MULTIPLE CHEMICAL SENSITIVITY

Prepared for the American Council on Science and Health by

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Executive Summary

In the United States and Canada, advocacy groups are fighting hard for recognition of "multiple chemical sensitivity" ("MCS") as a specific disease. These groups and the patients they represent are demanding that insurance companies cover the cost of expensive and unproven treatment by "clinical ecologists." They are also seeking payment through worker's compensation and Social Security Disability programs and pressing for special workplace and housing conditions.

"Clinical ecologists" — who number about 400 in the United States and Canada — are physicians who practice what they call "environmental medicine." They claim that MCS is a widespread condition caused by exposure to common foods, chemicals and other "stressors" that can sensitize people, causing them to react adversely to even tiny amounts of these substances.

Many people who believe they have MCS suffer greatly. In extreme cases, afflicted individuals perceive almost everything around them as allergy-causing and potentially life-threatening. Many of these individuals change their lifestyle drastically and attempt to live in a pristine, controlled environment, virtual prisoners of their perceived sensitivity. Unfortunately, the "MCS" diagnosis and its associated treatments rarely lead to improved health status and may divert patients from appropriate medical treatment. Some individuals spend tens of thousands of dollars in fruitless attempts to attain relief.

The prevailing rational and scientific viewpoint is that although some people are sensitive to small amounts of one or a few specific chemicals, there is no *general* hypersensitivity to chemicals. Scientifically oriented allergists, psychiatrists and occupational health clinicians suspect that the majority of "MCS" patients suffer from psychological disorders such as depression, anxiety reactions and somatization (bodily reactions to stress).[1]

Some people who currently have no symptoms are seeking damages based on the premise that mere *exposure* to extremely low levels of environmental chemicals, such as carpet fumes, airborne pollutants and pesticide residues in food, has damaged their immune system and jeopardized their future health. Claiming to

have “chemical AIDS,” they want compensation in advance for what they allege will be an inevitable decline into poor health. These claims are supported by a network of clinical ecologists and attorneys who assert that exposure to environmental toxins causes the immune system to overload, leaving people susceptible to infection, cancer, rheumatoid arthritis and other diseases.[2] The economic implications for many industries and insurance programs are potentially catastrophic. Unless the problem is properly addressed, the millions of dollars now changing hands through claims and lawsuits will become billions, wreaking havoc with many industries and insurance programs and ultimately raising costs to all consumers.

The American Council on Science and Health believes that false claims related to “multiple chemical sensitivity” and its associated pseudoscientific practices constitute a serious problem in our society. Some observers, including a committee of the National Research Council, have expressed hope that research can resolve the controversies described in this report. However, since “MCS” has not been clearly defined and many of its hypotheses are untestable, it is unclear what further research can accomplish.

What Is Multiple Chemical Sensitivity?

Clinical ecology, which is not a recognized medical specialty, relies on the concept that multiple symptoms are caused by hypersensitivity to minute amounts of common foods and chemicals. Clinical ecologists hypothesize that repeated small exposures (or a single high exposure) to environmental agents can sensitize people and cause their immune system to malfunction. They also claim that once “sensitized,” afflicted individuals become intolerant to a wide range of, and possibly all, synthetic chemicals — a situation that clinical ecologists call “multiple chemical sensitivity.” These ideas originated with Theron Randolph, M.D., who, in the 1940s, asserted that allergies to common foods and substances could cause depression, fatigue, confusion and irritability. He further speculated that humans were not successfully adapting to modern synthetic chemicals.

Proponents state that the symptoms of MCS can include virtually anything, but the most commonly cited problems are: headaches, mental confusion, memory loss, weakness, fatigue, depression, irritability, mood swings, inability to concentrate or think clearly, periods of confusion, drowsiness, sneezing, itching and watery eyes, runny or stuffy nose, wheezing, itchy nose, throat and skin irritation, muscle and joint pain, rashes, nausea, diarrhea, constipation, frequent urination, vaginal burning, and joint or limb swelling. The severity of symptoms is said to range from intermittent discomfort to total disability. The supposed causative agents include pollution, perfumes, pesticides, exhaust fumes, natural gas, household cleaners, foods, food additives and preservatives and synthetic products found in clothing, carpets, fabrics, building materials and many other items. Some patients practice avoidance techniques including strict diets and limited exposure to things such as cigarette smoke, scented shampoos, deodorants and colognes.

Other names for MCS include: “20th-century disease,” “total immune disorder syndrome,” “environmental hypersensitivity,” “total allergy syndrome,” “environmental illness,” and “chemical AIDS.” The patients involved are often difficult to treat and not well managed by mainstream physicians.

Each issue of the journal *Clinical Ecology*, published by the American Academy of Environmental Medicine, contains this definition in a statement titled “What Is Clinical Ecology?”:

> Ecologic illness is a polysymptomatic, multi-system chronic disorder manifested by adverse reactions to environmental excitants as they are modified by individual susceptibility in terms of specific adaptations. The excitants are present in air, water, drugs, and our habitats.

In 1985, the ad hoc Committee on Environmental Hypersensitivity Disorders of the Ontario Ministry of Health consulted proponents and reviewed proponent literature with the hope of defining "environmental hypersensitivity." Although skeptical of clinical ecology's tenets, the committee developed this "working definition":

> Environmental hypersensitivity is a chronic (i.e., continuing for more than three months) multisystem disorder, usually involving symptoms of the central nervous system. Affected persons are frequently intolerant to some foods and they react adversely to some chemicals and to environmental agents, singly or in combination, at levels generally tolerated by the majority. Affected persons have varying degrees of morbidity, from mild discomfort to total disability. Upon physical examination the patient is normally free from any abnormal, objective findings. Although abnormalities of complement and lymphocytes have been reported, no single laboratory test, including serum IgE, is consistently altered. Improvement is associated with avoidance of suspected agents and symptoms recur with re-exposure.[3]

The leading practitioner of clinical ecology is William J. Rea, M.D., who states that he has treated more than 20,000 patients at his Environmental Health Center in Dallas, Texas. He and his colleagues have suggested the following definition:

> Chemical sensitivity is... an adverse reaction to ambient doses of toxic chemicals in our air, food, and water at levels which are generally accepted as subtoxic. Manifestation of adverse reactions depend on: (1) the tissue or organ involved, (2) the chemical and pharmacological nature of the toxin, (3) the individual susceptibility of the exposed person (genetic make-up, nutritional state, and total load at the time of exposure), (4) the length of the time of exposure, (5) amount and variety of other body stressors (total load) and synergism at the time of reaction, and (6) the derangement of metabolism that may occur from the initial insults.[4]

Yale University's Mark Cullen, M.D., who does not identify himself as a clinical ecologist, provides this definition for MCS:

> An acquired disorder characterized by recurrent symptoms, referable to multiple organ systems, occurring in response to demonstrable exposure to many chemically unrelated compounds at doses far below those established in the general population to cause harmful effects. No single widely accepted test of physiologic function can be shown to correlate with symptoms.[5]

These definitions differ greatly from those for medically recognized chronic diseases such as diabetes,

asthma, rheumatoid arthritis and coronary heart disease, each of which is associated with a clear-cut history, physical findings and laboratory tests. These conditions are sufficiently well defined that properly trained physicians have little or no difficulty reaching identical diagnostic conclusions in specific cases. Type I diabetes, for example, typically begins with an abrupt increase in appetite, thirst and urine output, together with weight loss, and can be confirmed by testing the patient's blood glucose level. With "MCS," however, the range of symptoms is virtually endless; the onset can be abrupt or gradual and may or may not be linked to any specific exposure or causative factor; and symptoms may vary in intensity, may come and go and typically do not correlate with objective physical findings and laboratory results.

MCS Concepts

Dr. William Rea[6] has published an elaborate theoretical framework for MCS, which includes the following concepts:

1. *Total body load (also called total toxic load):* The body's immune system is like a barrel that fills with pollutants until it overflows. Once the limit is exceeded, disease and organ failure result. Pollutants can include foods, natural and industrial chemicals and other physical agents such as noise, weather change and electromagnetic radiation. Psychological stresses, such as job loss, divorce or the death of a loved one, can contribute to total body load.

2. *Adaptation*: The body adjusts to acute toxic exposure by increasing its detoxification activity. Nutrients (vitamins and minerals) are used up during detoxification, and when they run out, the system collapses. Adaptation can "mask" sensitivity, causing symptoms to temporarily disappear. Challenge tests performed on a patient in an adapted state are frequently negative. Therefore avoidance of a suspected substance for several days is necessary before a challenge test to demonstrate sensitivity.

3. *Bipolarity*: This is an another mechanism used to explain why symptoms may not obviously be related to exposure and why the results of challenge tests depend on how recently exposure has occurred. Rea states that individuals exposed to "pollutants" or other "environmental incitants" can have no immediate reaction but experience "withdrawal symptoms" after the exposure ends. Repeated exposure leads to a "craving" for the toxic substance. (For example, MCS patients often "crave" the foods that supposedly make them ill.) Eventually, "the body's defenses break down from overuse," "immune and enzyme detoxification and metabolic systems are unable to adequately process their total load," and "nutrient depletion and disabling symptoms of fixed-organ disease develop."

4. *Spreading*: This concept is used to explain how sensitization to one chemical leads to reactions to low doses of many other unrelated substances. It also refers to the patient's subjective report of increasing and spreading symptoms — from the initial target organ to additional organs.

5. *Switch phenomenon*: Developed to account for intermittent symptoms and inconsistent response to

exposure, switching refers to the radical shifting of symptoms after an exposure. Rea writes: "In observing thousands of controlled challenges in the environmental unit, we have seen target organ responses of many of our patients switch to several different ones during a long (i.e., 24-hour) reaction. Often, we have seen, for example, transient brain dysfunction followed by arthralgia [joint pain], followed by diarrhea, followed by arrhythmia."

6. *Biochemical individuality:* Every patient has unique genetic susceptibilities to toxicity. Each person has a different nutritional state and toxic load, both in utero and at the time of the pollutant exposure that triggers symptoms. Thus an individual who has an "increased total body load" while living in the city might react to eating certain foods at home, but not react while eating them at the seashore.

The practice of clinical ecology is characterized by two main procedures — provocation-neutralization testing and use of an "environmental control unit." But clinical ecologists may also use an array of highly questionable methods of diagnosis and treatment.[7] These include:

1. Food and chemical cytotoxic testing
2. Hair analysis
3. Blood and urine amino acid screens
4. Purge therapy (detoxification using coffee enemas)
5. Salt neutralization therapy
6. Orthomolecular therapy
7. Autogenous urine injections

Some physicians who identify themselves as clinical ecologists employ even more esoteric techniques, such as computerized galvanometers to diagnose "imbalances" and vitamin therapy and homeopathic remedies to correct them.[2]

The Scientific Viewpoint

Numerous scientific review bodies have concluded that there is no evidence to support the use of "multiple chemical sensitivity" as a diagnostic entity.

The American Academy of Allergy and Immunology has concluded: "The theoretical basis for ecologic illness in the present context has not been established as factual, nor is there satisfactory evidence to support the actual existence of 'immune system dysregulation' or maladaptation." The academy noted that there was no clear evidence for a cause-and-effect relationship between symptoms and environmental exposure.[8]

The California Medical Association (CMA) Scientific Board Task Force on Clinical Ecology conducted an extensive literature review and held a hearing on environmental illness and clinical ecology. They concluded: "Clinical ecologists have not identified specific, recognizable diseases caused by exposure to low-level-environmental stressors." Moreover, the task force decided "there is no convincing evidence that supports the hypothesis on which clinical ecology is based."[9] MCS advocates now claim that CMA has retracted its posi-

tion paper. According to CMA officials, however, the association's viewpoint has not changed; the group merely decided to stop issuing position papers because they wanted to minimize the legal risks involved in publishing critical reports.

The American College of Physicians has concluded: "The existence of an environmental illness as presented in clinical ecology theory must be questioned because of the lack of clinical definition." It also noted there was "inadequate support" for the basic beliefs of clinical ecology.[10]

The ad hoc Committee on Environmental Hypersensitivity Disorders in Ontario, Canada, conducted an extensive literature review, heard testimony and visited clinics. The committee's 500-page report concluded: "scientific support for the mechanisms that have been proposed to underlay the wide variety of dysfunctions are at best hypothetical. Moreover the majority of techniques for evaluating the patients and the treatments espoused are unproven."[3]

The Canadian Psychiatric Association's position statement on environmental hypersensitivity acknowledges that patients diagnosed as environmentally sensitive experience "subjective discomfort and sometimes disability." The Association concluded, however, that "there is not sufficient evidence to state that environmental pollutants or food additives cause the complaints subsumed under the term 'environmental hypersensitivity.'"[11]

The National Research Council has published a volume titled *Biologic Markers in Immunotoxicology,* which stated: "The reported evidence is inadequate to define a distinct clinicopathologic entity, MCS syndrome," that differs from conditions in which a measurable response, such as bronchospasm, follows exposure to an identifiable airborne chemical. The book recommends that "whenever possible the term 'multiple chemical sensitivity' should be replaced with a specific diagnosis to avoid confusion between diagnosis and etiology that is inherent in the term."[12]

A committee sponsored by the government of Nova Scotia has examined the medical records of 86 patients said to be "environmentally hypersensitive." In every case, the panel was able to make a standard medical or psychological diagnosis. The committee concluded there was no evidence to confirm the existence of "environmental illness."[13]

The American Medical Association's Council on Scientific Affairs has concluded that "multiple chemical sensitivity should not be considered a recognized clinical syndrome." The council has also stated that there were no well-controlled studies establishing a clear mechanism or cause for MCS.[14]

In 1992, the Board of the International Society of Regulatory Toxicology and Pharmacology (ISRTP) concluded:

> Current scientific information reports no clinical, laboratory, or other objective support for the proposition that MCS represents a clinically definable disease entity. The theories claiming to unify this condition as a toxicologically mediated disorder transgress basic principles of toxicology and clinical sciences. These violations include the allegations that: (1) a toxic response to one chemical can lead to a 'sensitivity' to all other chemicals; (2) 'petrochemicals' and 'man-made' chemicals somehow differ in their toxicological potentials from 'natural' chemicals; (3) a chemical may induce widespread symptoms associated with all organ systems; and (4) the manifestations of toxic responses to chemicals may vary widely and completely from individual to individual. Because these claims are both unproven and

> inconsistent with the current state of scientific knowledge, the ISRTP adopts the position that "MCS and its disorders, known as ecological illness and environmental illness, cannot be considered an organically based toxicological disease process.[15]

Thus the scientific community considers MCS an inappropriate diagnosis based on misbeliefs rather than on physical problems in the patient's body. John Selner, M.D., and Herman Staudenmayer, Ph.D., who have treated hundreds of patients who believed they were suffering from environmental illness, have noted that the association of symptoms with environmental factors "can usually be traced to the influence of a proponent of clinical ecology or an associated health-care provider (orthomolecular medicine, kinesiology or nutritional-faith healers)."[7]

Other researchers have reported similar experiences with patients who claim to have MCS or food hypersensitivity. In a study of 23 patients who believed they were hypersensitive to many foods, six had identified their allergies after reading a popular book on the subject and the rest had been persuaded by medical and paramedical personnel, including practitioners of "fringe" medicine.[16] In a report on eight patients previously diagnosed as environmentally ill, psychiatrist W. Carroll Brodsky, M.D., noted their history of switching from one physician to another. Dissatisfied with a diagnosis of mental rather than physical illness, the patients ended up with a small network of physicians who subscribe to the ideas of clinical ecology.[17] Researchers who compared 41 "MCS" patients with 34 control patients with chronic musculoskeletal injuries found significantly higher levels of psychological distress in the MCS group.[1] The MCS patients also exhibited a greater tendency to report "medically unexplained" physical symptoms both before and after the onset of "chemical sensitivity" symptoms.

Clinical Ecology's Approach

Clinical ecologists state that their usual evaluation begins with taking a detailed history that emphasizes the patient's dietary habits, drug use, exposure to chemicals at home or work and in particular, contact with inhaled odors or fumes. A physical examination is performed, but there are no characteristic findings associated with a diagnosis of environmental illness. Allergy testing may include standard tests as well as unproven ones.

The Environmental Health Center's *Outpatient Information Manual* states that testing usually lasts about five days and treatment can span anywhere from three months to two years. The testing takes place in an "Environmental Control Unit" ("ECU"), a facility designed to be "chemically free" and constructed using special materials such as porcelain, glass, aluminum and stone. It is also equipped with a special air-filtering system. Rea describes the testing as follows:

> The ECU is used to identify supposed triggering agents of chemical sensitivity after a patient's total pollutant load has been reduced and de-adaptation completed. This unit has also been used to carry out oral, injected, and inhaled challenges under controlled conditions. It has made possible the controlled evaluation of blood parameters, immune and non-immune enzyme biochemical detoxification systems,

levels of toxic chemicals, and nutrients found in the various body compartments. Safety features designed for use in the ECU have further been adapted by the Environmental Health Center-Dallas to control pollution in homes and public buildings, and we have used them to construct or modify over 17,000 less-polluted environments for chemically sensitive patients.

After an oral history, blood tests are done (RAST, IgE, IgG, total complement, T and B lymphocytes and total eosinophils). Then, inside the ECU, a series of provocation-neutralization procedures are completed. In these tests "incitants" or suspected substances are administered under the tongue, injected under the skin or inhaled, and the patient reports any symptoms within ten minutes. The onset of symptoms marks a positive test and then progressively lower doses are given until the symptoms disappear. This is known as the "neutralizing" dose.

Typical incitants include: inhalants such as dust, mites, molds, pollens and animal danders; foods such as corn, soybean, wheat, eggs, milk; yeasts and molds found in foods; and chemicals such as phenol, formaldehyde, ethanol, newsprint, perfume, cigarette smoke and unleaded diesel fuel.

During the testing the patient must follow strict dietary guidelines and avoid exposure to chemicals as much as possible. This can involve extensive lifestyle changes including many grooming restrictions such as the avoidance of perfume, bath powder, colognes, hair tonics, aftershave lotions or odorous cosmetics. In addition, they are told not to wear dry-cleaned clothes or any non-natural or synthetic blend fabrics.

The testing procedure may take many hours or several days, depending on the number of incitants to be tested and the procedures used. Once completed, the patient is equipped with a list of "stressors" or "offenders" to avoid.

Clinical ecology treatment can generally be divided into three categories:

• *Provocation/Neutralization Therapy.* Neutralization therapy is the natural extension of provocation-neutralization testing. Based on what originally "neutralized" the patient's symptoms, vaccines are prepared. The patient self-administers them, either sublingually or intradermally, following a schedule of increasing dosages. These purportedly can be used to relieve or prevent symptoms. Vaccines are stored in a refrigerator, and the patient is monitored at least annually.

• *Rotation Diet.* Foods believed to cause reactions are usually eliminated, but if that creates too restrictive a diet, they are introduced on a rotation basis once every four or five days. "Natural" and "organically grown" foods and spring or artesian water are recommended.

• *Avoidance Therapy.* This involves attempting to duplicate as much as possible the pristine atmosphere of the ECU. Patients are counseled to avoid a large number of substances, most commonly: perfumes, plastics, smoke, chlorine, natural gas, vehicle exhaust, detergents, alcohol, pesticides, synthetic fabrics, organic solvents, polluted air, fresh paint, new carpets, felt-tip pens, cedar-lined closets, newsprint, tar, new building materials, household cleaners and tap water. In the more extreme cases patients may relocate to an isolated "cleaner" environment, avoid social contact, and/or make extensive alterations to their living quarters. In one

case study, researchers found a 45-year-old woman living in a small trailer in the Arizona desert. She used a telephone wrapped in aluminum foil — to avoid touching plastic — and said she remained mainly indoors because of her allergy to sunlight.[7]

In 1992, in a paper presented at the National Research Council conference, Rea presented the following comments about MCS:

1. Challenge tests remain the cornerstone of confirmatory diagnosis.
2. Food sensitivity occurs in approximately 80 percent of people with chemical sensitivity.
3. Ninety percent of people with MCS have water-contaminant reactions.
4. Avoidance is the primary and most important MCS treatment.
5. Injection therapy for inhalants, foods and some chemicals will also help.

Rea's emphasis on challenge tests and food intolerance both returns to Randolph's original theories and moves closer to mainstream allergy and immunology investigations. Similarly, Rea's downplaying of the role of provocation-neutralization therapy is likely a reaction to the widespread attack it has suffered from critics. Despite these modifications, the basic diagnostic and treatment methods of clinical ecology have remained largely unchanged.

Severe Criticism

At least five prominent scientific panels have severely criticized the theories and methods of clinical ecology.

• The California Medical Association's Scientific Task Force on Clinical Ecology found that "clinical ecology does not constitute a valid medical discipline" and that there is no convincing evidence to support the theories upon which it is based. The task force concluded: "No convincing evidence was found that patients treated by clinical ecologists have… recognizable syndromes, that the diagnostic tests employed are efficacious and reliable or that the treatments used are effective."[9]

• The American Academy of Allergy and Immunology (AAAI), the largest organization of allergists in the United States, has concluded that there is no clear evidence to support clinical ecology theory and that its treatment methods were unproven. AAAI's 1986 position paper stated: "The idea that the environment is responsible for a multitude of human health problems is most appealing. However, to present such ideas as facts, conclusions, or even likely mechanisms without adequate support, is poor medical practice."[8]

• In 1989, the American College of Physicians stated: "Review of the clinical ecology literature provides inadequate support for the beliefs and practices of clinical ecology.… Diagnoses and treatments involve procedures of no proven efficacy… there is no body of evidence that clinical ecology treatment measures, singly or in combination, are effective."[10]

• The American College of Occupational Medicine issued the following 1991 statement addressing clinical ecology: “The pathophysiologic mechanisms described by these practitioners do not, in general, conform to what is currently known about human biological functions. To explain the phenomenon, these practitioners draw on new or modified mechanisms such as ‘total body load, spreading, switching.’ The scientific foundation for managing patients with this syndrome has yet to be established by traditional investigative activities that withstand peer review.”[18]

• In 1992, the American Medical Association’s Council on Scientific Affairs published its report on clinical ecology concluding that “there are no well-controlled studies providing confirmation of the efficacy of the diagnostic and therapeutic modalities relied on by those who practice clinical ecology.” The council also noted that it remains the responsibility of those who introduce a new procedure, test or treatment to prove by appropriately controlled peer-reviewed trials that it is effective, and that “the burden should not be shifted to opponents to prove that a new test or therapy is invalid.”[14]

The Burden of Proof and Testability

Critics emphasize that although almost 50 years have elapsed since clinical ecology’s theories were proposed, its proponents have conducted no scientifically sound studies of their diagnostic and treatment methods. The few tests they have done are seriously marred by methodological flaws. In addition, lack of consistency among clinical ecologists makes evaluation of their techniques difficult, if not impossible. Clinical ecologists differ on how to measure “positive” symptoms during provocation-neutralization testing. Some wait seven minutes for response, while others wait 90 minutes. Some increase the amount of allergen in the “neutralizing” dose; others lower it. Rather than devise and test standard protocols, clinical ecologists have generally been content to rely on clinical experience, testimonials and anecdotal evidence.[10] Moreover, results of their tests have been accepted as positive without establishing whether they are consistent or reproducible.[19]

Researchers at the University of California have tested the reliability of provocation/neutralization — the test most relied upon by clinical ecologists to diagnose their patients. The study, published in 1990, was funded by two proponent groups. The protocol was developed with the help of advocates and critics who agreed that it was a fair and appropriate test. The testing was conducted by seven experienced clinical ecologists in their own offices, with their own patients and their own extracts. Eighteen patients were given injections, three of which contained the test substance, and nine of which contained saline (a placebo). None of the participants knew which patients received which. In previous non-blinded testing, all the patients had reacted to active injections, reporting such symptoms as burning eyes, itchy throat, ringing ears, dry mouth, headache, facial tingling, dizziness, disorientation and aching legs. Under experimental conditions, their reactions to the active and placebo injections were indistinguishable — they reported just as many symptoms whether they received food extracts or salt water. This surprised the researchers who had themselves witnessed the patients react readily in unblinded tests. They wrote:

It is regrettable that every patient undergoing challenge or provocation testing is not tested in a double-

blind fashion, so that the effect of suggestion or anxiety on the end points could be evaluated. If they were so tested the problems of validity that we found would have been discovered decades ago.[20]

The effects of reliance on unproven testing were highlighted when Canadian investigators visited the control units run during the mid-1980s by Dr. Rea in Dallas and Dr. Randolph in Chicago. The investigators reported a major problem with diagnosis, noting that only four out of 2,000 of Dr. Rea's patients had tested negative for environmental sensitivity, and those four were found to have malignancy as part of their investigation. The reviewers stated that Rea used "no appropriate controls and the patients were assumed to have environmental hypersensitivity mainly by being referred to the unit."[21]

Under the rules of science, the burden of proof of the reliability of tests and the efficacy of treatment is on the proponent. Clinical ecologists have not only sidestepped this responsibility but have ignored findings that refute their theories. Even more problematic are theories concerning MCS that are virtually untestable.

Some clinical ecologists use the term bipolarity to describe the effect of "incitants" on their patients, drawing an analogy to studies of drug abusers and alcoholics. But drug abuse researchers use objective measures of alcohol in blood or drugs in urine specimens to make their determinations. No such tests exist for the array of "incitants," particularly at the extremely low levels that clinical ecologists invoke.

Similarly, the theory of "total body load" is problematic in terms of testability. "Total load" includes exposure to a limitless range of environmental substances, as well as to electromagnetic forces, weather changes, low-level radiation and social stress factors. There is no meaningful way to measure it. Critics have also pointed out that if the "total body load" concept were generally true, a large dose of a chemical would generally have the same effects as the sum of small amounts of many unrelated chemicals — a notion that is preposterous.

Sensitization is another difficult concept to address. According to clinical ecologists, once an individual's "total load" capacity for antigens has been exceeded, that person becomes sensitized to even minute concentrations of innumerable chemicals. This premise is impossible to verify. Clinical ecologists claim that even a single molecule of incitant in the patient's ambient exposure could be a factor in a producing symptoms. This position is held despite evidence that virtually *all* air samples contain microtraces of "pollutants." Methane and propane are ubiquitous in the atmosphere and many chemicals, such as formaldehyde, occur naturally in foods.

Clinical ecologists also challenge tests which demonstrate that MCS patients may be suffering from diagnosable psychological problems. Some proponents insist that all potential environmentally-induced nervous and immune dysfunction be ruled out before considering psychosocial factors as the cause of MCS. This requirement is, of course, impossible to fulfill. Staudenmayer and Selner write: "If one accepts as we do that measurable toxins exist in virtually all persons, then seemingly this reasoning could be used to discredit all physiologic observations in any patient or control subject."[22]

Calls for more research into MCS have come from proponents and critics alike. It is a legitimate demand if the theories to be studied are testable. The rational evaluation of testable theories is science; the persistent invocation of untestable hypotheses is a hallmark of junk science.[23]

"Junk science is the mirror image of real science, with much of the same form but none of the same substance.… It is a hodgepodge of biased data, spurious inferences, and logical legerdemain, patched together by researchers whose enthusiasm for discovery and diagnosis far outstrips their skill. It is a catalog of every conceivable kind of error: data dredging, wishful thinking, truculent dogmatism, and, now and again, outright fraud."

— Peter Huber
Galileo's Revenge[23]

Prominent Voices in the "Debate"

The debate over clinical ecology and multiple chemical sensitivities does not divide itself neatly into two camps, with clinical ecologists in one and mainstream medicine in the other. There is a wide-range of research, and there are several important schools of thought about MCS.

• Abba Terr, M.D., an allergist affiliated with Stanford University Medical Center, has studied many patients diagnosed and treated by clinical ecologists for "environmental illness." In a report on 50 patients, he noted that most of them had made a worker's compensation claim for industrial illness. Terr could find no unifying pattern of symptoms, no consistent physical findings and no laboratory abnormalities. Eight were symptom-free, 11 had symptoms related to pre-existing, non-environmental disease, and 31 had multiple subjective symptoms. Their treatments included: avoidance of pollutants, dietary restriction, food and chemical extracts, antifungal drugs and portable oxygen. Fourteen were advised to move to a more rural area, and a few were given vitamins, minerals, adrenal extract, female hormones and oral urine. Despite treatment, 22 reported a worsening of symptoms, 26 remained unchanged, and only two improved.[24]

In 1989, Terr published similar observations on a study of 90 patients, including 40 from the previous report. In this group, 32 patients had been told they were suffering from "candidiasis hypersensitivity," another diagnosis rejected by rational physicians.[25] He concluded that most of these patients were suffering from a diagnosable physical or psychological problem and had been misdiagnosed by unreliable provocation/neutralization methods. In no case did clinical ecology treatment improve a patient's condition. Many got worse, probably due to "increasing fear of other possible environmental hazards." Terr was the principal author of the American College of Physicians' position paper on clinical ecology. In a recent editorial he noted that "avoidance therapy, rotation diets, sauna detoxification and various maneuvers to 'boost' the immune system serve merely to reinforce a counterproductive behavior pattern.[26]

• John Selner M.D., and Herman Staudenmayer Ph.D., have written one of the most lucid and comprehensive analyses of clinical ecology and MCS.[7] They are unique among practitioners because they utilize an environmental control unit (ECU) in their investigations but are not clinical ecologists. While acknowledging that

many people are very sensitive to microorganisms, noxious chemicals and common foods, they noted that these had quantifiable signs and symptoms consistent with physical or laboratory findings. In well-designed double-blind studies of 100 patients, Selner and Staudenmayer found MCS patients could not recognize specific incitants and typically had been diagnosed as "universal responders" by clinical ecologists. They noted how the diagnosis is welcomed by patients who desperately want a physical explanation for their problems to avoid facing their real problem — which is psychiatric. They believe that patients made aware of their problem can benefit from psychotherapeutic intervention. The researchers also noted that "ecologists claim a unique identity with victims of the environment by declaring themselves, or members of their families similarly affected.… This is a powerful bonding tool which snares patients into a familiar cult of interdependence in which facts are irrelevant."[7] Selner and Staudenmayer have encountered individuals who have specific reactions or sensitivities to specific chemicals, but they have never seen an individual with general chemical sensitivity.[27]

• Mark Cullen, M.D., was among the first non-clinical ecologists to conclude that MCS patients exist as a distinct group. In 1986, the Yale occupational and environmental medicine clinics began compiling records on patients diagnosed with MCS according to Cullen's criteria. Cullen excludes all patients with mental disorders from his definition of MCS and feels all MCS patients should be evaluated psychiatrically. Cullen's article, *Workers with Multiple Chemical Sensitivities,* is an important review of the work on MCS and makes a serious attempt to define it.[28] Since the number of people fitting Cullen's criteria is extremely small, he has been criticized by some MCS proponents who feel his definition is too narrow. Other occupational physicians feel Cullen's work simply supports "junk science." Fiedler, Maccia and Kipen evaluated MCS patients by Cullen's criteria and found that none fit the strict definition.[29]

• Rebecca Bascom, M.D., has written a comprehensive report on "Chemical Hypersensitivity Syndrome (CHS-MCS)," at the request of the Maryland legislature in 1988. The report was peer-reviewed by a panel nominated jointly by the Chemical Manufacturers Association, the Chemical Sensitivities Disorders Association, academia and the Maryland Department of the Environment (MDE). The report contains an annotated bibliography covering literature up to 1989 and is a model of objectivity. It asks all the right questions and notes that key answers are lacking. Noting that "CHS is one of the many popular terms that has been used to describe a group of poorly defined disorders," Bascom makes several important points:

1. The prevalence of chemical sensitivity disorders is unknown. The commonly reported "15 percent" statistic is not supported by any documentation. Without consistent terminology, prevalence cannot be determined.
2. The causes of chemical hypersensitivity are unknown, as is the prognosis of people who think they have it.
3. The issue of whether avoidance will alter the course of the disorder is a key point. Public policymakers require information obtained through systematic research rather than "clinical judgment" alone.[30]

Based on this report, MDE Secretary Martin W. Walsh advised that "there are still more questions than

answers on chemical hypersensitivity. Until such time as the foundational research is performed and the definitional problems resolved, it is not possible to develop a viable, workable CHS program for the state."[31]

• Nicholas Ashford, Ph.D., and Claudia Miller, M.D., wrote a lengthy report on MCS for the New Jersey State Department of Health, which they later modified and published as the book *Chemical Exposures: Low Levels and High Stakes.*[32] Ashford and Miller accept the tenets of clinical ecology as valid working hypotheses. As the book's title implies, they propose the hypothesis that low levels of environmental chemicals cause MCS. In particular, they define four populations of MCS patients: industrial workers, tight building occupants, contaminated communities and individuals more closely matching the population described by Rea (70 to 80% female; 50% from 30 to 50 years old, white, middle to upper-middle class and professional). Ashford and Miller do not present any data that might help resolve the medical questions. Like Rea, they speak of chemical sensitivities of various kinds, not a specific syndrome called MCS. Their concept of contaminated communities — those near industrial or hazardous waste sites — has raised the level of concern in New Jersey and elsewhere in America. Ashford also wrote the preface to Dr. Rea's *Chemical Sensitivity*.[6]

• The National Research Council (NRC) of the National Academy of Sciences has published two books dealing with MCS. The first volume, *Biologic Markers of Immunotoxicology*, is a consensus document, prepared by the Subcommittee on Immunotoxicology, which describes both "sick building syndrome" and MCS as "controversial" areas of medicine. The report also noted that the existence of MCS has been challenged by the medical and scientific communities and that a "paucity of solid scientific data has severely clouded objective scientific understanding of this syndrome, including its clinical diagnosis and objective treatment." The report recommended replacing the term MCS whenever possible with a specific diagnosis, doing epidemiologic research on the prevalence of MCS, and performing studies under controlled environmental conditions to confirm or eliminate immune-system dysfunction as a possible cause of MCS.

One chapter of this book contained a libelous passage that unfairly criticized Dr. Abba Terr. MCS advocacy groups, who consider Terr a major adversary, then asked the American College of Physicians (ACOP) to withdraw its 1989 position statement on clinical ecology because Dr. Terr's work had now been "discredited by no less than the National Academy of Sciences." ACOP, of course, not only denied this request but protested, along with Dr. Terr, that NRC's criticism of Terr was inappropriate. Following review by NRC's Subcommittee on Immunotoxicology, an "erratum" was issued with the attack on Terr deleted.

The second NRC volume, *Multiple Chemical Sensitivities: Addendum to Biologic Markers of Immunotoxicology*, was not peer-reviewed and consisted of papers presented at a 1991 workshop cosponsored by the National Academy of Sciences and the U.S. Environmental Protection Agency. Almost all of the papers were written by MCS proponents. Despite the absence of a consensus recommendation, the editors of the volume characterized MCS as a controversial but legitimate diagnosis of a disease that in time will be as well defined as AIDS.

Not surprisingly, MCS support groups such as the New York Coalition for Alternatives to Pesticides and the National Center for Environmental Health Strategies have welcomed the two reports and noted their support for more research. In the summer issue of the newsletter *The Environmental Physician*, Earon Davis, an attorney who promotes the concept of MCS, congratulated the National Academy of Sciences, "for its

recognition of the pseudoscientific nature of the 'studies' which purport to show MCS and 'Clinical Ecology' to be without merit."[12]

• Richard Brown and Paul Lees-Haley have written "Fear of Future Illness, Chemical AIDS, and Cancerphobia: A Review," and "Biases in Perception and Reporting Following a Perceived Toxic Exposure," two articles that explore how media reports about pollution and low-level chemical exposure can have a profound impact. They postulate several reasons why people may exhibit symptoms that have no toxicological basis:

1. Sufferers believe they are abnormally susceptible to chemicals.
2. Stress based on fears about pollution, warnings from doctors and lawyers and feelings of vulnerability may create stress that alters the immune system in ways not yet discovered.
3. For psychological reasons, some people are prone to develop symptoms similar to those described in press reports.[33]

• The Association of Occupational and Environmental Clinics has published *Advancing the Understanding of Multiple Chemical Sensitivity*, based on a 1991 MCS workshop funded by the U.S. Public Health Service's Agency for Toxic Substances and Disease Registry (ATSDR).[34] ATSDR sponsorship of this symposium may foreshadow formal recognition of MCS as a disease to be tracked by the U.S. Centers for Disease Control and Prevention. (Federal definition of something that doesn't exist can only increase public confusion.)

How Prevalent Is MCS?

Estimates of the prevalence of MCS are linked to the beliefs of the estimators. There appear to be five basic viewpoints.

Group 1: MCS is a misdiagnosis. There are NO MCS patients. A well-known proponent of this group is Abba I. Terr, M.D. He believes that MCS is frequently a misdiagnosis and that patients who claim to have MCS really have other disorders, either physical or psychological, that are well known and can be characterized by employing standard clinical tests and diagnoses. This view, that there is no such disease entity, was recently echoed by a 1992 Nova Scotia provincial government committee examining the MCS issue. Physicians in this group think that large numbers of MCS patients have psychiatric problems — depression, somatization disorders and anxiety disorders — which are causing their symptoms. Donna Stewart, M.D., shares this view, noting that "Twentieth-century disease appears to be not a new illness, but rather, a fashionable name for a condition known to physicians for centuries."[35] The Nova Scotia group also includes skeptical doctors who feel there may be MCS patients, but that the term should not be used until controlled, double-blind studies of diagnostic and treatment protocols have been completed.

Group 2: There are a few MCS patients with a distinct disorder. Procedures for differential diagnosis and

treatment must be investigated. This viewpoint is best represented by Mark Cullen, M.D., who dissociates himself from the methods of clinical ecologists but identifies a small number of patients who have symptoms similar to those the clinical ecologists have described.

Group 3: MCS complicates the conditions of patients with conventional disorders. Physicians in this group believe well-characterized medical problems — from headaches to cancer — are either caused or exacerbated by exposure to chemicals causing "environmental illness." Alan S. Levin M.D., a clinical ecologist, feels that an acute or chronic episode of exposure to environmental chemicals must be described before the patient's problems can be ascribed to environmental illness. Levin supports the idea that MCS is a multisystem disease affecting the neurologic, endocrine and genitourinary systems as well as the immune system. Also in this group are physicians who theorize that "chronic candidiasis" or "candidiasis hypersensitivity syndrome" is the cause or a major factor in MCS. The idea of chronic yeast infections was popularized by *The Yeast Connection* by William G. Crook, M.D.[36]

Group 4: MCS is widespread and well characterized.
This is the view held by most clinical ecologists. It is also the position of Ashford and Miller, although they do not consider MCS well-characterized. Physicians in this group often speak of chemical sensitivities and include a wide range of conditions such as hay fever and poison ivy, not usually described as "chemical" conditions. Dr. William Rea claims that about 100,000 chemically sensitive patients have received treatment worldwide.

Group 5: MCS is epidemic: at least 15 percent of Americans have it.
This is the extreme view held by a few medical professionals, support groups, activists and lawyers. It was proposed by Linda Lee Davidoff, psychologist and president of the Chemical Sensitivity Disorders Association of Baldwin, Maryland, in an article written for the *Amicus Journal*, a publication of the Natural Resource Defense Council (NRDC).[37] She arrived at this figure by extrapolating from anecdotal information. NRDC, which orchestrated the Alar scare and raises alarms about low levels of environmental chemicals, is largely concerned with the politics of MCS rather than the medical issues. Proponents in this group suggest that living near a hazardous waste site, for example, can cause MCS. About 21 million Americans live within three miles of such sites.

The evidence to support positions 3, 4, and 5 is scarce or nonexistent, but that has not stopped MCS patients and advocates from working vigorously to gain recognition of MCS as a bona fide and compensable disease. For MCS sufferers, science is cumbersome and slow; the real arena for the battle of MCS is political.

The Politics of "Multiple Chemical Sensitivity"

While the scientific community does not recognize MCS as a diagnosis and has rejected the beliefs and practices of clinical ecology as unsubstantiated, supporters of MCS are working diligently to establish its legitimacy in society. As with cancer, arthritis, diabetes and many other recognized diseases, MCS has its own spe-

cialized practitioners, self-help and support groups and fundraising and lobbying efforts.

About 400 clinical ecologists belong to the American Academy of Environmental Medicine (AAEM), a group originally called the Society for Clinical Ecology. About 90 percent of these are medical doctors, and the rest are osteopaths. AAEM publishes a quarterly journal and sponsors courses which, despite clinical ecology's rejection by mainstream medicine, are accepted for continuing education credits by the American Medical Association and the American Academy of Family Physicians. (Note: The term "environmental medicine" is used by mainstream physicians to describe scientific approaches to health problems related to environmental factors. These have little or nothing to do with the tenets of clinical ecology. Although most medical courses approved for continuing education credit are scientifically sound, approval is neither a guarantee nor an endorsement.)

A second professional organization, the American Academy of Otololaryngic Allergy (AAOA), was founded by Theron Randolph, M.D., in 1941 and now has about 2,000 members. How many are practicing clinical ecologists is unknown, but AAOA has endorsed the use of provocation/neutralization testing for allergies.[38]

There are dozens of grass-roots support groups for environmental hypersensitivity, but only a few are established on a national scale. The Human Ecology Action League (HEAL) is a nonprofit organization founded in 1977 by physicians and citizens concerned about the health effects of environmental chemicals and now has several thousand members. HEAL publishes a quarterly magazine, *The Human Ecologist,* and serves as a clearinghouse for information and a source for print and electronic media. Their slogan is "Chemicals Can Affect Your Health."

Perhaps the most vocal MCS group is the National Center for Environmental Health Strategies (NCEHS) in Voorhees, New Jersey which was founded in 1986 and now has about 2,000 members. NCEHS publishes a newsletter, *The Delicate Balance*, acts as distributor of articles and books on chemical sensitivity and consults with groups and organizations on MCS issues. Its founder and president Mary Lamielle and its legal consultant Earon Davis vigorously lobby politicians, medical organizations and journals, unions, insurance companies and many other organizations.

In Canada similar organizations exist, including The Human Ecology Foundation of Canada, the Allergy and Environmental Health Association and the Canadian Society for Environmental Medicine.

"MCS" sufferers and supporters do not see the issue of MCS as a scientific debate, but rather as a battle. In some areas, MCS supporters have waged effective campaigns.

- In 1992, NCEHS announced that Congress had appropriated $250,000 for research into MCS to be coordinated with NCEHS. With funds from the 1993 budget for the Agency for Toxic Substances and Disease Registry, research protocols will be developed, along with a national registry of people with MCS.

- Using money from a grant by the New York State Department of Labor, Occupational Safety and Health Training and Education Program, the New York Coalition for Alternatives to Pesticides (NYCAP) published a 16-page booklet on MCS from their Multiple Chemical Sensitivity in the Workplace Taskforce. Coordinator Tracy Fritsch says the booklet was distributed to 20 MCS groups

in America.

- NYCAP is also working with labor organizations to gain what Fritsch called "reasonable accommodations" in the workplace for people with MCS. They would include: perfume-free environment, no use of cleaners or toxic building materials, no volatile paints, no smoking, vented laser printers and copy machines and similar provisions for the worker's route in the building, i.e., stairwells, elevators etc.

- The MCS lobby has been effective. In 1992 the U.S. Department of Housing and Urban Development (HUD) sent out a memorandum establishing that MCS is a "handicap" under the Fair Housing Act and sufferers are entitled to "reasonable accommodation" in housing.

- In Canada, the Disabled Residential Rehabilitation Program of the federal government's Canada Mortgage and Housing Corporation (CMHC) has offered up to $10,000 in grants and loans for home renovations for people with hypersensitivities. CMHC also publishes a book titled *Housing For the Environmentally Hypersensitive*.

- "Environmental illness" advocates are targeting trade unions and professional associations. In 1993, the Minnesota chapter of the National Association of Social Workers adopted a policy statement recognizing MCS as a disability.

MCS in Court

It may be easy for the general public to disregard the controversy over MCS as medical turf wars and esoteric scientific debate in the pages of little-known journals. But the effect that MCS has beyond the clinic and the journals should not be ignored.

While some MCS patients grow weary of mainstream medicine and move on to find relative satisfaction with the treatment they receive from clinical ecologists, many do not. They want insurance companies to cover their diagnosis and treatment costs. They want worker's compensation, disability payments and unemployment benefits, as well as reimbursement for special housing and environmental needs. They are assembling teams of professionals who will help them press for payment.

Support groups, doctors willing to serve as expert witnesses and lawyers willing to take on class-action suits on behalf of MCS patients have turned a personal health problem into a societal problem. Some individuals have won substantial court-directed settlements by using physicians who base their diagnosis of MCS on subjective findings and "prove" chemical exposure without reference to dose. Without objective clinical laboratory tests, the opinions of clinical ecologists become the decisive factor in court.

Conrad and Mason have compiled a list of court cases involving "immune dysfunction" and "cancerphobia." They describe the problem as follows:

In any group of people, some will have illnesses and disorders. The illnesses or disorders can vary

from group to group, but there will always be some present. If there is a pattern in these illnesses, scientists can use techniques such as epidemiologic studies to reveal the pattern and to search for the causes of the pattern. But what if there is no pattern? Our courts are now being confronted with lawsuits in which allegations are being made that despite the absence of any pattern of diseases… environmental toxins are causing such disparate illnesses as may exist in the population.… This prophecy is often being "proven" by random illness, or in some cases no clinical evidence of illness at all, only laboratory results claimed to show damage to the immune system.[39]

Consider the following cases:

- In 1982, eight families in Woburn, Massachusetts filed a lawsuit against three companies for polluting the town's water and causing leukemia in their children. After a partial trial and much out-of-court negotiating, the charges were dropped. One company paid the families $8 million and spent at least $7 million defending itself.

- In 1986, a federal court awarded some residents of Hardeman County in Tennessee $12.7 million in compensation for a chemical company's alleged pollution of their water, which the residents claimed had caused widespread cancers. The judge, citing the expert testimony of clinical ecologist Dr. Alan Levin, specifically earmarked $875,000 for people with damaged immune systems.[40]

- In 1985, clinical ecologists tested 32 residents of the town of Sedalia, Missouri who were suing a nearby chemical plant for causing a wide range of diseases including brain damage and kidney infections. They testified that they found immune abnormalities in all the people tested. The jury awarded $6.2 million in compensatory damages and $43 million in punitive damages against the company.

These cases may be just the beginning of what some lawyers and doctors fear could be an avalanche of lawsuits in which clinical ecologists convince judges and juries that people are suffering from "Chemical AIDS" due to low-level exposure to chemicals. Similar cases involving the testimony of clinical ecologists in California, Louisiana and South Carolina have resulted in compensation as high as $19 million.[23]

The "Woburn strategy," in which environmental pollutants are linked to disease without evidence of causation, will have devastating effects on industry. Fearing bad publicity and huge legal bills, many companies will settle out-of-court rather than battle the scientific validity of the claims in court. As one critic noted, "In immune dysregulation theory lawyers have found a gold mine, a profitable strategy in environmental damage cases."[41]

An even bigger gold mine is the "unsick plaintiff." In these cases, the plaintiff does not claim to be ill but merely claims damages due to exposure to an environmental chemical. Because there would be no one to sue if the chemical culprit were a naturally occurring substance, the problem is invariably traced to a nearby industry. The alleged damages may include fear of illness as well as chemically-induced immune dysfunction.

Whole industries are being affected by the specter of class-action suits in which plaintiffs blame chemical exposure for whatever disease they acquire. For example, the pulp and paper industry has spent about $10

billion dollars in an effort to reduce dioxin content in its waste water. Though the campaign reduced dioxin levels to those found in nature, the pulp and paper industry is justifiably worried. With MCS theory, *any* exposure could affect the immune system, and *any* person who drank water downstream from a pulp and paper plant or ate a fish from the same river could sue for damages with at least some chance of winning.

If the medical community accepts the diagnosis and theory of MCS, a wide range of industries could be seriously affected:

1. *The perfume and toiletries industry.* Complaints have already begun about perfumed magazines and department stores whose clerks provide sample sprays. People could be asked to refrain from wearing colognes or perfumes in the workplace.
2. *Chlorine-containing products.* Chlorine use in pulp and paper production is under attack because it helps create dioxin. "Chlorine-free in '93" is an environmental slogan. Household use of chlorine bleaches and the chlorine used in swimming pools could also be restricted.
3. *Gasoline.* Petroleum products are often listed as incitants. The issue of benzene in gasoline will be re-examined. Self-serve pumps could be discontinued. The neurotoxin hexane will receive new scrutiny.
4. *Alcoholic beverages and other products containing alcohol stabilizers.* Most MCS patients are asked by clinical ecologists to refrain from alcoholic beverages or those containing ethanol or isopropanol as preservatives. Drinking is a choice issue, but labeling regulations could change dramatically.
5. *Carpeting.* The case of Linda Sands, the Vermont woman who blamed her family's MCS on new carpet and launched a government hearing into carpet safety, is typical of cases facing the carpet industry. The Consumer Product Safety Commission has received about 500 complaints about "toxic" carpets. Although a few chemicals have been closely investigated, no specific chemical has been proven to produce toxic effects when used in carpeting.
6. *Silicone breast implants.* Makers of silicone breast implant materials have liabilities covering two million women with the implants. Thousands of cases have already reached the courts.
7. *Dry cleaning industry.* The use of the agent perchloroethylene in dry cleaning is sure to come under attack by MCS sufferers.
8. *The tobacco industry.* Secondary smoke is a prominent health issue that has accelerated the banning of smoking in public buildings, restaurants and even outdoor facilities. MCS patients, who commonly complain about sensitivity to tobacco smoke, may play a small role in this movement.

Under federal and state laws, judges have the right to determine whether alleged experts and their testimony meet a reasonable scientific standard. In a recent decision, the U.S. Supreme Court suggested four criteria that could be used for this purpose:

1. The method or technique is testable and has been tested. That is, the expert's testimony must, in some way, be based on the scientific method.
2. The theory or method has been published in peer-reviewed journals. However, lack of publication is not necessarily grounds for disallowing the testimony.
3. The known or potential error rate of the particular scientific technique at issue has been considered.

4. The extent of acceptance by the scientific community should be considered: “Widespread acceptance can be an important factor in ruling particular evidence admissible, and a known technique that has been able to attract only minimal support… may properly be viewed with skepticism.[42]

Although the case was unrelated to MCS, the Supreme Court’s ruling could make it difficult for clinical ecologists to testify as experts in the future.

Conclusion

The theory and practice of clinical ecology are unsupported and unsubstantiated. Similarly, “multiple chemical sensitivity” is not recognized as a clinical syndrome by mainstream medical practitioners. The medical and scientific communities have rejected MCS and denounced the practices and beliefs of clinical ecologists as ineffective and unproven. However, some doctors, lawyers, environmentalists, and advocacy groups are fighting to keep the concept of MCS alive. The patients, whose suffering is undeniable, may be caught in the crossfire of controversy.

Convinced by proponents that they are environmentally ill, these patients are misdiagnosed, treated improperly and often persuaded to alter their lifestyle in unnecessary and life-limiting ways. In addition, their demands for compensation, insurance payments, workers compensation, and special treatment are burdening industry, government and society as a whole. Unsick people who are convinced by clinical ecologists that they risk future illness and are suing for damages compound the already substantial legal problem.

Calls for further research by MCS proponents may not be a search for a scientific resolution for the problem of MCS. MCS is so poorly defined and the theories surrounding it are so vague that critics believe they are untestable. The people involved in the MCS controversy, many of whom believe they themselves suffer from MCS, constitute a subculture whose unifying concerns are not based on rational thought. Thus there is little reason to believe controlled trials and new research will solve the MCS controversy.

Junk science feeds upon and breeds fear. MCS theory promotes an irrational fear of all chemicals around us. This kind of junk science makes it possible to convince people that carpets are potentially life-threatening products or that miniscule amounts of chemicals in water are destroying their health. Ironically, junk science can divert attention away from real environmental health problems and their solutions.

MCS junk science is costing society millions of dollars. It is restricting people’s lives in unnecessary ways and diverting them from effective medical treatment. It can cause enormous problems in the workplace and can cost people their jobs. It may burden the health-care system, severely tax the insurance industry and wreak havoc with workers compensation programs. It may also drive safe products from the market and make surviving products more expensive without improving their quality or safety.

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