
Communicable Disease Services

Multnomah County Health Department



A Year in Review, 2016

Contents

Introduction: Sharing a Year in Review	1
Program Activities and Outcomes	3
Communicable Disease Services Investigations and Case Management	3
Disease Specific Programs	6
<i>Metro Area Pertussis Surveillance (MAPS) Program</i>	6
<i>Perinatal Hepatitis B Prevention Program</i>	7
<i>Emerging Infectious Diseases</i>	8
<i>TB Case Management</i>	9
Communicable Disease Services Clinic	11
Population-Specific Programs	12
<i>TB Screening, Evaluation, and Treatment for People in Shelter Settings</i>	12
<i>TB Evaluations and Treatment for Recently-Arrived Refugees and Immigrants</i>	12
<i>Occupational Infectious Disease Program</i>	13
<i>Immunizations for Children and Adults</i>	14
Community Immunization Program	15
Why This Work Matters	18
Disease Investigators Track Down and Halt the Spread of Dangerous Meningococcal Disease	19
Managing Large and Complex Pertussis Outbreaks	20
A Fresh Start for a Premature Baby	21
A Young Man with Multidrug-Resistant Tuberculosis is Smiling Again	22
Health Literacy: An Immigrant’s Story	23
Community Health Workers Successfully Use Analogy to Teach about Tuberculosis	24
Reluctant Client Commits Completely to Latent Tuberculosis Infection Treatment	25
Community Immunization Program Protects Children From Disease	26
A Note from the Occupational Infectious Disease Program Nurse	26
Communication and Training Makes School Immunization Reporting Process Easier for Schools	27
What We are Watching in 2017	28
Appendix	29

Introduction: Sharing a Year in Review

Multnomah County Health Department's Communicable Disease Services (CDS) delivers the type of core public health work that has protected people for more than 100 years. This second *Year in Review* highlights our 2016 activities and achievements. It provides information and stories that help explain our work and how we serve the almost 800,000 residents of Multnomah County.

In CDS, we respond to diseases and conditions that are reportable under Oregon statute and rules. Diseases are reportable if they can cause serious health effects and if we have interventions to stop them. We also track new public health threats to make sure they don't gain a local foothold. Sexually transmitted infections like syphilis and gonorrhea are handled in another program, and not included here.

Our communicable disease investigations, tuberculosis (TB) prevention work, and immunization services are provided across closely coordinated teams within CDS.

- The **CDS Investigations and Case Management (ICM)** team determines when a disease report meets a public health case definition; identifies people exposed to reportable diseases (contacts); ensures healthcare provider access to necessary lab tests; and coordinates client and contact access to treatment. They are our disease detectives. When a preventable public health concern is identified, they investigate to find out who was exposed, and how to prevent ongoing disease spread.
- The **CDS Clinic** team provides direct client services, mostly for people who have latent TB infections and people who need essential immunizations. They also reach out into the community to ensure access to TB screening and medications. Occupational infectious disease screenings and trainings for Health Department employees are also provided through the clinic.
- The **Community Immunization Program (CIP)** ensures access to immunizations provided under the Federal Vaccines for Children and Section 317 programs. CIP also enforces Oregon rules on school immunization requirements and provides technical assistance to providers for safe vaccine storage and handling.

In addition to these teams, CDS Epidemiologists support the work of all the teams, working on complex outbreaks and program evaluation. Our Community Liaison supports response and preparedness activities, and our Data Analyst follows our business and IT needs.

This 2016 *Year in Review* features information and stories from many of our staff.

Program Activities and Outcomes

CDS Investigations and Case Management

There are more than 60 reportable communicable diseases and conditions that can potentially be investigated by the CDS Investigations and Case Management (ICM) team. The ICM team receives reports from healthcare providers and laboratories throughout Multnomah County, who are legally required to report diseases, as well as from the public. Each disease or condition has its own specific guidelines to follow during an investigation.

The ICM team is usually notified about reportable conditions by fax, phone call, or electronic lab report. Each new case report is assigned to a registered nurse or epidemiologist. Their investigations include timely interviews of people affected, as well as planning for appropriate interventions. This process includes patients, health care providers, and other community partners. Interventions that may be recommended or provided include preventive treatment, disease screening, and health education.

In 2016, ICM staff investigated or followed up on **2,590 cases** of reportable conditions (see Appendix, Table A1). For most conditions, people receive a required standardized interview and health education about their illness. Chronic hepatitis B and C are the most commonly reported diseases. For these, laboratory and provider reports are reviewed to determine risk. Investigations are conducted for people with acute disease and for women who are pregnant (see Perinatal Hepatitis B Program description). Some conditions, like *campylobacter*, are followed up with a letter unless a cluster of related cases is identified.

What is a reportable condition?

All Oregon physicians, other healthcare providers, and laboratorians are required by law to report certain diseases and conditions to local health departments. These diseases and conditions are known as *reportable conditions*. The timing of reports for each reportable condition reflects the severity of the illness or condition and the potential value of rapid intervention by public health agencies. A full list of reportable conditions is available on the State of Oregon website.

Source: Oregon Health Authority (OHA)



The Investigations and Case Management Team gathers to debrief at the end of each day.

In the course of their work, ICM staff assess information from hundreds of phone calls, faxes, and electronic lab reports (Table 1). They use these to determine the presence or absence of a reportable disease. Some situations are also investigated if they present a high risk for a serious disease. For example, some animal bites carry a risk for rabies. The ICM team and Multnomah County Animal Services officers work together to evaluate a person's risk after a bite. They ensure the person bitten has access to preventive treatment if needed.

All investigations require partnership. ICM nurses and epidemiologists may partner with hospitals, clinics, other Health Department programs (especially Environmental Health), the Oregon Public Health Division, or others to prevent the further spread of illness.

The ICM team also investigates outbreaks that occur in schools, daycare centers, long-term care facilities, restaurants, and other places in our community. Team members interview both ill and well individuals to find common exposures, trying to identify the cause of the outbreak and stop others from becoming ill.

A total of **66 outbreaks** were confirmed by the ICM team from a variety of facilities in 2016 (Table 2). Some outbreaks are caused by diseases that are individually reportable. For example, in the fall of 2016, an outbreak of cryptosporidiosis in a pool in Clackamas County affected 29 Multnomah County residents, making our cryptosporidiosis case count also look high during those months (Figure 1).

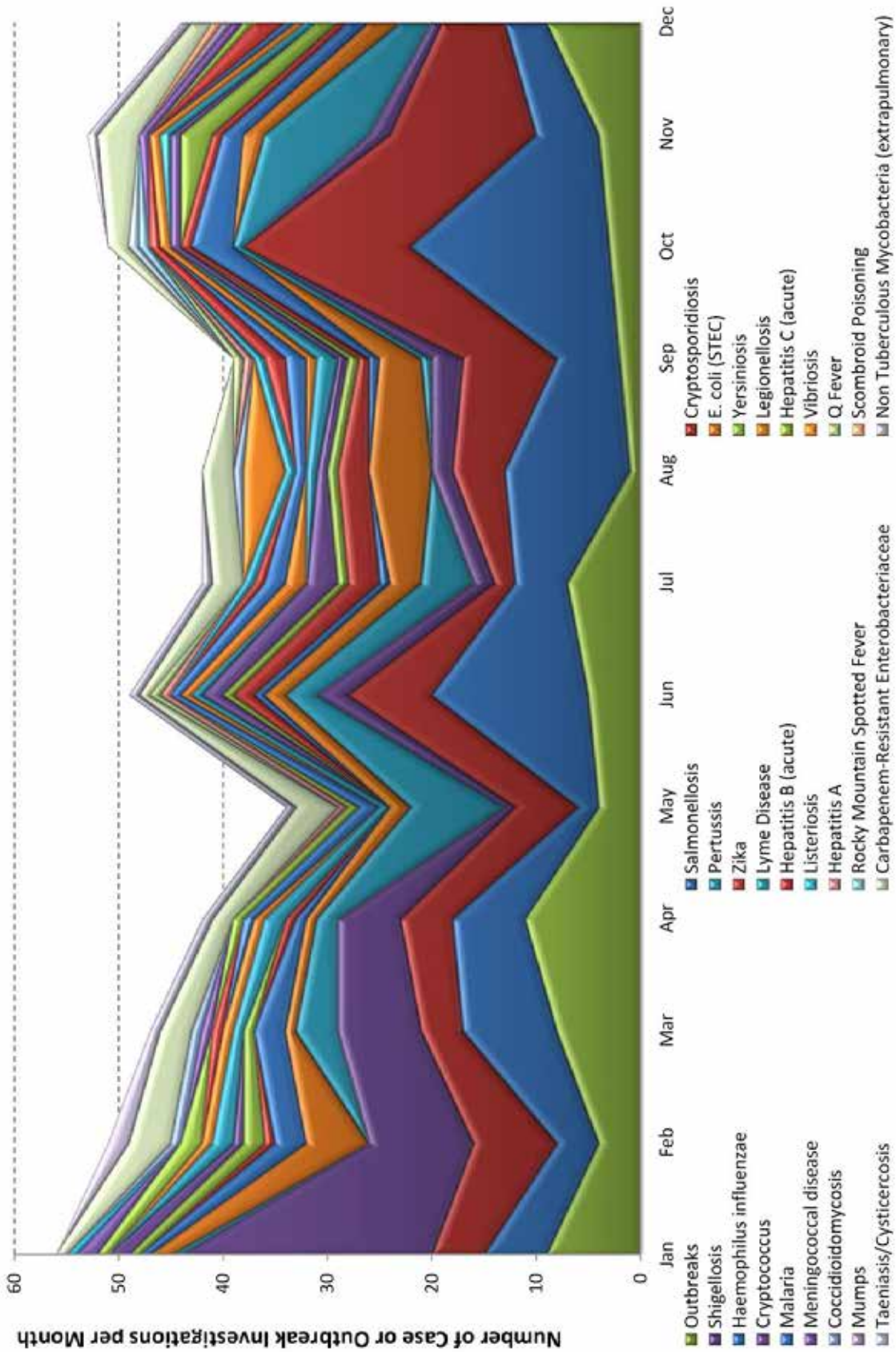
Public complaints about restaurants go to the Health Department's Environmental Health (EH) program, which is also responsible for inspecting restaurants. The Environmental Health Specialists who log these complaints contact the ICM team if they suspect a foodborne disease outbreak. In 2016, more than 100 restaurant complaints were recorded by EH. From these, **five restaurant-related investigations** were conducted by the ICM team in partnership with EH.

What is a cluster of cases or illness?

A cluster is a greater than expected number of cases (confirmed, presumptive, or suspect) of disease in a given time, place, and population group likely resulting from common or related exposures. Disease investigators try to determine the relationship between the cases in a cluster. Sometimes the relationship is clear, but the source of illness is difficult to determine. For example, there may be a cluster of reported cases eating at the same restaurant, but the source, or what specifically at that restaurant made people sick, is unknown. Other times, the relationship between the cases in a cluster is not clear. When this happens, disease investigators will create a questionnaire to try to determine how the cases in a cluster are related. For example, there may be a cluster of cases with the same type of salmonella being reported in the same neighborhood, but there are no clear relationships between the cases.

Source: Centers for Disease Control and Prevention (CDC)

Figure 1: Reportable Disease and Outbreak Investigations, Excluding TB
 Multnomah County Health Department, Communicable Disease Services, 2016



The Investigations and Case Management team investigated a broad array of diseases and conditions with varying caseloads in 2016. The variation in disease type and investigation numbers from month to month highlight the skill needed by ICM team members.

Table 1

**Reports Not Resulting in a Confirmed or Presumptive Case
(excluding Emerging Diseases and Disease Outbreaks)**

Multnomah County Health Department, Communicable Disease Services, 2016

Description	Number
Animal Bites	191
Investigated Reports (disease ruled out or suspect case only)	
Enterics	66
Lyme Disease	58
Hepatitis	38
Pertussis	35
Other	64
Sub-total Investigated Reports	261
Lab Reports not Requiring Investigation	
Negative Result (72% Hepatitis C confirmatory testing)	257
Immunity Testing (hepatitis B, measles, polio, rabies).....	80
Other	37
Sub-total Lab Report Only.....	374
Total	826

Table 2

Confirmed Disease Outbreaks Investigated

Multnomah County Health Department, Communicable Disease Services, 2016

Description	Norovirus or Noro-like	Salmonella	Other GI	Influenza	Other Respiratory	Other	PFGE Linked	Total
Outbreaks Investigated:	30	3	5	14	10	4		66
Persons:								
Potentially Exposed*	2, 413	33	555	1,767	1,300	1,152		7,220
Total Number Sick	484	29	99	198	81	91		982
Confirmed Cases	34	19	4	65	36	37	38	233
Facility Type:								
Hospital	2	0	0	0	1	0		3
Long-term Care Facility	18	0	0	13	5	0		36
Restaurant/Caterer	2	2	1	0	0	0		5
School/Child Care Facility	4	0	2	0	4	4		14
Home/Non-catered Event	0	1	2	0	0	0		3
Other	4	0	0	1	0	0		5

*not collected on all outbreaks

Disease Specific Programs

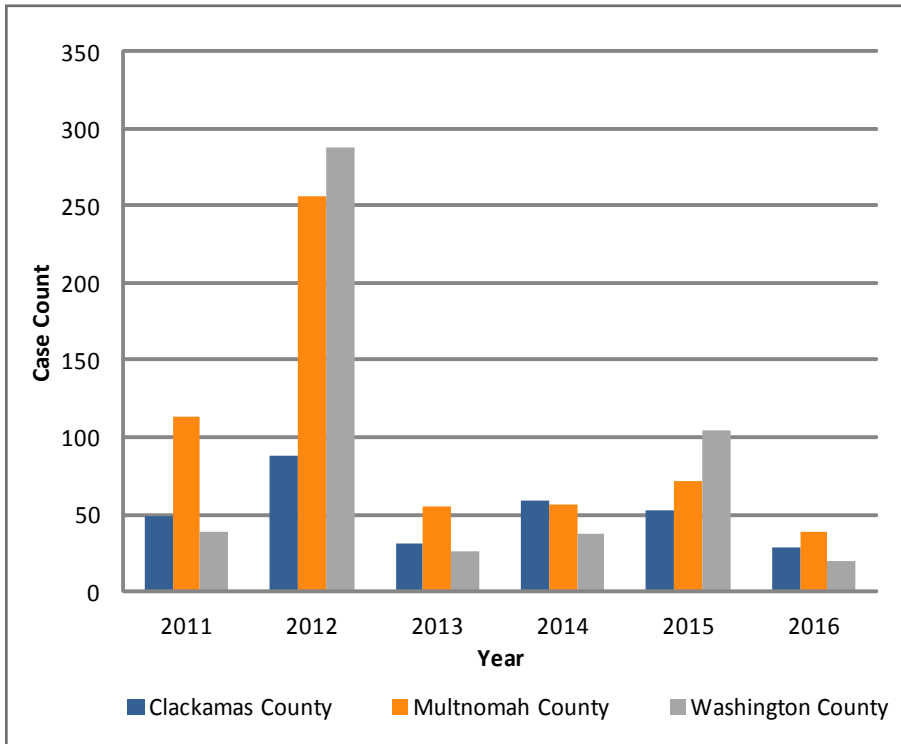
Metro Area Pertussis Surveillance (MAPS) Program

Metro Area Pertussis Surveillance (MAPS) is a Centers for Disease Control (CDC)-funded, enhanced public health surveillance program that includes tracking and investigation for all reported pertussis cases in Multnomah, Clackamas, and Washington Counties (the tri-county Portland metropolitan area). People with pertussis and their close contacts are asked questions ranging from immunization history to duration of cough, in order to protect others from pertussis and better understand the disease in the community.

In 2016, **88 confirmed and presumptive cases** of pertussis were reported. The 2016 incidence rate of 4.9 cases per 100,000 people was low compared to most of the previous five years. Of the 88 cases in 2016, 29 were residents of Clackamas County, 39 were residents of Multnomah County, and 20 were residents of Washington County. As seen in Figure 2, 2012 remains the most recent epidemic year, with 632 cases throughout the three-county metro area.

Figure 2: Pertussis Cases by County and Onset Year

Multnomah County Health Department, Communicable Disease Services, 2011 – 2016



Passive vs. Enhanced Surveillance

The most common type of disease reporting for communicable disease is called *passive surveillance*. In passive surveillance systems, public health programs wait for disease reports to come to them, usually after a healthcare system diagnosis has been made. There is no active search for cases.

For *enhanced surveillance*, the original case usually comes in through passive surveillance, but the follow-up lasts longer. Cases may be followed all the way through their illness, to characterize the course of disease. Case contacts may be actively followed over days or weeks to see if they become cases. Enhanced surveillance is used for gathering additional disease- or event-specific information.

Source: CDC

Incidence vs. Prevalence Rates

Incidence is the occurrence of new disease cases. *Prevalence* is the proportion of persons in a population who have a particular disease. Both look at cases during a specified period of time. The biggest difference between the two is that prevalence includes both new and pre-existing cases and incidence includes only new cases.

Source: CDC

Perinatal Hepatitis B Prevention Program

The Perinatal Hepatitis B Prevention Program works to prevent hepatitis B transmission from pregnant women to their infants. Hepatitis B is a virus passed between people through exposure to blood or other bodily fluids. The transmission risk from a mother with hepatitis B to her baby during birth is particularly high, so protecting newborns is essential. Hepatitis B testing is a routine part of prenatal care.

The CDS Perinatal Hepatitis B Prevention Program epidemiologist follows up with all pregnant women who have hepatitis B. Before the birth of her baby, each woman gets counseling on how to protect household members, sexual contacts, and her newborn from getting hepatitis B.

After each birth, the epidemiologist follows up with the infant’s health care provider to ensure the infant gets the necessary immunizations to develop immunity. When the infants are at least nine months old and have received all the hepatitis B vaccines, she works with their providers to do a blood test that will confirm the baby’s immunity. Collaboration with local providers and hospitals is essential to the success of this program.

About 50 to 60 infants are born to hepatitis B positive mothers in Multnomah County each year. Of the perinatally exposed infants who reached 18 months of age in 2016, **98% were tested** to see if they were immune to, or infected with, hepatitis B (Table 3).

Since 2013, Multnomah County Health Department has tracked vaccination and testing for more than 200 infants born to hepatitis B-positive mothers, only one of whom has developed the disease. Perinatal hepatitis B transmission rates vary widely due to variations in the mother’s infectivity at delivery. Without vaccination, the CDC estimates that between 10% and 90% of infants born to hepatitis B-positive moms would contract hepatitis B. Without this program, we could expect at least 20 infants, and possibly as many as 180 infants, in Multnomah County, to have developed hepatitis B from 2013 through 2016.

Why do we need to protect infants?

The age of a child when it becomes infected with hepatitis B affects their risk of developing hepatitis B-related cirrhosis of the liver or liver cancer later in life. Premature death from liver disease is seen in one in four people who become infected as infants or young children. Up to 90% of infants who contract hepatitis B at birth develop chronic infections. Vaccinating infants who are exposed at birth not only prevents transmission from mother to baby, but is 95% effective in conferring lifelong protection to infants.

Source: CDC

Table 3

Perinatal Hepatitis B Prevention, Exposed Infants Reaching 18 months of age in 2016 (N = 57¹)

Multnomah County Health Department, Communicable Disease Services, 2016

Level of Completion	Number	Percent
Infants receiving hepatitis B immune globulin and hepatitis B vaccine at birth	57	100%
Infants completing 3-dose hepatitis B vaccine series by 12 months old	57	100%
Infants receiving hepatitis B post-serological testing by 18 months old ²	56	98%

¹ One infant who died due to unrelated causes and three infants who moved out of state prior to 18 months of age are excluded from analysis.

² One infant was lost to follow up after completing the vaccine series, but before completing testing. Of the tested infants, one had contracted hepatitis B. All others were immune to hepatitis B.

Emerging Infectious Diseases

With the completion of Ebola virus monitoring in January 2016 and reduced reporting of Middle Eastern Respiratory Syndrome (MERS-CoV), the main emerging disease threat monitored in Multnomah County in 2016 was Zika virus.

In May 2015, locally acquired cases of Zika virus were reported in Brazil. By November 2015, the Brazilian Ministry of Health declared a public health emergency due to an unusual increase in children born with microcephaly, a severe brain defect. On January 22, 2016, the U.S. Centers for Disease Control and Prevention (CDC) activated its Emergency Operations Center to respond to Zika in the Americas, including associated birth defects and Guillain-Barré syndrome.

While the mosquito species known to transmit Zika virus is not found in Oregon, Multnomah County residents traveling to and from areas with active transmission were at risk and remain at risk. With the help of CDC Public Health Emergency Preparedness funding, CDS was able to anticipate and respond to the Zika virus threat to the community.

CDS collaborated closely with the Oregon Public Health Division to create and revise local protocols for Zika testing and prevention. The team, working closely with the Health Department’s Medical Director and Health Officer, responded to calls from the public and healthcare providers, providing evidence-based travel recommendations and approving Zika testing when appropriate.

Oregon State Public Health Laboratory began offering testing at the end of January 2016 for Oregon residents who traveled to, or came from, countries with ongoing Zika epidemics. With each test, the CDS team collected (and continue to collect) relevant clinical and demographic information for each suspect case. There were **13 confirmed or presumptive cases** of Zika virus in returning travelers, and **no cases** of congenital Zika syndrome in infants (Figure 3).

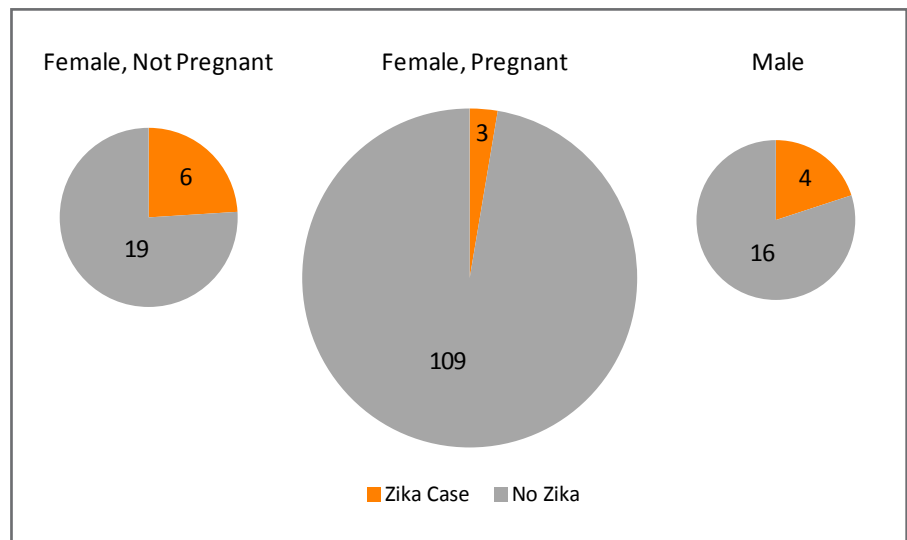
Testing criteria and preventive recommendations for Zika evolved as the international scientific community accelerated study of the virus and its effect on human health. CDS, along with

What is an emerging disease?

An emerging disease is one that has appeared in a population for the first time, or that may have existed previously, but is rapidly increasing in incidence or geographic range.

Source: World Health Organization

Figure 3: Zika Testing Submitted by Local Provider Offices to the Oregon State Public Health Laboratory, Multnomah County Residents
 Multnomah County Health Department, Communicable Disease Services, 2016



state partners, has stayed up to date on these developments to ensure that our community is well informed.

Zika information is shared through the Multnomah County website, as well as through presentations and media appearances. Information on Zika cases in pregnant women and infants are now submitted through the Oregon Public Health Division to the CDC's Zika Pregnancy Registry. Information in the registry is used to identify how the virus affects pregnancy and infant outcomes, and to update recommendations for families affected by Zika virus.

TB Case Management

Both the CDS Investigations and Case Management Team and the CDS Clinic are involved in tuberculosis (TB) prevention. Through the close coordination of these two teams, CDS provides evaluation and treatment of active and latent TB for Multnomah County residents, and serves as regional support for neighboring counties.

The TB Case Managers in the ICM team focus their attention on all of Multnomah County's active cases of TB disease and on the contacts of these cases. Most of the TB cases come to the program through provider reporting. New cases are assigned to a Nurse Case Manager, who then handles all the coordination and follow-up needed to assure a successful outcome for the client and the community. This work includes:

- Developing treatment plans with the client's healthcare provider.
- Coordinating directly observed therapy (DOT) with outreach staff.
- Evaluating people under treatment for possible medication side-effects.

TB Case Managers also ensure that the contacts of infectious active cases are identified, screened, and offered treatment for latent TB infection if needed. All of this occurs over the months to years that it takes to complete treatment. Important milestones in case management include determining the infectivity of each person, as well as establishing when each person ceases to be infectious.

In 2016, CDS TB Nurse Case Managers evaluated **55 reports** of active TB disease, including screening and laboratory testing for clients seen by outside

What is Latent TB Infection?

Persons with latent TB infection (LTBI) do not feel sick and do not have any symptoms. They are infected with *Mycobacterium tuberculosis*, but do not have TB disease. The only sign of TB infection is a positive reaction to the tuberculin skin test or TB blood test. People with latent TB infection are not infectious and cannot spread TB infection to others. Without treatment, 5% – 10% of people with LTBI will develop active (infectious) TB disease at some time in their lives.

Source: CDC



Nurse Angelica Barron regularly reviews TB medications with patients.

providers. From these reports, **27 people** with active TB disease were identified, most of whom were infectious when they were identified. One case was identified at autopsy.

It takes a great deal of time to work up a TB case. Screening extends to eight weeks after last exposure and case treatment can go on for months or even years. Thus, the success of 2016 cases will not be known until a year or two from now. However, for **27 cases** identified in 2015, TB Case Managers identified **231 contacts**, 22 of whom were newly diagnosed with latent TB infection. Of these 22 people, 18 (82%) started treatment for their latent infection, and 15 of those (83%) completed that treatment. These latent infection treatment initiation and completion rates exceed national averages of 68% – 71% and 44% – 46%, respectively. (Source: CDC)

Complicating treatment of both those with active TB and those with latent TB and their contacts is the increasing presence of multidrug-resistant (MDR) TB cases. MDR TB used to be rare in Multnomah County—only one case every few years before 2012. Since then, there has been at least one new case of MDR TB each year. People with MDR TB require lengthy treatment (up to 3 years) with drugs that can be difficult to administer and to obtain. The lengthy and unusual regimens also add cost. Not only are the second and last line drugs very expensive, but most are not included in the federal 340B program, which covers the pharmacy cost of all first line TB drugs.

How much does MDR TB treatment cost?

Multidrug-resistant TB is relatively rare in the U.S., but treatment comes at a terrible price. It is very expensive and takes a long time to complete. It disrupts lives and has potential life-threatening side effects. The average cost of treating someone with TB disease increases with greater resistance. Direct costs average from \$18,000 to \$494,000. This average does not include productivity losses experienced by clients while undergoing treatment.

Source: CDC

Communicable Disease Services Clinic

The CDS Clinic is essential to the TB prevention program, providing screening, evaluation, and treatment for people at high risk of developing TB disease. In Oregon, this includes the sheltered homeless, persons arriving in the U.S. from a country where TB is common, and contacts of local cases. The TB Case Managers and TB Medical Director also see clients in the clinic. Clinic field workers ensure directly observed therapy (DOT) for both active TB disease and latent TB infection.

The work in the clinic is closely coordinated with the work of both the ICM team and the Community Immunizations Program to provide a full-spectrum of services—population-based and clinical. The CDS Clinic is a safety-net provider for immunizations. In addition, clinic staff provide occupational infectious disease screenings and trainings for Health Department employees. Combined, these programs prevent the spread of preventable, life-threatening communicable diseases.

In the CDS Clinic during 2016, staff screened or evaluated more than 3,000 clients for TB, 222 of whom initiated treatment for latent TB infection. They immunized more than 1,300 children and adults, and provided occupational infectious disease screening services for more than 1,500 county employees.

What is Directly Observed Therapy?

Directly Observed Therapy (DOT) is a strategy used to ensure that patients with TB take all their medications. In DOT someone watches the patient taking their medications every day. Observed doses are essential because TB is very susceptible to developing drug resistance. It also supports patient safety throughout the long, multidrug treatment period. In Oregon, it is the standard of care required for people being treated for active TB disease and sometimes latent TB.

Source: CDC



Clients are greeted in person and on the phone at the CDS Clinic by the friendly CDS clinic staff, including Maria Ramirez.

Population-Specific Programs

TB Screening, Evaluation, and Treatment for People in Shelter Settings

TB Shelter Screening is the largest program within the CDS Clinic, serving **2,590 people** experiencing homelessness in 2016 (Table 4). Most of those screened live in dormitory-style shelters. TB can spread explosively in this type of setting, exposing large numbers of people who sleep in tight quarters.

Individuals experiencing homelessness are initially seen by the CDS Clinic’s outreach staff at a site hosted by Transition Projects Inc. There, they receive a TB skin test. If the test is negative, the person is issued a TB clearance card—called a *Blue Card*. If the test is positive, the person is given additional information on TB and encouraged to seek further evaluation at the CDS Clinic. People who have screened positive in the past may come directly to the clinic for an evaluation that includes a symptom assessment and a chest x-ray. Those with no indication of active, infectious TB disease, are given a *Blue Card*.

TB Evaluations and Treatment for Recently-Arrived Refugees and Immigrants

Globally, TB is a leading cause of death. Another important component of CDS Clinic activities is providing TB evaluations and latent TB infection treatment for persons arriving from parts of the world where TB is still a relatively common concern.

Refugees are referred to the CDS Clinic from the Health Department’s Mid-County Clinic refugee screening program. In addition, CDS Clinic staff see people who arrive through immigration visa programs and who had a TB finding at an overseas screening. These individuals usually present with latent or past TB infection, as persons with active infectious TB disease are not allowed to travel to the U.S. until their disease is treated.

The evaluations for refugees range from chart reviews to an additional round of screening tests and chest x-rays. In 2016, the CDS Clinic staff evaluated **394 refugees** referred from Mid-County Clinic, and **77 immigrants** referred directly from an overseas screening. A grant from the federal Office of Refugee Resettlement supports follow-up with refugees who

Table 4	
TB Screening, Evaluation, and LTBI Treatment	
<i>Multnomah County Health Department, Communicable Disease Services Clinic, 2016</i>	
Description	Clients
Homeless Shelter Patrons and Employees	2,590
Newly Arrived Refugees	394
Class B Immigrants (non-refugees)	77
Clients Initiating LTBI Treatment	222

initiate latent TB infection (LTBI) treatment, to improve the number who complete their treatment. The Community Health Worker in this role is also actively engaged with the Immigrant and Refugee Community Organization (IRCO) and other local refugee service providers in conducting general health education classes for newly arrived refugees and immigrants.

Occupational Infectious Disease Program

The Oregon Occupational Safety and Health Administration (OSHA) provides a legal framework and guidance for ensuring worker safety in all industries. In addition, the CDC provides many related best practice recommendations. Between these two agencies, specific regulations and guidelines exist for people with a high risk of exposure to infectious diseases because of their work.

The Occupational Infectious Disease Program (OID) provides services that ensure the county meets or exceeds these requirements. In addition to providing direct services, OID staff also participate on departmental committees, like Safer Sharps, that seek to prevent workplace exposures (Appendix, Table A2).

The Airborne Pathogen Protection Program includes tuberculosis screening for all new Health Department employees who have face-to-face contact with clients in the health clinics, in the field, or in outreach locations. Annual Worksite TB Risk Assessments are conducted to identify medium- to high-TB-risk worksites. Employees at those worksites continue to receive TB screenings annually.

Employees who have face-to-face contact with clients also must have proof of immunity to measles, mumps, rubella, and varicella. For employees who need vaccines, for either these diseases or others like pertussis, vaccinations are given at no cost to the employee. OID also works with the department's large primary care and corrections health programs to promote annual influenza vaccinations.

The Bloodborne Pathogen (BBP) Program covers all employees whose work tasks or job duties place them at increased risk of exposure to blood or related potentially infectious materials. These employees must have proven immunity to hepatitis B. If not, they



A Health Department employee gets a TB test (PPD) from the Occupational Infectious Disease Program nurse.

can receive hepatitis B immunization at no cost to themselves. The BBP Program also includes new employee and annual on-line BBP training. The training covers personal protective equipment, safer sharps, and other engineering controls designed to protect employees and clients from exposure to hepatitis B, hepatitis C, and HIV, as well as what to do in the event of a BBP exposure.

In 2016, the Occupational Infectious Disease Program provided services to **1,518 county employees**. Services included baseline and annual TB screening, bloodborne pathogen training, immunity testing, and immunizations (Appendix, Table A2). The program also investigated two exposures to infectious pulmonary tuberculosis with a total of **12 exposed employees**. To date, no employee TB conversions have resulted from any of these exposures.

Immunizations for Children and Adults

The immunizations provided through the CDS Clinic are usually for children needing vaccines to attend school or a daycare. Staff also immunize people who are at risk because of exposure to someone with a reportable disease like hepatitis B. These clients are never turned away due to inability to pay.

In 2016, **935 children** (under 19 years old) and **381 adults** received immunizations, for a total of 1,316 people. The children and teens received **2,923 doses of vaccine**—an average of almost three immunizations each. The vaccines that were provided covered eighteen combinations of vaccine antigens (Appendix, Table A3). Pertussis was the most common disease protected against from these combinations of vaccines, with 864 pertussis antigen containing immunizations provided.

Over the last several years, the numbers of vaccines directly provided through the CDS clinic has decreased. This is generally a good sign, indicating that people have access to vaccines through other sources like primary care providers and pharmacies.



Nurse Jennie Green draws up vaccine to give to a patient in the CDS clinic.

Community Immunization Program

In addition to directly offering immunizations (Appendix, Table A3), the Community Immunization Program makes sure that there is the infrastructure in place to protect people in Multnomah County from vaccine-preventable diseases. This infrastructure includes implementation of Oregon rules related to school immunizations and making sure that community clinics in the area can get federally-supplied vaccines to their clients.

Changes to state school immunization laws in 2016 required that parents with existing vaccine exemptions for their child update their child's status. The Community Immunization Program followed these changes, and supported parents, childcare providers, and schools in their implementation.

Changes for parents included a new nonmedical exemption process. To submit an exemption for their child's immunization, parents now have to receive education about the benefits and risks of each vaccine prior to claiming the exemption. This education can come through their health care provider or from an online video.

In 2016, exemptions among Multnomah County's school children (grades K-12) fell by almost a full percent (5.7% in 2015 to 4.8% in 2016) eliminating approximately 900 nonmedical exemptions. This drop was likely a combined result of this new process and the after-effect of a national measles outbreak.

Also in the 2016 immunization changes, schools and childcare facilities (both referred to as facilities here) with more than 10 children are now required to publicly provide their immunization and nonmedical exemption rates to parents two times each year. Facilities must report their rates 30 days after school starts and 30 days after exclusion day. Parents must have access to the information three ways: parent newsletters, facility websites, and postings in a main facility office.

To support this new requirement, the program developed the tagline, *Twice a Year, Three Ways*, and incorporated it into all trainings, webinars, and e-mail communications to facilities.

What is a vaccine exemption?

While most parents in Oregon vaccinate their children, Oregon law allows parents to obtain exemptions from having their child vaccinated against specific diseases. Parents have two exemption options:

1.) Medical exemptions from a health care provider are for children who should not, or cannot, get a particular vaccine due to a health concern.

2.) Nonmedical exemptions are for children whose parents have requested the exemption after doing one of the following:

- Talking to their health care provider and obtaining a Vaccine Education Certificate.
- Watching an online education module for each vaccine and obtaining a certificate to complete the nonmedical exemption request.

Source: OHA



In 2016, changes to state immunizations laws required parents to update their children's vaccine exemption status.

Facilities also post Multnomah County’s overall childhood immunization coverage information, so parents can compare their facility to the county as a whole. Having all of this information easily accessible allows parents to assess the status of their child’s school. It also provides additional information for parents looking for a new school or childcare facility.

Facility-level records also help the public health response to a disease outbreak caused by a vaccine-preventable condition. The records provide an indication of how quickly a disease may spread and what interventions are required to limit this spread.

For all of the different types of vaccines required in Oregon schools, up-to-date vaccine coverage of children is better for school-aged kids than for their younger counterparts (Figure 4). Parents of young children are more likely to claim nonmedical exemptions for one or more vaccines than are parents of older children.

While the vast majority of immunizations in Multnomah County are provided through health care providers, the role of CDS as a trusted safety-net provider also comes into play around school exclusion time. Around this time in February each year, the Community Immunization Program and the CDS Clinic combine forces to provide last minute vaccinations to keep kids in school.

After letters go out to parents that their children might be at risk of being kept out of school, the Community Immunization Program provides outreach clinics at multiple sites across the county to make it easier for parents to get their kids vaccinated. In winter 2016, the program vaccinated **467 children** at four different locations across the county, and an additional **40 children** at the CDS Clinic during the weeks leading up to exclusion (Table 5).

What is School Exclusion Day?

Immunizations are required by law for children attending public and private schools, preschools, child care facilities, and Head Start programs in Oregon. School Exclusion Day falls on the third Wednesday of every February. It is the day when students are not allowed to remain in school if they are not up-to-date on their school immunizations AND do not have the requisite medical or nonmedical exemptions in place for each required vaccine. Exclusion Orders are sent to parents by mail the first Wednesday of February, but schools typically communicate with parents about their child’s immunization status at the beginning of every school year.

Source: OHA

Table 5

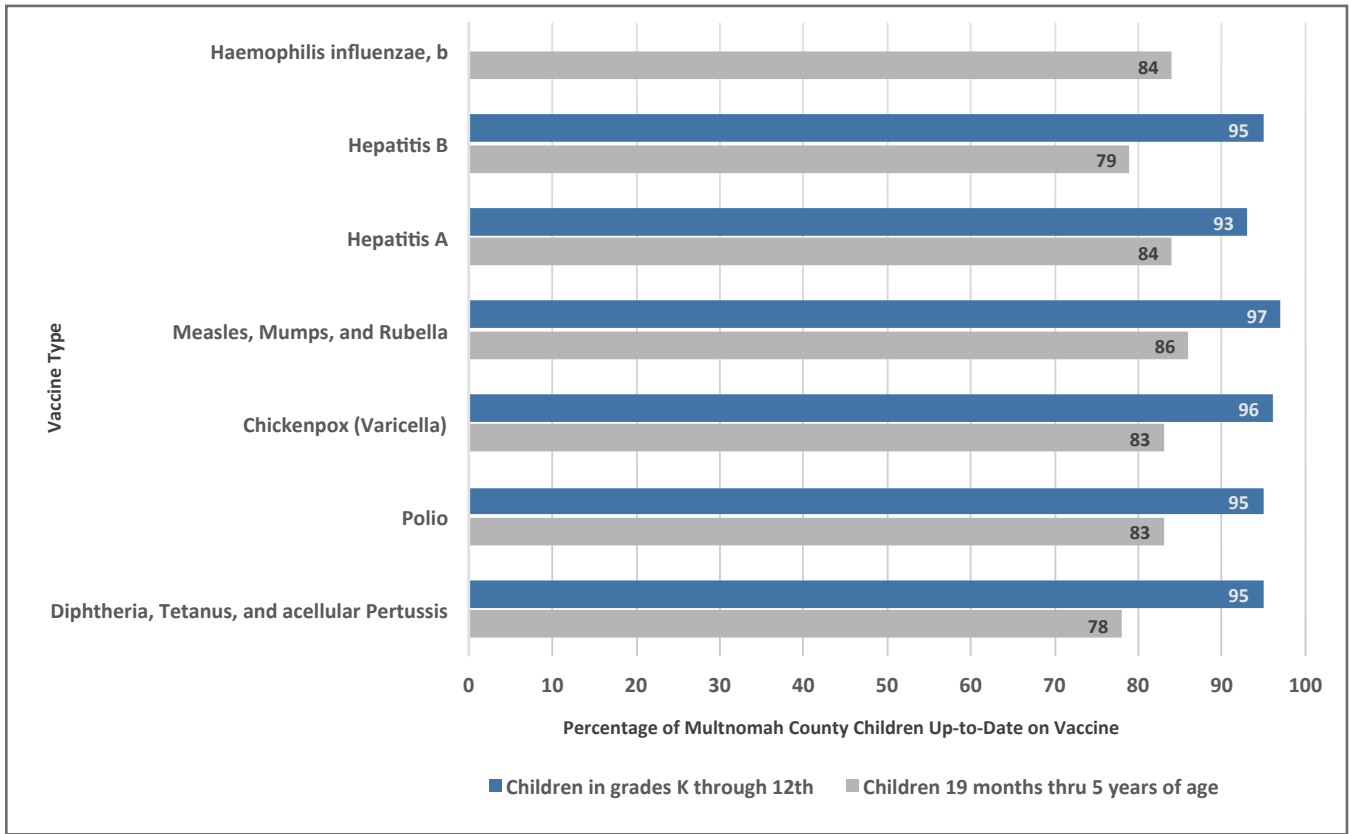
School Exclusion Immunization Clinics

Multnomah County Health Department, Communicable Disease Services, 2016

Date(s)	Location	Number of Clients	Number of doses
2/06/16	Reynolds Clinic	94	230
2/13/16	David Douglas Clinic	151	345
2/16/16	Portland State Office Building	51	91
2/18/16	East County Building Clinic	171	387
2/05/16 – 2/17/16	CDS Clinic (children)	40	99
Total		507	1,152

Figure 4: Vaccination Coverage for Children in Multnomah County, Percent up-to-date on vaccines.

Oregon Health Authority Immunizations Program, February 29, 2016



Why This Work Matters

Every person seen in the clinic, every case of a reportable disease tallied, and every number reported has a story behind it.

This collection of stories, written by Communicable Disease Services staff, illustrates the work done every day. The stories show both the breadth and the depth of the work of Communicable Disease Services. They give a glimpse of both the people behind the numbers and the people behind the scenes.



Why This Work Matters

Disease Investigators Track Down and Halt the Spread of Dangerous Meningococcal Disease

by Sara McCall

Meningococcal disease in a person without stable housing is a case report that gets our hearts pounding. Transience, tight quarters, and lack of access to healthcare makes our goal of preventing the spread of this deadly disease in the homeless community particularly challenging. One case in particular in 2016 could easily have slipped through the cracks if it weren't for public health surveillance.

The client was a high utilizer of healthcare services—with 17 separate emergency department visits documented in one week. Fortunately, at one visit, he was tested for *Neisseria meningitidis*, the bacteria that causes meningococcal disease. The timely receipt of those positive test results sent through the automatic state surveillance system allowed us to respond quickly and prevent further spread of the disease.

When we receive case reports, our focus is two-fold: 1) Investigate where the person was exposed to the disease, and 2) Stop further spread of disease by following up with close contacts.

This client's social circle included unstably housed individuals who often live in shelters or tent camps. We were concerned that these tight living spaces could lead to rapid disease spread. Another concern, in this case, was the transient nature of this population, visiting different camps, shelters, and assistance programs. Tracking close contacts of the infectious client was going to be difficult.

The client was not able to provide sufficient information about his whereabouts while he was infectious—seven days prior to his first fever. Because of this barrier, we collaborated with our

community partners to piece together a timeline of his whereabouts during his infectious period. Most of his daytime whereabouts could be determined based on emergency department records. We coordinated with Emergency Medical Services (EMS), Adult Protective Services, MultCo 911 Program, Home for Everyone, and local homeless shelters to determine where he most likely slept for the nights he was infectious. Then we visited several homeless shelters to identify people who slept near him during that time.

In all, we identified 12 contacts who were eligible for preventive (prophylactic) antibiotics, and held clinics at the shelters to offer prophylaxis to them. Of these 12 contacts, we gave antibiotics to two. One other contact received treatment from another healthcare provider, and nine remained unreachable despite letters posted at several local homeless shelters.

We received no additional reports of meningococcal disease in the homeless population in the weeks following this investigation and intervention. We believe our interventions controlled the spread of the disease.



Homeless shelters often have tight sleeping quarters like these shelter bunkbeds.

Why This Work Matters

Managing Large and Complex Pertussis Outbreaks

by Joan Coleman

In 2016, the Multnomah, Clackamas, and Washington County Health Departments in Oregon, and Clark County in Washington joined together to develop and exercise a quad-county approach to managing complex pertussis outbreaks.

The process of developing the protocol and testing it across county and state lines was first done in 2015 with the Quad-County Measles Protocol. It proved an effective way to bring stakeholders to the table and make group decisions in order to more efficiently and seamlessly manage large disease outbreaks.

The approach and process for pertussis was titled the *Quad-County Pertussis Protocol*. It included representatives from the four county health departments, with communicable disease staff, health officers, and public information officers participating. Oregon Health Authority representatives and Multnomah Education Service District nurses also participated.

The initial introductory meeting was held in January 2016, culminating six months later with the final table top exercise in July 2016. The resulting protocol for pertussis outbreak response includes sections of medical management, contact management, exclusion guidance, communications plans, and immunization clinic response. The group created cross-jurisdictional tools,

including letters for exposures, prophylaxis recommendations, and exclusion, as well as pertussis fact sheets. The letters and flyers were translated into five different languages and are ready to use as needed.

The outcome of the Quad-County Pertussis Protocol was beneficial for more than just developing tools and documents. The work of the protocol allowed for a continued and strengthened collaboration among the four counties in our public health response. In addition to coordinating local and state health departments, the work also reinforced the importance of working with external partners such as schools and daycare facilities in our responses.



Joan Coleman coordinates with four other Metro-area counties on the Quad-County Pertussis Protocol.

Why This Work Matters

A Fresh Start for a Premature Baby

by Marta Fisher

Collaboration between CDS, local healthcare providers, and hospitals is critical to the success of the Perinatal Hepatitis B Program. This is especially true when it comes to the highest risk babies in our community.

Premature and low birthweight babies have a lower immune response to the dose of hepatitis B vaccine administered at birth, so the CDC recommends an additional vaccine dose for premature babies.

In 2016, MCHD completed the follow-up on a preterm infant born to a hepatitis B-positive mom. The baby needed to stay in the Neonatal Intensive Care Unit (NICU) for several months after birth. The NICU providers were unaware of the mother's hepatitis B status and the fact that the baby needed an additional vaccine to ensure hepatitis B immunity.

CDS coordinated with the NICU staff to administer the vaccines on the correct schedule. After the baby left the NICU, we also ensured that the child's new primary care provider was aware of the special vaccine and testing schedule.

Testing confirmed that the infant is now immune to hepatitis B. Coordinated transfer of information between health care providers, hospitals, laboratories, and state and local health departments made this possible. Such coordination allows babies and families in the most susceptible populations a fresh start, free from chronic disease.



CDS coordinates with local healthcare providers and hospital staff to ensure the highest risk babies are protected from hepatitis B.

Why This Work Matters

A Young Man with Multidrug-Resistant Tuberculosis is Smiling Again

by Tyson Hegarty

A critical electronic lab report from CDC arrived in the middle of another busy day at the Multnomah County Tuberculosis Program. It wasn't good news. Testing results showed that a young man, newly diagnosed with potentially fatal tuberculosis disease of the lungs, had a rare drug-resistant form of the bacteria.

This drug-resistant TB bacteria (called multidrug-resistant, or MDR, TB) is extremely difficult to treat. It is also highly contagious. The young man would have to undergo eight months of six or seven daily medications, some given through a centrally-placed IV line, and each with its own difficult side effects.

Having only recently relocated to the U.S. with his family, this adolescent client with the big smile had been working hard to make new friends and find his place among his peers. Pre-existing mobility limitations, respiratory isolation, and multiple side effects would only make his life more challenging. While steps had already been taken to prevent further spread of this airborne bacteria, testing and treating those who may have been exposed became an urgent task.



Ahn Tran reviews a client's chest x-ray.

Our TB Case Management team is prepared to handle situations exactly like these. We specialize in helping clients through the long and difficult TB treatment process, while protecting other members of the community from the spread of the disease.

Our work fighting TB requires a lot of diligence, some ingenuity, and an endless reservoir of compassion. In his first year of treatment, our young client required all of these in abundance.

Our TB case management team met with the family daily, and worked closely with pediatric infectious disease specialists locally and nationally. We coordinated several hospital admissions to address treatment complications. We also worked closely with specialists in rheumatology, orthopedics, mental health, ophthalmology, and audiology to navigate the complexities of this client's treatment. We worked with the State of Oregon to get a grant to assist the client's family with financial pressures that threatened to leave them homeless. We also identified, tested, and treated members of the community who had been exposed. Staff with specialized cultural competencies were brought in to help.

The majority of the work, however, was done by the client himself. As support rallied around him, the young man remained determined. Gradually his condition has improved. He is able once more to engage in activities important to all teens. He is making friends again, spending time with his family, and planning his future. Perhaps most important of all, he is smiling again.

Why This Work Matters

Health Literacy: An Immigrant's Story

by Irina Grigorov

As I stood in front of a class of 57 newly arrived refugees from all corners of the earth, I imagined the emotional turmoil my parents felt when we were labeled as newly arrived aliens.

I clearly remember my mother sobbing due to the uncertainty of what the future held for our family of five. Heated discussions lasted deep into of the night about whose responsibility it would be to miss work to determine why our food stamp benefits were terminated, why I was excluded from school in mid-February, or why my father lost his well-paying job the day he suffered an on-the-job injury that required medical care we could not afford. We relied on good Samaritans and our pre-Google-era English-to-Russian dictionary to navigate a system so foreign to us.

In 2016, I breathed a sigh of relief knowing that CDS has partnered with Immigrant & Refugee Community Organization (IRCO) to provide health literacy trainings to all newly arrived refugees residing in Multnomah County.

The health literacy series consists of eight morning and afternoon sessions held at IRCO every other Friday. An amazing collaboration has been built between multiple Health Department programs and community organizations such as Portland Fire and Rescue and Lutheran Community Services in an effort to provide a solid foundation for our newly arrived families starting a new chapter in their lives.

Attendees are introduced to the U.S. healthcare system with a focus on access and navigation, mental health services, chronic conditions,

preventive health, nutrition, infectious diseases, and maternal and child health. A session is dedicated to environmental health, focusing on healthy homes, as well as emergency preparedness.

Each session is attended by up to fourteen interpreters to ensure that each participant receives the information in their own spoken language. Class sizes range from twenty-four to eighty attendees. In December 2016, our Community Health Worker presented a session on Infectious Diseases which was attended by 138 refugees and 20 interpreters.

Feedback from the interpreters, the majority of whom are established refugees in the community, has been overwhelmingly positive, including:

“I wish I knew this information when I entered the U.S. five years ago.”

“This is so informative, thank you for providing this session.”

Relocating a family to a new neighborhood can be difficult. Relocating a family to a foreign country with unfamiliar practices and systems is overwhelming. A well-informed and well-equipped family with resources and necessary tools to maintain a healthy and strong community is bound to succeed.

It is humbling to realize the role we play in welcoming and supporting our refugees through education and the provision of health care services to our expanding refugee community.

Why This Work Matters

Community Health Workers Successfully Use Analogy to Teach about Tuberculosis

by Eugene Sadiki

During one of our health literacy classes at IRCO we were explaining the terms *communicable disease* and *infectious disease* and how an infectious disease can also be communicable. Deep into our lesson, we began talking about HIV, AIDS, and TB. Participants began talking about the bacille Calmette-Guérin (BCG) vaccine for TB, which is very commonly given outside of the U.S. Our participants were discussing whether someone who had received BCG vaccine could have a positive TB skin test and if they would be asked to take LTBI treatment in the U.S. even if they had not been infected with TB.

As facilitators of the course, we recognized the need to adjust our teaching plan in order to quell this myth. We used the opportunity to explain the different TB screening tests, and how we use each one in order to detect TB infection. We clarified that BCG vaccine does not cause TB infection or necessitate TB treatment. We also needed to explain the real purpose of latent TB infection (LTBI) treatment and the difference between active TB disease and latent TB.

In an effort to explain these complicated issues, our speaker used an analogy. He asked the audience to suppose an enemy had entered the classroom with the intention to hurt us. Unfortunately for the enemy, he fell asleep before he could hurt us. He asked what they would do in this situation.

One participant suggested we get rid of the enemy before he wakes up. Our presenter explained that this is what health care providers are doing with latent TB infection. We have a

treatment to kill the TB germs before they wake up in the body and make people very sick. He then asked the audience,

“Now, should we take the LTBI treatment or wait until we develop symptoms of active TB?”

The audience agreed that it would be better to take one antibiotic for a few months than to take three or more types of pills for longer.

A few days later, one participant from the session called the TB clinic saying he would like to begin his LTBI treatment to “kill the enemy.” He started his LTBI treatment and was fully compliant throughout.



Eugene Sadiki looks over a supply of TB medications.

Why This Work Matters

Reluctant Client Commits Completely to Latent Tuberculosis Infection Treatment

by Mbaki Masotja

One memorable Tuesday morning, a client came into the Tuberculosis Clinic to begin his latent TB infection (LTBI) treatment after being referred by the Health Department's Mid-County Clinic.

The client immediately began voicing concerns. He said,

"I am not sick!"

"I don't want treatment!"

"I've never taken any pills in my life and why start now?"

The Tuberculosis Clinic serves refugees, immigrants, people experiencing homelessness, and anyone with TB symptoms, providing detailed TB screenings and evaluations. Tuesday mornings are allocated for refugees beginning LTBI treatment.

Through an interpreter, we asked this man to give us a chance to explain his condition and the treatment options. After a long conversation and a detailed explanation of the differences between LTBI and active TB disease, the client recalled one his friends in Vietnam going to the clinic to get some treatment for active TB. Sadly, his friend died of TB disease.

Our client's concern was that although he did not want to get TB, he also had heard that the side effects of TB drugs are unbearable. We took the opportunity to further educate him about the benefits and risks of treatment and why treatment is so important. At the end of the appointment, when all his questions were answered, he signed a consent form to start treatment.

Normally, when clients begin treatment, they are monitored and encouraged to call the TB clinic when they have about 10 pills left, so we can mail them a refill. This client didn't want to take the chance that his medicine didn't arrive on time. He decided to come to the clinic personally to pick it up until he completed his treatment.

Though he was reluctant at first, our client's change of heart was so complete, it extended to helping encourage his daughter to complete her own treatment.

Why This Work Matters

Community Immunization Program Protects Children From Disease

By Jennie Green

Each fall, we reserve a day of appointments in our clinic for the Portland Christian School's Chinese foreign exchange students. The students come in as a group with a school staff member from the foreign exchange program.

On these days, we see up to twenty-five students in a two hour period. The clinic allows students to stay current with their vaccinations and not be excluded in February. Partnering with the school has helped reduce the number of students that might not otherwise stay up-to-date with CDC guidelines or Oregon law.

On other clinic days we see a variety of different clients. One very memorable moment was a family of five children who were newly arrived to the U.S. Between the five children, they required twenty-three vaccines! The father was very pro-vaccination. Not only did he want them vaccinated for school requirements, he wanted all his children to be protected from the diseases to which they would be susceptible without the shots.

A Note from the Occupational Infectious Disease Program Nurse

By Sandy Holden

Multnomah County Health Department employees are public health professionals who have dedicated themselves to protecting the health of the people and communities in which we all live. As part of the Occupational Infectious Disease Program, I get to meet our new employees face to face and welcome them to the Health Department.

My responsibilities include new Health Department employee health screenings, annual employee TB screenings, and the investigation of employee respiratory and bloodborne pathogen exposures.

During new employee health screenings, I evaluate, educate, and offer TB screening, immunizations, and titers to employees to determine their immunity to vaccine preventable communicable diseases.

Some of our employees, including facilities and corrections employees, work different shifts throughout the day and night. My role requires me to be flexible to provide services to these employees at hours that are convenient to them.

I am privileged to have the opportunity to care for these very special individuals.



Sandy Holden reviews a new Health Department employee's immunizations with her.

Why This Work Matters

Communication and Training Makes School Immunization Reporting Process Easier for Schools

by Virginia Schmitz

Immunization reporting can be a complicated and time consuming process for school administrators. This year, we have made great headway in the development of a complete training and communications strategy for school immunization reporting.

Throughout 2016, our program's Health Educator, along with the rest of the team, designed and delivered webinars, an in-person workshop, and job aids for school administrators. We also developed an email newsletter aimed at improving communications with administrators and childcare providers tasked with reporting their immunization and exemption rates each year.

Part of this strategy included education around a new Oregon law requiring schools and facilities to share their immunization rates with families and the public. Because the law requires very specific timing for this, the Immunization Team developed the *Twice a Year, Three Ways* campaign to encourage timely and complete compliance. This included email newsletters with instructions for calculating, downloading, and sharing the required information at the correct times.

Thanks to this well-rounded approach, our program noted improved reporting accuracy and compliance from more than 450 schools and facilities.

Comments from schools on our webinars and workshops

- *"It's great to have the webinars as an option. I like being able to take a refresher course each year."*
- *"Step-by-step instructions [are] helpful for meeting deadlines. [The] variety of examples offered are very useful."*
- *"I appreciate the detail and clarity of the [webinar] presentation."*
- *"... the Immi team was INCREDIBLY helpful and responsive through email, and I really appreciate all of their work in helping to make this as seamless a process as possible. Thank you!"*
- *"It just gets better every year I do this. Thank you."*

What We are Watching in 2017

In 2017, we will be following outbreaks and newly emerging international disease situations. New stories will make their way to us, such as a complicated Hepatitis A potential exposure, and a cluster of Salmonella cases where mapping was the key to identifying risks in the community.

In collaboration with our partners at the Oregon Health Authority Acute and Communicable Disease program, we have also started a new program to look more closely at one of our greatest new threats—multidrug-resistant healthcare-acquired infections.

Informatics infrastructure is especially essential for communicable disease reporting and response. In 2016, we saw changes in this infrastructure that included pioneering work with OCHIN (a nonprofit healthcare information and innovation center) and the Health Department's Clinical Systems Informatics Group on a TB-specific electronic health record. This system will help us better capture and describe the clinical services we provide for the community.

In 2017, we expect the innovation to continue, including a project with our county Information and Technology staff to improve real-time reporting from our public health disease tracking data. This work will help us spot disease trends in the community, and better share timely information with the public.

We look forward to telling you about this work and more in the future.

In recognition of the CDS staff,

Amy Sullivan,
CDS Director



Amy Sullivan and Taylor Pinsent review data from an outbreak investigation.

Appendix

Table A1

Reportable Diseases and Case Investigations in 2016.*

Case reports found to be confirmed or presumptive cases.

Multnomah County Health Department, Communicable Disease Services, 2016

Disease	2016 Total (Number of Confirmed or Presumptive Cases)	Previous 5-year Average (Number of Confirmed or Presumptive Cases)
Total	2,590	2,379
Routinely Investigated, Cases in 2016		
Botulism	1	0
Brucellosis	1	0
Carbapenem-Resistant Enterobacteriaceae	29	**
Coccidioidomycosis	3	1
Cryptococcus	12	**
Cryptosporidium	88	46
Dengue	2	0
E. coli (STEC)	32	22
Haemophilus influenzae	19	17
Hepatitis A	3	3
Hepatitis B (acute)	8	9
Hepatitis C (acute)	6	5
Legionellosis	10	10
Listeriosis	4	2
Lyme Disease	12	9
Malaria	10	8
Meningococcal disease	5	3
Mumps	1	1
Non Tuberculous Mycobacteria	9	**
Pertussis	39	110
Q Fever	2	0
Rickettsia	1	0
Rocky Mountain Spotted Fever	1	1
Salmonellosis	95	80
Scombroid	1	0
Shigellosis	62	32
Taeniasis/Cysticercosis	1	2
Tuberculosis	27	26
Vibriosis	4	5
Yersiniosis	13	8
Zika	14	**
Limited Investigation or Intervention		
Animal Bites	160	78
Acute flaccid myelitis	1	0
Campylobacteriosis	216	215
Giardiasis	116	140
Hepatitis B(chronic)	176	211
Hepatitis C (chronic)	1,402	1,334
Hepatitis D	3	1

* The following are diseases that we usually see once or twice every five years, but had no cases in 2016: Anaplasmosis, Babesiosis, Borrelia (tick borne relapsing fever), Chikungunya, Ciguatera, Cyclosporiasis, Hemolytic Uremic Syndrome, Hepatitis E, Leishmaniasis, Measles (rubeola), and West Nile Virus

** 5 year average not available

Table A2

Occupational Infectious Disease Services Provided to 1,518 County Employees

Multnomah County Health Department, Communicable Disease Services Clinic, 2016

Service Description	Total Services
TB Screenings	1,276
BBP Training Completions*	814
Immunizations:	
Hepatitis B.....	109
MMR (measles, mumps rubella) and Varicella.....	62
Influenza (seasonal).....	488
Tetanus, diphtheria, pertussis	37
Immunity Tests:	
Hepatitis B.....	169
Measles, mumps, rubella, varicella.....	566

*Number of employees completing bloodborne pathogen training.

Table A3

Immunizations Administered

Multnomah County Health Department, Communicable Disease Services Clinic, 2016

Vaccine Type	Client Age		Total Doses
	</= 18 yrs.	> 18 yrs.	
Diphtheria / Tetanus / Pertussis (DTaP).....	302	0	302
Hepatitis A.....	367	110	477
Hepatitis B.....	287	220	507
Hib (Haemophilus influenzae Type B).....	141	0	141
Human Papilloma Virus (HPV).....	76	19	95
Influenza (Seasonal).....	42	36	78
Measles, Mumps, Rubella	330	154	484
Meningococcal Meningitis.....	40	6	46
Pneumococcal Pneumonia	121	5	126
Polio	432	17	449
Rotavirus.....	56	0	56
Tetanus / Diphtheria / Pertussis (Tdap)	390	195	585
Varicella (Chickenpox).....	339	123	462
Total	2,923	885	3,808

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