

IN THE COMPLEX PATTERNS OF HEALTH AND DISEASE, THE FACULTY MEMBER AND ALUM OF THE SCHOOL MAKES CONNECTIONS THAT CAN BE USED TO IMPROVE HEALTH.



BEATE RITZ: Epidemiological Sleuth On the Case for Prevention

As a medical student at the University of Hamburg, Germany, Dr. Beate Ritz quickly realized that clinical work wasn't for her. "I was less interested in taking care of sick patients than in learning why they had become sick in the first place," she says, "and I knew it would frustrate me enormously to have to treat someone when I might have prevented the disease." She also discovered she had a gift for the detective work and analysis of complex patterns of population health and disease that defines the field of epidemiology.

In becoming an occupational and environmental epidemiologist, Ritz found the perfect marriage of her skills and her bent toward prevention. "If you find a genetic factor that puts people at risk for a disease, there's not always a lot people can do with that information," says Ritz, who got her M.P.H. and Ph.D. from the UCLA School of Public Health before joining the Department of Epidemiology faculty in 1995. "On the other hand, any disease caused by an occupational or environmental factor is potentially preventable by taking that factor out of the workplace or general environment." But in choosing to explore connections between exposures and increased disease risk for certain workers and communities, Ritz frequently courts controversy. "These are often politically high-stakes kinds of questions in which you have people on both sides who are very interested in our findings," she says. "There's almost always somebody who doesn't like what I'm doing."

That message was delivered resoundingly in the first few years of Ritz's faculty career, when highly publicized findings from studies she and her colleagues conducted of cancer risk for radiation-exposed workers at Rocketdyne's Santa Susana Field Laboratory drew a harsh rebuke from the company, which is now owned by Boeing.

With funding from the U.S. Department of Energy, Ritz's group reviewed medical and personnel records for 4,563 employees monitored for radiation between 1950 and 1993 at the facility (located near Simi Valley, Calif.), and found that workers exposed to low doses of radiation had a cancer risk that was at least 6-8 times greater than previous studies had reported. The increased risk was found at exposure levels far lower than prior research had shown. In addition, the rocket fuel hydrazine was, for the first time, identified as a human lung carcinogen.

Ritz believes the company, fearful of potential lawsuits, calculated it would be much cheaper to hire its own panel of scientists to poke holes in the researchers' methods.

"Epidemiology isn't exposing rats to a certain amount of chemicals in a controlled setting," Ritz notes. "When there are humans involved, there is a lot of potential for error. But it's still the scientific method. One study can be only so certain with its results, but in the context of the larger science, you draw your conclusions. And when the vested interests don't like your conclusions, they will always be able to find people willing to question them."

More recently, when Ritz wanted to investigate a possible link between air pollution and adverse birth outcomes, the controversy concerned her decision to even study pregnancy in that context. "No one would fund it, because everyone figured that fetuses in the womb don't breathe, and reasoned that for air pollution to have an effect you have to inhale," she recalls. Undaunted, Ritz proceeded without funding, using public databases on birth outcomes and air pollution monitoring to produce the first compelling evidence that air pollutants, even at the levels currently found in Los Angeles, can contribute not only to asthma and other respiratory illnesses, but also birth defects.

She found that when exposed early in their term, pregnant Los Angeles-area women living in regions with higher levels of ozone and carbon monoxide pollution were as much as three times as likely as women in areas with the cleanest air to give birth to infants who suffered serious heart problems.

While these findings await confirmation by other studies, researchers all over the world have employed similar databases to corroborate other results initially reported by Ritz, including as associ-

ation between air pollution and low birth weight and preterm birth. Ritz is now investigating the relationship between exposure to air pollutants and asthma in Los Angeles and San Diego counties, using detailed information on traffic density, an extensive air monitoring network, and data from the 2001 California Health Interview Survey, based in the school's Center for Health Policy Research.

In 1999, Ritz ventured in a new direction with research examining the impact of exposure to pesticides suspected of increasing the risk of certain neurological disorders. She now co-directs UCLA's Center for Gene-Environment Studies in Parkinson's Disease, funded by the National Institute of Environmental Health Sciences to study the interplay between pesticides and "candidate" genes that could leave certain people susceptible to Parkinson's when exposed to the toxins. As part of the center, Ritz heads a study testing the gene-environment interaction hypothesis for Parkinson's by conducting a population-based case-control study of newly diagnosed patients in three rural California counties. The study takes advantage of more than three decades of data collected as part of California's mandate on reporting commercial and agricultural pesticide use.

"With technology that allows researchers to inexpensively and efficiently conduct genetic screens on large numbers of samples, we've seen an explosion of genetic knowledge," Ritz says. "As a result, we can now begin to go out into the field and apply those laboratory findings to populations."

A positive finding on the relationship between pesticides and Parkinson's would be certain to make headlines, something Ritz recognizes as coming with the turf – even if it's not something she relishes.

"It's difficult, because people are always trying to pull you one way or the other, and often that means they want you to say something that the science hasn't arrived at yet," she says. "But I do feel an obligation not just to let others interpret my data, so I will respond to media requests and I'm always happy to answer questions from members of the communities that are affected."

More enjoyable, she says, is the process of discovery, particularly when she's sharing it with students. "It's a lot of work to train and re-train students, particularly at the master's level, since they often will only be around for a year or two," she says. "But I believe the research experience is valuable to them, and they bring such great enthusiasm to the studies. That's what I enjoy about what I do."

She pauses, smiling. "The media and professional attention, which a lot of people assume are so glamorous, I see as necessary but somewhat stressful."

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—Dr. Beate Ritz