As Earth warms, West Nile spreads

By Brittany Patterson, Atlantic

The day that everything changed was a broiling Thursday in July—95 degrees, the kind of dry heat that Sacramento Valley residents are used to. If you have to work outside, you do it before noon, swathed in long sleeves and pants to keep the sun at bay and the mosquitoes from eating you alive.

On this day, however, my grandmother, an active and spritely woman even at 80, never made it outside to the garden. She mentioned at breakfast that she wasn't feeling well, and my grandfather suggested that she take a nap in the sunroom. When he finally woke her up at 4pm, she still felt ill and feverish. The nearest emergency room is more than an hour's drive from their 20-acre farm in rural northern California, but they decided to make the trip. The doctors performed a CAT scan, gave my grandmother some Tylenol, and sent her home.

When my grandparents finally got back at around 11pm, my grandfather tried to convince my grandmother to eat something; she said that she could manage a piece of toast. A few days later he found the toast, one bite taken out of it, abandoned in the microwave.

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While getting ready for bed, my grandmother went into the bathroom and stood in the dark for 10 minutes. "I asked her what she was doing, and she said she was washing her teeth," my grandfather recalls. He coaxed her out, and they climbed into bed.

It was around 4am when the tumult began. “I’m falling out of bed!” my grandmother screamed. Half asleep, my grandfather tried to push her back in, but when he touched her, she shrieked and began sobbing. He rushed down the hallway, phoned the hospital, and was told to call 911. By the time that he could get back to the bedroom, my grandmother was slumped on the floor, her head against the bedside table, babbling incoherently. The paramedics arrived within 15 minutes.

“I wasn’t thinking of it being anything,” my grandfather says now. “I thought it was something she would get treated for and get better.”

My grandmother – or Oma, as we call her, the German word for grandmother – had always been a picture of perfect health, a trait that she and Opa, my grandfather, attributed to decades spent farming organic produce and tending to their land. But as Oma spent the next 32 days in the hospital and then three weeks in a rehabilitation facility, my family came to realize that the first night of terror was just the beginning. Despite the best efforts of her doctors, Oma did not get better.

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On Aug. 23, 1999, an infectious disease doctor in northern Queens reported two patients with encephalitis—swelling of the brain—to the New York City Department of Health, according to a Centers for Disease Control and prevention (CDC) report from October 1999. Upon investigation, the health department identified six patients with identical diagnoses who lived in the same vicinity.

In what appeared to be an unrelated development, crows were being found dead all over New York state that summer. It was as if they were dropping from the sky. In early September, a cormorant, two captive-bred Chilean flamingos, and an Asian pheasant died at the Bronx Zoo. The unexplained deaths filled the papers with foreboding stories. It was thought that

mosquitoes were spreading some kind of virus, but which one, and whether it could spread to humans, was unknown.

The local mosquito vector control agency jumped into action and began spraying pesticides. About 300,000 cans of DEET-based mosquito repellent and 750,000 pamphlets with information about personal protection against mosquito bites were distributed to NYC residents, according to the same CDC report.

On Sept. 20, samples from the deceased birds at the Bronx Zoo were tested and sent to the CDC. DNA sequencing revealed a viral strain, closely related to West Nile virus found in other parts of the world, but never before found in the Western Hemisphere. Around the same time, the CDC, while performing tests on a human brain specimen from an encephalitis case, discovered a strain of West Nile virus identical to the one found in the bird. Over the course of the next few months, the same match between the viruses in the birds and those in humans was found dozens of times. A previously undetected strain of West Nile virus, it seemed, was now in the United States.

Like all viruses, West Nile requires a host to survive and reproduce—in this case, birds. Like most arboviruses (diseases transmitted by blood-feeding insects), it is transmitted by mosquitoes. West Nile is also a neurotropic virus, which means that, in some cases, it can infect the brain.

“When West Nile first showed up, it was big news,” says Stephen Ostroff, formerly the associate director for epidemiologic science at the National Center for Infectious Diseases, which is part of the CDC. Hundreds of newspaper articles were published about the emerging disease, often with frightening headlines like “As Fears Rise About Virus, the Answers Are Elusive.”

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The answers were elusive in part because of controversy, which is still ongoing, about how best to stop the spread of the virus. Multiple local governments were forced by their health departments to spray pesticides from helicopters and trucks to reduce the adult mosquito population, according to a Journal of Urban Health article from 2002 and the media struggled to compare the risks of pesticide spraying with the risks of the virus.

Just as feared, the problem quickly began to spread to other states. Ostroff was appointed point person for the investigation by the Department of Health and Human Services.

“As we watched it march across the country, in different years there would be different hotspots,” he says. “One year Louisiana, one year Chicago. It would reproduce all of the issues, concerns, and questions about control measures.”

In 2002, West Nile made it to California. By 2004, it had been found in every state in the contiguous United States, according to the American Society for Microbiology’s report on West Nile virus.

In a new climate change report, the National Climate Assessment, which was prepared by a large scientific panel with the oversight of the federal government, the authors write that climate is “one of the factors that influence the distribution of diseases borne by vectors, such as fleas, ticks, and mosquitoes, which spread pathogens that cause illness.”

They go on to write that outbreaks of this diseases are sensitive to local weather and human modifications to the landscape. There are a lot of different variables that influence outbreaks, but they conclude with this: “Enhanced vector surveillance and human disease tracking are needed to

address these concerns.”

But after the march of West Nile across the country, our monetary investment in the disease petered out, due in part to the amorphous nature of the disease itself. Unlike the flu, which will arrive every year without fail, the severity of a West Nile outbreak varies hugely.

The authors write that “summers are longer and hotter, and extended periods of unusual heat last longer than any living American has ever experienced. Winters are generally shorter and warmer. Rain comes in heavier downpours.”

Although it will vary by region, these characteristics fomented by climate change, don’t bode well for West Nile outbreaks. And although it may be possible to disregard the slow changes happening within our climate, it’s less easy to ignore the effects of a disease ravaging a family.