

# DBD BULLETIN

regards from  
*Rana...*

Dear Colleagues,

It has been months since we had our last Bulletin. This year has been very busy for DBD and the size of this Bulletin reflects all our hard work. We supported numerous meningococcal and Legionnaires' disease outbreaks and launched carriage studies and a very impressive Advanced Molecular Detection program. We worked with ACIP to support recommendations for pneumococcal and serogroup B meningococcal vaccines, published over 30 manuscripts, conducted many interviews, and developed new tools to increase public awareness about bacterial diseases and our work. As usual, DBD staff received some of CDC's highest civil service honor awards and recognitions and were invited to present at conferences around the world. We also enhanced our MenAfriNet activities and assisted with setting up the agency's new Global Health Security Initiative.

In the spring, our Get Smart program reached out to its network of partners to support CDC's role in the White House Forum on Antibiotic Stewardship. Sadly, as the agency moves to implement the U.S. National Action Plan for Combating Antibiotic-Resistant Bacteria, the Get Smart program has been transitioned into the Division of Healthcare Quality Promotion. DBD and NCIRD built a strong program that will contribute immensely to the Antimicrobial Resistance Initiative and to DBD's activities in this field.

We can all be proud of the number of DBD staff who stepped forward to reinforce the agency's Ebola response, both abroad and here at home. In this



Photo: Members of the MVPDB swabbing and enrollment team from the carriage evaluation at a Rhode Island university in February 2015. From left to right, top to bottom: Amy Blain, Sarah Meyer, Amanda Faulkner, Lucy McNamara, Manisha Patel, and Anna Acosta.

## Exploring Meningococcal Outbreaks and Carriage with Whole Genome Sequencing

Typically, there is less than a one in a million chance of getting serogroup B meningococcal disease. However, in February 2015, students at a small university in Rhode Island found their odds increasing to approximately one out of every 2,500 after just two students, with no known contact to each other, came down with the disease. Soon after, a separate outbreak of serogroup B meningococcal disease occurred at a large university in Oregon. Over the course of four months, these outbreaks sickened nine individuals and tragically resulted in one death.

Between October 2014 and January 2015, two serogroup B meningococcal (MenB) vaccines were licensed in the United States allowing universities to quickly respond to outbreaks by vaccinating their students. These vaccines help protect against one type of the germ that causes meningococcal disease, *Neisseria meningitidis* serogroup B.

An important benefit of some vaccines is their ability to also protect against the carriage of germs, which can lead to the establishment of herd immunity. Carriage is when people have *N. meningitidis* in the back of their nose and throat with no signs or symptoms of disease. It is believed that about one out of every 10 people carry *N. meningitidis*, but it is not known if the new MenB vaccines affect carriage. Vaccine campaigns at these universities in response to these two outbreaks offered a unique opportunity to observe the effects of MenB vaccination on carriage, identify the germs in circulation, and investigate general carriage rates of *N. meningitidis* among U.S. college students.

However, performing carriage studies is no easy task. In this case, it required analyzing thousands of samples collected from students. In the past, a lab technique known as pulse-field gel electrophoresis (PFGE) was used to compare the DNA of *N. meningitidis* strains to see if there were genetic links. This process is time-consuming, labor intensive, and limited in the results it can provide. DBD's Bacterial Meningitis Laboratory, with aid from



Photo: Marsenia Harrison, in DBD's Pertussis and Diphtheria Laboratory, examines agar plates inoculated with oropharyngeal swabs for bacterial growth from the Rhode Island outbreak, February 2015.

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Bulletin, some of our staff and I share our experiences supporting this global public health priority. Our involvement in "Getting to Zero" included epi and lab staff from both branches, along with communications, policy, and tactical administrative support from the office of the director. Staff were involved in helping to launch the STRIVE Ebola vaccine trial.

Please take a few minutes to read about all that is happening in the Division, congratulate your colleagues, and get to know our new staff members. As always, I am deeply appreciative of all of your efforts.

Regards,  
Rana

# White House Forum on Antibiotic Stewardship

"Antibiotic resistance may be the single most important infectious disease threat of our time," according to CDC Director Tom Frieden. As part of a continued effort to combat antibiotic resistance, the Obama Administration convened a White House Forum on Antibiotic Stewardship on June 2, 2015. Hicks was chosen to attend and moderate a session at the forum.

Antibiotic stewardship means using antibiotics when necessary and appropriate. CDC finds that between a third and a half of all antibiotics used in the United States are either unnecessary or the antibiotic is not the best choice to treat the germ. Antibiotics are not needed, for example, for colds, most sore throats, and many sinus infections.

The forum brought together key human and animal health organizations to discuss how they will support antibiotic stewardship. More than 150 food companies, retailers, and human and animal health stakeholders highlighted their commitments to implement changes over the next five years to slow the emergence of resistant bacteria and prevent the spread of resistant infections.

When asked about her experience in participating in the event, Hicks commented, "To be able to participate was an extreme honor and a highlight of my career. So many organizations made



*Photo: CDC antibiotic resistance subject matter experts attend the White House Forum on Antibiotic Stewardship in Washington, DC on June 2, 2015. From left to right: Jean Patel (NCEZID/DHQP), Arjun Srinivasan (NCEZID/DHQP), Nimalie Stone (NCEZID/DHQP), and Lauri Hicks (NCIRD/DBD).*

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## Exploring Meningococcal Outbreaks Continued...

the Biotechnology Core Facility Branch and National Center for Immunization and Respiratory Diseases' Bioinformatics Support Team, investigated the two outbreaks and subsequent carriage studies using whole genome sequencing (WGS) in order to better understand outbreak strains and carriage at these universities. WGS allowed for more sophisticated, in-depth strain comparison between the germs found in carriers and those that caused the outbreak. WGS also allowed the lab to see if there is any connection to strains that have been seen on other college campuses in the past few years.

"Both on-site and in-house processing of the samples required dedication and long hours of work every day and night," recalls DBD's Bacterial Meningitis Laboratory Director Xin Wang. "The Bacterial Meningitis Laboratory team and participating members from the Microbial Pathogenesis and Immune Response and Pertussis and Diphtheria Laboratories rose to the challenge and completed the work quickly."

A final round of each carriage study will be held in fall 2015, at which point, CDC will look to see if the new MenB vaccines have had an impact on the carriage of *N. meningitidis*.

## Serogroup B and C Meningococcal Outbreaks Span United States in 2015

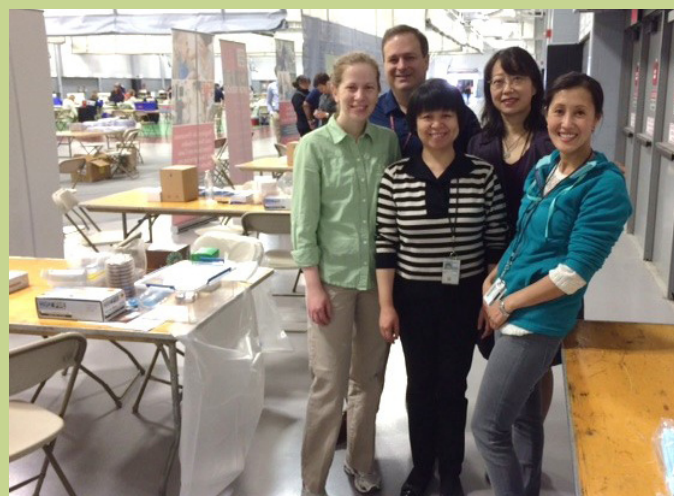
Meningococcal disease outbreaks across the country kept DBD's Meningitis and Vaccine Preventable Diseases Branch (MVPDB) busy this year.

Many states are now turning to CDC for guidance on how to use MenB vaccines to control outbreaks at colleges and universities, in large part due to the division's experience helping obtain vaccines to respond to two outbreaks in 2013 and 2014 before vaccines were licensed in the United States. Now, two MenB vaccines are licensed and recommended for use in response to serogroup B meningococcal disease outbreaks. Few states have experience with these vaccines, which are quite different from the quadrivalent meningococcal conjugate (MenACWY) vaccine.

In the first quarter of 2015, MVPDB provided epidemiologic and laboratory support for serogroup B meningococcal disease outbreaks at colleges in Rhode Island and Oregon. These outbreaks resulted in nine cases, including one death. As of early August more than 21,000 doses of vaccine had been provided. In addition to support for those outbreaks, MVPDB also provided technical and laboratory assistance to at least six other states regarding sporadic cases of meningococcal disease.

Most recently, MVPDB assisted the Chicago and Illinois Departments of Public Health in tackling a challenging outbreak of serogroup C meningococcal disease among primarily African-American men who have sex with men (MSM). Epidemic Intelligence Service Officer Temitope Folaranmi and colleagues from CDC's National Center for HIV/AIDS, Viral

Hepatitis, STD, and TB Prevention traveled to Chicago to help the health department determine how to best target their vaccination campaign by conducting a knowledge, behaviors, and practices survey among the target population. Staff from across the National Center for Immunization and Respiratory Diseases also provided vaccine assistance to help the health department promote MenACWY vaccine use in the population at risk. As of July 9, 2015, the Chicago Department of Public Health distributed more than 11,000 doses of MenACWY to community partners and provided 5,190 vaccines directly to residents.



*Photo: Bacterial Meningitis Laboratory team preparing for one of the carriage evaluations in February 2015. From left to right: Melissa Whaley, Brian Harcourt, Xin Wang, Fang Hu, and Jeni Vuong.*



## ...White House Continued

major commitments to improve antibiotic use and work with the Get Smart program. The new partnership opportunities have opened many doors and will undoubtedly help us move the needle on the problem of antibiotic misuse.”

According to HHS Secretary Sylvia Mathews Burwell and USDA Secretary Tom Vilsack, “A world without effective antibiotics is a frightening prospect. But our greatest threat isn’t evolution of bacteria—it’s inaction from people. Through smart policies and cross-sector partnerships, we can make sure effective medicine is there when we need it.”

### Get Smart Medical Director Gets a Rare Opportunity

Getting the chance to thank your hero is a rare opportunity. DBD’s Lauri Hicks, medical director of the Get Smart: Know When Antibiotics Work program, was recently lucky enough to do just that.

Following the White House Forum on Antibiotic Stewardship held on June 2, 2015, Hicks was invited to appear on a Connecticut-based health radio show. The show was scheduled to occur live on a Sunday morning, so Hicks needed to first see if she could squeeze this into her busy weekend. But once she learned who else would be on the show with her, the decision to participate became obvious. As luck would have it, another guest doctor on the show that day would be her mentor and “hero” from her time as a medical resident at Connecticut’s Hartford Hospital, Jack Ross. Ross inspired Hicks to go into the field of infectious diseases and encouraged her to apply to the Epidemic Intelligence Service fellowship at CDC, which brought her to the Respiratory Diseases Branch in 2003. If it weren’t for Ross, CDC may not have Hicks as a champion tackling the crisis of antibiotic resistance.

Hicks, with support from Get Smart’s Becky Roberts, the Division of Bacterial Diseases’ policy coordinator, Marsha Houston, and the Division of Healthcare Quality Promotion’s Michael Craig reached out to dozens of partners in preparation for this event. In response, commitments were made by health systems to incorporate goals, such as reducing inappropriate outpatient prescribing. CVS Health and Walgreens announced commitments to educate patients and providers and introduce antibiotic stewardship into their retail health clinics—a rapidly growing segment of the healthcare system.

The forum and commitments follow the March 2015 release of the National Action Plan for Combating Antibiotic-Resistant Bacteria.

Commitments made could even impact life at CDC’s cafeterias. At the forum, the White House announced a Presidential Memorandum directing the federal government to buy meat from sources that follow responsible antibiotic use.

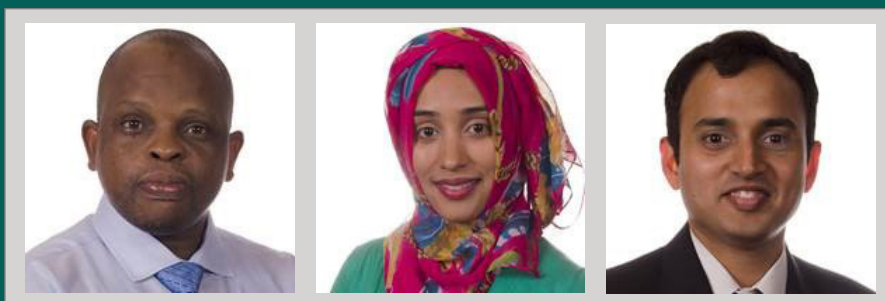
All this progress brings tears of joy to members of the Get Smart program, some of whom have been working on these efforts since as far back as 2001.

Learn more about and watch the opening session of the White House Forum at <https://www.whitehouse.gov/blog/2015/06/02/white-house-hosts-forum-combatting-antibiotic-resistance>.

*Note: The Get Smart program joined the Division of Healthcare Quality Promotion in August 2015 as the agency moves to coordinate all human antibiotic stewardship activities from the same office.*

## DBD Welcomes New EIS Officers and LLS Fellow

During the 2014 Epidemic Intelligence Service (EIS) Conference, DBD recruited 3 new EIS officers. They joined the division for 2-year assignments that started this summer. Please welcome John Otshudiema to MVPDB, and Sana Ahmed and Srinivas Nanduri to RDB (left to right).



EIS officers have had significant impact in improving the public’s health domestically and internationally through:

- Identifying causes of disease outbreaks
- Investigating other urgent public health threats
- Recommending prevention and control measures
- Implementing strategies to protect people from injury, disability, illness, and death



In December 2014 CDC Director Tom Frieden announced the establishment of the Laboratory Leadership Service (LLS), a new public health laboratory fellowship at CDC. This innovative fellowship program provides early career laboratory scientists with a strong foundation for future leadership and management positions in public health laboratories. LLS is a 2-year postdoctoral service learning program that combines competency-based public health laboratory training with practical, applied investigations and service. This new fellowship focuses on biosafety, quality management systems, and management and leadership competencies. LLS furthers CDC’s and partners’ commitment to advancing laboratory biosafety and quality. Anna Llewellyn is DBD’s first LLS Fellow, and she is located in RDB’s Pneumonia Response and Surveillance Laboratory.

# DBD: All Hands on Deck to Support the Ebola Response

At CDC, it is our mission to respond to new and emerging health threats, both foreign and domestic. In March 2014, a single case of Ebola in a child in Guinea led to the largest epidemic of Ebola ever recorded. CDC, along with other U.S. government agencies, the World Health Organization (WHO), and international partners, became actively involved in responding to the outbreak in March 2014 and deployed the first five person team to Guinea by the end of the month.

It would have been impossible to predict that by June the following year (2015), Guinea, Sierra Leone, and Liberia would have more than 27,500 suspected, probable, and confirmed cases of Ebola and 11,220 fatalities. July 9, 2015 marked the one-year anniversary of the activation of CDC's Emergency Operations Center (EOC) to respond to this epidemic.

The Division of Bacterial Diseases (DBD) is providing substantial support in the fight against Ebola. As of July 2, 2015, DBD staff members worked more than 2,300 person days with 44 individuals assigned to tasks domestically and in countries with outbreaks. Domestically, DBD staff members worked in the EOC on the many different teams and task forces, including the infection control team, rapid response team, vaccine task force (STRIVE), and the domestic task force. DBD staff members were also deployed to Guinea, Liberia, and Sierra Leone as well as countries with smaller outbreaks, like Nigeria and Mali. DBD continues to provide both in-country and domestic support with many staff members still on detail or with future details scheduled.

Out of the many DBD staff who supported the response, here are just a few examples reflecting the division's work—told in their own words.

## Rana Hajjeh, Division Director, Division of Bacterial Diseases Response Lead, Guinea, 3/23/2015–4/26/2015

I was in Guinea for 5 weeks (March–April 2015) as the lead of the CDC response team. We were doing everything: providing support for the national Emergency Operations Center, surveillance, contact tracing and other epidemiologic activities, laboratory capacity, multiple rapid diagnostics building and evaluation, quarantine and border efforts, strengthening infection control capacity, communications, coordinating with multiple partners and closely working with the Ministry of Health (MOH), and a lot more. It was extremely busy and we often worked 18 to 20 hour days, but we had a great team that kept going and understood the importance of its mission.

I was based in Conakry, but I often went to the field, as it was important to check the epidemiologic situation firsthand and follow up with many of our staff in the provinces. Together with the MOH, CDC helped plan the first door to door awareness campaigns that were critical to improving case finding and contact tracing.

My best memories are from these field visits, whether by car (long rides due to terrible traffic and bad road conditions) or preferably by helicopter (with the United Nations). I remember one day meeting an Ebola survivor while visiting one of the rural health departments. She had come back with a huge container of cooked rice that she presented as a gift to the staff who took her to the Ebola treatment center when she became sick. I was very touched by this woman, who lost her husband, mother-in-law, and son, but was back to thank the healthcare workers!

Another great field visit was to the Ebola treatment unit that was set up by the French military to treat all Guinean and other healthcare workers who develop Ebola. It was a state of the art unit (the best I have seen in the region) that provided great care (survival rate of about 70%!) and it was very heartwarming to see such care provided to these workers who were putting their lives on the line each day.

Another lasting memory from all my Ebola assignments is that I got to work and meet many wonderful colleagues from all over CDC that I would not have worked with otherwise. We truly have a great workplace!



*Photo: Rana Hajjeh being interviewed by the local radio station in Forecariah, Guinea where her team launched the first public awareness campaign in collaboration with the MOH in April 2015.*

## Jennifer Loo Farrar, Epidemiologist, Respiratory Diseases Branch Active Monitoring Team, Atlanta, GA, 12/1/2014–1/8/2015

I served on the Employee Active Monitoring Team as a team member (under Lauri Hicks) and then as Team Lead. Our team monitored the overall health of CDC employees returning from countries with Ebola outbreaks, including those assigned to and returning to international offices. We were often one of the first points of contact for returning deployers and we conducted 21-day active monitoring for signs and symptoms related to Ebola. We worked a lot with other teams in the CDC Emergency Operations Center, state health departments, and other federal agencies to coordinate efforts.

During my detail, we were able to move from Georgia-based employees having to report to both CDC and the Georgia Department of Public Health to one integrated system for reporting.

I really enjoyed working with people from all over CDC who I may never have interacted with otherwise in my regular job. I also enjoyed being able to welcome fellow colleagues home after their field deployments and be a listening ear or voice of encouragement during their transition back to life in the United States. Working on the Ebola response reminded me why I love public health and CDC—I got to work with so many incredible people from all over the agency literally doing life-saving work.

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## ...Ebola Response Continued

**Heidi Soeters, EIS Officer, Meningitis and Vaccine Preventable Diseases Branch**  
Healthcare Infection Prevention Team, Guinea, 11/7/2014–12/10/2014

As a member of the Healthcare Infection Prevention Team, I had two main roles: 1) to help develop a curriculum and conduct infection control trainings for healthcare workers, and 2) to conduct infection control assessments at health facilities. I spent the majority of my deployment in southeastern Guinea in the prefectures of N'Zérékoré and Macenta, where we trained more than 700 frontline healthcare workers, including everyone from doctors and nurses to janitors and ambulance drivers. The training included classroom sessions and hands-on exercises in handwashing, triaging patients, putting on and taking off personal protective equipment, and cleaning up contaminated fluids.



I will never forget how eager the healthcare workers were for training, support, and basic infection control supplies. Two particular moments stick out in my mind. One was on our first day of training in N'Zérékoré, where we had 80 students enrolled and were astonished to find that more than 200 had shown up, pleading to have a spot in the course. The second moment was when a training day ran late and the classrooms without electricity grew dark. I expected people to be tired and want to go home, but they pulled out flashlights and refused to leave until all of the material was covered. The first time this happened, it was a big surprise, but these late sessions became a daily occurrence.

As this was my first international emergency response, I learned a lot from watching how everyone came together as one big team. On a daily basis, we were working side-by-side with local healthcare staff, the Ministry of Health, CDC, the World Health Organization (WHO), the United States Agency for International Development (USAID), the United Nations Children's Fund (UNICEF), Catholic Relief Services, the United Nations Mission for Ebola Emergency Response (UNMEER), Médecins Sans Frontières (MSF, or Doctors Without Borders), World Food Program, and many others. The collaboration and mutual support was incredible, and I left the experience with many lasting friendships.

*Photo: Heidi Soeters arriving in N'Zérékoré, Guinea, in November 2014 to begin four weeks of field work.*

**Brian Harcourt, Microbiologist, Meningitis and Vaccine Preventable Diseases Branch**  
Laboratory Team, Liberia, 1/11/2015–2/24/2015

I was sent to Liberia in January 2015 to be the CDC Lead Laboratory Coordinator. I also went under the WHO's Global Outbreak Alert & Response Network as a consultant and ended being the CDC liaison to the U.S. military. The roles were so dynamic that it is difficult to describe the job. At one point I made a list of projects/responsibilities to share with my incoming deputy but had to stop at 23 because some other fire had to be put out. There was never a dull moment, to be sure.

Most days were a mix of day-to-day laboratory needs to meet, including fuel supply, distilled water for battery powered cold storage units in the field, obtaining results in a rush, results reporting questions, and lab security; short-term laboratory planning such as the transition plan for ensuring the closure of the 41st Army Medical Laboratories (1st AML) did not impact laboratory coverage and how to reorganize and coordinate specimen transport to the enduring labs to minimize disruption and to give the best opportunity to maintain a 24-hour turnaround time from specimen draw to result throughout the country; and long-term strategic planning for health restoration and development of laboratory and surveillance systems.

The long-term planning pertained not only to Ebola, but also to other infectious diseases such as measles, malaria, yellow fever, and Lassa fever. This planning was done with other members of the CDC Liberia Team, partners from the Ministry of Health, USAID's Assistance Response Team, Department of Defense (DoD), Defense Threat Reduction Agency, WHO, World Bank, and several non-governmental organizations (NGOs), including our close partners: Academic Consortium Combating Ebola in Liberia, Riders for Health, MSF, Global Communities, and more.

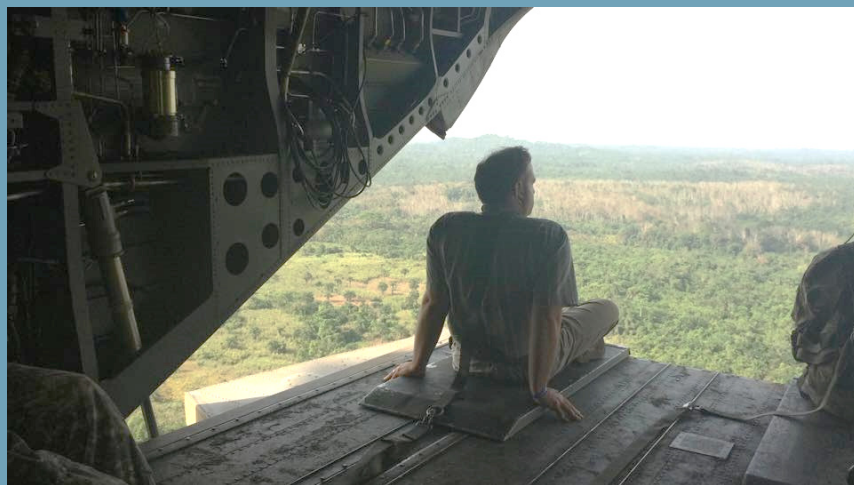


*Photo: Brian Harcourt washing his hands during January 2015 in chlorinated water outside in Liberia—where the water tanks remind you that “EBOLA IS REAL.”*

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## ...Ebola Response Continued

In my role as liaison to the U.S. military (Operation United Assistance), I attended the Commanding General's Update Briefing several times a week; briefed Major General Volesky (the commanding general of Operation United Assistance Joint Forces Command—and commanding general of the 101<sup>st</sup> Airborne Division) as necessary; worked closely with the 1<sup>st</sup> AML commander, COL Patrick Garman, to synchronize the transition plan with CDC's plan and the needs of the country after their departure; and flew to each of the four lab sites with DoD and MOH representatives to inform local health officials and leaders of the closure of 1<sup>st</sup> AML lab in that area (Sanniquellie, Tappita, Zwedru, and Greenville) of the timeline for the lab closures, the plan on where their specimens were to be tested, and the mechanism to use to transport the specimens to the proper enduring lab, and to listen to their concerns.



*Photo: Brian Harcourt taking a breather on the edge (tethered) of a Chinook helicopter traveling from Tappita to Monrovia while in Liberia working on the Ebola response. in January 2015*

As you can imagine, I can't even come close to writing about everything that my lab team, with our CDC Liberia Team colleagues and partners, were involved in, but those are some highlights. I have stories galore!

Choosing one experience out of 1,000 memorable experiences is tough. This deployment certainly was the most powerful experience of my professional life and ranks pretty high on my life's experience list, too. The overall experience of being a part of a response this enormous, working in unison with so many partners towards a common humanitarian goal vital not only to that region, but globally, is singular and indescribable. I'm thankful to have had the opportunity to serve and am honored and humbled to have worked with so many incredibly talented and dedicated people from Liberia, the United States, and around the world.

One specific memorable experience was meeting and talking with an Ebola survivor working as a nurse in the Sinje Ebola treatment unit (Grand Cape Mount county). She was infected early in the outbreak

in Lofa county where she was working as a nurse. She ended up working with sick kids at the Sinje Ebola treatment unit because they weren't afraid of her. She is an inspiration!

I really had no idea that my boundaries could be pushed so far outside of my comfort zone and that I would, in turn, love that. It was nerve-wracking at times, but I wouldn't trade the experience for anything.

### **Stephanie Schrag, Epi Team Lead, Respiratory Diseases Branch STRIVE Team Lead, Atlanta, GA, 12/8/2014–ongoing**

On the Ebola Vaccine Task Force, I served as the U.S. co-principal investigator (PI) for STRIVE, which is the Sierra Leone Trial to Introduce a Vaccine against Ebola. There was another CDC co-PI (Marc-Alain Widdowson from the Influenza Division) and a PI in Sierra Leone (Mohamed Samai from the College of Medicine and Allied Health Sciences, University of Sierra Leone), plus a team of people from across CDC working in Atlanta and Sierra Leone. As co-PI, one of my main responsibilities was writing the study protocol, including developing and implementing a vaccine safety monitoring plan.

My most memorable experience was probably coming in and changing the study design as the epidemic evolved and making sure all the study partners were on board to make that change. When I came onto the trial, the decision was to do a design called a stepped wedge and everybody was referring to the trial as 'the stepped wedge trial.' But that's not a very common design and as I learned more about it, it became apparent that it wasn't going to be a good fit for what we needed to do in the field—both for the scientific objectives but also for the field realities. So we had to come up with a way to shift the design that the leadership would feel comfortable with and all the communication messages to Sierra Leone would remain relatively consistent despite the fact that we needed to change how we were approaching the trial. So we changed it to an individually randomized design, which still did not use a placebo. You can learn more about the trial and its design at [www.cdc.gov/vhf/ebola/strive](http://www.cdc.gov/vhf/ebola/strive).

I've learned so many things. Overall, I learned how to work on something when the landscape keeps changing and nobody in the agency has done something quite like this before in a setting that has no experience ever doing this kind of study. The fact that we have launched a trial and enrolled around 8,500 people and vaccinated about half of them as of mid-August is a real testament to the dedication of Sierra Leone to rise to this very unusual occasion and to the dedication to all of the partners to help support them and make it happen. This has been a once in a lifetime opportunity.





# MenAfriNet Partners Respond to Serogroup C *Neisseria Meningitidis* Outbreak in Niger

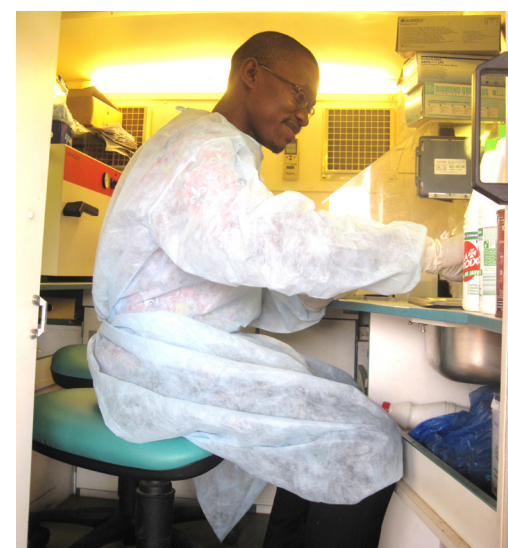
In March 2015, Niger health officials identified multiple cases of serogroup C meningococcal disease in the Dogon-Doutchi health district. There were enough cases to exceed the outbreak threshold set by the World Health Organization (WHO) in multiple health areas in the district. How would CDC be able to assist the Niger Ministry of Health (MOH) in responding to this outbreak?

Niger is located within the meningitis belt of sub-Saharan Africa where epidemic meningococcal disease has been pervasive for over 100 years. Prior to a vaccine campaign targeting serogroup A *Neisseria meningitidis*, approximately four out of every five cases of meningitis in Niger were caused by serogroup A *N. meningitidis*. “After the MenAfriVac™ serogroup A conjugate meningococcal vaccine was introduced in Niger in 2010–2011, we hoped that these devastating meningitis epidemics would become a thing of the past,” commented DBD’s Sarah Meyer.

While meningococcal disease can also be caused by other serogroups of *N. meningitidis*, large scale epidemics have been less common. “When we heard of this meningitis epidemic due to serogroup C,” Meyer continued, “we knew we needed to get on the ground quickly to help the Niger MOH investigate the outbreak and implement control measures.”



**Photo: The LaboMobil®, provided by Agence de Médecine Préventive during the Niger meningitis outbreak in spring 2015, is an all-terrain vehicle outfitted with a variety of laboratory equipment and its own energy and water source.**



**Photo: Oubote Abodji (Agence de Médecine Préventive) working inside the LaboMobil®, performing on-site cultures, gram stains, and biochemical identification tests at Lazaret during April 2015.**

With a rising number of cases, the Niger MOH officially declared an outbreak of serogroup C meningococcal disease on April 1, 2015. Two days later, the Niger MOH formally requested assistance from MenAfriNet in investigating and managing the outbreak. MenAfriNet is a regional meningitis surveillance network established by CDC to evaluate the impact of MenAfriVac™. The Division of Bacterial Diseases (DBD) leads these efforts in partnership with WHO, Agence de Médecine Préventive (AMP), African Ministries of Health, and other institutions with expertise in meningitis surveillance in the African meningitis belt.

“This outbreak took the country and us by surprise,” recalls DBD’s Stephanie Schwartz. “Many resources that would have been employed to respond to a meningitis epidemic had been channeled to other priorities in recent years as a result of the success of MenAfriVac™.” This outbreak of serogroup C *N. meningitidis* overwhelmed the local hospitals and laboratories very quickly.

As a result, MenAfriNet provided funding for 13 short-term national staff to aid in surge capacity for epidemiologic and laboratory support. Resources were also provided for the permanent national staff to conduct outbreak investigations and provide outbreak response. “We were fortunate to be able to get on the ground quickly to strengthen and add to their capacities in rapid laboratory confirmation,” says Schwartz, “including mobilizing the LaboMobil®.” The LaboMobil®, which was provided by AMP as a MenAfriNet partner, is an all-terrain vehicle outfitted with a variety of laboratory equipment with its own energy and water sources. The LaboMobil® was stationed at Lazaret treatment center for six weeks during the height of the outbreak, and offered enhanced lab capacity for rapid tests where it was needed most.

The outbreak continued to accelerate throughout the month of April, peaking in May with 2,182 suspected meningitis cases in just one week. The outbreak resulted in 8,500 cases and 573 deaths as of June 30, 2015. Out of the 44 districts in Niger, 13 were affected by the outbreak with the capital district of Niamey suffering the most, with 5,267 cases. CDC and MenAfriNet technical assistance was extensive with approximately 400 days of person-time in-country during the declared outbreak. Fifteen CDC epidemiologists, data managers, and microbiologists (six from DBD) allowed for continuous CDC and MenAfriNet presence during the outbreak from April 9, 2015 to July 3, 2015.

## Global Health Security

The importance of global health security has never been clearer. New microbes are emerging and spreading, drug resistance is rising, and laboratories around the world could intentionally or unintentionally release dangerous microbes. Globalization of travel and trade increase the chance and speed of these risks spreading. To address these challenges, CDC is joining with other U.S. government agencies and global partners to advance a Global Health Security (GHS) Agenda. The aim of this agenda is to ensure countries have strong capacity to prevent, detect, and respond to infectious disease outbreaks quickly.

Multiple DBD epidemiologists and laboratory scientists are working with GHS countries to consider ways in which CDC can leverage existing infrastructure and relationships within GHS countries to improve surveillance, laboratory, and response capacity. DBD is working closely with the Center for Global Health to establish the GHS platform in various countries; in particular Burkina Faso, where DBD/MVPDB established strong working relationships with the Ministry of Health and infrastructure for bacterial meningitis lab-based surveillance that can help strengthen other surveillance systems.

RBD’s Chris Van Beneden recently completed a several month detail to NCIRD/OD where she helped to establish NCIRD’s role in GHS. And DBD Director, Rana Hajjeh, serves as the technical lead for Burkina Faso, working closely with Rebecca Greco Kone, the country’s new GHS Office Director. Hajjeh said that, “GHS is a huge opportunity for DBD to use its technical capacity in surveillance as well as diagnosis of and response to respiratory outbreaks to support this CDC priority.” Learn more about GHS at [www.cdc.gov/globalhealth/security](http://www.cdc.gov/globalhealth/security).

## PacBio Ribbon Cutting Ceremony

DBD unveiled its newest genetic sequencing system, the PacBio RS II, with a ribbon cutting on February 2, 2015. The PacBio provides highly accurate sequencing results, and can provide longer sequencing reads than other instruments currently available. The PacBio is being used in DBD's many advanced molecular detection projects and will serve four primary laboratories within the division, including the sequencing of such bacteria as *Bordetella pertussis*, *Legionella pneumophila*, *Neisseria meningitidis*, *Streptococcus pneumoniae*, and many others.

## External Laboratory Accreditation Underway in Microbial Pathogenesis and Immune Response Lab

The Microbial Pathogenesis and Immune Response (MPIR) Laboratory is undergoing an accreditation process through the American Association of Laboratory Accreditation. In response to recommendations made by the external Laboratory Safety Workgroup of the Advisory Committee to the Director, CDC, the MPIR Laboratory is seeking accreditation in the ISO 17025 standard. Laboratories that are accredited to this international quality standard have demonstrated that they are technically competent and able to produce precise and accurate test data. The MPIR Laboratory is one of five labs across CDC participating in the ISO 17025 pilot program.



Photo: Alison Mawle (NCIRD/OD), Rana Hajjeh (DBD/OD), Cyndy Whitney (DBD/RDB), Nancy Messonnier (NCIRD/OD), Leonard Mayer (DBD/OD), and Jonas Winchell (DBD/RDB) at the PacBio ribbon cutting ceremony on February 2, 2015.

## Streptococcus Laboratory Provides Technical Support for Global Disease Detection Program in Kenya

Through a partnership with CDC's Global Disease Detection Program, a five year study was conducted from 2009 to 2014 in Kibera and Lwak, Kenya to demonstrate the impact of the 10-valent pneumococcal conjugate vaccine (PCV10) on carriage of *Streptococcus pneumoniae* in children and adults. In order for the study to be successful, DBD's *Streptococcus* Laboratory helped the Kenya bacteriology lab (KEMRII) by training over 10 staff members in pneumococcal isolation and serotyping in the field lab, hosting key Kenyan laboratory staff in Atlanta for in-depth training, and providing support with quality control and assurance. Together, DBD's *Streptococcus* Laboratory and the KEMRII Laboratory analyzed 4,552 samples from study participants over the course of the study. Averaged across the study's timeframe, the project team found that almost 9 out of every 10 children and 3 out of every 10 adults in the areas carry *S. pneumoniae*. Since the introduction of PCV10 in 2011, there has been a steady decline in the carriage of *S. pneumoniae* strains that are covered by the vaccine.

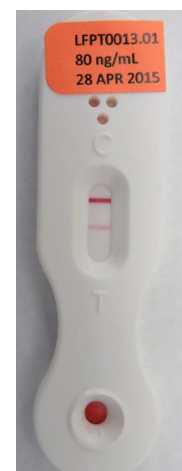


Photo: Example of a positive test with the new MPIR lateral flow diagnostic tool used to test for inhalation anthrax infection.

## New Culture-Independent Diagnostic Tool in Development for Anthrax Disease

The MPIR Laboratory is developing a point of care lateral flow test targeting symptomatic inhalation anthrax. This test uses a finger prick of blood on a lateral flow immunoassay, similar to a pregnancy test, to detect Anthrax Lethal Factor (LF), the earliest biomarker that indicates infection. The test requires only 20  $\mu$ L of blood to detect 10–20 ng/mL of LF, which is within the diagnostic range for inhalation anthrax.

## Streptococcus Laboratory Co-leading the Global Pneumococcal Sequencing Project

With the Wellcome Trust Sanger Institute and Emory Global Health Institute, DBD's *Streptococcus* Laboratory is leading the Global Pneumococcal Sequencing Project. The Sanger Institute is leading the whole genome sequencing of over 20,000 isolates of *Streptococcus pneumoniae* sequenced from across the globe. Approximately 2,000 strains of *S. pneumoniae* have been identified at the United States' Active Bacterial Core surveillance program alone, with an additional 3,000 strains identified from the Global Strain Bank. The sequencing will help researchers better understand the evolution of *S. pneumoniae*, both regionally and globally, and identify genetic changes and adaptations that allow bacteria to avoid current vaccines or become resistant to antibiotics.

## U.S. Patents Granted (9,046,520; 9,102,742): Serologic Correlates of Protection against *Bacillus anthracis* Infection

CDC inventors Vera Semenova (DBD/MVPDB), Conrad Quinn (DBD/MVPDB), Jan Pohl (NCEZID/DSR), and Pavel Svoboda (NCEZID/DSR) recently had two patents granted by the U.S. Patent Office. The patents will protect the intellectual property of unique sequences within the Protective Antigen (PA) protein toxin of *Bacillus anthracis*, the bacterium that causes anthrax disease. The inventors discovered that antibody responses to these regions of PA are correlated with vaccine induced protection against anthrax disease. They also discovered that antibodies raised against synthetic peptide versions of these sequences were able to neutralize anthrax lethal toxin in laboratory tests. The inventions improve understanding of vaccine induced correlates of protection. The discoveries may be used in developing synthetic peptide vaccines for anthrax.



# ...Laboratory Continued

## Advanced Molecular Detection Updates

### Historical *Legionella* Isolates Impacting Research Today

DBD's Pneumonia Response and Surveillance Laboratory is using today's advanced molecular detection technology to better understand *Legionella pneumophila*. The lab has cultivated historical samples from the 1970s that will be analyzed for comparison to the environmental and clinical strains that are circulating today. The sequencing data from these strains are being processed and analyzed through the newly developed bioinformatics pipeline and will be used to better understand the evolution of this bacterium and why some strains tend to cause more infection than others.

### Automated Bioinformatics Pipeline Established for *Streptococcus pneumoniae*

DBD's *Streptococcus* Laboratory has fully established and implemented its automated bioinformatics pipeline (ABP) for *Streptococcus pneumoniae*. The ABP can determine serotypes, antibiotic resistance, and genotypes based on over 1,500 pneumococcal isolates. So far, the ABP has characterized over 600 pneumococcal isolates that have caused invasive infections in 2015 and are projected to characterize over 3,000 isolates by the end of 2016. Pipelines for groups A and B *Streptococcus* are also being created and are expected to be functional by 2016.

### Bacterial Meningitis Laboratory Receives Funding for New Project

DBD's Bacterial Meningitis Laboratory was selected by the Office of Advanced Molecular Detection to receive funding for its new project, "Monitoring the Impact of Meningococcal and Hib Vaccines on Disease Burden Using Whole Genome Sequencing Based One-step Testing Scheme." This project will transform bacterial meningitis surveillance by replacing the large number and combination of tests (PCR, Sanger sequencing, and PFGE) with an automated genomic analysis platform, currently in development. The platform will streamline the management of whole genome sequencing data and allow for the unambiguous identification and characterization of *Neisseria meningitidis* and *Haemophilus influenzae*, two of the three leading causes of bacterial meningitis, in just one step including classification, serogroup/serotype determination, antibiotic resistance detection, new strain detection, and strain genome comparison. This process will not only expand the knowledge on these bacteria, but also reduce costs and labor and improve overall efficiency and accuracy of laboratory diagnosis. This platform will be web-based and can easily be expanded to include other bacteria.

### Bioinformatics Seminar Series Presentation on Pertussis

MVPDB's Stacey Martin and Michael Weigand participated in the Office of Advanced Molecular Detection's Bioinformatics Seminar Series on April 30, 2015. Their presentation focused on the state of pertussis in the United States and DBD's Pertussis and Diphtheria Laboratory's use of advanced molecular detection (AMD) to better understand genomic changes that make circulating strains different from those current vaccines target. With whole genome sequencing and PacBio RS II sequencing technology, DBD's Pertussis and Diphtheria Laboratory has actually found that pertussis is far more genetically diverse than once believed and that genetic changes are much more frequent than previously thought. This AMD-funded project continues to explore genome variation, using that data to help identify potential targets for future vaccines.

## Communications

### Get Smart Website Is Mobile-friendly

DBD launched a newly designed Get Smart: Know When Antibiotics Work website ([www.cdc.gov/getsmart/community](http://www.cdc.gov/getsmart/community)) in April. The website features new information for both consumers and clinicians in a format called responsive design. This allows users to view content on the new website in a way that is automatically optimized depending on the device used, including mobile phones, tablets, laptops, or widescreen computers.

### New Website Highlights Impact of EPIC Study

A new CDC website dedicated to the Etiology of Pneumonia in the Community (EPIC) study was launched in February ([www.cdc.gov/pneumonia/epic/](http://www.cdc.gov/pneumonia/epic/)). The EPIC study was a prospective, multicenter, population-based, active surveillance study to monitor the burden of pneumonia, as well as its causes, in order to help guide policy and future treatment recommendations. The new website provides an overview of the study, a map of the sites where surveillance was conducted (3 pediatric hospitals and 5 adult hospitals), and a collection of publications that have resulted from the study.

### New Campaign Promotes Maternal Tdap Vaccination

"Born with Protection against Whooping Cough," aims to increase awareness among pregnant women and healthcare providers that the whooping cough vaccine, Tdap, is recommended during the third trimester of every pregnancy. This recommendation helps protect babies from whooping cough during the first few months of life, when they are most vulnerable to serious disease and complications. Developed in collaboration with the American Academy of Family Physicians, American Academy of Pediatrics, American College of Nurse-Midwives, and the American College of Obstetricians and Gynecologists, the campaign includes a number of research-based resources for pregnant women (in English and Spanish) and healthcare professionals. Print materials can be ordered through CDC-Info on Demand.

Getting your whooping cough vaccine in your 3<sup>rd</sup> trimester...

helps protect your baby from the start.

Outbreaks of whooping cough are happening across the United States. This disease can cause your baby to have coughing fits, gasp for air, and turn blue from lack of oxygen. It can even be deadly. When you get the whooping cough vaccine (also called Tdap) during your third trimester, you'll pass antibodies to your baby. This will help keep him protected during his first few months of life, when he is most vulnerable to serious disease and complications.

Talk to your doctor or midwife about the whooping cough vaccine.

Born with protection against whooping cough.  
[www.cdc.gov/whoopingcough](http://www.cdc.gov/whoopingcough)

Image: New poster from the "Born with Protection against Whooping Cough" campaign.

## ACIP Recommends Serogroup B Meningococcal Vaccine

The Advisory Committee on Immunization Practices (ACIP) voted during its February meeting to recommend that persons 10 years of age and older who are at an increased risk for meningococcal disease should be vaccinated with serogroup B meningococcal vaccine. ACIP identified persons at increased risk to include those with persistent complement component deficiencies or anatomic or functional asplenia, and microbiologists routinely exposed to isolates of the bacteria that cause meningococcal disease (*Neisseria meningitidis*), as well as those identified to be at increased risk because of a serogroup B meningococcal disease outbreak. The recommendation became official CDC policy on June 12. During its June meeting, ACIP supported serogroup B meningococcal vaccination for teens and young adults (16 through 23 years olds) under a category B recommendation. A category B recommendation allows clinicians to weigh the risk of the disease with the risks and benefits of the vaccine for individual patients, while providing access to these vaccines. This new ACIP recommendation will become official CDC policy once published in the *Morbidity and Mortality Weekly Report (MMWR)*.

## ACIP Harmonizes Interval Recommendations for Adult Pneumococcal Vaccination

In June, ACIP voted to change the recommended interval between doses of pneumococcal conjugate vaccine (PCV13) and pneumococcal polysaccharide vaccine (PPSV23) for adults 65 years or older. The new recommendation is that PPSV23 should be given at least 1 year following a dose of PCV13; the previous recommendation was an interval of 6 to 12 months. This vote does not change the recommended 1-year interval between vaccinations if an adult 65 years or older has already received PPSV23 and needs PCV13. Instead, this recommendation will allow the recommended interval between these vaccinations to match, regardless of which vaccine is administered first.

## Meetings

The **Active Bacterial Core surveillance (ABCs) Steering Committee Meeting** was held May 18–19, 2015 in Atlanta, GA. It was the 20<sup>th</sup> anniversary and the “hot topics” included antimicrobial resistance and advanced molecular detection.

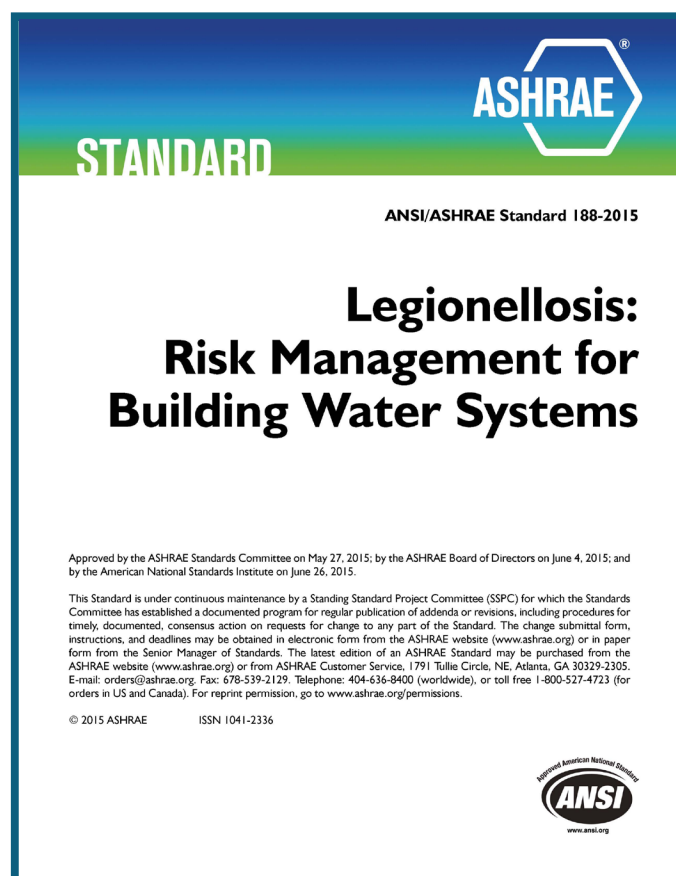
The **American Society for Microbiology (ASM) General Meeting** was held May 30–June 2, 2015 in New Orleans, LA and several DBD laboratory scientists presented at the meeting. **Al Benitez** presented “Rapid Detection of Human Pathogenic *Mycoplasma* Species Using a Multiplex Real-Time PCR Assay.” **Jeff Mercante** presented “Whole Genome Sequence Analysis for High Level Discrimination of *Legionella pneumophila* Isolated during Outbreak Investigations.” **Shatavia Morrison** presented “Bioinformatics Analysis Pipeline for Rapid Molecular Detection and Characterization of Atypical Bacteria that Cause Pneumonia.” **Vera Semenova** presented “Development of a High Throughput anti-PA IgG Enzyme-Linked Immunosorbent Screening Assay (ELISA) for Anthrax Emergency Response.” **Velusamy Srinivasan** presented “Real-Time PCR Assay for Detection of *Streptococcus suis* from Clinical Specimens.” **Lucia Tondella** presented “Reemergence of Pertussis and Considerations for Strain Evolution.” **Jonas Winchell** presented “Targeted Re-sequencing and Metagenomics Analysis to Identify and Characterize Pathogens in Respiratory Specimens from Unexplained Respiratory Diseases Outbreak (URDO) Responses.”

The **Pneumonia Investigators Meeting** was held June 8–9, 2015 in Washington, DC. The purpose of this meeting was to review the methods and results of various pneumonia and sepsis etiology studies. DBD staff presented on behalf of ANISA, the Aetiology of Neonatal Infections in South Asia project.

The **American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Annual Conference** was held June 27–July 1, 2015 in Atlanta, GA. In conjunction with the meeting, industry guidance on legionellosis was released: ANSI/ASHRAE Standard 188-2015, *Legionellosis: Risk Management for Building Water Systems*. The document, which DBD experts contributed to, establishes minimum legionellosis risk management requirements for building water systems. RBD’s **Claressa Lucas** co-chaired a discussion entitled “Electronic nicotine delivery systems and indoor air quality” for the ASHRAE Environmental Health Committee’s session.

Mark your calendar for these upcoming meetings:

- **Advanced Molecular Detection Day** at CDC, September 28, 2015, Atlanta, GA
- **IDWeek**, October 7–11, 2015, San Diego, CA
- **2<sup>nd</sup> Annual MenAfriNet Partners Meeting**, October 20–22, 2015, Niamey, Niger
- **American Academy of Pediatrics National Conference and Exhibition**, October 24–27, 2015, Washington, DC
- **American Public Health Association Annual Meeting & Exposition**, October 31–November 4, 2015, Chicago, IL



*Image: New guidance, Legionellosis: Risk Management for Building Water Systems, was released at the ASHRAE conference on June 26, 2015.*



# Awards

## 2014 CDC & ATSDR Civil Service Honor Awards

The CDC & ATSDR Civil Service Honor Awards celebrate the best of public service by recognizing the outstanding, talented, and dedicated staff of CDC for their contribution to improving public health and making the world a better place. DBD staff were recognized in several award categories at the 2014 ceremony on March 24, 2015.

The **Excellence in Frontline Public Health Service** was awarded to a group for the 2014 Unaccompanied Children Response. They won for superlative public health support during the humanitarian response to unaccompanied children crossing the U.S. border. Group members from DBD included: Alison Albert, Bernard Beall, Maureen Diaz, Louise Francois-Watkins, Ryan Gierke, Aaron Harris, Lindsay Kim, Miwako Kobayashi, Lesley McGee, Matt Moore, Kathy Thurman, Sara Tomczyk, Matthew Westercamp, Cyndy Whitney, and Jonas Winchell.

The **Excellence in Program Delivery, International** was awarded to the Latin American Pertussis Project Team for exemplary leadership and support of keeping CDC at the forefront of leadership in pandemic preparedness and response, emerging infectious diseases, and global health security. The group from DBD included: Anna Acosta, Elizabeth Briere, Pam Cassiday, Lucia Pawloski, Lucia Tondella, and Brunilis White.

The **Excellence in Laboratory Quality** was awarded to the Laboratory Safety Improvement Workgroup for exceptional contributions to accelerating improvements in laboratory safety and quality at CDC. DBD's Conrad Quinn was part of the recognized group for this award.

The **Excellence in Emergency Response, Ebola** was awarded to Deployers to West Africa. Group members from DBD included: Anna Acosta, Lucy Breakwell, Fabien Diomande, Steve Hadler, Rana Hajjeh, Brian Harcourt, Lindsay Kim, Preeti Kuty, Miwako Kobayashi, Lucy McNamara, Sarah Meyer, Ryan Novak, Manisha Patel, Tamara Pilishvili, Heidi Soeters, Jennifer Thomas, Kathleen Thurman, Tej Tiwari, Sara Tomczyk, and Emily Weston.



*Photo: Lucia Tondella, Chief, DBD's Pertussis and Diphtheria Laboratory, accepts the Excellence in Program Delivery, International award from CDC Director Tom Frieden at the 63<sup>rd</sup> Annual CDC & ATSDR Honor Awards ceremony on March 24, 2015.*

## Donald C. Mackel Memorial Award

RBD's Louise Francois-Watkins won the Donald C. Mackel Memorial Award for efforts involving response to a *Mycoplasma pneumoniae* outbreak associated with Stevens-Johnson Syndrome (see fall 2014 DBD Bulletin). This award is sponsored by the Epidemic Intelligence Service (EIS) Alumni Association and recognizes a current EIS officer for the oral or poster presentation that best exemplifies the effective application of a combined epidemiologic and laboratory approach to an investigation. Sara Tomczyk, in RDB, was also nominated for this award for response efforts to the outbreak of severe respiratory infections among unaccompanied children.

## Kaafee Billah Memorial Award

Ruth Link-Gelles and Matt Moore from RDB, along with several coauthors, won the 2014 Kaafee Billah Memorial Award in Economics Research at CDC for their paper, "Cost-Effectiveness of Using 2 vs 3 Primary Doses of 13-Valent Pneumococcal Conjugate Vaccine" (published in *Pediatrics*, 2013 <http://www.ncbi.nlm.nih.gov/pubmed/23821695>). The Billah Award has been presented by the Health Economics Research Group annually since 2008. The award recognizes outstanding published scientific contributions in economic research at CDC that apply economic methods, theories, and knowledge to analyze a public health problem. The Billah Award is named after former CDC economist, Kaafee Billah, PhD, (1967-2006), and is the first CDC award to honor contributions in the field of economics.

## Laboratory Safety Innovation Championship

Darbi Boulay was recently presented with the Laboratory Safety Innovation Championship award. Her winning idea was to create a database of laboratory safety incidents at CDC. Boulay was recognized in a Championship Ceremony, at which she presented her idea to the Office of the Associate Director for Laboratory Science and Safety leadership.



## Charles C. Shepard Science Award

Three papers with DBD authors were nominated for the 2014 Award:

- **Assessment Category:** Bowden KE, Williams MM, Cassiday PK, et al. **Molecular epidemiology of the pertussis epidemic in Washington State in 2012.** *J Clin Microbiol.* 2014;52(10):3549–57.
- **Data Methods Category:** Chen L, Schiffer JM, Dalton S, et al. **Comprehensive analysis and selection of anthrax vaccine adsorbed immune correlates of protection in rhesus macaques.** *Clin Vaccine Immunol.* 2014;21(11):1512–20.
- **Laboratory Category:** Srinivasan V, Metcalf BJ, Knipe KM, et al. **vanG element insertions within a conserved chromosomal site conferring vancomycin resistance to *Streptococcus agalactiae* and *Streptococcus anginosus*.** *MBio.* 2014;5(4):e01386–14.

The award is presented to the best manuscript on original research published by a CDC or ATSDR scientist in a reputable, peer-reviewed journal. The purpose of the award is to recognize excellence in scientific achievement by CDC and ATSDR authors of outstanding scientific papers and honor the memory of Charles C. Shepard whose career was marked by the pursuit of scientific excellence.

*Photo: Darbi Boulay, laboratory scientist, Microbial Pathogenesis and Immune Response Laboratory, won the Laboratory Safety Innovation Championship award on June 30, 2015.*

# Epi-Aids & Outbreak Investigations

**Meningococcal carriage study Epi-Aid**—Rhode Island, February & April 2015. A team of epidemiology and laboratory staff was deployed to conduct a *Neisseria meningitidis* carriage evaluation following a serogroup B outbreak at a college.

**Meningococcal carriage study Epi-Aid**—Oregon, March & May 2015. A team of epidemiology and laboratory staff was deployed to conduct a *Neisseria meningitidis* carriage evaluation following a serogroup B outbreak at a university.

**Meningococcal carriage study Epi-Aid**—Rhode Island, March & April 2015. A team of epidemiology and laboratory staff was deployed to conduct a *Neisseria meningitidis* carriage evaluation at a university in Rhode Island not experiencing an outbreak.

**Group A Streptococcal cluster Epi-Aid**—Conway, South Carolina, March 2015. A team was deployed to assist the South Carolina Department of Health and Environmental Control in determining the extent of an outbreak in a long-term care facility, evaluating infection control practices, and implementing control and prevention measures.

**Legionnaires' Disease outbreak**—Bronx, New York, August, 2015. A team of epidemiology, laboratory, and environmental health staff was deployed to help investigate and respond to a large community-associated cooling tower outbreak of Legionnaires' disease.

**Meningococcal disease outbreak**—Niger, April–June 2015. A team of 6 CDC staff was deployed to Niger to provide epidemiologic and laboratory support in response to the largest serogroup C meningococcal disease outbreak in Africa.

**Meningococcal disease outbreak Epi-Aid**—Chicago, Illinois, June 2015. A team was deployed to assist the Chicago Department of Public Health in better targeting vaccination campaigns in response to a serogroup C meningococcal disease outbreak by conducting a knowledge, behaviors, and practices survey among targeted populations.

**Pneumococcal carriage study Epi-Aid**—Texas, August, 2015. In July 2014, an outbreak of severe respiratory illness occurred among unaccompanied children, mostly adolescents, crossing the U.S.-Mexico border and residing in shelters operated by HHS' Office of Refugee Resettlement. The outbreak involved multiple etiologies, including influenza and *Streptococcus pneumoniae* serotype 5, a serotype that rarely causes disease among U.S.-borne children. Rapid implementation of influenza vaccine and 13-valent pneumococcal conjugate vaccine (PCV13) led to interruption of transmission and there were no additional cases for the remainder of the summer. Since then, however, the number of children crossing the U.S.-Mexico border has declined dramatically and crowding in shelters has been greatly relieved. To determine whether continued use of PCV13 is necessary, a team was deployed to conduct a pneumococcal carriage study among currently arriving children who are first staying in shelters.



*Photo: Anna Llewellyn (RDB LLS Fellow) and Jeff Mercante (RDB Microbiologist) examine environmental sample isolates during the NYC Legionnaires' disease outbreak investigation.*

## Publication Highlights

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# ...Publication Highlights Continued

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