

Inconspicuous consumption: California is the nation's leader in tuberculosis

BY RYAN MILLER

The cough starts out normally, for a cough, like the sound I hear from a few desks over when my stubborn co-worker has a cold. But as the hacking goes on, I can hear a wheeze at the end, a desperate, shrill squeeze of air.

It sounds wet.

It sounds bad.

Fortunately, in this case, it's just an audio file. In real life, I would likely have been exposed to tuberculosis.

Coughing in the county



Signs and symptoms

If you've got a cough, don't worry. It's probably not tuberculosis. Still, if you'd like to track the symptoms, there are a variety to watch for.

"If they've had a cough lasting longer than a month accompanied by weight loss, night sweats, coughing up blood—those are all concerning signs for tuberculosis in the lungs," Dr. Charity Thoman said.

If that's your case, contact your primary physician to get a round of testing started.

For more information, visit cdc.gov/tb/topic/basics/default.htm.

PHOTO BY JANICE HANEY CARR/COURTESY OF CDC/DR. RAY BUTLER

Santa Barbara County normally sees about 20 cases of tuberculosis in a year. In 2013, the Public Health Department recorded 26 cases, all but six of which came from North County.

That's a seemingly small jump in that it's just six more people from the average, but it represents a 30 percent increase over a typical year.

Dr. Charity Thoman with the county Public Health Department (she's served as the tuberculosis

controller and was recently named the county's health officer) said that three of those cases were in children younger than 10.

"One of those children sustained permanent disability, and that's something we take very seriously," she said, noting that tuberculosis is difficult to diagnose in younger subjects.

She couldn't reveal the specific disability due to privacy reasons, but she highlighted some potential negative outcomes, generally: permanent limb deformity from an infection in the bone or joint, permanent mental disability from infections in brain, permanent scarring from surgery to lymph nodes around the neck or face.

"It's always frustrating for those of us in the tuberculosis world when there is a poor outcome," Thoman said. "We do see that from time to time, so it's important for us to really stay on the increased numbers in the county."

In addition, the department tests every specimen for drug resistance. Nationally, about 3 to 7 percent of tuberculosis cases are found to have some sort of resistance, meaning they don't respond well to the mix of drugs typically given to patients in an effort to combat the infection. In California, about 10 percent of the cases carry resistance, Thoman said.

"California is No. 1 for tuberculosis in the United States," she emphasized. "It's also No. 1 for drug-resistant tuberculosis."

When testing the 26 county cases from 2013, Thoman and her colleagues found eight to have some sort of resistance, making the county average almost 31 percent.

"The fact that our county has ... higher than 10 percent, it's concerning, and it doesn't necessarily mean we're doing something wrong or different in our county," she said. "What this really means is that this is going to become the new normal in our county and state."

Christine Gaiger, a tuberculosis controller nurse with the San Luis Obispo County Public Health Department, said TB isn't as big of a problem in her sphere right now.

"We—knock on wood—have not had any in our county in a long time, in a few years," she said.

SLO County saw four cases in 2013, she said, which fits neatly into the three-to-six average this area's been seeing over the last five years.

"Certainly whatever Santa Barbara County has could affect our county eventually in that the residents sometimes cross the county line ... but that hasn't happened yet," Gaiger said, adding another knock on wood for good measure.

According to the California Department of Public Health, annual cases in the state dropped from almost 12,000 a year in the 1930s to less than 4,000 in the 1970s. A bump took it back over 5,000 cases in an early 1990s epidemic, but total cases have been declining ever since. The jagged red line on a graph tracking the disease in the state was dropping toward 2,000 total cases. In 2012, a report of 2,191 marked the lowest number of cases since reporting began.

"Now is the time to reinvigorate our efforts to make TB elimination a reachable goal!" reads a July 2013 letter to the governor from Dr. Jennifer Flood, chief of the Tuberculosis Control

Branch in the Division of Communicable Disease Control at the Center for Infectious Diseases with the California Department of Public Health.

That letter is included in a report that elsewhere reads: "California continues to experience both successes and challenges in controlling TB in our state. The decline in case numbers and rates reflects the commitment of the California Department of Public Health and our local and national partners to identifying and treating TB cases. Nevertheless, a new case of TB is diagnosed in California every four hours, a Californian dies with TB every other day, and a child under 5 is diagnosed with TB every week in California."

California is still well above the national case rate average as of the latest data, sitting almost six cases per 100,000 people—as opposed to the U.S. average of 3.2.

Some clue as to why might come in the recent report, which reveals that the majority of the state's cases in 2012 came from people born outside of the country: "Although the rate of TB among those born outside the U.S. has declined each year since 2001, the disparities between U.S.- and foreign-born persons has increased slightly. In 2012, the rate of TB among foreign-born persons was nearly ten times greater than among those born in the U.S. compared to less than nine times greater in 2003 ..."

The most common countries of origin were, by far, Mexico and the Philippines.

The reality of worry

The last thing I want to do in reporting on health issues is to create a panic. After all, Santa Barbara County saw 24 cases in 2012 putting the rate at 5.6 per 100,000 people, ranking it at No. 17 on the list of California counties, which is a shade under the statewide average rate of 5.8.

So I asked Thoman: Why shouldn't people worry about this Santa Barbara County uptick?

About 100 years ago, she explained, tuberculosis control efforts were a main contributor to the formation of public health departments.

"This is core public health: finding contacts, testing them," she said. "This is exactly what public health was created to do."

To that end, people in her line of work have had a century to develop and refine their attacks, and they've gotten quite good at it.

"Because California is the No. 1 state for tuberculosis, we have a really effective way of finding it," she said.

Their methods include contact investigations, through which they interview patients and people with whom those subjects have come in contact. If necessary, they test people who've potentially been exposed. The goal is to cast a wide net and catch every active case.

Within the last decade, molecular diagnostics have progressed to a point where it's possible to get a genotype on every positive tuberculosis case that comes in so doctors can spot matches on a genetic level.

"We do detective work, but with bacteria," Thoman said.

If cases from a specific geography link up, medical professionals can explore active transmission within that area—as opposed to situations in which neighboring cases might have coincidentally come from different sources.

Thoman said public health staffers have made investigations with every tuberculosis case in Santa Barbara County in 2013, and the disease has left distinct fingerprints on related cases, indicating active transmission in North County.

"We find them, we test them, and then we offer them treatment," she said of carriers.

OK. Next question: Why should people worry?

Thoman said that tuberculosis has sort of fallen off the collective radar, not just with citizens, but with physicians.

"The very first drug for tuberculosis became available in the 1940s or 1960s," she said. "It radically changed the fate of anyone with tuberculosis. One-hundred years ago, tuberculosis was the No. 1 killer in the United States.

"Fast forward 100 years, and no one's heard of it."

In other words, awareness is healthy these days, especially since the bug's been adapting to those life-saving treatments.

"The topic of resistance in tuberculosis is an important one," Thoman explained. "The CDC just published a report on microbial resistance, and one of the bugs they talked about was tuberculosis."

Adaptation

Tuberculosis treatment is complicated. It involves four different drugs that have to be taken for a strict and lengthy regimen.

If someone only doses with three of those drugs or otherwise fails to complete the full course, the bacteria can start to develop a resistance, making it harder to treat in the future as it's coughed out and passed on to a new host.

Thoman said that multi-drug-resistant tuberculosis started emerging in the 1990s, even as the overall number of TB cases in the state peaked and began declining.

"Truth is," she said, "bacteria are evolving way faster than our drugs are."

Hence the tough strains popping up in Northern Santa Barbara County. Thoman said her department tests every sample for resistance.

"We grow the bug in a culture, smack [it] with an antibiotic, and see if they survive," she said.

About 30 percent of the samples in the county did.

The bug from the past

A century and more ago, tuberculosis was known as “consumption,” because it eats away at people; weight loss is one of the potential symptoms to watch for.

Paul S. Sledzik and Nicholas Bellantoni reported in a 1994 article in *The American Journal of Physical Anthropology* that 19th century New Englanders attributed vampirism to tuberculosis symptoms.

“The New England folklore is consistent in its incorporation of tuberculosis and examination of the body of the vampire for putative signs of life,” they wrote. “Following the death of a family member from consumption (i.e., tuberculosis), other family members began to show the signs of tuberculosis infection. According to the New England folk belief, the ‘wasting away’ of these family members was attributed to the recently deceased consumptive, who returned from the dead as a vampire to drain the life from the surviving relatives.”

While the medical community has moved toward genome testing and away from digging up bodies to burn a suspected undead creature’s heart, the basic testing remains virtually the same.

After a positive test or two—a skin or blood test, followed by a chest X-ray—someone from public health will show up with a “sputum cup” into which the patient has to cough up phlegm. A doctor will then smear the sample out on a slide and look at the bacteria under a microscope in an effort to identify any little rice-grain-looking slivers.

“You can see in antique stores these . . . silver flasks that are old sputum flasks from the early 1900s,” Thoman said. “Believe it or not, that part hasn’t changed. Finding the bacteria is still the gold standard. Now, there are also molecular diagnostic tests, but the gold standard is seeing the bacteria in the sputum.”

The big question

In the coming months, the state is going to be helping the Santa Barbara County Public Health Department tackle the uptick, making sure they find every possible active case.

The disease spreads through air—when an infected person coughs, sneezes, or even sings—so one of the risk factors is living in close quarters. Having fellow patients, inmates, nursing home residents, or even roommates around can create an environment in which tuberculosis spreads.

Some of the local cases came from people who lived in close quarters with each other, Thoman said.

“Sometimes we will find more active cases within a household,” she said. “What we’re doing right now is going into those households to see.”

The department has already seen some cases at the beginning of 2014.

So why is tuberculosis on the rise in Northern Santa Barbara County?

“We have a few different theories, and we don’t know which one is correct yet,” Thoman said,

adding that the mystery is one of the reasons the state is involved with the investigation. “We do know that there have been linked cases, so we do know that there’s been ongoing transmission.

“Why does that happen or where is it coming from?” she asked. “We don’t know that yet.”