The Medical Examiner

Solving Life and Death Mysteries through Forensic Science
As Chief Medical Examiner of Florida’s District Nine in Orlando, Florida, Jan Garavaglia collects forensic evidence, performs autopsies, provides expert testimony in criminal trials—and has a hit TV show. “Dr. G” has become the voice of forensic medicine for a public with an ever-increasing fascination with the topic. In 2008, she summarized some of the conclusions she’s made in her 30-year career in a book entitled How Not to Die: Surprising Lessons on Living Longer, Safer, and Healthier. Here, Dr. Garavaglia talks about the past, present, and future of forensic pathology—and how examining the dead is helping to save lives.

How did you become interested in forensic science?

In medical school, I liked the challenge of obtaining the patient’s history, doing physical exams, determining which tests to run, and coming up with the diagnosis. But I found it frustrating that people sometimes wouldn’t want the treatment, or wouldn’t follow through with treatment. There was a mentor at my medical school who was a forensic pathologist. I was fascinated by his lectures and by how you could put the pieces of the puzzle together to come up with a diagnosis. The autopsy was one of the major pieces of that puzzle. It was through this professor that I saw how interesting forensics can be.

Forensic pathologists are doctors. We use the same techniques that a regular physician would. We get a history, do an exam, and get ancillary tests to come up with possible causes of a person’s illness and then hopefully pinpoint what it is.
It's a little more challenging as a forensic pathologist because the person is dead. They can't give you a good history, and often, there are no known circumstances that might have led to their death.

**How has the field evolved since then?**
When I first got into forensic pathology some 30 years ago, there were only 25 women in the field. Today, more than half of those going into forensic pathology are women. And although there were some anthropologists doing this kind of work, there wasn't a field of forensic anthropology. We did a lot of the crime scene investigations, doing many things that today are done by specialists such as odontologists, who help us with bite mark identification, and forensic anthropologists, who examine victims in criminal cases.

**What percentage of your work involves crime?**
A lot of people think all we do is crime, but only about 10 to 15 percent of my caseload is crime-related. Of course, for every dead body that comes through my office, I have to consider the possibility that a crime occurred. The medical examiner needs to know how to quickly classify a skeleton by age, and at least give a rough ballpark of ethnicity, sex, and height. As the gatekeepers who determine how a case will be investigated, medical examiners need to know those things right off the bat to be able to give the police at least a working framework.

But that's only a small fraction of my caseload. The rest are people who die suddenly and unexpectedly. We have to try to figure out why they died. We perform the autopsy, look at the circumstances of their death and their known history, and run toxicology and subsequent blood tests. We look at tissue biopsies under the microscope, which can help us determine such things as when a heart attack occurred, or if there had been previous damage to the heart. All these components are pieces of a puzzle that, when solved, can tell us why that person died.

If there's a possibility that a crime has occurred, we first gather evidence, but as physicians, our main focus is to figure out what happened to that person; not who did it, but what happened.

**It would seem that DNA analysis must have been a boon to this field.**
The advent of DNA analysis in the 1980s didn't help us much initially. I would try to take DNA off a body—from under the fingernails, for example, to get the DNA of the person the victim was struggling with—but there just wasn't enough DNA. Polymerase chain reaction (PCR) changed that. It allowed us to amplify copies of the DNA that is left behind, and that's made a tremendous difference.

Mitochondrial DNA analysis has greatly improved our ability to identify bodies in cases where the nuclear DNA has broken down to the point that we're unable to utilize it. The nuclear DNA in cells is relatively fragile and there aren't a lot of copies of it in the cell, but there are hundreds of copies of mitochondrial DNA, which is in the cytoplasm. It's not an exact identification because you inherit your mitochondrial DNA only from your mother, but it used to be that once a body had decomposed, we wouldn't have any DNA at all. If we don't have any DNA, we have no basis for comparison. With the ability to analyze mitochondrial DNA, we can see if we're in the ballpark. If the mother or any of the siblings can provide a sample, we can see if the victim's mitochondrial DNA matches their DNA.

**What’s the biggest limitation in your work?**
The biggest limitation in determining what happened to someone is that bodies aren't pristine. They start decomposing, and that's your evidence—all the information, the pieces of the puzzle that could help you figure out what happened—slowly degrading.

**How did you decide to pursue a TV show based on your work?**
Many of the forensic science TV shows only show the crime part, because a lot of people are interested in that. When Discovery approached me about doing a show about a real-life female forensic pathologist, I knew that all they wanted to know about was crime, but that's not the most interesting part of my job. The most interesting part of the job is trying to figure out how someone died, whether it was the result of a crime, disease, or an accident of some kind. I'm just as interested in figuring out why the guy at the bottom of the pool is dead as I am in learning that the guy in the middle of the street died from a gunshot wound, which seems a little self-evident. I said, “Follow me around and see what a real medical examiner does. If we can do a show about what a real-life M.E. does, I would be interested.” Once the guy saw how much passion I had for figuring out how people died,
he said, “Yeah, I think we can do it about all types of cases.” I wanted the show to be realistic; I wanted people to see what we really do.

**What influence do you think the show has?**
I think it brings to light the good that forensic scientists do for society and for families who’ve lost loved ones. It’s helped people realize that some conditions that they might not think of as lethal—like hypertension, which often has no symptoms—can really kill you. I’ve received many letters saying things like, “Now I realize—after watching the episode with the man that carried his groceries up and sat in a chair and died of a cerebral hemorrhage from years of high blood pressure—why I have to take my medicine even though I feel great.”

We once did a story about atypical chest pain in women. It depicted a woman who suddenly became very tired, and it turned out to be a heart attack. We discussed how atypical women’s heart attacks can be, and how their symptoms can mimic being tired, or include abdominal pain. I got a letter from a woman who had been having abdominal pain and suddenly became very tired. It was Christmas day, and she was going to ignore these symptoms. She thought she was just doing too much, but she had watched that show and could not get my voice out of her head saying that she needed to have this checked out. She went to the hospital, as she put it, just to shut me up, and she’s very glad she did, because that night she had a cardiac catheterization and had two stents placed. She credits me with saving her life, which is a huge thing for a forensic pathologist—for anybody—to hear.

**Is that how your book came about?**
Yes. My producer could see that even the people in the studio putting the show together—the editors and the writers and producers—were taking these lessons to heart. It was changing their lifestyle. He said, “You ought to concentrate on that in a book about how people die. We had a 17-year-old boy with absolutely no medical history. He had been on a senior class trip. He was an athlete in school, and certainly, no one expected him to die. He was having some abdominal pain. They decided to take him by car to one of the clinics in town, and he died on the way to the hospital.

Of course, the family was devastated. They wanted to know what happened. When I performed the autopsy, I found that his aorta had been torn in a couple of places. When you see that in a young person, it’s either from major trauma or from a congenital abnormality. We knew he didn’t have major trauma, so I suspected that he had a congenital abnormality. The family couldn’t believe that until I got genetic testing for him. He had a genetic abnormality called vascular Ehlers-Danlos, which caused his vessels to be weak. That has huge implications now for the rest of the family. They were grateful.

My professor had said that I would be surprised at how just letting families know what happened—just being that honest voice that families can trust, or that honest voice for the criminal justice system—is a tremendous asset to society. And it is. If you didn’t have a medical examiner, the family would always wonder what happened to their child. Was it foul play? Was it something he ate? Was it something that happened on an amusement park ride? Without an honest voice to depend on, you can make up all sorts of things in your mind, but once I had the facts, not only did I know that his aorta tore, I could pinpoint to the molecule on his genes the location of his genetic abnormality.

**What case is most memorable for you?**
I love the cases where I find something unexpected. Recently, we had a 17-year-old boy with absolutely no medical history. He had been on a senior class trip. He was an athlete in school, and certainly, no one expected him to die. He was having some abdominal pain. They decided to take him by car to one of the clinics in town, and he died on the way to the hospital.

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