

## Anne Schuchat, M.D., '84: Sleuth for the CDC

By Laura Stephenson Carter

She had dreamed of becoming a doctor from the time she was a little girl. She also wanted to be like William Carlos Williams, the famous doctor in New Jersey who wrote poetry. What she never imagined was that she'd one day be investigating infectious diseases all over the world—responding to international medical emergencies like the SARS outbreak in China.

But long before she became chief of the Respiratory Diseases Branch in the Division of Bacterial and Mycotic Diseases at the U.S. Centers for Disease Control and Prevention (CDC), 1984 DMS alumna Anne Schuchat, M.D., was being groomed for the job. Dartmouth virologist Elmer Pfefferkorn, Ph.D., and infectious disease specialist Fordham von Reyn, M.D., sparked her interest in the CDC—even though they didn't know it at the time.

"I first learned about CDC," says Schuchat, "and the kinds of things that CDC did from Dr. Pfefferkorn, who used to read snippets from the MMWR, the 'Morbidity and Mortality Weekly Report,' which is CDC's weekly bulletin. He would illustrate viruses and bacteria and infectious diseases by the stories summarized in the MMWR." Pfefferkorn also invited a former CDC Epidemic Intelligence Service (EIS) officer to talk to his class—Ford von Reyn, a 1969 DMS graduate who is now chief of infectious diseases at DHMC.

Von Reyn "talked about going off and investigating possible plague in the middle of the Southwest," continues Schuchat (whose name is pronounced SHUCK-ut). "He told a very exciting story about the kind of applied infectious-disease work that CDC was doing."

Schuchat impressed Pfefferkorn, now an emeritus professor of microbiology and immunology, "as a keen student of all things microbiological," he says. "Now our roles are reversed, and she is my teacher: I use her publications to keep my medical school classes up-to-date." Schuchat has written over a dozen MMWRs and published more than 150 articles and book chapters on such topics as listeriosis, Group B strep infections, sepsis, toxic shock syndrome, bioterrorism-related anthrax, and severe acute respiratory syndrome (SARS).

After completing a residency in internal medicine at the Manhattan VA Hospital in 1988, Schuchat joined the CDC as an EIS officer herself. "I really thought I was going to do two years of applied epidemiology and then do an infectious disease fellowship and do clinical work for my career," she says. "But instead I never left CDC."

One of her early assignments was investigating a mysterious outbreak of listeriosis in newborn babies at a hospital in Costa Rica. Listeriosis, a serious infection caused by the bacterium *Listeria monocytogenes*, is "a rare cause of meningitis and sepsis and pregnancy complications," she says. After about three weeks of sleuthing, she deter-

mined that the infection was being spread by a shared bottle of contaminated mineral oil used to wash the newborn babies.

The mineral oil "had gotten infected or contaminated from a first case of listeriosis that probably came in from the community," she explains. "The team I worked with helped put in place a change so that the use of a common bottle of mineral oil would stop and that the washing of babies would be done in a safer manner."

Luckily for those babies, Schuchat had worked on a very large U.S.

study of listeriosis, interviewing nearly 200 patients. "I probably had talked to more people with listeriosis than anybody at the time," she says. In that study she was trying to determine whether

Schuchat also headed the Beijing-based SARS team for the World Health Organization. The largest outbreak of SARS—more than 2,500 cases—occurred in Beijing.

there were food habits or dietary risks associated with listeriosis. It turned out that most of the people who had come down with the disease had eaten contaminated soft cheeses or deli meats. "Over the next several years, there were big outbreaks associated with deli meats that hadn't been detected before our study," she says. Now there is "a zero-tolerance for *Listeria monocytogenes* in ready-to-eat processed meats—that hadn't been enforced before that study."

For Schuchat, working on the listeriosis outbreak in Costa Rica "cemented a lot of the principles of epidemiology": defining a case, comparing it to other cases, searching for "a common source when there's a lot of noise in the system," and finally "taking what you've learned and influencing policy."

But she says her work is not only about outbreaks. For example, soon after she got to CDC, she wrote an MMWR summarizing what had transpired in the 10 years since the toxic shock syndrome (TSS) scare of the late 1970s and early 1980s. TSS, caused by the *Staphylococcus aureus* bacterium, is associated with the use of tampons.

"Outbreaks may get the media attention, but we can have an impact on illness by concentrating on infections over the long haul," Schuchat says. "There were so many changes that occurred after the [TSS] outbreak. The FDA came up with standard labeling for tampons that has helped consumers make informed choices. I think that if we only deal with problems when they're in the news, we may not have as much impact." As a result of such efforts, the incidence of menstrual-related TSS cases has dropped dramatically—from more than 800 in 1980 to fewer than 10 a year by the late 1990s.

Yet Schuchat realizes that outbreaks do play an important role in raising public consciousness about health issues. For example, the rare but potentially deadly *Hantavirus* had been around for decades. It wasn't recognized until 1993, however, when there was an outbreak of hantavirus pulmonary syndrome in the Four Corners region of the southwestern United States—where New Mexico, Colorado, Arizona, and Utah meet. *Hantavirus* is transmitted by infected

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rodents—through urine, droppings, or saliva—to humans who inhale virus-contaminated air.

“We had people calling from all over the country with unusual cases they remembered,” says Schuchat, who worked on the CDC phone banks during that time. “I took a call from somebody who had taken care of a patient a year earlier. He wondered when he read the news about hantavirus, ‘Could my patient have had that? Because it really sounds a lot like it. He was a young healthy guy who was hiking.’ That was one of the sporadic cases we found retrospectively that really was hantavirus. . . . Outbreaks help us notice that there’s something new. But we’ll look back and, especially with archival specimens, you can show something that’s happened for a long time before anybody connected the pathogen with the disease.”

Schuchat’s primary focus at the CDC has been endemic, common infections. She spends most of her time doing “research, public health response, surveillance, [and] training—training either epidemic intelligence service officers like I had been, or training students or visiting scientists,” she says. “It’s been a very rich experience in terms of getting to see an impact in a few years.”

Schuchat has also headed the CDC’s Group B streptococcal research program. Group B strep (GBS) is a common cause of life-threatening infections in newborns—such as sepsis (a blood infection) and meningitis (an infection of the fluid and lining surrounding the brain). Before prevention efforts were put in place, 8,000 babies a year got GBS, and 1 in 20 would die. The epidemiological studies by Schuchat’s group culminated in the development of prevention guidelines, including a policy that all pregnant women undergo prenatal GBS screening. As a result, says Schuchat, “there’s been a 70-percent drop in infections caused by Group B strep in newborns. It’s been very exciting to be part of a process that now touches everyone who delivers a baby in the country. It’s probably preventing almost 5,000 infections a year,” she adds.

Schuchat has had other high-profile assignments, too—ones she gladly took on but wishes hadn’t been necessary. Not long after the September 11 terrorist attacks in 2001, she found herself part of CDC’s Anthrax Emergency Response Team. She was the principal liaison for the field team charged with investigating the anthrax spore-laden envelopes sent to the House and Senate office buildings in Washington, D.C. “That was my first experience with a major emergency response,”



Schuchat (right) is pictured here with one of her CDC colleagues, Weigong Zhou, in front of the hotel that served as the SARS command center in Beijing—with thank-you notes in traditional calligraphy that the team received from Chinese schoolchildren.

she remarks, recalling that it “was similar to internship in terms of the 24-hours-a-day, seven-days-a-week type of schedule. There was a lot of challenge to the agency and to my team. CDC worked well together during that time. I certainly share everyone’s feeling that we would like the person who did that to be caught.”

More recently, Schuchat has been involved with another investigation covered widely by the media—the SARS outbreak in China. She headed the Beijing-based SARS epidemiology and disease control team for the China Office of the World Health

Organization (WHO). The largest SARS outbreak—more than 2,500 cases—occurred in Beijing, a city of over 14 million people.

“When I was there in May and June, there were a lot of questions about whether the outbreak was increasing or decreasing,” she explains, and “why cases were occurring in people who didn’t have contact with other patients with SARS. So I worked on a few epidemiological studies with the Beijing CDC to describe the outbreak, to characterize super-spreaders—people who spread the infection to many others. We also looked at factors associated with getting SARS when you didn’t have contact with another SARS patient,” she adds.

That was the most incredible experience of my public-health career,” declares Schuchat. “I traveled to Beijing at a time when foreigners were not coming to China because of SARS.” She was one of only 15 to 20 people—all members of the WHO team—in an otherwise empty 17-story hotel. “The people that I worked with on the Beijing task force had seen colleagues intubated with life-threatening pneumonia and had to make decisions about triage and health-care resources that were limited. They decided to build a hospital when it looked like there weren’t enough isolation beds for the cases that were occurring. They built a hospital in eight days for 1,000 patients. . . . I have quite a bit of admiration for the Beijing public-health authorities who led the control measures.”

Surprisingly, Schuchat wasn’t worried about getting SARS herself. “It was gratifying to have a chance to help with the response and not just focus on fear,” she says. Yet she takes comfort in knowing the CDC is very concerned about its employees’ safety. “There’s certainly a culture here to be careful,” she says. “I definitely am that way as a supervisor with my staff when they are flying off to places, remind-

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