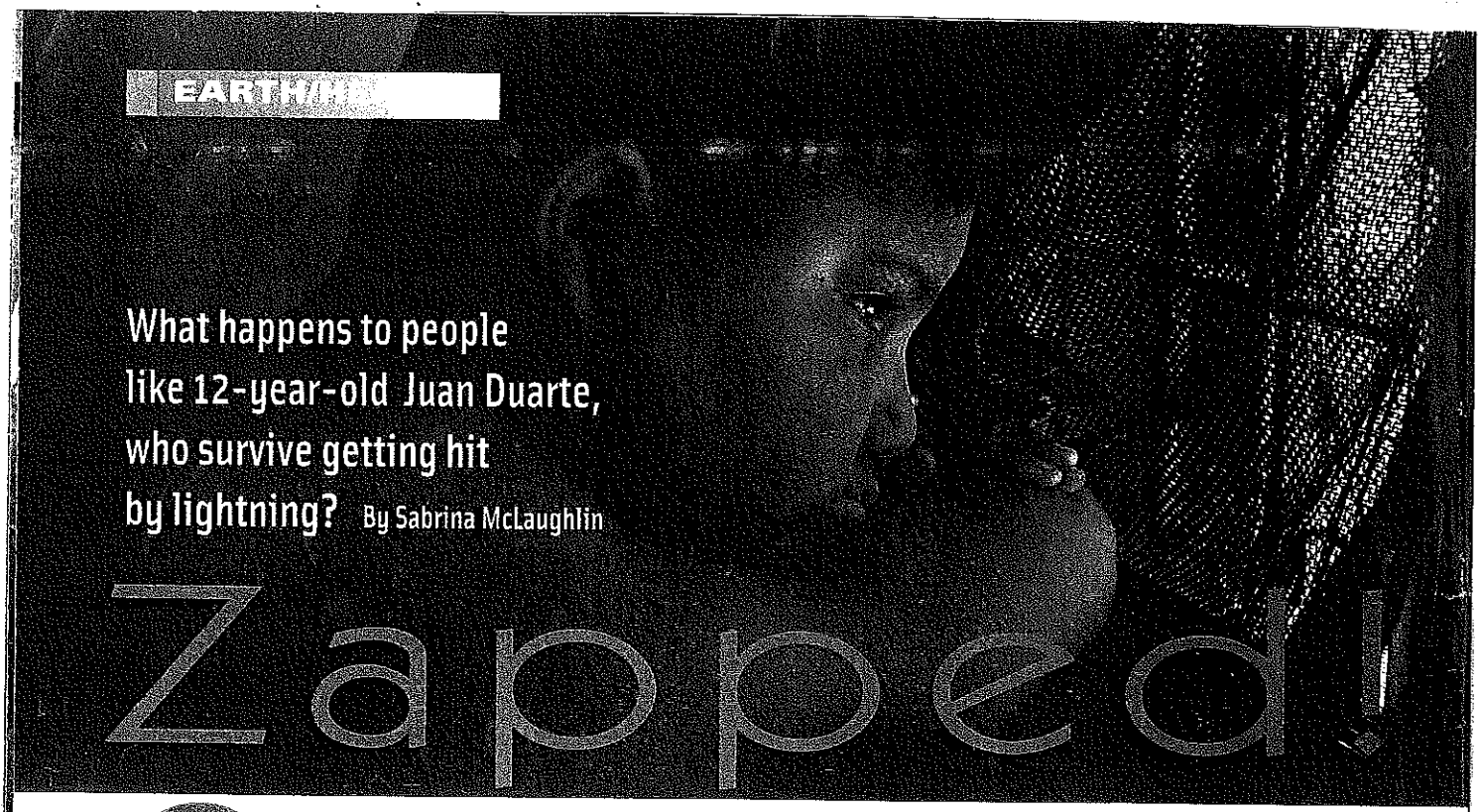


## What happens to people like 12-year-old Juan Duarte, who survive getting hit by lightning? By Sabrina McLaughlin

# Zapped!

One evening last July, 12-year-old Juan Duarte of Los Angeles was watching TV when the sound of a brewing thunderstorm distracted him. He ducked outside to get a good look.

Juan's mother thought nothing of his disappearance until she spied him staggering around outdoors with no shirt on and a trail of blood running down his back. She ran to him, fearing he had been caught in a drive-by shooting. Instead, she found he'd been struck by lightning!

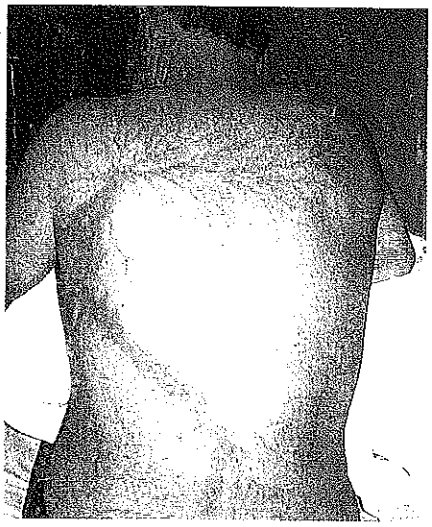
Juan's mom rushed him to the hospital, where doctors examined the boy and concluded that he was OK except for a thin red scar. Juan was lucky.

According to the National Weather Service, about 70 people are struck dead by lightning each year in the United States. Of the hundreds of others who survive lightning strikes, their lives change in a flash.

### CHANGED UP

Only a handful of experts understand *keraunopathy,* the medical consequences of being hit by lightning. Mary Ann Cooper, a doctor and the director of the Lightning Injury Research Program at the University of Illinois, is one of them. Cooper, who has specialized in keraunopathy for 25 years, told *Current Science,* "People think being struck by lightning means getting burned, and that's not the case."

The force of a bolt of lightning can reach 200 million volts. But lightning doesn't electrocute anyone. The bodies of electrocution victims are often badly burned on the inside and outside. Lightning's intense heat (30,000 degrees Celsius [54,000 degrees Fahrenheit]) might singe the eyebrows or melt jewelry and pocket change. But a lightning strike lasts only a few milliseconds—too short a time to seriously damage human tissue. Instead, lightning kills by stopping the heart.



**Lightning can leave its mark in the form of *Lichtenberg's flowers,* a fernlike pattern on the skin that is similar to a bruise. Lichtenberg's flowers trace where the force of the electric current shattered capillaries and left a trail of pooled blood.**

Top: Beatrice de Gea/*Los Angeles Times*; Bottom: *The New England Journal of Medicine*

The rate and strength of a human heartbeat are controlled by the *autonomic nervous system (ANS),* a network of nerves that regulates many of the body's involuntary vital functions (including breathing, digestion, and sweating). A bolt of lightning can stop the heart in mid-beat. Lightning "short-circuits" the ANS and interferes with the signals it carries to the heart, experts believe.

Sometimes the heart recovers on its own. Other times, it needs help to restore its normal rhythm. Lightning victim Michael Utley owes his life to *cardiopulmonary resuscitation (CPR),* a first-aid technique that combines external heart massage (to keep blood flowing through the body) with artificial respiration (to keep air flowing in and out of the lungs). Utley was playing golf on Cape Cod, in Massachusetts, when lightning zapped him. By the time his golf buddies had reached him, Utley was lying in a lifeless heap, "similar to a broken doll," he said. Utley's friends performed CPR until an ambulance arrived and paramedics used a defibrillator to jump-