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Deadly Dust

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Deadly Dust: A mysterious fungus has been sickening residents of California's Central Valley for hundreds of years. No one has seemed to care until now.

Last fall, Kirt Emery was riding on his motorcycle, cruising up the 99 freeway over the mountains from Santa Barbara to Bakersfield, when he saw the dust storm materializing in front of him. Visibility was low, but he wanted to get through it as quickly as he could, so he held his breath and hammered his bike up to 100 miles an hour.

As the head of epidemiology for the Bakersfield Public Health Services Department, Emery, whose tanned face and faint white moustache suggests frequent rides on his bike, has spent the past two decades studying dust like this – and avoiding it at all costs. He knows all too well what could happen to him if he got sick: the expensive medications with their nasty side effects, the uncertainty of whether he could be ill for the rest of his life.

It's been more than twenty years since he moved to Bakersfield, and so far, he's remained unharmed. That makes him one of the lucky ones. For many people living in places like Bakersfield, and throughout much of California's Central Valley, dust can be deadly.

Coccidioidomycosis, also known as cocci, or valley fever, is a fungal disease endemic to the soils of the Southwest in places like Arizona, Nevada, New Mexico, Texas and Utah. In California, it's rampant across the Central Valley, an area just slightly smaller than West Virginia that grows most of the country's produce. About 30 percent of all valley fever cases nationwide occur in the Central Valley each year.

Cocci is a puzzling and intimidating pathogen, one that has perplexed doctors and patients alike for more than a century. Symptoms of valley fever range from mild fatigue to incapacitating, flesh-eating infections, and despite decades of research, little is known as to how the microbe operates, making advances in treatment and the push to develop a vaccine painfully slow. There's virtually no way to guard against inhaling the spores that cause valley fever, as masks can't filter out the microscopic dust particles that carry the spores into the air and into our lungs. Being infected with valley fever can be as simple as driving through a place like Bakersfield with the windows down – or in Emery's case, on a motorcycle.

For reasons still unclear, rates of valley fever are rising nationwide. Between 1998 and 2011, documented cases across the country have increased steadily by about 15 percent each year, from just 2,000 infections in 1998 to more than 22,000 in 2011. In areas where the fungus is widespread, like Kern County, it's statistically more probable to develop valley fever than hepatitis or chickenpox.

Bakersfield, the largest city in Kern County, more closely resembles a sleepy town in America's heartland than a city of population 358,000 just four hours south of Silicon Valley. It's a town perhaps best known for the Bakersfield Sound – a genre of country music inspired by Dust Bowl migrants into the Central Valley, made popular by musicians like Merle Haggard in the 1950s – and for its incredibly profitable agriculture industry. Kern County, the world's number one supplier of carrots, also grows more almonds and pistachios than any other area in California. Though appropriately nicknamed the Golden Empire for its oil derricks, multiple military bases and fertile soil, it also happens to be one of the poorest areas in the state. More than 22 percent of Kern's population lives below the poverty line, and Bakersfield is the nation's third most impoverished suburban city.

It's also one of the most polluted. Apart from the smog, which often blankets much of Bakersfield in a grubby haze, the city is also covered in dust, fine brown grime kicked up from neighboring farmlands. The dust streaks windshields and gathers on dashboards. It collects in piles on sidewalks, engulfs cars in sooty plumes, and crisscrosses roads, leaving grids of brown tire tracks. The dust is everywhere, and if you live in Bakersfield, you can't escape it.

Kern County's soils have some of the highest levels of cocci fungus in the entire state. Between 2009 and 2011, rates of valley fever have tripled there. Researchers blame a population boom, increased construction – which kicks up infected soils into the atmosphere – and unusual weather patterns. As rainy and drought seasons become more erratic, rates of valley fever could continue to rise. Unusually wet years lead to massive cocci blooms in the soil, while subsequent dry spells kick up the spores and render them airborne – in dust.

As valley fever escalates in Kern County, the job of getting the rest of the state to notice, and act, falls heavily on Emery's shoulders.

“When you look at how we report cases of cocci here in Kern County and if you ask me what's being done about it, well, there's my secretary out there and there's me. That's it,” he says. “The joke for the last month when my secretary retired was that 50 percent of the cocci program went away. Does Kern County invest in cocci? No, they don't.”

As far as disease names go, “valley fever” sounds relatively benign considering the variety of symptoms it can inflict on the body, ranging from outwardly nonexistent in some infected people, to fatal in others. Unpredictably, valley fever can spread to the bones, lung or brain, or it can cause nothing more than a highly phlegmy cough. It can also lead to blistering boils on the face, neck, chest and extremities; lesions in membranes of the heart and gut; it can paralyze the nerves in the face. Save for the gastrointestinal tract, cocci has been found in nearly every organ of the body.

Most people never even know they've been exposed to cocci. Although once introduced cocci never truly leaves the body, about 60 percent of infections present no symptoms. Even then, however, there's no guarantee of immunity. An infected patient will test positive for it for the rest of their lives, even if they never get sick. Severe stresses on the immune system, though, like treatment for cancer or organ transplants, can cause symptoms to flare up decades after exposure – another contributing factor to rising rates. "People with cancer are living longer, so there's more of them available to be infected than there were before," says David Stevens, chief of infectious disease at Santa Clara Valley Medical Center. "The evidence for that is in people who used to live in endemic areas like Arizona, they migrate to New England or Canada or some place that doesn't have valley fever, and they haven't been exposed to the fungus in 30 years. That proves that the organism is still in their body, living."

The remaining 40 percent of infections resemble the flu, or result in painful boils that typically clear up following a few months of treatment. But for reasons still mysterious to doctors, a very small percentage of valley fever infections become brutal lifelong illnesses. There's scant understanding why cocci targets some people more virulently than others, but the amount of spores inhaled, in addition to the strength of the patient's immune system and genetic predisposition, all play a role.

Emery has made a career working with infectious diseases – mostly AIDS and the gamut of STDs. He knew valley fever would become his life's work on November 1, 1994: his first day on the job in Kern County. Valley fever was one of the most peculiar public health issues he had ever encountered, he says, in part because the disease is highly lethal in certain populations like blacks and Filipinos, but has also been almost completely overlooked by the national spotlight. He's since devoted his life to advocating for the disease, a job that requires extensive outreach to the local community about symptoms and ways to protect themselves from dust; to major companies in the area to protect their workers, and to national organizations like the American Lung Association to try to raise funding for more research. He wishes he had time to fly fish, or to tend to the horses he keeps on his property in the mountains by Lake Isabella, but instead many of his nights are sleepless, dominated by racing thoughts on how he can get more people outside of Kern County to care about valley fever and the people at risk for contracting it. "It means something to the Central Valley," Emery says, "but it's an orphan disease."

It's also, to Emery, a compelling one. "This [disease] is particularly fascinating for people who love to solve puzzles. When I got to Kern, it just drew me in."

Emery's lab tests blood serum from every person potentially infected with valley fever in all of Kern County – roughly 20,000 tests a year. It's monotonous, brain-numbing work, done by hand with just a handful of employees. Terry Oubsuntia – his primary microbiology specialist in charge of testing – has a fondness for bolo ties and for spinning his pipettes like pistols as he tests each sample, hundreds of them a week. Under the protective glass casing at his workstation, the cocci fungus he cultures for testing looks like really moldy bread. It's been several years since he moved to Kern County from Thailand and, so far, he's remained disease-free. But the prospect of catching valley

fever is worrisome enough that he personally tests his own blood serum every few months.

Fungi are nature's great garbage disposals. Some species of fungi are saprophytes – *Sapros* in Greek, means rotten – so they thrive off of dead or rotting materials, like wood or mammals. Cocci, a particularly virulent saprophyte, lives just as well in the soil as it does in humans, where the lung seems to be a favorite habitat.

But cocci's life cycle begins in the dirt. As the fungus develops, it forms spindly, white chains that grow rapidly in the soil following rainfall. Moisture is a critical component of its life cycle, but too much dampness prevents the chains from forming into tiny, barrel-shaped packages of dormant spores that help the fungus survive during drier periods. The spores break apart easily when airborne, and when carried on the breeze, they either settle in new soils to reproduce, or – if a human happens to breathe them in – in the warm, moist environments of our lungs.

Cocci is a clever microbe. It's dimorphic, able change its shape to maximize its survival in the ground – when it's a spindly filament – or in the body, as a circular blob packed with little endospores. These spores function much like the barrel-shaped packages that break off in the soil: They help the fungus spread throughout the body as quickly as possible.

When inhaled, the spores heads straight to the tiny, hollow sacs located at the ends of our air passageways. These little purses are lined with very thin, wet walls – about one cell thick -- surrounded by a network of capillaries. It's here where oxygen and carbon dioxide enter and leave the lungs when we breathe, and where the cocci spherules start to multiply, feeding off the body's flesh. As the spherules mature and swell, they eventually burst, releasing hundreds of little spores that each form into a new spherule with hundreds of little spores of their own, starting the cycle all over again.

By time the cocci sets up shop in the lungs, the body's immune system has already kicked into overdrive, sending out immune cells to the infection site bent on a single task: seek and destroy. Their goal is to recognize the fungus – specifically, the unfamiliar markers on it, also known as antigens, that first alerted the body to an invader – and either dissolve or kill it off. But cocci will do whatever's necessary to evade the immune system. It's able to change its own markings, successfully deceiving immune cells to fend off their attack. Unlike viruses, which need a living host to survive, pathogenic fungi like cocci depend on living or decaying matter. And the sooner it's dead, the better.

The world's first reported case of valley fever dates back to 1892, to a 36-year-old Argentinian cavalry soldier named Domingo Ezcurra. What started with a lesion on his right cheek soon spread and worsened into red, itchy spots and oozing, pus-filled

ulcerating papules. Before long, most of his right cheek became covered with a single, large purple fungal growth. The cauliflower-like excrescences baffled doctors.

Meanwhile, just a year after Ezcurra's case was reported, a Portuguese immigrant farm laborer named Joas Furtado Silveira checked into a San Francisco hospital more than 6,000 miles away with similar mysterious skin lesions. Silveira had just immigrated from the Azores to Modesto, and a spot enlarging on the back of his neck was concerning him, a minor nuisance from an irritating collar, he thought. Yet, as with Ezcurra, new growths soon started to form. They grew around his eyebrows, forming grotesque bulbous lumps that nearly swelled his eyes shut. Silveira eventually lost both of his eyes, his nose, part of his upper lip, and half an ear. It's unclear whether his horrible disfigurement was caused by valley fever specifically, or by his medical treatment, which was rudimentary at best. It included a toxic cocktail of topical methyl violet – used in purple dye – potassium permanganate – one of the principal chemicals used in film and television sets to create an “ancient” look on cloth or glass – and carbolic acid.

Both the Argentinian soldier and the Portuguese farmworker eventually died, after years of painful, horrendously disfiguring cysts, unsuccessful treatment, and before there was any understanding of the mystery illness that plagued them. Silveira managed to leave scientists with one significant clue, though. Doctors were stunned by what they saw during his autopsy: his body was riddled with nodules in places like his lungs, lymph nodes, spleen, testes, prostate, and liver. When they later examined the nodules under a microscope, they were full of tiny, wriggling organisms: cocci.

The peculiar nature of the men's mutilating illness intrigued two doctors, Emmet Rixford, a surgeon at San Francisco's Cooper Medical College (which later became Stanford University Medical School), and T. Caspar Gilchrist, a pathologist at Johns Hopkins Medical School in Baltimore. They took skin samples from Silveira during the course of his treatment, and christened the organism *Coccidoides*, for resembling *Coccidia* – a parasitic disease infecting the intestinal tract of animals – and *immitis*, Latin for *severe*.

A few years later, in August 1901, the inexplicable disease was reported for the first time in Kern County. This time, the victim was a 19-year-old man who worked as a canner and had been a resident of the county for only 12 days before showing symptoms. By then, less than 10 cases of what would later turn out to be called valley fever had been reported across the United States. “They thought it was plague, they thought it was leprosy, they thought it was all kinds of things,” Emery says. It took a laboratory accident in 1929 before scientists understood that valley fever symptoms cover a wide spectrum of mild and serious health effects. Within nine days of opening a petri dish full of cocci mold and breathing in its spores, 26-year-old Harold Chope, a Stanford University medical student at the time, became ill with acute pneumonia. Four weeks later, nodules erupted on his shins and scientists found cocci spherules in the mucus produced from his cough. Fears over his impending death made the national news, but Chope surprisingly made a full recovery. Valley fever, they realized, was much more complex than they [who?] thought.

Adan Barragan was just seventeen when he left his home in Colima, a picturesque beach town on Mexico's Pacific Coast, for California to work in the fields more than a decade ago. He settled in Delano, Kern County's second largest city after Bakersfield, and a central hub of farmworker organization efforts and Chicano movement politics in the 1950s. Before long Barragan was a farmworker himself, harvesting peaches, and then picking, pruning and packing grapes, Kern's top grossing commodity. Now 29, he lives in a modest tract home in Delano with his wife and four young children. He digs irrigation lines and sprays pesticides for Grapeman Farms, a local grower. It's backbreaking work that seems possible only with a sturdy build like his, all 220 pounds of it. He has to manage nearly 4,000 acres of land, which when split between five other people, requires putting in 10 to 12 hour shifts in the fields, six days a week.

Last October, Barragan noticed a tiny bump in the middle of his chest. It looked like a pimple, he says, so he didn't think much of it at first. But then it started growing. Before long, it was the size of a bright red baseball, hard to the touch and oozing pus. The bigger it grew, the harder it became for him to breathe, and to lift and carry the heavy machinery he operates in the fields as he tends grapes. His wife, Alma Ramos, worried it was cancerous, and urged Barragan to seek medical attention at Kern Medical Center. He was diagnosed immediately with valley fever.

A small number of valley fever infections, roughly five percent, turn into what doctors deem "the valley fever complex," eruptions of fiery red clusters and painful pustules on the shins, thighs, arms or buttocks, that flare up if the fungus leaves the lungs and spreads from the lymphatic system to the blood stream, which carries it throughout the body. For reasons unknown, some patients go on to develop arthritis, most commonly in the ankles or knees, or chronic pneumonia after the bumps clear. About five to ten percent of cocci-related chest infections result in lasting damage, like scarring, nodules or cavities in the lungs, which when seen under an X-ray, are often misdiagnosed as cancer.

Barragan's extensive exposure to the soil at Grapeman Farms puts him at a higher-risk of developing valley fever, but Ramos says they had never heard of the disease before, or realized how serious it could be. It was a total wakeup call.

"If we knew more about it, he probably would have been more careful," Ramos says, translating for Barragan, who only speaks Spanish. "I hear valley fever and all I think is 'fever.' So I'm thinking a cold. He probably had symptoms before and we didn't know." Barragan still works as a farm laborer, but his health scare was enough to convince him to start considering other work, like enlisting in the military or the Navy. "He's learning English," Ramos says. "He's going to get a high school diploma, because he doesn't want to be out in the fields anymore."

While Barragan was in the hospital, he underwent a strict regimen of the antifungal fluconazole, delivered intravenously three days a week for three months. Sometimes the treatments lasted for hours at a time. The medicine gave him seizures, and caused him to

shed weight, about 50 pounds over the course of his stay. The use of other oral azole treatments, like fluconazole, in combatting valley fever traces to advancements in the HIV epidemic. When azole therapies were found to ease symptoms for HIV-positive patients with suppressed immune systems in the late 70s and early 80s, researchers studying cocci decided to test whether they could combat fungal infections, too. Because antifungals are rarely administered directly to the infection site – with the exception of shunts to convey them directly into the brain to combat meningitis – the hope is that enough can be pumped throughout the body to target the fungus wherever it is. Yet even with advances in treatment, the sustained use of antifungals – whether orally or intravenously – can cause permanent kidney damage. “With the oral medications, why it gets scary is that they see how much the patient can tolerate,” Emery says. “It’s not like with other drugs when they say, ‘OK, we know this body weight and we give them this specific amount of medication.’ It’s how much can this person tolerate.”

Barragan’s symptoms responded to the treatment: the pustules subsided, and he started regaining his strength. Yet Even now, Barragan is supposed to take up to 10 pills of fluconazole a day for the next three years to prevent any symptoms from reemerging. He’s wary of experiencing any more side effects, like the extreme tiredness that put him out of work for four months, but he considers himself fortunate; of the ten other patients also in treatment for valley fever during his stay in the hospital, four of them died from “disseminated” disease he says.

Disseminated valley fever is one of the greatest conundrums surrounding the illness. It only occurs in one percent or less of infections, but its damage to the skeletal system, joints, lungs or meninges – the delicate and precious membranes that enclose the brain and spinal cord – is vicious. The fungus can decompose the vertebrae, skull, ribs and long bones, like the femur and tibia, or the joints of the knees, wrists, ankles and elbows. Meningitis, the most serious manifestation of disseminated cocci, happens if the fungus manages to break into the brain and spinal cord. To keep a patient alive, treatment – either with oral medications or a shunt inserted directly into the brain – must last a lifetime.

“It just scares me – I have a kid that lives down in Bakersfield,” Emery says in his office, surrounded by piles of maps of Kern County and studies on valley fever dating back to the early 1900s. An image of a preserved human head in a jar covered in pustules – one of the first known valley fever patients ever recorded – is projected on a PowerPoint presentation on the wall behind him. “We live up in the mountains and I work down here, but the fact of the matter is that [getting infected] is a game changer. Your life has to revolve around getting these drugs or you die. No one will take their patients off of medication believing that they’ll survive. We’ve tried. Everything looks healthy, everything looks normal, and then we try taking them off the medication and they go back to disease state.”

Disseminated cocci might be rare, but if a patient is black or Filipino, the rates of developing it jump from 1 percent or less, to higher than 50 percent, one of the strongest arguments for developing a vaccine. “It’s the \$64,000 question,” Stevens says, as to why

such ethnic groups are at such heightened risk. “If we knew, we’d know a lot more about protecting people.”

At first glance, a framed photograph hanging on the wall of George Rutherford’s office looks like a vast tide receding toward the crest of a giant, foaming wave. It’s actually a tsunami of dust, the “Tempest from Tehachapi,” one of the worst dust storms in history. “You just have to inhale one spore,” says Rutherford, a professor of epidemiology and preventive medicine at UC San Francisco. “The risks of getting a face full of this stuff all depends on where you are, what the climate is.”

A dust storm can begin with just a few particles of dry soil and a strong draught of wind. Once swooped off the ground, these particles start to vibrate and bounce, propelled by increasing gusts. They break into smaller pieces each time they hit the ground. Each time the lighter dust particles descend downward into the heavier ones, which stay near the bottom of the storm, they’re propelled farther upward. The storm escalates as the dust climbs higher and higher, ricocheting off each other with intensifying speed. When Tempest from Tehachapi struck Bakersfield in 1977, it lasted for 48 hours. The storm rose nearly 10,000 feet, producing a towering cloud of dust that cut visibility to less than a quarter mile, and dimmed the sun as far north as Reno.

Wind gusts during the storm topped 192 miles per hour; strong enough to strip paint off of cars, topple airplane hangars and permanently alter much of Bakersfield’s landscape from fertile farmland, to eroded, sandy soil. The storm caused nearly 40 million in losses – not including the irreparable damage sustained to valuable farm and cropland – and deposited 25 million metric tons of soil and bedrock on the surrounding area. The dust, borne on high currents, eventually settled as a “mud storm” on sidewalks and cars across much of California. It was inescapable; it seeped through windows and door cracks, depositing fine layers of grime on car seats and furniture. After the storm, Bakersfield looked more like a Depression-era Dust Bowl town in the Great Plains than a city in the Central Valley. Some local accounts likened the scene to a post-apocalyptic nuclear attack, or to the set of a bizarre, sci-fi movie. One Kern County resident even went as far as to describe the phenomenal deposit of dirt in her swimming pool as “the result of a Fleet’s enema.”

The dust was also lethal, and laden with cocci spores. They were carried as far north as San Francisco, Marin County, Sacramento, Santa Clara and even Oregon, sickening several hundred people well outside the Central Valley with valley fever, including a gorilla at the San Francisco Zoo, who ultimately died from the disease.

Cocci is quite resilient in the soil, but if temperature or moisture levels aren’t just right, it goes dormant, to a non-infectious state. During extended periods of hot, dry weather, when the top levels of soil become partially sterilized, cocci somehow stays alive by moving deeper into the dirt. When it finally rains again, and the soil becomes fertile once more, it migrates back to the surface.

“It’s sort of like Invasion of the Body Snatchers,” says Garrison Sposito, a professor of Soil Science at UC Berkeley. “They stay in the soil as these little spores, they wait for the right conditions, and then they pop right back out again. It’s creepy.”

Kern County’s first “Great Epidemic” of valley fever began in 1991 and lasted for three years, the result of a particularly rainy spring following a five-year drought. In just one year – from 1991 to 1992 – cases jumped from 959 to over 3,000 sicknesses. Counting asymptomatic patients, though, some doctors think up to 8,000 people may have been infected with valley fever in that period.

The surge was alarming, but Emery says interest and funding for the disease disappeared completely two years after the epidemic ended. This was about as shocking to him as deciding to de-fund cancer research. “We put fire stations everywhere to protect you, but when it comes down to public health, you’re fighting for everything. Sheriffs, fire, police, they all have their challenges, but what we do doesn’t necessarily get seen until something bad happens, like a big outbreak of cocci, H1N1, or bioterrorism,” he says. “When something like that happens, all of the sudden we get funding, but it just seems like we continuously chase our tails.”

When a second valley fever epidemic hit Kern County in 2001 – it’s still ongoing – Emery vowed to become more outspoken in his advocacy for state and federal support. “What we measure in public health, in our successes and in our failures, typically tends to be in 10 year increments,” he says. “I looked at what happened after the first time around and that’s why I was so vocal the second time. I don’t have another ten years to sit around here hoping for another epidemic to see if we can get some action here.”

It took the deaths of more than three-dozen inmates from valley fever since 2006 at two nearby state prisons, Avenal and Pleasant Valley, before Kern County’s epidemic received the national attention Emery had been waiting for. The CDC began an investigation last May, and a federal judge mandated a transfer of more than 2,500 at-risk inmates out of Kern County. Because the prisons house high concentrations of black and Filipinos inmates, valley fever infection rates are astronomical there compared to the state average; 1,000 times higher at Pleasant Valley, where more than 1,000 inmates have contracted valley fever over the past five years, and 189 times higher at Avenal. In September, the National Institutes of Health and the CDC announced plans to start a clinical trial in Bakersfield, in hopes of understanding how early diagnosis affects the course of treatment and finally developing a vaccine.

Another hopeful development spurred by Kern County’s most recent epidemic is the reintroduction of a skin test to diagnose the disease. First developed in the 1920s, the test used to be one of the fastest ways to diagnose valley fever, but it was discontinued after the FDA charged pharmaceutical companies more than \$700,000 in marketing fees to sell the test. For years, Emery and his cohort have pressed the FDA to waive the fee – possible

if the Administration rules there is a substantial threat to public health. It was finally waived earlier this month, and the \$20 skin test should be back on the market by the end of this year. If someone tests positive for valley fever using the skin test, but has never shown any symptoms in their lifetime, the prognosis is good; it generally means their immune system has prevented a chronic infection. Using the skin test, prisons in the Central Valley, for example, would be able to test all of their inmates, and then transfer those at high risk of developing disseminated disease, like blacks and Filipinos, to other prisons.

Because of the widespread screening, “It won’t let the state get out of cocci as easy,” Emery says. “Now that there’s more of a system, the state can analyze the major players [like Kern],” Emery says. They can’t use a lack of data as a scapegoat to avoid acknowledging that they have a problem.”

Seventy years after the first valley fever patient was diagnosed in Argentina, the prospect for a safe, effective therapy or, better yet, a vaccine, still remains uncertain. Developing a vaccine for valley fever would mean creating a financial incentive lucrative enough to draw Big Pharma into producing a product that only a relatively small portion of the entire country would ever use. The government-backed CDC clinical trial and the reintroduction of the skin test should give us a better idea how extensive the problem is, but whether this will be enough to inspire research from pharmaceuticals is doubtful. There are less and half a dozen researchers nationwide working toward a vaccine – primarily in California, Texas, and Arizona – and Emery believes the effort needs another big infusion of money to push it over the top. It could be decades before a vaccine is perfected in the lab.

Yet the question remains whether valley fever would still be as mysterious or overlooked if it didn’t affect some of California’s poorest and most powerlessness residents. Kern County, the state’s disease epicenter, is a hub for farm laborers, not investment bankers, media types, politicians or tech start-ups, making the issue much easier to ignore. Farming in Kern might be a \$6 billion enterprise, but the reality is that one out of three children under the age of five lives in poverty there.

“Most of the other vaccines that we’re dealing with now were sort of a big full court press government thing,” Rutherford says. “If you look at the AIDS vaccine efforts, you know, [their budgets] are astronomical. The amounts of money spent, and properly so, are very high. I can guarantee that this is true, that if this disease were happening in Washington, DC, the conversation wouldn’t be, “Well, these diseases have been around since the ‘40s.’”

Emery for whom retirement beckons within the next decade, feels an obligation to stay on the job as long as valley fever remains a puzzle. He says he’s “scared to death” that when he leaves the Kern County’s public health department, so too will local pressure to confront valley fever. He wonders if there will be someone as passionate about a tiny, regional mystery fungus as he is, or as the other doctors before him, like Emmet Rixford

or Harold who revolutionized treatment and even infected themselves with the disease for the sake of understanding the cause.

“It’s my disease. It’s Kern County’s disease,” he says, adding that his work will probably never be done in his lifetime. “I was up the other night, frustrated as hell and thinking I should be reviewing my statistics. Even if you call me an epidemiologist and say I’m just a mediocre cocci guy, and he’s not doing the CDC studies, I have made a stink and we’ve actually gotten some attention. This disease needs a voice. If I die tomorrow on my motorcycle, I’ll die with a smile. I got involved and I made a difference.”

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