		
Specimens	0	0
Positives	0	0
West Nile		
Bird/Mosquito Specimens	77	37
Positive	0	0
<i>Yersinia</i> Cultures		
Specimens	0	0
Positives	0	0
QA/QC	186	0
Total PH Microbiology/ Serology	2,569	37
Total PH Microbiology/ Serology Positives	567	0

*Branch Laboratory closed 9/30/2009. Water testing transferred to Mesa County Health Department effective 9/30/2009. Milk and public health testing transferred to State Laboratory in Denver effective 6/30/2009. Public Health Testing ceased 6/30/2010.

Workload Report - Laboratory Improvement Program

LABORATORY IMPROVEMENT PROGRAM	FY 09	FY 10
<i>Laboratory Certifications</i>		
CLIA Laboratory Certifications	213	208
<i>Number of laboratories cited for deficiencies</i>	192	116
NCIMS Certifications	7	9
Drug Residue Certifications (LEAF)	10	10
MQSA Inspections	12	N/A
<i>Safe Drinking Water (SDW) Act</i>		
Radiochemistry Certifications	2	3
Microbiology Certifications	28	33
Chemistry Certifications	17	21
<i>Number of SDW laboratories cited for deficiencies</i>	39	79
Desk Survey Reviews (<i>in-state</i>)	46	51
Desk Survey Reviews (<i>out-of-state</i>)	41	34
Total Number of laboratory inspections completed	376	369

Total Number of Laboratory Tests Performed

	FY09	FY10
Total number of tests performed (Chemistry and Microbiology)	3,013,495	2,912,930

Total Number of Abnormal Results

	FY09	FY10
TOTAL Number of results detected in excess of established standards (abnormal results)	16,210	16,101

Internal Training Events (FY 2009-10)

2009 Influenza Update
Aflatoxins by LC MS MS
Annual Chemical Hygiene & HAZMAT Training for Lab Personnel
Annual Ethics Training for Environmental Labs
Challenges & Opportunities in Detecting Prescription Drug Use & Abuse
Climate Change - Mastering the Public Health Role, Overview & Impacts to Health
Climate Change and Health: Impacts and Response
Climate Science 101
Current Methods for the Diagnosis of Pertussis Infections
Detection of RNA for Mumps by RT-PCR
Does Your Lab Measure Up? Meeting ISO Accreditation Requirements
Emerging & Resurging Infectious Diseases-2010
Encephalitis and Lessons Learned from California Encephalitis Project
Environmental Lab Internal Audit: Data Review of Inorganic Methods
Environmental Lab Internal Audit: Data Review of Organic Methods
Environmental Response Laboratory Network (ERLN) Water Laboratory Alliance (WLA)
Establishing a Fully Integrated National Food Safety System with Strengthened Inspection, Laboratory
Examples From the Field Challenges & Successes for Quality Tuberculosis Specimens
Food for Thought and Action: Implementing the CIFOR Guidelines for Foodborne Disease Outbreak
Identifying Intestinal Flagellates & Apicomplexans
Implementing FDA EUA-Cleared Molecular Tests for Respiratory Viruses
Infection Control and *Clostridium difficile*: Clinical and Economic Implications of *Clostridium difficile* Infection
Intestinal Protozoa-Amoebas that Parasitize Humans
Meeting Challenges in Antimicrobial Susceptibility Testing & Reporting
Molecular Diagnostic Tests That Are Becoming New Gold Standards In Infectious Disease Testing
Pandemic Influenza 2009 What Does It Mean and Will You Be Ready
Proficiency Testing for Environmental Labs: Handling & Scheduling
Public Health Lab Role in Chemical Exposure Emergency Response
Public Health Laboratory Guidelines for the Detection and Isolation of Shiga Toxin-producing *Escherichia coli* Infections
QIAGEN & Association of Public Health Laboratories - Pyrosequencing Technology Overview
Safety First: Protection of Lab Workers from Lab-Acquired Infections
Spot On! Newborn Screening for Preterm, Low Birth Weight, & Sick Babies
Storage, Retention and Use of Residual Newborn Screening Dried Blood Spots
The Current and Future State of HIV Testing in the U.S.
The Laboratory Diagnosis of Shiga Toxin-Producing *Escherichia coli* Infections
The Top 10 - CLSI Guidance to Address Most Common CMS Deficiencies
Toxic Chemical Regulation Reform in the U.S.
Tuberculosis Genotyping Information Management System (TB GIMS)
Virtual Tour of CDCs Emergency Operations Center
Walking the Talk CAP-ISO & QS Application of Clinical and Laboratory Standards Institute (CLSI) Documents



External Training Events, Meetings and Conferences (FY 2009-10)

2010 National Sexually Transmitted Disease Prevention Conference
62nd Annual Meeting American Academy of Forensic Sciences - National Safety Council on Drugs and Driving
6th National Conference of Laboratory Aspects of Tuberculosis Conference
Association of Public Health Laboratories Annual Meeting
Association of Public Health Laboratories - Board of Directors Meetings
Campylobacter Training at CDC
Chemical Terrorism Coordinator Workshop
CLIA Western Consortium Mtg
CMI, Inc. Intoxilyzer 5000EN Training
EPA Surveyor Certification
EPA Water Lab Alliance Summit
Food Emergency Response Network - Diversilab Instrument Training
Food Emergency Response Network National Training Conference
FoodNet Vision Meeting
Indiana University's Robert F. Borkenstein Course on Alcohol and Highway Safety: Testing, Research and Litigation
Infectious Disease Committee Meetings
Laboratory Methods for Detecting Rabies Virus Workshop at CDC
Laboratory Response Network Operational Work Group Meetings
Methicillin-Resistant *Staph aureus*, Vancomycin Resistant *Staph aureus* and *Clostridium difficile* Training at CDC
Newborn Screening Symposium
Pacific Southwest Regional Milk Seminar
Quality Assurance/Quality Control Newborn Screening Subcommittee Meeting
State Milk Laboratory Evaluation Officer's Workshop
Training Course for Radioanalytical Laboratory Personnel at EPA



Image Sources:

CDC Public Health Image Library, Photospin and CDPHE Laboratory Services Division
Page 5 - Influenza virus particle - CDC/ Erskine, L. Palmer, Ph.D.; M. L. Martin
Page 8 - Rabies virus cross section - CDC
Page 9 - *Mycobacterium tuberculosis* - CDC/Dr. George P. Kubica
Page 9 - *Campylobacter fetus* ss. jejuni - CDC/Sheila Mitchell
Page 10 - *Bacillus anthracis* - CDC

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