

ARIZONA CENTER FOR ADVANCED MEDICINE



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Multiple Chemical Sensitivity (MCS)

It is estimated that 74 million Americans have some form of a chemical sensitivity. For some this might be something as simple as an occasional, temporary head-ache from the odor of a perfume or fresh paint, but about 10 million are so severely affected by chemicals that they must totally change their lifestyle and no longer can live in a normal manner.

–Doris Rapp, M.D., OUR TOXIC WORLD

This phenomenon was first described in the early 1950s by Dr. Theron G. Randolph, then a professor at Northwestern University. He noted several of his patients had a “petrochemical problem” in that they became ill when passing through the heavily industrialized areas of northwest Indiana and South Chicago. Dr. Randolph suggested that human failure to adapt to modern-day synthetic chemicals had resulted in a new form of sensitivity to these substances.

Randolph was a new breed of “clinical ecologist” who believed *chemical* antigens are not always eliminated from the body and can lodge in fatty tissue and act as continual irritants to the immune system. Once a person is sensitized to a substance, future exposures can lead to increasingly severe and debilitating reactivity.

CHEMICALS AND HEALTH

Multiple Chemical Sensitivity (MCS) is generally defined by clinical ecologists as an adverse reaction to potentially toxic chemicals in air, food or water, at concentrations generally accepted as harmless to the bulk of the population.[1]

Others describe MCS as “the ultimate 20th century illness” and people who have succumbed are sometimes referred to as “the modern-day canaries in the mine.” Researcher and author Pamela Reed Gibson, Ph.D., suggests:

“MCS is an illness that is caused by industrialism, it is an indictment of industrial culture because it directly points to chemicals as a cause of disability, and it is totally incongruent with industrial culture. We are a culture that does “risk assessment” of each of our chemicals allowing a certain number of people to get sick or die from exposure to each chemical.”[2]

There are an estimated 80,000 chemicals in use today in our environment, most of which have not been tested either individually or in combination for their effects on human health. A person with MCS typically reacts most often to those chemicals which are members of the petrochemical family.

People with MCS often have great difficulty when they encounter:

- pesticides sprayed outdoors and in buildings
- perfumes and fragrances
- cigarette smoke
- scented soap
- dry cleaning residues
- air fresheners
- strong smells in the detergent aisle at the grocery store
- clothing washed in detergents and fabric softeners that leave a smell
- common household cleansers
- new carpet or flooring
- common building paints with VOCs (volatile organic compounds)
- solvents
- chlorine in municipal water supplies
- pressed wood or plywood, especially that which contains formaldehyde
- moldy carpets
- newsprint
- natural gas
- plastic with strong smells as in new cars and products made of soft, pliable plastics
- computers, printers, and copiers

People at particular risk are workers in heavy industry, occupants of “sick” buildings, Gulf War veterans, and residents of communities exposed to toxic waste dumps, aerial pesticide spraying, groundwater contamination, or industrial pollution.

It appears that people with MCS have detoxification mechanisms that have been seriously compromised, most likely from a combination of environmental insults superimposed on inefficient genetic detoxification pathways.

What triggers MCS? Some people report its onset after one significant exposure, such as being in the driveway of their home and sprayed from above with pesticides. Others report that it manifested after prolonged exposure to a small but significant dose of chemicals, such as when they moved into a new home, or went to work in a newly built or newly remodeled office.

Once the excessive reactivity develops, then it can “spread” so that the body now either reacts to a wider range of chemicals over time or develops dysfunction in more organ systems.

MCS – REAL OR IMAGINED?

Unlike chronic fatigue, which now receives some recognition and study from the medical profession, MCS remains a condition surrounded by medical controversy. There is also uncertainty regarding its definition, causes, and indicated treatments.

Many recognized medical groups, including the American Medical Association (AMA), the American Academy of Allergy, Asthma and Immunology (AAAAI), and the Centers for Disease Control (CDC) do not consider MCS to be a distinct physical disorder. According to the Office of Safety and Health Administration (OSHA), for example, MCS is merely a “theory”:

“...in theory, an adverse physical reaction to low levels of many common chemicals. Chemical sensitivity is generally accepted as a reaction to chemicals but debate continues as to whether MCS is classifiable as an illness. There are a number of synonyms for MCS, including 20th century disease, environmental illness, total allergy syndrome, idiopathic environmental illness, and chemical AIDS.

“Proposed theories to explain the cause of MCS include allergy, dysfunction of the immune system, neurobiological sensitization, and various psychological theories. There is insufficient scientific evidence to confirm a relationship between any of these possible causes and symptoms.”[3]

Patients often have a difficult time requesting medical help. Many allopathic physicians are unfamiliar with or do not believe in MCS. Some doctors still tell patients that “it’s all in your head.” Many doctors’ offices are loaded with offending chemicals (which the doctors themselves may not be able to smell) that MCS patients simply cannot tolerate.

Meanwhile, physicians frequently are baffled when they face a patient with multiple complaints that do not fit into a known diagnostic disease category. It doesn’t help that regular laboratory tests (e.g. CBC, liver function tests, sedimentation rate, urinalysis) often appear to be completely normal.

People with MCS have physical *and mental* symptoms that are far ranging – fatigue, concentration or memory difficulties, irritability, nervous tension, depression, daytime drowsiness, food cravings, insomnia, headaches, nasal congestion, muscle and joint aches, ringing in the ears, gastrointestinal distress, palpitations... the list goes on...

Few allopathically-trained doctors know to look for demonstrated physical effects such as enzyme deficiencies, chemical messenger changes[4], airway changes, improvement with nasal lavage, or restricted blood flow to the brain during chemical exposure.

MCS, for many in the allopathic world, defies classification as a disease.

I have seen nothing to demonstrate that [MCS] exists ... [the syndrome is] an “irrational fear of man-made chemicals.”

– Dr. William Waddell, former chair of pharmacology and toxicology at the University of Louisville School of Medicine[5] and consultant to industry

MCS is commonly either misdiagnosed or under-diagnosed by physicians.[6] Thus the exact prevalence of MCS is unknown. However, the National Academy of Sciences estimates that up to 15% of the American public could be experiencing a heightened sensitivity to common chemical products; this was confirmed in a 1999 study on hypersensitivity to low levels of common chemicals.[7] Household population studies have found prevalence rates for MCS that range from 12.6% to 33% of the population.[8]

CONNECTING THE DOTS

- MCS occurs in all races, usually developing after age 30; it also strikes many more women than men.
- Symptoms range from mild to disabling and even to life-threatening.
- Chronic fatigue syndrome, irritable bowel syndrome, fibromyalgia and Candida overgrowth are frequently found in people with MCS. It is not yet clear whether these are separate diseases or different manifestations of the same underlying problem.
- The avoidance of pollutants/toxicants is the best protection, albeit extremely hard to achieve.
- One's genetic makeup is key; one can inherit a predisposition to MCS.

Let's look at that last factor. It explains why nobody in the elevator has a problem with the guy who steps in reeking of aftershave — except the person with MCS.

All day long, your liver is detoxifying all manner of substances which you encounter as you move through the world. The liver sorts out the good from the bad and breaks almost everything down into parts that can be excreted primarily in urine, feces, and sweat. The liver uses special proteins called enzymes to break things down and other special compounds called conjugating molecules to attach the waste products to. This is called the process of metabolism.

However, if the supply of enzymes or nutrients is depleted or damaged, as appears to be the case in people with MCS, the liver is unable to break down toxic substances efficiently.

Suppose your friends invite you to dinner and they've lit candles to provide a pleasant ambiance. The scent the candles exude is actually a petro-chemical that you have now inhaled. If your liver is in great condition and your diet gives your body everything it needs to break down and excrete those chemicals, you will be fine. (You are also a very rare person these days.) If your liver is in so-so condition, you will have problems breaking down the petrochemical fragrance and, unbeknown to you, the fragrant molecules are probably stored in the soft tissues of your body. If you have MCS, you will quickly feel ill and likely need to leave that house within a few minutes.

One reason pesticides cause so much trouble for the human body in general, and those with MCS in particular, is that the manufacturer often adds an enzyme blocker to the formulation so that the poison cannot be metabolized properly. This means that the chemical remains in the body (of insect or human) longer, making it even more toxic. That may be desirable if we are talking about killing cockroaches. It is definitely not good for the human beings who share the same air and end up inhaling or absorbing the same toxic chemicals through their skin.

Desert Storm Veterans

“Many of these veterans are suffering from the same kind of symptoms seen in people with multiple chemical sensitivity,” said Claudia Miller, an allergist and immunologist at the Texas Health Science Center. “We have to look to MCS as a working hypothesis.”

An estimated 4,000 Persian Gulf veterans returned from the first Gulf war complaining of widespread health problems such as fatigue, depression, irritability, memory and concentration difficulties, muscle aches, shortness of breath, diarrhea, and a host of other problems which they attribute to exposures in the Gulf. Such exposures include combustion products from oil-well fires, paints, fuels, pesticides, solvents and vaccines. Some reports raised the specter of possible chemical or biological warfare.

Women are more prone to MCS because of their “enzyme inventory.” There is an enzyme called alcohol dehydrogenase that detoxifies carbohydrates, sugar, alcohol, and chemicals. Men have much more of this enzyme than do women.[9]

What’s more, levels of butylcholinesterases, which scavenge chemicals, are lower in females (over the age of ten) than in males, and decline further in women over the age of thirty.[10]

Additionally,

- Women have a greater total percentage of body fat, which stores chemicals.
- Women’s immune systems are more complicated because they need to protect and accept a ‘foreign’ fetus in the womb.
- Women use more fragrances, hair coloring, hair sprays, lipstick and other makeup with known toxic ingredients.
- Women typically do the house cleaning, and are exposed daily to toxic products.
- Women are more likely to use diet foods, with synthetic content, such as aspartame (Nutrasweet®), sorbitol, etc.
- The past or present use of antibiotics and/or birth control pills is an additional risk factor.

Many clinical ecologists believe that the immune system has a threshold which, once reached, will precipitate a variety of other symptoms in response to toxicity. The body’s threshold is not fixed – it can be lowered by stress, infections, lack of sleep, lack of exercise, as well as exposure to chemical substances.

If a person has a high body burden of lead, mercury, or other heavy metals, those heavy metals are thought to contribute to the development or aggravation of MCS.

Over time, people with MCS may react to a widening array of things in their everyday world – foods, pet dander, house dust mites, pollen, mold, synthetic fabrics, and electromagnetic fields.

Patients with a history of chemical injury may develop chronic fatigue,[11,12,13,14] headaches and fibromyalgia.

CANARIES IN THE MINESHAFT

To many, it makes sense that humans would become weaker – physically and mentally – in the face of increased environmental contamination. This is the canary-in-the-mineshaft theory. Claudia Miller from Texas Health Science Center, and a national expert on MCS, believes that the loss of ability to tolerate poisons is the mechanism for the development of many modern diseases. She postulated in 1997 that the shift to understand toxins as causes of illness may be as important as it once was for science to understand germ theory.

In personal care products, “fragrance” can actually include complex mixtures of hundreds of chemicals

- 95% of the chemicals in fragrances are synthetic compounds derived from petroleum.
- 5000 different fragrances can be found in the products used daily – from health aids to laundry detergents.
- Some “unscented” and “fragrance-free” products can contain masking fragrances to cover up the smell of other ingredients.

Wastewater treatment facilities do not remove the chemicals that make up fragrances; many are persistent organic pollutants, (POPs), which accumulate in the environment.

Miller and Iris Bell, of the Department of Psychiatry at the University of Arizona Health Sciences Center, shed light on why MCS has both physical and mental components. There are rich neural connections between the olfactory system and the limbic and temporal regions in the brain's cerebral hemispheres, which, in part, regulate mood and autonomic functioning. The pair suggested a decade ago that many environmental chemicals gain access to the central nervous system via the olfactory and limbic pathways, inducing lasting changes and altering a broad spectrum of behavioral and physiological functions to produce clinical MCS syndromes.

There is a direct pathway from the nose into the central part of the "old" animal brain, or limbic system, which is involved in governing sleep, mood, eating, aggression, and other very basic survival behaviors. Limbic "kindling" refers to the process of sensitizing nerve tissue. For example, if you put a frog's nerve in a Petri dish, and stimulate it with electrical impulses that individually are too mild to fire the nerve, eventually the nerve will fire due to repeated stimulation. Some individuals are thought to have "kindled" to low-level chemicals. In this way, very small amounts of chemicals can induce abnormal reactions. Because the limbic system is involved in regulating so many body systems, its disruption could easily cause many of the symptoms reported by people with MCS.

Dr. Gunnar Heuser and Dr. William Ross have found that brain scans can identify damage in people with MCS. Though MRIs may show normal results, the use of PET and SPECT scans have found areas of decreased blood flow or metabolism in areas of the brain that correlate with the symptoms expressed by the patients.[15]

Biochemist Martin Pall suggests that a vicious chemical cycle may be to blame.

Pall cites many studies that suggest that the initial chemical exposure creates a hypersensitivity in the neurons in the brain, which react by creating the two chemicals that cause further hypersensitivity. Pall believes that organic solvents activate N-methyl-D-aspartate (NMDA) receptors in the brain, stimulating a feedback loop in which both peroxynitrite and nitric oxide are elevated. As the NMDA receptors become more sensitive, cytochrome P450 is inhibited by the nitric oxide, and the blood brain barrier made more permeable by the peroxynitrite. Pall sees organophosphate and carbamate pesticides and organic solvents as the primary sensitizers in MCS. His theories are congruent with the self-reported sensitization histories of those with MCS.[16]

"The MCS response is produced," said Pall, "when chemical exposure produces excessive responses over large regions of the brain. In this way, normal and important mechanisms may act to generate this chronic illness. Thus, not only is the brain constantly inundated by chemicals to which it is normally somewhat sensitive, but the brain of a person suffering from MCS becomes abnormally sensitive to the chemicals – from 100 to 1,000 times more sensitive than in an unaffected person." MCS overlaps with other medical conditions of uncertain mechanism including chronic fatigue syndrome, fibromyalgia, posttraumatic stress disorder, and Gulf War syndrome. Pall has proposed similar mechanisms for all of these conditions. "The notion that a biochemical vicious cycle may underlie all four is very exciting and, if correct, suggests that this is a major new paradigm of human disease." [17,18]

The general public accepts that some people are unable to tolerate many chemicals. The popular television show "Northern Exposure" featured a chemically sensitive attorney who lived in a dome in Alaska, isolated from the toxins of industrialization and mainstream society. Segments of the federal government seem to be several steps ahead of the mainstream medical community in their willingness to accept chemical sensitivity. In 1990, the Americans with Disabilities Act included MCS as a recognized condition, and by mid-1992, the Department of Housing and Urban Development established disability status for the disorder.

The EPA got an unintended, up-close look at MCS in 1987 when it installed new carpet in its Waterside Mall headquarters in Washington, D.C. The agency received more than 1100 health complaints from employees, but waited two years to remove the toxic carpet. Some employees, who said they had

become chemically sensitized, sued the EPA and initially won the jury trial. But the court overturned the verdict saying that it was not convinced. Typical wall-to-wall carpet includes chemical adhesives to bind fiber to backing; more glues or adhesive strips to attach carpet to floor; and chemical surface treatments to stainproof and mothproof. Tufted fibers are usually affixed to the carpet with an adhesive that contains 4- phenylcyclohexene (4-PC), which irritates the eyes and respiratory tract.

AN INCONVENIENT TRUTH

Mainstream medical resistance remains robust. Just ask the esteemed Dr. William J. Rea of Dallas, a Board certified surgeon and one of the earliest medical professionals to recognize MCS. He has been a target of the medical establishment for the last 25 years. He has treated sick Exxon Valdez cleanup workers and people sick from the toxic chemicals in crude oil and dispersants released during the BP oil spill. In August of 2007, the Texas Medical Board challenged his recognition and treatment of MCS and threatened to revoke his medical license. After three years in court, it was finally proven that the Board's claims were unsubstantiated and he was exonerated of all charges; he is left with a boatload of legal bills. The Board said that from now on, Dr. Rea must simply inform patients that his treatment is not FDA approved.



Many parties have a vested interest in keeping all manner of chemicals a large part of the world economy. It is sobering to know that in 1990 for example, the Chemical Manufacturers Association vowed to work with state medical associations to block the recognition of MCS. (See accompanying article from Dr. Ann McCampbell.)

It appears that such interests, however, are losing their ability to manage the public perception that we always “live better through chemistry.” Just as global warming is receiving more serious consideration, so too is the potential danger that is inherent in the links between chemicals and human health.

The evidence that MCS is a real – and a growing problem – is becoming irrefutable. In November of 2007, the California Medical Association adopted a Resolution on a “Chemicals Policy for California” that says, in part,

“The state, national, and global scale of industrial chemical production is immense and is expected to grow four-fold by 2050 ...

“Ever-expanding research confirms that many chemicals are ... known to be hazardous to human biology and health, particularly in utero and in developing children.

“Numerous other nations including Canada and the European Union are adopting more proactive health-oriented chemicals policies, based upon scientific knowledge, assessment, and accepted public health principles ... Problems include the projected appearance of 600 new hazardous waste sites each month in the U.S. over the next 25 years and the development of chronic diseases caused by chemical exposures on the job among 23,000 California workers each year ... Therefore, be it resolved that the CMA calls upon the State of California and United States to implement a modern, comprehensive chemicals policy in line with current scientific knowledge on human health, and which requires a full evaluation of the health impacts of both newly developed and existing industrial chemicals now in use...”[19]

TREATMENT OPTIONS

There are no easy tests to confirm a diagnosis of MCS. A knowledgeable doctor will rule out allergies and other physical or mental health disorders as the cause of the symptoms. At the Arizona Center for

Advanced Medicine, we look at the person's full spectrum of symptoms, and conduct a complete medical history and physical examination.

To treat, we identify and eliminate as many toxins as possible. These may include toxic foods, cleaning chemicals, heavy metals, pesticides... the list goes on. We can help identify toxins in the home or workplace, and can help you create a safe environment in your own home. We help with nutrition – using both organic foods and supplements, to improve physical status...

Our clinic was designed to be environmentally friendly. We recognize that most commercial office buildings present barriers to those with chemical sensitivities and we designed our clinic with the needs of MCS patients in mind.

RESOURCES:

The James Madison University MCS Research Team, Harrisonburg, Virginia.
<http://www.mcsresearch.net/>

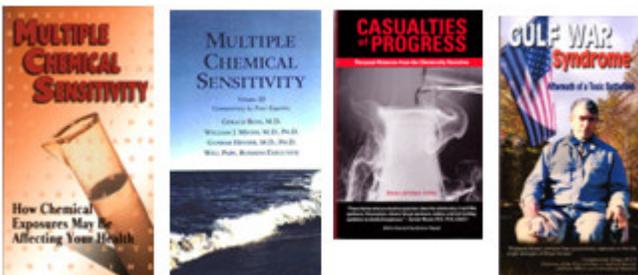
Chemical Injury Information Network (CIIN)

<http://www.ciin.org/>

A non-profit a support and advocacy organization dealing with Multiple Chemical Sensitivities. It is run by the chemically injured for the benefit of the chemically injured.

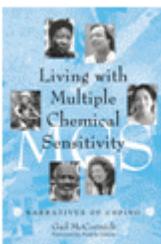
Fragranced Products Information Network

<http://www.fpinva.org/>

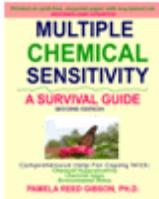


A series of videos about Multiple Chemical Sensitivity produced by Alison Johnson.

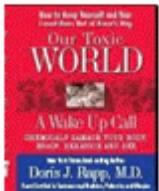
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Author Gail McCormick, professional health counselor and a woman living with MCS in Seattle, interviewed thirty people with MCS. Their lives are changed in ways unimaginable to the average person. Their coping skills are a complex web of emotional, financial, and practical necessities.



Author Pamela R. Gibson, Ph.D., of James Madison University has researched the life impacts of environmental sensitivities since 1992. She has authored numerous journal articles and conference papers on MCS and environmental health.



Dr. Doris J. Rapp, the “mother of environmental medicine,” explains how every-day chemicals are hurting our bodies, all wildlife, and our planet. Find out how to protect yourself and your loved ones from polluted air, water, soil, food, homes, schools, and workplaces in Dr. Rapp’s book, *Our Toxic World – A Wake Up Call*.

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