

# Postmortem Findings in Person with Guillain-Barré Syndrome and Zika Virus

*[Announcer] This program is presented by the Centers for Disease Control and Prevention.*

[Sarah Gregory] I have Dr. Emilio Dirlikov with me today. Dr. Dirlikov is a CDC scientist and we'll be talking about Guillain-Barré Syndrome and Zika virus. Welcome, Dr. Dirlikov.

[Emilio Dirlikov] Buen día. Thank you for having me.

[Sarah Gregory] So tell me, what is Guillain-Barré Syndrome and what causes it?

[Emilio Dirlikov] Guillain-Barré Syndrome, or GBS, is a rare disease in which the person's own immune system damages the nerve cells, causing muscle weakness and sometimes even paralysis. This happens as part of the body's natural response following an infection with a virus or bacteria, and less frequently, after vaccination.

For GBS patients, weakness is progressive, meaning it gets worse, affecting more parts of the body over time. In interviews we conducted, patients often describe that symptoms begin with a loss of strength in their hands or feet. For example, they noticed that they could no longer properly push down on the gas pedal while they were driving. And then they might have some trouble supporting their weight when they get out of bed or even when they're walking. This weakness progresses throughout the body, and in severe cases, can affect the patient's ability to breath.

So, promptly seeking care is crucial, as starting appropriate treatment can slow down and stop the progression of symptoms, limiting the damage to the nerve cells.

[Sarah Gregory] How is Zika virus connected with GBS?

[Emilio Dirlikov] Well, Zika has surprised the world in a number of ways, including a connection with GBS. Reports from countries affected by Zika, including French Polynesia, Brazil, and Colombia, noted an increased number of GBS patients during Zika epidemics. Several epidemiologic investigations have found that Zika is a risk factor for GBS, including a study we conducted in Puerto Rico.

So, while GBS is a rare disease, we expect that it is a little less rare during Zika epidemics. People should protect themselves against Zika by taking steps to reduce mosquito bites, such as by using mosquito repellent, and by taking precautions to reduce the risk of sexual transmission.

[Sarah Gregory] Can it kill people?

[Emilio Dirlikov] The majority of GBS patients are not fatal. Death generally results from respiratory failure or blood clots in the deep veins.

In the United States and Europe, we see that about three to seven percent of GBS cases are fatal. A study we conducted in Puerto Rico found that GBS mortality on the island, prior to the arrival of Zika, was within this range, at approximately four percent.

Although the majority of GBS cases do not result in death, it's important to note that long-term consequences can vary patient to patient, with some patients experiencing difficulties moving parts of the body and other effects that can stay with the person for months, and sometimes even years.

[Sarah Gregory] Puerto Rico introduced a surveillance system for GBS. Tell us about that.

[Emilio Dirlikov] Given the reports from other countries affected by Zika, in Puerto Rico, we were concerned that a similar pattern might occur on the island. And we really didn't know much about Zika at the time, this was late 2015, early 2016. Indeed, among our first 30 confirmed cases of Zika was a GBS patient.

The Puerto Rico Department of Health, working with CDC and the University of Puerto Rico, worked quickly to alert healthcare providers across the island of an expected increase in GBS patients. Providers were asked to quickly report GBS patients and send patient samples, such as blood and urine, so we could use laboratory tests to identify whether the patient had been infected with Zika.

So, through these efforts, we tracked the number of GBS cases that occurred during the 2016 Zika epidemic. We identified a total of 123 GBS patients, of which 71, or 58 percent, had evidence of Zika infection.

[Sarah Gregory] On that note, we'd like to hear about your study.

[Emilio Dirlikov] As part of our surveillance system, healthcare providers were also asked to notify public health authorities if GBS patients passed away. And there was two primary reasons for this. First, we wanted to know if Zika was triggering a more severe form of GBS, especially to alert healthcare providers and appropriately prepare resources, if this was the case. Second, we also wanted to better understand the mechanisms by which Zika was triggering GBS. This includes looking for evidence of infection in different body tissues, particularly in these cases, the nerves and the brain.

For this particular patient, healthcare providers submitted samples, which confirmed Zika infection prior to his death. When he unfortunately passed away several weeks later, we worked closely with his healthcare providers to explain to his family the importance of this investigation—what it could mean to improve our understanding of Zika and how it was triggering GBS. And I was sincerely humbled by their understanding and selflessness during that difficult time. With their consent, the Puerto Rico Institute for Forensic Sciences performed an autopsy, and specimens of various organs were sent to CDC's Infectious Disease Pathology Branch, located in Atlanta, for further laboratory examination.

[Sarah Gregory] What conclusions did you draw from this?

[Emilio Dirlikov] We observed physical evidence of damage to the myelin covering of the nerves. In particular, damage was noted on the sciatic and fourth cranial nerves, which provide sensation and control of the muscles in the legs and eyes, respectively. This is consistent with

noted symptoms of GBS triggered by Zika, where patients report facial weakness in addition to the weakness of the extremities typically associated with GBS.

However, we did not find evidence that Zika directly infected the patient's nerves or other tissues. This suggests that the way Zika triggers GBS is the expected mechanisms, whereby the immune system damages nerves cells rather than through direct infection.

[Sarah Gregory] Would you like to tell us about your job at CDC and your involvement with GBS and Zika?

[Emilio Dirlikov] Sure. I joined CDC in 2015 as an Epidemic Intelligence Service officer, posted to the Puerto Rico Department of Health. And throughout the local emergency public health response to Zika, I served as the team lead for neurologic complications following Zika virus infection among adults. That is including neurologic conditions such as Guillain-Barre Syndrome. And so, working over a year and a half with a very small, but dedicated, group of public health professionals, we really worked towards better understanding the consequences of Zika virus, alerting public health providers, and being out in the community with patients during those difficult moments. Since then I've transitioned to CDC's Global Rapid Response Team and I continue my work to respond to public health threats throughout the world.

[Sarah Gregory] So, tell us what the Global Response Team does.

[Emilio Dirlikov] Well, we're a set of multidisciplinary public health professionals that quickly responds to global health threats throughout the world, ranging from diseases like Ebola, Zika, Dengue virus, to measles and polio.

[Sarah Gregory] Thanks so much for taking the time to talk with us today, Dr. Dirlikov. Listeners can read the entire January 2018 article online at [cdc.gov/eid](http://cdc.gov/eid).

I'm Sarah Gregory for Emerging Infectious Diseases.

*[Announcer] For the most accurate health information, visit [cdc.gov](http://cdc.gov) or call 1-800-CDC-INFO.*