What happened in the gulf?
Physician seeks answer to war’s mystery illness

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Claudia S. Miller, MD, entered the Health Science Center’s Medical School after 12 years as an industrial hygienist. Her work in mines, foundries and steel mills led her to pursue research in human sensitivities to chemicals. Today she is regarded as one of the nation’s leading experts on Gulf War Syndrome.
Faculty physician wins a battle for research in her quest to solve the mystery of Gulf War Syndrome

By Jim Barrett

A final victory in the Persian Gulf War may be won far from Iraq's desert and the burning oil wells whose smoke darkened Kuwait for weeks. American troops fought in one of the most chemically active combat zones in the history of U.S. warfare. And now as many as 4,000 veterans have Gulf War Syndrome, an illness that so far has defied diagnosis.

Victims complain of many problems, including fatigue, memory disorders, mood swings, body pain and insomnia.

With the war's shift from the battlefield to the field of clinical research, Claudia S. Miller, MD, an allergist and immunologist at the Health Science Center, finds herself on the front line of a politically-charged medical mystery. In January, the Defense Department pledged $1.2 million for a research project similar to that first proposed by Dr. Miller to test the sick veterans for "multiple chemical sensitivity," or MCS.

"Her work has... a tremendous potential benefit to society, which is increasingly being exposed to low levels of a variety of chemicals in the environment," Dr. Blanck said.

The Gulf War mystery fell in Dr. Miller's lap in 1992. She had become nationally known for her research into chemical exposure and its relationship to human illnesses. The Department of Veterans Affairs hired her as a consultant to examine its Gulf War patients and try to find a diagnosis.

"I noticed that the symptoms of some of the veterans were strikingly similar to multiple chemical sensitivity, a controversial condition that civilian patients had reported having before the war," she said.

In 1993, Dr. Miller was appointed to the VA's blue-ribbon scientific panel on the Gulf War illnesses. She acknowledged that MCS was unproven but pressed for clinical research on the subject.

MCS is a condition that has stirred controversy since it was first described 40 years ago. Victims say they are "sensitized" by intense or long-term chemical exposures and thereafter become sick when exposed to low levels of any number of chemicals.

Dr. Miller had studied related issues involving indoor air pollution and pesticide exposure, but said it was unknown whether exposure to low
"Why can’t you be the way you were?" Victoria’s 7-year-old son said.

She didn’t have an answer. Neither do her doctors.

Victoria, 39, is like many sick veterans from the Persian Gulf War. She has so many ailments that doctors are stumped for a diagnosis.

A former Army medic, Victoria spent eight years in the service and more than six months in the Persian Gulf. She is a single mother who manages to hold down a job in San Antonio. It isn’t easy.

Victoria has fatigue, chest pains, breathing problems, sores that leave scars, recurring high fevers and two menstrual periods a month.

"I knew things were bad, but it just broke my heart when my son asked me why I was sick all the time," said Victoria, who asked that her real name not be used.

Since her discharge in September 1991, Victoria has been treated in nine separate military clinics without a diagnosis. "The doctors look at me like I’m crazy and say it’s just stress. Well, I may be stressed, but that’s only because they don’t know what’s wrong with me," she said.

The armed forces deployed 650,000 men and women in the Gulf War. About 5,000 came from South Texas. No one is sure how many service members are sick. Defense officials report 500 to 1,000 defined cases of Gulf War Syndrome, but the Disabled American Veterans, a veterans organization, has estimated as many as 4,000 veterans are affected.

In 1991, the VA established a national registry for Gulf War veterans. Registrants could receive free physical examinations, counseling, family support and other services. In South Texas, 844 veterans have registered and doctors have examined 200, most of whom were referred to specialists.

Officials at Audie L. Murphy Memorial Veterans Hospital in San Antonio have adapted procedures for the unique situation. They contracted with three private doctors to help speed examinations. In addition, they put each Gulf War patient under the care of a primary physician. "There were so many symptoms and the patients were seeing so many different doctors that we had to get more consistency in treatment. We needed one doctor who could monitor an individual’s situation and get the big picture," hospital spokeswoman Amber Baldwin said.

Most veterans organizations say the VA is handling Gulf War veterans better than it did Agent Orange patients. Agent Orange was a chemical defoliant used in the Vietnam War. For years after the war, veterans claiming Agent Orange disabilities were denied benefits until Congress acted.

Few Gulf War veterans claiming chemical exposure have won disability benefits so far. The VA has granted about 80 claims out of 1,500.

Dr. Miller’s name and work have been cited by the New York Times, USA Today, the prestigious journal Science and other publications. In 1993, she testified before the House Veterans Affairs Subcommittee on Oversight and Investigations and began to win allies in her call for MCS research.

"She took a very courageous stand," said Iris Bell, MD, PhD, a leading researcher in the effects of environmental exposures on the brain. Dr. Bell is a psychiatrist at the University of Arizona and the VA hospital in Tucson.

The environmental medical unit would have eight beds in four rooms where the indoor air is filtered for optimum purity. Porcelain walls and special furnishings would minimize "out-gassing," the release of low-level chemicals common in plastics and other synthetic materials.

After several days in the unit, away from their usual home and work environment, patients would be given very low concentrations of the chemicals they would breathe, ingest or somehow encounter in daily living. These "challenges" would be blinded. In other words, substances would be presented so that patients could not smell or taste them. Patient reactions would be measured and analyzed.

The environmental unit is critical to ending the debate about whether MCS is real or imagined, said...
Sanford A. Miller, PhD, no relation to Dr. Miller, who is dean of the Health Science Center's Graduate School of Biomedical Sciences and a former high ranking executive in the U.S. Food and Drug Administration.

"Claudia Miller wants to apply scientific standards to define what this disorder is and she has been remarkably objective. If she were anything but neutral in this debate, the last thing she would want is that environmental unit because it could just as well prove that she is wrong as prove she is right," he said.

Findings from the environmental unit could have a profound effect on medicine, consumer products and the way Americans live if evidence emerges to link illness with low-level chemical exposures.

Dr. Claudia Miller contends that Americans encounter many of the same chemicals suspected of making the Gulf War veterans ill. She said more doctors are seeing patients with similar problems and the number of cases of reported chemical sensitivity appears to have risen sharply in the past decade.

Years ago, miners kept caged canaries nearby to warn them if they were breathing dangerous gas. They would flee if a bird died. "Some people feel these chemically sensitive people are our canaries," Dr. Miller said. "I don't know, but we need to find out."

Military personnel in the Gulf War encountered a potent brew of chemicals. "The use of environmental agents was far greater in this war than in Vietnam," Dr. Blanck said.

There were pesticides to kill desert insects. Ammunition and armor made with depleted uranium, a heavy metal that is toxic as well as radioactive. Pyridostigmine bromide pills to protect against a poison-gas attack. Smoky, fuel-burning tent heaters. Diesel oil doused on roadways, runways and even inside tents to stop sand from blowing. One veteran said the diesel wicked up his tent's canvas siding. Others reported diesel odor and smoke in their tents and other areas.

Iraqi forces torched Kuwait's oil fields. Smoke from the fires was visible from space. The air turned foul, the sky turned dark and it rained a black, oily residue. Water became contaminated. "We all took showers in oily water," a former Army medic from San Antonio said.

In 1993, reports surfaced that some military personnel may have been exposed to low levels of Iraqi chemical warfare agents. Investigators for Sen. Donald Riegle, D-Mich., said it was possible the chemicals escaped when U.S. warplanes bombed Iraq's nerve-gas plants.
Defense officials have examined the possibility of low-level gas exposure, but report finding no evidence to support it.

In 1992, the VA's Houston Regional Referral Center hired Dr. Miller to examine some of the sickest Gulf War veterans who had been sent there from across the nation. She has since completed more than 20 comprehensive evaluations.

In the '70s, she distinguished herself as an industrial hygienist. Determined to pursue an interest in health effects of low-level chemical exposure, Dr. Miller enrolled in the Health Science Center's School of Medicine in the '80s. Later, her work became widely read. In 1991, she wrote the acclaimed book *Chemical Exposures: Low Levels and High Stakes*, which won an award from the World Health Organization.

Her co-author, Nicholas A. Ashford, PhD, JD, professor of technology and policy at Massachusetts Institute of Technology, said the book brought MCS into the mainstream of medical inquiry. Issues involving chemical sensitivity had become clouded by the unconventional treatment techniques of its chief proponents, clinical ecologists. Some ecologists prescribed vitamins or sweating in a sauna.

She wrote: "Claudia Miller understands the problem of chemical sensitivity better than anyone else in the world. She does not overstate what the evidence shows. She is clear about where the facts end and the speculation begins."

Dr. Miller grew up in Milwaukee. Her mother was a reading teacher; her father, a patent attorney. In the early '60s, she was the first girl at her high school to win the annual Bausch & Lomb science award.

She went to college amid the anti-war protests of the '60s. Dr. Miller was Phi Beta Kappa at the

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**What is MCS?**

**What is multiple chemical sensitivity?**

MCS is a controversial illness. Patients complain of fatigue, memory problems, mood changes and many other health problems. To those who accept it, MCS is a new diagnosis in medicine that is in a transitional stage of acceptance. They cite lupus and multiple sclerosis as examples where doctors detected a disorder, but could not immediately understand it.

**How do people become chemically sensitive?** A two-step process seems to lead to chemical sensitivity:

- Sensitization. "In many MCS patients, the illness appears to develop following a major exposure to any of a wide range of environmental chemicals. The sensitizing event may be either an acute high-level exposure, such as a chemical spill, or it may be a repeated or continuous exposure occurring at much lower levels such as in a sick building," said Claudia S. Miller, MD, an authority on chemical sensitivity.
- Triggering. Following sensitization, patients report that extremely low levels of

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**Tobacco Smoke**

**Paint**

**Detergent**

**Fragrances**

**Newspaper**

**Traffic Exhaust**

**Nail Polish Remover**

common chemicals tolerated by the majority of the population — for example, tobacco smoke, perfume and traffic exhaust — trigger severe symptoms. Commonly, they report that their symptoms are triggered not only by the chemicals involved in the original exposure, but also everyday, low-level exposures to other chemicals that are structurally different from the original exposure," she said.

**What things can make people sick?**

Patients say a wide range of products trigger symptoms. These include nail polish remover, new carpet, insecticides, a fresh newspaper, perfume, tobacco smoke, hair spray, fresh paint and even the detergent aisle at the supermarket.

**Why is MCS so controversial?**

Chemically sensitive patients do not react the same way as people with allergies. The body produces IgE, an antibody, when it encounters a known allergen such as ragweed or bee venom. With MCS, no such "biological marker" has been discovered; therefore, there is skepticism that the syndrome exists.

**How do chemicals get into the human system?**

Dr. Miller and Iris Bell, MD, PhD, a leading researcher on the subject, theorize that airborne chemicals may sensitize the brain's limbic region, which controls mood and helps record new memories, making it more vulnerable to subsequent exposures.

Nerves in the nose that allow us to smell connect directly to the olfactory bulb, which is within the brain and offers the most direct pathway between the brain and the outside chemical environment.

The limbic system is a primitive region of the brain associated with instinctual responses and behavior. For example, it records the pleasant value most people assign to the smell of new-mowed grass or freshly baked bread. The limbic region's role, if any, in chemical sensitivity is unknown, but is becoming the subject of research.

**How many people have MCS? No one knows. One theory is that many people suffer from chemical sensitivity but may not recognize it. Humans have an enormous capacity to adapt to many substances. Examples are nicotine and alcohol. "MCS patients refer to adaptation as 'masking.' Many report that their illness began with flu-like symptoms. If they avoided exposures, either intentionally or unintentionally, they noticed their symptoms improved. With re-exposure, they observed that their symptoms recurred," Dr. Miller said.**
University of Wisconsin, where she received her bachelor's degree in molecular biology in 1968. She obtained her master's degree in public health a year later from the University of California at Berkeley. After graduating from Berkeley, Dr. Miller became an industrial hygienist and worked in the field for 12 years—first for the University of California Medical Center in San Francisco, then the Occupational Safety and Health Administration (OSHA) and finally for the United Steelworkers union.

In the mid-'70s, she helped solve unexplained illnesses at an electronics assembly plant in Pennsylvania. Dozens of solderers, mostly women, complained of headaches, nausea and difficulty concentrating. Federal investigators blamed the illnesses on psychological causes, but Dr. Miller had doubts.

"The women were breathing a cloud of organic and inorganic chemicals from the solder fumes. Some of us wondered if the cause might not be from these low-level chemical exposures. Our thinking was that maybe levels that meet OSHA standards still aren't safe for everybody," she said.

Dr. Miller recommended adding exhaust hoods to ventilate the soldering area. The company installed the units and the illnesses went away.

Dr. Ashford, then chairman of OSHA's advisory committee, was impressed. "Everyone was calling this case mass psychogenic illness, but Claudia Miller thought they were jumping to conclusions and suggested the idea of systemic poisoning. She was right on the money, and that was 20 years ago."

Her colleagues describe her as tenacious, incisive and adept at analyzing complex problems.

"Claudia Miller is a dedicated scientist who is devoted to unraveling the mysteries behind the symptoms displayed by Persian Gulf veterans and others," said James J. Young, PhD, dean of the Health Science Center's Medical School and himself a former career soldier. "If she is given the necessary resources to establish an environmental unit and to conduct the appropriate research, I am confident that she will play a pivotal role in finding the root causes of these troubling conditions and pointing the way to their treatment."

Dr. Miller's dedication seems to be nourished by her years examining occupational health issues, particularly those affecting blue-collar workers.

"I've been in mines, smelters, foundries, steel mills and manufacturing plants of all kinds. It was a very compelling and eye-opening experience. I realize what people must do to make a living and what they are exposed to in the process," she said.

"I wouldn't have gone to medical school if I hadn't been an industrial hygienist first and seen a problem that I felt was important enough for me to spend nine years in medical school and in training."

Dr. Miller teaches environmental and occupational health in the Health Science Center's department of family practice. On campus, she collaborates in research with Howard C. Mitzel, PhD, assistant professor of family practice, and Leonid Bunegin, assistant professor of anesthesiology. She also is an adjunct faculty member in the School of Public Health and teaches aerospace medicine residents from Brooks Air Force Base in San Antonio.

National debate about "sick building" syndrome, hazardous waste sites and the Gulf War illnesses has focused growing public attention on chemical sensitivity.

Several state and federal agencies have been pulled into the debate, but none so directly as the Environmental Protection Agency (EPA), which was sensitized itself by an embarrassing incident in 1987. About 200 EPA employees became sick when the agency remodeled its headquarters in Washington. Workers had repainted office space and installed 27,000 square yards of new carpet.

Several dozen employees have since claimed they have MCS. Some have sued. They have complained that they are unable to tolerate perfume, engine exhaust, tobacco smoke and low levels of other substances that never bothered them before the incident.

Business and industry have paid close attention to incidents that seem to be associated with chemicals in products.

"The struggle here is between psychosocial issues and science. In other words, when is a smell an irritant, and when is it just a smell most of us don't like?" said Mark Stuart of the National Association of Manufacturers in Washington, a trade organization.

"The truth is there is no way to tell in black and white that any smell is directly related to an illness," Stuart said.

Real or imagined, illness associated with low-level chemicals from the Gulf War or elsewhere appears to be a frontier for medical research in the '90s. Amid the controversy, Dr. Miller said she keeps in mind a lesson her parents taught her years ago.

"They patiently read stories to me as a child, encouraged my interest in science and taught me to keep the two separated. You have to remember that stories are about belief. Science is 'guess and test.' It's not about belief. It's about facts."