Defending The Public's Health

APHL ASSOCIATION OF PUBLIC HEALTH LABORATORIES

An autoclave at work neutralizing biohazardous material.

Who We Are

The **Association of Public Health Laboratories (APHL)** is a national non-profit dedicated to working with its members to strengthen public health laboratories. By promoting effective programs and public policy, APHL strives to provide public health laboratories with the resources and infrastructure needed to protect the health of US residents and to prevent and control disease globally.

Public Health Laboratories—
Analysis, Answers and Action

Public health laboratories provide life-critical services in an era when health threats can—and do—appear overnight. When new health risks emerge or well-known problems reoccur, public health laboratories *analyze* the threats, provide *answers* to mount effective responses and *act* with other health authorities, officials and first responders to protect citizens.

Unlike private medical laboratories—that perform tests to diagnose problems afflicting individual patients—public health laboratories safeguard entire communities. In one way or another, the work of public health laboratories affects the life of every American. For example, public health laboratories:

- Screen 97% of the babies born in the US for potentially life-threatening metabolic and genetic disorders.
- Monitor communities for pathogens that spread in food or through contact with people or animals.
- Perform almost all testing to detect and monitor newly emerging infectious diseases like West Nile virus, SARS and Avian Influenza.
- Test drinking and some recreational water for bacteria, parasites, pesticides and other harmful substances.
- Rapidly identify suspect agents, as in 2001 when public health laboratories tested over 1,200 specimens a day during the anthrax attacks, ultimately conducting over one million laboratory analyses.

The numerous functions of public health laboratories cannot be distilled and elucidated in one brochure. The six narratives that follow—all true—exemplify these laboratories' contributions to the health and safety of their communities and to the nation.

Serving Communities Large and Small

Every US state and territory, as well as the District of Columbia, has a **"state" public health laboratory** that performs testing and other laboratory services on behalf of the entire jurisdiction, scanning the horizon for anything suspicious. In addition, most states have a number of **local public health laboratories**—ranging in size from large metropolitan laboratories with hundreds of scientists to small rural laboratories with one or two people—that support local public health activities like sexually transmitted disease control and lead abatement.

State and large local public health laboratories frequently perform tests that are unavailable elsewhere, coming literally face-to-face with the microbes, environmental toxicants and other substances that threaten Americans. But their work does not stop there. Especially at the state level, public health laboratories help formulate public policies, develop new methods to detect and combat infectious diseases, regulate private medical laboratories and perform other essential services to protect residents' health and well-being.

An Athabascan woman prepares salmon for drying in Alaska.

Savoring the Benefits of Biomonitoring

Anchorage resident Colleen Dushkin loves salmon. "Growing up in King Cove, wild salmon was the main part of my diet," she said. "Salmon is a wonderful food. You can have it smoked,…kippered,…canned,…baked and fried. We used to eat chumla (raw, fresh-caught salmon) with salt and wild celery leaves."

Colleen recently worked for the Aleutian/Pribilof Islands Association, a non-profit tribal organization that provides an array of services to the Aleut people in Alaska. Because the Aleut's rely on local foods for subsistence, she said "people wanted to know if it was safe to eat wild fish." Colleen, who had her own hair tested by the Alaska Public Health Laboratory as part of its studies on mercury exposure, believes biomonitoring "is a great tool to have… [With it] We were given the go-ahead to say 'Yes, wild salmon should be a part of your diet. Traditional foods and wild salmon are good for everybody.'"

Alaska Public Health Laboratory Puts Salmon Back on the Menu

Alaska residents eat hundreds of pounds of fish—mostly salmon—every year. In fact, many Alaskans rely on locally caught fish as their primary source of protein and have no readily available alternative.

Hence Alaskan public health officials took note when the US Environmental Protection Agency (EPA) and the US Food and Drug Administration (FDA) issued national advisories in 2001 and 2004, recommending that women of childbearing age restrict their fish consumption to avoid excess exposure to methylmercury, the primary form of mercury absorbed by humans from fish. Officials recognized that fish is a nutritious food, also important to the spiritual, cultural and economic health of many Alaskan communities. Would warning people away from fish actually harm their health?

Alaska public health laboratory scientists and epidemiologists knew that the federal advisories were based on methylmercury levels found in *fish* from a few specific locations in the US and that they were issued regardless of the actual levels of mercury found in *people*. They also knew that, thanks to technological advances in analytical chemistry, they had the ability to measure actual human exposure to mercury among *Alaskan* women of childbearing age who eat *Alaskan* salmon. If local, wild-caught fish posed a risk to state residents, they wanted to be certain.

In July 2002, public health laboratory scientists and state epidemiologists began an ongoing program using new *biomonitoring* technology to measure mercury levels in hair samples voluntarily provided by pregnant women at the invitation of their health care providers. They also performed targeted testing of women of childbearing age—pregnant or not—in areas of the state where residents consume especially large quantities of fish and/or marine mammals.

Through December 2004, scientists analyzed hair samples from 178 pregnant women and 71 women of childbearing age residing in 40 Alaska communities. All the test women had hair mercury levels well below the World Health Organization's "no observed effect level" of 14 parts per million (ppm).

A participant in the Alaskan biomonitoring study gives a hair sample.

For comparison, health officials also tested the hair of 550-year-old Aleutian Island mummies. They documented methylmercury levels of 1.2 ppm for adults and 1.4 ppm for infants, roughly comparable to levels among Alaska women today!

Lori Verbrugge, PhD, an environmental toxicologist with the Alaska Public Health Laboratory said the results are "really good news." The observed levels of mercury are "below the lowest level at which you'd see health effects in the most sensitive person." Based on these findings, the Alaska Division of Public Health recommends unrestricted consumption of fish caught in Alaskan waters.

Scott Arnold, PhD, an environmental toxicologist and mercury expert with the Alaska Section of Epidemiology, works with Verbrugge on the biomonitoring program. He said, "public health officials in any state can use laboratory biomonitoring data to target advisories to specific populations that are potentially at risk of exposure to chemicals in fish." Some states, for example, may release fish advisories because of site contamination in particular rivers or lakes.

An article in the *American Journal of Public Health*, co-authored by Arnold, Verbrugge, and two other scientists, notes that national fish advisories "overemphasize risks and undervalue the benefits of fish consumption" and "can cause harm by unnecessarily warning people not to consume fish." Arnold added, "In the rural areas of Alaska, the only way to get food in and out is by cargo plane; it's very expensive and generally used to transport highly processed food. If rural Alaskans ate less fish because of national advisories, the quality of their diet would suffer."

Ultimately, said Verbrugge, "the national advisory approach is too generic and doesn't take local information into account. Alaska salmon is very healthy and we don't think it should be taken off anyone's menu."

The Alaska Public Health Laboratory and epidemiology program expect to expand their biomonitoring program to include all women of childbearing age throughout Alaska and will eventually test for exposure to other chemicals of concern—PCBs, pesticides and heavy metals—in addition to mercury.

Giana Swift with her mother and father.

Laboratory data conclusively demonstrated the benefit of expanded newborn testing. In September 2004, the state enacted a law mandating the addition of the new genetic conditions to the standard panel of tests for all infants born in California.

California Public Health Laboratory Transforms a Miracle into a Test for All Newborns

Giana Swift was born in fall 2002. A beautiful baby. Her father, David, recalled admiring her tiny features through the window of the hospital's infant ward, when a passing nurse asked a seemingly bizarre question: "Do you want your daughter to be part of a pilot study for newborn screening?" She was, said David, "a random nurse in a random hallway in the middle of the night." But looking back on that conversation today, he says, "It was a miracle; that's how I see it."

David and his wife agreed to enroll Giana in a pilot program initiated by the California Public Health Laboratory's genetic disease laboratory. At that time, blood from all babies born in the state was collected at birth via a tiny heel prick and tested for a handful of congenital disorders. As a member of the pilot study, Giana's blood would be tested for the standard newborn diseases as well as an expanded panel of about 35 genetic conditions.

California's Genetic Disease Laboratory Director, John Sherwin, PhD, explained how the pilot program came to be. His mandate is to "proactively scan the horizon and review the scientific literature" to identify new technologies that might benefit the citizens of California. "We were aware," he said, that a new technology, called tandem mass spectrometry (MS/MS), was being used in parts of the US and in Europe to test for dozens of genetic diseases that were previously undetected in newborns, but that, if detected, could be treated.

California's Genetic Disease Program staff prepared and submitted a proposal to the California State Institutional Review Board, outlining a pilot program to evaluate the new technology and its potential value for infants born in California. Babies would only be tested with their parents' informed consent. All testing would be performed free-of-charge at the state public health laboratory. And any babies with presumptive positive test results—i.e., who might have one of the disorders—would be referred to one of 15 metabolic centers that agreed to provide follow-up services. Sherwin stressed that no baby would go untreated. "It's part of our ethical responsibility," he said, "to assure diagnosis and care."

Had Giana not been tested for expanded newborn screening, she'd most likely be dead today or at least severely mentally and physically retarded.

Over a period of 18 months, the public health laboratory performed MS/MS testing on the blood of roughly 375,000 babies, including Giana Swift. Fifty-one tested positive for one of the new conditions.

David remembers the phone call from his pediatrician. He had forgotten about the pilot study. The pediatrician said a specialist would be calling from Santa Monica UCLA Hospital, the site of one of the metabolic centers working with the state public health laboratory.

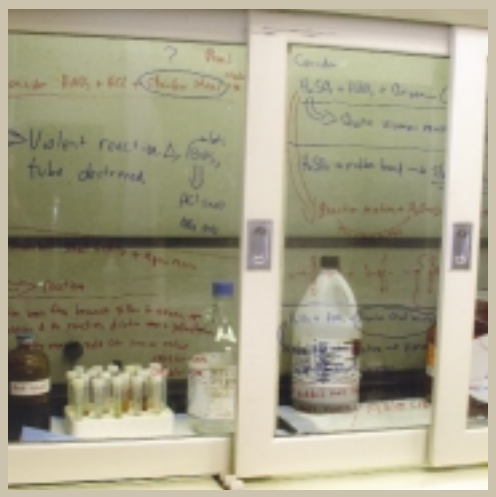
Giana had tested positive for 3-methylcrotonyl-CoA carboxylase deficiency, an error of inborn metabolism that leaves youngsters unable to metabolize leucine—an amino acid found in many forms of protein. Giana went to the hospital for follow-up testing. She was such a happy baby that even the specialists wondered whether the result was a mistake.

A week later David got a call from the UCLA genetics program confirming the diagnosis. "At the time, it seemed to be the worst call I ever received in my life," he said. "In hindsight, I'm certain it was the best call I'll ever receive. Had we not received that call, had Giana not been tested for expanded newborn screening, she'd most likely be dead today or at least severely mentally and physically retarded."

Instead, David describes his daughter—who has a strictly-controlled, virtually protein-free diet—as "super healthy," "amazingly precocious" and "a beautiful, joyful barrel of fun."

When the pilot study ended, it was deemed a success: laboratory data conclusively demonstrated the benefit of expanded newborn testing. In September 2004, the state enacted a law mandating the addition of the new genetic conditions to the standard panel of tests for all infants born in California. New parents no longer need consider it "a miracle" that their babies are tested for treatable genetic diseases that might otherwise cause irreparable harm. In California, it is the routine work of the state public health laboratory.

What is the value of a laboratory test? Ask David Swift. He'll tell you that for his family, for Giana, "It was a life saver; it was the gift of life."



Biosafety cabinet at Utah laboratory with scientist's notes from analysis during March 2005 chemical spill.

Limited Capacity to Respond to Chemical Terrorism

When spores of the bacterium *Bacillus anthracis* were sent through the mail in 2001, the nation's public health laboratories had the rudimentary systems in place to respond to the crisis. But had the terrorists chosen arsenic, sarin or other chemical agents instead of a biological organism, the laboratory response could not have been as swift. At that point in time, by almost any meaningful measure—facilities, technology, training—laboratory readiness for a chemical terrorism event lagged far behind readiness for bioterrorism.

Mary Abrams, PhD, a scientist and administrator of Oregon's Department of Environmental Quality Laboratory, recalled that in 2001, "the nation was really pretty exposed. Outside of a few military assets, there was virtually no chemical terrorism test capability across the country." "With chemical agents," Abrams said, "you're talking about stuff that can kill you right away."

Public health laboratories began a major initiative, said Abrams, "to make this issue understood at the national level," and particularly at the key federal agencies responsible for emergency response. In 2003 federal funding became available to states for the first time for chemical terrorism preparedness. These funds—although still limited—have been used to purchase instrumentation, train staff, hire chemists and acquire safety equipment, including mobile triage units to prevent contamination of the main laboratory.

The Centers for Disease Control and Prevention has developed a rapid toxic screen that can test for up to 150 chemical agents and their metabolites in humans and is transferring similar technology to members of the nation's Laboratory Response Network. More than 40 public health laboratories can test human specimens directly to detect exposure to a number of chemical agents, such as cyanide and toxic metals. A handful of public health laboratories can test for an expanded slate of chemical agents in people. These are significant accomplishments. But gaps remain.

Chemical Terrorism or Simple Negligence? The Results Can Be the Same—in Utah and Elsewhere

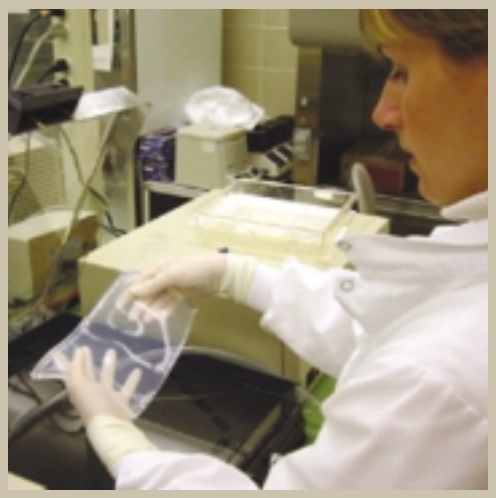
Industrial accidents often involve the exact same chemicals that might be employed in a chemical terrorism attack. As such, public health laboratories need the same equipment and the same skilled scientists to help contain them. Just one example is the story of a toxic tanker in Utah's largest metropolitan area…

Early on a Sunday morning in March 2005, railroad workers spied something bubbling through the seams of a tanker car sitting in a train yard in South Salt Lake City. A plume of noxious, orange fumes was spreading downwind. Yet, 15 hours after the disintegrating car was discovered, city officials still were not certain what was in the tanker due to conflicting reports from its owner and a second company that had leased the car to transport hazardous wastes. On-site field tests were inconclusive. In the meantime, thousands of gallons of chemicals were soaking into the soil beneath the tanker (and threatening to contaminate groundwater), as many as 6,000 people were evacuated from nearby homes and some of Utah's busiest stretches of freeway were shut down.

At 11:15 that evening, officials contacted Barbara Jepson, head of the Utah public health laboratory, to respond to "a public health disaster in the making." "We were called to take this toxic soup and identify what was in it," Jepson said. She called in a team of environmental chemists, led by Sanwat Chaudhuri, PhD, that worked through the night. Screening tests, confirmatory tests and back-up tests yielded the answer. The soup was a witch's brew of seven agents: acetic acid, ammonia, nitric acid, hydrochloric acid, phosphoric acid, sulfuric acid and—the nastiest of the lot—hydrofluoric acid, a recognized agent of chemical terrorism. The chemical cocktail could burn skin on contact. The fumes alone could corrode the respiratory system, trigger vomiting and damage the eyes.

The laboratory's initial analysis and follow-up testing were critical to determine possible human health risks, necessary abatement measures (e.g., excavation of contaminated dirt), when residents and business owners could safely return to the area and, along with other information, whether it was appropriate to bring criminal charges against those responsible for the crisis. The FBI investigations ruled out terrorism.

The Utah Public Health Laboratory worked through the night to identify what was in the "toxic soup" leaking from a nearby tanker car.



Using a molecular subtyping technique called pulsed field gel electrophoresis, the laboratory in Minnesota was able to discover the DNA fingerprint of the isolated meningitis organism.

Bacterial Meningitis

Bacterial meningitis is one of few infectious diseases circulating in the US that can kill a healthy young adult within hours. It can settle into the spinal fluid, causing inflammation of the lining around the brain and spinal cord and prompting a headache, stiff neck, fever, vomiting and delirium. Or it can invade the blood, a form of the infection called meningococcal septicemia, and form poisons that attack the blood vessels so fluid leaks out, producing a grape-colored, bruise-like rash.

A few thousand cases of meningitis are diagnosed in the US each year. Some are isolated cases that arise spontaneously and are easily contained, but others are clusters, cases linked by a common organism, potentially spreading to more and more people. It takes astute laboratory analysis to tell the difference…and the difference is extremely important.

Swift Response by Minnesota Public Health Laboratory Curtails Stubborn Meningitis Outbreak

On Super Bowl weekend in January 1995, three sick teenagers in the town of Mankato were hospitalized with the classic symptoms of meningitis. One case would not necessarily endanger the community, but three cases—*if* meningitis and *if* related—would constitute a cluster, a public health threat. Recognizing the potential seriousness of the situation, the hospital's infection control specialist contacted state public health authorities. The Minnesota Public Health Laboratory and the state epidemiologist quickly became involved in a tense and unpredictable outbreak that would directly impact most of Mankato's 55,000 residents over the next six weeks.

Real-time Laboratory Analysis Identifies Outbreak

Blood specimens from the three patients were immediately forwarded to the state public health laboratory in Minneapolis, where scientists worked over the weekend to collect valuable clues. Meningitis can be caused by one of several bacteria, including *H. influenzae, Streptococcus pneumoniae* and *Neisseria meningitides*. It is important to know which one is responsible for illness because prevention and treatment strategies vary.

The laboratory isolated the organism and identified a common culprit in all three cases: *Neisseria meningitides*. There are several types of *N. meningitides* and antibody tests showed that all the microbes involved in this cluster belonged to serogroup C, a critical finding because a vaccine is available to guard against serogroups A, C and Y, but not serogroup B. In Mankato, the vaccine would work.

Further laboratory tests yielded DNA fingerprints of the isolated organisms, conclusively demonstrating that the students were infected with identical microbes. This three-case cluster represented an outbreak-in-the-making, probably related to a common exposure. On Monday, a fourth student was admitted to the hospital with meningitis symptoms.

The real-time laboratory analysis provided concrete data for decision-making. The state epidemiologist met with Mankato officials and made plans to vaccinate all high school and junior high school students in town—3,300 children in all.

Rapid Action Calms Town, Halts Outbreak

But the vaccine takes a few days to work and *N. meningitides* refused to give up. By the end of the week 15-year-old John Janavaras, a hockey player at Mankato West High, was hospitalized with meningococcal septicemia. He died less than five hours later. People were panicked, recalled Norm Crouch, MN public health laboratory director. Parents kept their children home from school. Truckers literally drove 100 miles out of their way to avoid going through town (even though the bacteria are transmitted in saliva by direct contact via kissing, sharing food or drinks or coughing). Health officials decided to treat all students prophylactically with the antibiotic rifampin and to vaccinate family members of West High students, the school that was the common denominator among all of the cases.

Three weeks later, the remaining patients were recovering and the outbreak seemed over. But again, *N. meningitides* reared its head. A seven-year-old boy and 18-year-old college freshman were diagnosed with meningitis. Neither had had contact with the original at-risk students. Was the same microbe involved? The Minnesota Public Health Laboratory quickly confirmed that at least the seven-year-old was infected with the same outbreak strain, the most unsettling and ominous finding yet, because it meant the microbe had slipped beyond the initial circle of patients and was now at large in the community. Residents of Mankato were on the verge of hysteria.

Based on the state public health laboratory's report, officials took the extraordinary step of vaccinating all Mankato residents younger than 30. Thirty thousand of Mankato's 55,000 residents were vaccinated at a cost to the state of $1.2 million, and finally the outbreak ended.

A Meningitis Epilogue

Exactly four years later, laboratory tests confirmed another cluster of meningitis in Minnesota, this time in Duluth and the nearby Fond du Lac Indian Reservation. Lacking an identified source of infection, public health authorities acted quickly to vaccinate those at risk: in this case, 3,000 Native Americans under age 30 and all students at Nettleton Elementary School in Duluth, where one of the four patients was in the third grade.

Of the six additional cases reported in the following weeks four were unrelated, but lab test showed that two young Minneapolis children were infected with the outbreak strain found in Duluth. When epidemiologists learned the two children had had contact with residents of the Fond du Lac Indian Reservation, a logical chain-of-transmission was explained. Public health officials provided prophylactic antibiotics to those who might have had contact with the children, but additional mass vaccination was unnecessary, *saving the state more than a million dollars*, considerable anxiety and the kind of panic seen in Mankato four years before.

Examples of Other Public Health Laboratory Investigations Leading to Food Recalls*

Date	Food	Pathogen	Area Affected
May 2005	Chicken & Turkey Sandwich Meats	Listeria	US Northeast
May 2004	Raw Almonds	Salmonella	US (nationwide), plus France, Italy, Japan, Korea, Malaysia, Mexico, Taiwan and the United Kingdom
October 2003	Beef Jerky	Salmonella	US Nationwide
June 2003	Frozen Steaks (sold door-to-door)	E. coli O157	US Midwest
March 2003	Alfalfa Sprouts	Salmonella	Oregon and Washington

*Note: All of these investigations involved multiple public health partners at the state and national levels. At least seven people died in the *Listeria* outbreak.

Pennsylvania Public Health Laboratory Targets Tainted Tomatoes in Control of Salmonella Outbreak

July 2004 was an unforgettable month for James Birmingham of Midland, Pennsylvania—but not in a good way. On a seemingly uneventful day, Birmingham broke for lunch at the scaffolding company where he works his main job just outside of Pittsburgh and drove to a gasoline station deli where he bought a 12-inch chicken sub with tomatoes and onions. He ate half the sub right away and took the rest to his second job, evenings, as a bartender in an open-air amphitheater.

"A day or two afterward," said Birmingham, "I woke up feeling ill, tired, sick-to-my-stomach. It kept getting worse. I couldn't eat lunch. Then I went home and went to bed. I woke up with severe diarrhea and vomiting. And that went on for five, six days straight. It was really bad." Birmingham ended up in the hospital emergency room where physicians gave him intravenous fluids. He celebrated his 25th birthday sick in bed, lost several days of work time and "didn't get my energy back for about two months."

It turns out Birmingham was one of 429 people with culture-confirmed *Salmonella* in one of the largest foodborne outbreaks on the East Coast in recent years. Authorities estimate that as many as 15,000 more were sickened in the outbreak, but never sought a medical diagnosis. And the numbers would certainly have soared higher had not public health personnel pinpointed the source of the *Salmonella* bacteria and intervened.

Wayne Chmielecki, a microbiologist with the Pennsylvania public health laboratory, was probably one of the first to know something was awry. In Pennsylvania, as in many states, hospital and other private laboratories are required to forward certain patient specimens—including stool specimens containing *Salmonella*—to the state public health laboratory for detailed analysis and tracking. The DNA fingerprint of every foodborne bacterium is then posted on PulseNet, a database maintained by the Centers for Disease Control and Prevention, to identify clusters of foodborne illness that might signify an outbreak.

Said Chmielecki, "From January to June 2004, we received maybe one specimen of Javiana (a particular *Salmonella* serotype) a month. Starting the second week of July that number increased to about 41, and the third week it increased to 182." Chmielecki performed a test called pulsed field gel electrophoresis on the *Salmonella* isolates and found that most had identical DNA patterns, a strong indication that an outbreak linked to a single source of bacteria was occurring. Chmielecki posted the DNA patterns on PulseNet and contacted the state epidemiologist.

Laboratory data together with information from interviews with infected individuals led authorities to suspect that the *Salmonella* bacteria were growing on the tomatoes in James Birmingham's chicken sub and the sandwiches of countless others. Laboratory tests of Roma tomatoes from the gas station deli confirmed the suspicion. On July 14, the deli chain voluntarily removed all Roma tomatoes from its stores.

Altogether the outbreak spread across nine states, with most of the ill residing in Pennsylvania, Ohio, Maryland, Virginia and North Carolina. While no one died, about 130 people were hospitalized. The US Food and Drug Administration together with state food regulatory agencies and state health departments conducted trace-back investigations of the tainted tomatoes.

Meanwhile, Birmingham was relieved the public health laboratory pinpointed the *Salmonella* source "…so it didn't become an even bigger outbreak than it was."

In South Texas, Saving Lives and Building a Firewall Against TB

Tuberculosis (TB) was once the leading cause of death in the United States. But thanks to aggressive public health interventions, this potentially fatal bacterial disease has not been a major threat here for many years. Public health laboratories are working with other health partners to keep it that way.

The laboratory plays a vital role to prevent and treat TB. When funding for TB laboratory services fell in the 1980s, delays in laboratory confirmation of TB and reporting of drug-susceptibility results (a list of the drugs to which the bacteria are either immune or sensitive) led to treatment delays, prolonged infectiousness, inappropriate therapy and missed opportunities to prevent transmission. These delays contributed to the resurgence of TB and the emergence of multi-drug-resistant TB (MDR-TB) in the US in the early 1990s.

Today, costly TB outbreaks still occur, and MDR-TB continues to spread. (The bacterium is spread easily through air from person to person.)

Much of the TB, and especially MDR-TB, present in the southern United States is spread from Mexico, where the disease is less well controlled. Aurora Martinez, manager of the Department of State Health Services/South Texas Laboratory in Harlingen, Texas, says, "The border is no dividing line for TB. Many people have relatives on both sides of the border and travel back and forth all the time."

Public health officials in Texas recognize that we cannot control TB in the US without helping to control TB in Mexico. Thus, since 1994 the South Texas Laboratory—a branch of the Texas state public health laboratory—has been doing public health testing for the Mexican state of Tamaulipas as part of a bi-national tuberculosis project called *Grupo Sin Fronteras* (*Group Without Borders*).

Said Martinez, "Each month we receive approximately 150 specimens…from Mexican patients for TB testing." The laboratory tests for the presence of TB bacteria as well as the bacteria's sensitivity to an array of first- and second-line drug therapies. Results are forwarded to the regional Texas public health department and officials there send them to the proper Mexican authorities. While about 5% of all US specimens test positive for TB, about 30% of the Mexican specimens do. And of these positive results, about a third are MDR-TB.

This patient credits his health and the birth of his son to the bi-national program.

Cynthia Tafolla, who manages *Grupo Sin Fronteras* at the regional Texas health department, said the program is working. After laboratory testing, Texas health officials collaborate with Mexican physicians to maintain close contact with TB patients and their families to assure appropriate treatment.

Cynthia Tafolla recounted one of many patient stories:

> Probably one of our greatest success stories is that of a patient we'll call "Jose." Jose was 44-years-old when the South Texas Laboratory confirmed that he had multi-drug-resistant TB. Although he had received treatment at a local health clinic in Mexico two years before, he had had a relapse and didn't understand why he was ill since he had been taking his medication faithfully. At the time he enrolled into the bi-national project, Jose lived with his wife and two children. He stressed to us how much he wanted to be cured and live a full life for his family. Jose was true to his word. He was an excellent patient who rarely complained about the numerous side effects of more potent second-line TB medications. Once we showed him the laboratory results showing that he had multi-drug resistant TB, he never questioned our recommendations. During the course of his treatment, Jose's wife was also diagnosed with TB. This time the family was spared the drug-resistant germ. His wife's TB was easily cured using standard medications. Just recently Jose completed his two-year treatment. He was also blessed with an addition to his family, a third son whom he says would never have been born without the care he received from the bi-national team. The bi-national team would not have been able to adequately treat Jose had it not been for the exceptional work done by the South Texas Laboratory. Without accurate laboratory test results, physicians could not have determined the best course of treatment for Jose.

This story is one of hundreds with similar endings. In effect, the work of the public health laboratory in this bi-national effort is helping to stem the growth of TB in Mexico and creating a firewall against TB for Texas and the nation beyond.

For more information, please see the following Web sites:

Public Health Laboratories *(page 1)*	www.aphl.org
Salmon Back on the Menu *(page 3)*	http://www.cdc.gov/biomonitoring/
Test for All Newborns *(page 5)*	http://www.cdc.gov/nceh/dls/newborn_screening.htm
Chemical Terrorism *(page 7)*	https://www.aphl.org/docs/aphl_chemical_terrorism_report.pdf
Meningitis Outbreak *(page 9)*	http://www.cdc.gov/ncidod/dbmd/diseaseinfo/meningococcal_g.htm
Tainted Tomatoes *(page 11)*	http://www.cdc.gov/pulsenet/
Firewall Against TB *(page 12)*	http://www.cdc.gov/nchstp/tb/faqs/qa.htm

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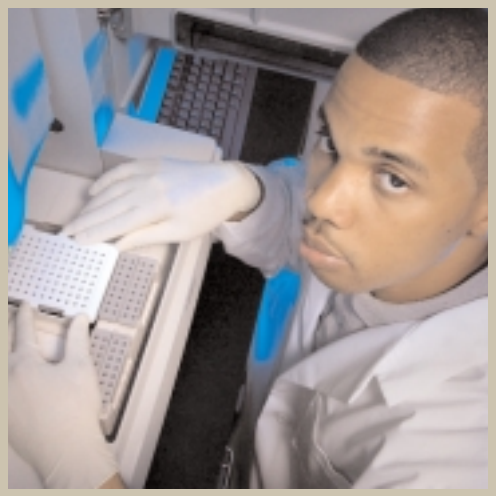

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