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All Guests and Participants:

**RECORD OF PROCEEDINGS OF
MULTIPLE CHEMICAL SENSITIVITY.
SYMPOSIUM HELD 16-17 MAY 2001**

The Minister of National Defence, the Honourable Arthur Eggleton, and the Department of National Defence, through the Director General Health Services, hosted a Multiple Chemical Sensitivity (MCS) Symposium on 16-17 May 2001 at the Château Cartier Hotel in Aylmer. The Multiple Chemical Sensitivity symposium was organized in consultation with members of the Environmental Illness Society of Canada.

The symposium's goal was to provide a forum of international medical expertise on the subject of MCS. The symposium's learning objectives were to review the history of MCS, the various proposed definitions for MCS, the various theories around MCS, diagnostic methods, treatment modalities, and examine the controversies surrounding this diagnosis. Presentations by representatives from both sides of this issue allowed CF health care workers and other attendees to develop a better appreciation of this important subject.

The Record of Proceedings from this symposium, in bilingual format, is enclosed

Sincerely,

original signed by

K.C. Scott
Colonel
Deputy Chief of Staff - Medical Policy

Enclosure: Record of Proceedings



National Défense
Defence nationale

MULTIPLE CHEMICAL SENSITIVITY SYMPOSIUM

PROCEEDINGS

16-17 May 2001
Château Cartier Resort
Aylmer, Québec
Canada

Canada 

May 16, 2001

Introduction

Colonel Ken Scott, M.D.

“Mister Minister, Surgeon General, honoured guests, welcome to Aylmer and the National Capital Region,” said Dr. Scott, noting that many speakers and participants had travelled great distances to be at this symposium on multiple chemical sensitivity (MCS). He acknowledged the generous contribution of the Minister of Defence, the Honourable Art Eggleton, in helping to bring a panel of international experts together to provide a complete and thorough examination of this topic.

Canada has deployed many of its Forces personnel as peacekeepers around the world, only to have some of them return with a perplexing array of symptoms that defy easy classification. Many different centres have tried to come to grips with these post-deployment complaints as personnel who are unwell ask for explanations. MCS has remained a troubling social and medical phenomenon, and Dr. Scott told participants that they would be hearing from both sides of the debate. He gave special thanks to the speakers who will be sharing their research with the symposium over the next two days.

Dr. Scott acknowledged the tremendous amount of work done by Capt. Denis Jetté—described as his “right-hand man”—in preparing for this symposium. Similarly, Marie-Hélène Dubé made a significant contribution, as has Greg Hogan from the Communications Branch. Dr. Scott urged participants to fill out the evaluation forms after each speaker finished.

Dr. Scott introduced the Honourable Art Eggleton, Minister of Defence. Mr. Eggleton, who has the distinction of having been the longest-serving mayor of Toronto, has now been the Minister of Defence for several years. Dr. Scott suggested that perhaps Mr. Eggleton has set out to repeat his record by remaining in his current portfolio for some time to come.

Opening Symposium

The Honourable Art Eggleton, Minister of National Defence

Mr. Eggleton thanked Dr. Scott and all those present, making special note of those who had come from far away—the U.S., England, and Australia—as well as from all parts of Canada.

This symposium is very important, said Mr. Eggleton. “That’s why I came this morning. It’s important to me both personally and professionally.” Mr. Eggleton related that he shares a close friendship with someone who has suffered from MCS, and although he was initially skeptical of the possibility, he is no longer.

Secondly, Mr. Eggleton said that, as the Minister of National Defence, he has heard from many who went into overseas service as robust individuals only to see their health deteriorate over subsequent years. Some have looked at depleted uranium as a possible cause, while others have

looked at the red sand used in sandbags in Croatia. Their growing frustration is fuelling the search for a cause and an understanding of what has shattered their lives.

Mr. Eggleton acknowledged that traditional medicine debates the existence of MCS. While scientific evidence says that these illnesses are not caused by MCS, people continue to suffer. “We must look at what is needed to help try and solve the problem. That’s the bottom line,” he asserted. It is important to look to the beliefs of those who suffer—these individuals must be a key part of any solution.

“I hope there will be an open-mindedness today,” the Minister commented. That might involve a holistic approach to problem solving, and will almost certainly include a discussion of the associated psycho-social problems.

“I certainly hope you can look to the needs of those who suffer and focus on how you can come out of here looking to how to help,” said Mr. Eggleton, adding that this could include examining support systems and pensions. He urged participants to have an open mind, and implored them “to think outside the box.”

“I’d like to see this symposium be the start of finding solutions made in Canada. I’m prepared to provide that kind of leadership,” he concluded.

Basic Principles of Environmental Medicine and Multiple Chemical Sensitivity *Gerald Ross, M.D.*

“Mister Minister, Surgeon General, and guests, it is indeed a pleasure to be here,” said Dr. Ross, adding that he was somewhat daunted by the task of presenting such large topics within a 30-minute time frame. He began with a slide of the lighthouse at Peggy’s Cove, saying that it not only reminds him of his roots, but of the need for all of us to be like that lighthouse, providing a sense of light, guidance, hope, and inspiration to our patients and others.

Dr. Ross said his views, like those of the Minister, had changed over the years. When he graduated as a medical doctor in 1974, he was very skeptical about MCS. Then in 1983 he became seriously ill and developed a neuropathic illness, which was confirmed on a nerve biopsy. He began to develop reproducible reactions to food and chemicals: certain triggers would produce certain symptoms.

It was then announced that there was dry cleaning fluid in the town’s drinking water, and blood tests confirmed that it was present in him as well. That class of chlorinated solvents is known to induce neuropathy.

He reported that he was disabled for a time, but was treated for environmental sensitivities, and with the financial support of the government of Nova Scotia, completed an International Fellowship in Environmental Medicine. He was able to go back to productive work. His opinions changed, based on having seen “both sides” of the issue of MCS and “low-level” environmental influences on health.

Dr. Ross urged attendees not to think that they have all the answers. He quoted former deputy editor of the *New England Journal of Medicine* Drummond Rennie, who in 1980 said of a 1959 issue of the journal, "This was the finest medical research of its time, and most of it has already been proved wrong. The best that can be said about today's *Journal* is that we're publishing today's lies."

Illustrating ubiquitous environmental exposures, Dr. Ross showed a slide of the plume of smoke from a tanker truck fire, taken from the balcony of his house in Utah. "We are all exposed to a variety of environmental toxins," he said. The county to the west of his home is being reported as the most polluted county in the U.S., in terms of the release of neurotoxic and developmental toxins.

Showing an American Medical Association slide entitled "Triggers of Asthma," Dr. Ross commented that 25 years ago this would never have been published, as it showed natural gas, propane, cigarette smoke, and smog as chemical triggers of asthma.

The next slide described the Canadian government's plans to reduce the domestic use of pesticides and the refusal by Dow AgroSciences (Canada) to phase out production of the pesticide chloropyrifos, despite agreeing to do so in the U.S. Dr. Ross commented that either this chemical was dangerous in the U.S. but not in Canada, or that the manufacturer valued the health of Canadians significantly less than that of Americans.

Dr. Ross described the "total load" effect, that is, the cumulative and combined effect of all the patient's stressors. A patient's state of health depends on many factors: food, infections, stress, chemicals, inhalants, genetics, nutrition, and electromagnetic forces. Using a simple analogy, Dr. Ross explained that if a rain barrel can be used to represent a patient, the barrel's capacity represents the patient's capacity to tolerate a variety of stressors, which constitute the total load, or L . The patient can usually function reasonably well with almost a full load, but when an additional stressor, A , is added to the barrel, that patient's capacity to cope becomes overloaded and the barrel overflows. This overflow represents the production of illness or symptoms.

Most people assume that the additional stress A caused the overflow, when in fact it is $A + L$ (all the rest of the total load) that produces the symptoms. Dr. Ross stated that approaching his patients' problems with the total load concept in mind had enabled him to do more for their treatment than any other information he had learned in medicine. The therapeutic message to lower the total load is a simple construct, but one that works.

As an example of the total load effect, Dr. Ross presented research done in 1970 by Taylor and Francis. Mice were exposed to a number of stressors, but cardiac arrhythmia only occurred with additive exposures, when a threshold or total load was exceeded.

The total load approach provides more options for therapy, as most of the factors are modifiable (food, water, air quality, emotional stress, infections, inhalants, etc.), with the possible exception of genetics. Air filters, detoxification, dietary modifications, and stress reduction are all ways to decrease the total load.

A second basic principle of environmental medicine is that of biochemical individuality. Because we are all different genetically, we are all different metabolically, Dr. Ross said, adding that the pharmaceutical industry has known this for years. Genetic polymorphism, for the purpose of discussing environmental effects, is defined as the genetic variation between individuals of a population, whereby specific genes may be present or absent, or expressed to different degrees, resulting in varied biologic, metabolic, and detoxification responses to the same medication or environmental pollutant. Research in this field goes back to 1994. We do not behave the same when confronted with either medications or environmental toxins, commented Dr. Ross.

The third principle is the non-linear response curve, whereby the old axiom, “the lower the dose, the less the effect” may not always apply. University of Texas research on exposure to various chemicals revealed that exposure to low doses of environmental toxins may be more hazardous than exposure to high doses. In military terms, Dr. Ross described this as “coming in under the radar.” There is more chromosomal damage with low and medium levels of exposure than with high levels. High exposure levels trigger enzyme induction that helps to clear the toxic material from the body, and therefore less genetic damage was seen at higher levels of exposure in this study.

“It’s almost as if there’s a threshold of recognition,” Dr. Ross remarked. With low doses, the body does not seem to recognize what is happening and does not induce the enzymes needed to detoxify the xenobiotics.

The next major concept, that of adaptation and withdrawal, is of fundamental importance to an understanding of MCS and environmental medicine. Adaptation is a physiological homeodynamic change that produces tolerance of a substance. Once adapted, the patient may associate few or no symptoms with exposure to the substance, even though the substance adds to the total load, and a “metabolic price is paid.” A classic example of this is cigarette smoking where, after the initial exposure, the smoker becomes acclimated to the effects of the cigarettes, despite their known destructive effect. Withdrawal is the opposite: it is a de-adaptation that occurs with loss of exposure to a substance to which a person has adapted.

After a period of no exposure, the person will usually have symptoms on re-exposure (also known as re-challenge). Either adaptation or withdrawal can be uncomfortable and associated with physical or emotional signs and symptoms. Dr. Ross used the example of workers in a nitroglycerin factory. Initially they suffered from headaches until they became acclimated to the environment. They then experienced headaches or withdrawal symptoms on weekends until they discovered that they could prevent this by putting nitroglycerin on their hatbands, which would be absorbed slowly over the weekend.

“Monday fever” in those working around grain dust or welding fumes is another example of what happens after a weekend of abstinence from the substances to which workers have become adapted during the week. Few physicians or patients understand that many foods, chemicals, and inhalants can produce adaptation and withdrawal effects, depending on the patient’s reactivity. Such withdrawal effects can be very much like narcotic withdrawal, with a lot of somatic pains.

In the last 50 to 60 years, Dr. Ross said, medicine has gone down a path that he believes is limiting and incomplete, toward an overdependence on pharmaceutical interventions. He showed a picture of a welder taken from an advertisement for an asthma inhaler. If the welding fumes trigger his asthma, the best treatment is to get him away from the stuff that's causing it, not suppressing his symptoms with steroids and bronchodilators, Dr. Ross said. He quoted Dr. Doris Rapp, who asked, "Suppose you have a nail sticking through the bottom of your shoe and into your foot. What are you going to do? Keep putting a bandage over the wound in your foot? Or remove the nail?"

Dr. Ross said that much of modern medicine focuses on short-term symptom suppression with pharmaceuticals, but environmental medicine has a different philosophy—it tries to identify and remove the nail. The main message is to lower the total load, after seeking out individual initiating and exacerbating factors of illness.

Dr. Ross noted that MCS is variously thought of as a credible diagnosis, a pseudodisease, a belief system, a neural sensitization, or a toxic encephalopathy. The big question is whether it is psychological or physiological. Or could it be, as Dr. Claudia Miller suggests, that MCS is not an ordinary disease per se but a manifestation of an underlying and unrecognized mechanism of illness? Dr. Ross proposed that we may well be on the verge of such a recognition of a new mechanism of illness, of which MCS is only one manifestation.

Regarding MCS, Drs. Ashford and Miller were the first to identify four patient categories: industrial workers; occupants of "tight" buildings; residents of communities whose air or water is contaminated by chemicals; and individuals who have personal and unique exposures. Dr. Ross suggested that there is also a fifth category: those who have no identifiable prior chemical exposure, but who can nevertheless be diagnosed with MCS.

Many definitions have been proposed for MCS, but the one upon which most agree lists six key factors. These are that the condition is chronic, symptoms recur reproducibly, symptoms occur in response to exposure to low levels of chemicals, the chemicals are of multiple unrelated types, symptoms improve or resolve if exposure is removed, and symptoms occur in multiple organ systems. Women's College Hospital in Toronto, which has a government-sponsored environmental medicine clinic, has chosen to operate using this consensus definition for MCS.

Dr. Ross showed two different pesticide labels. Both warned that repeated contact could, without the manifestation of symptoms, progressively increase susceptibility to poisoning. He related that the phenomenon of increasing susceptibility to lower and lower doses was a lot like MCS.

Dr. Theron Randolph was the first to describe chemical sensitivity, and his name is linked to many publications going as far back as 1951. Dr. W. J. Rea's four-volume *Chemical Sensitivity* provides thousands of literature references. Dr. Ross said that the best, and most cited, reference is Ashford and Miller's *Chemical Exposures: Low Levels and High Stakes* Second Edition (1998). There are also a number of epidemiology studies, including one by Kreutzer (1996), who surveyed 4,000 Californians and discovered that 6% were diagnosed with MCS and 16% were unusually sensitive to everyday chemicals. Kipen (1995) found that 69% of those diagnosed with MCS met the threshold score, and Bell (1996) found that 28% of over 800 young adults said that they were especially sensitive to chemicals.

Drs. Davidoff and Fogarty (1994) undertook a review of papers reporting a psychiatric causation of chemical sensitivity. They concluded that studies considered widely supportive of a psychogenic origin for MCS had serious methodological flaws, a view upheld by a review of their paper in the *Journal of Occupational Environmental Medicine* (1996).

In a comprehensive review of more than 600 articles in the peer-reviewed MCS literature, MCS Referral and Resources (www.mcsrr.org) found—in addition to some papers with mixed conclusions—that 311 papers concluded that there was a physical or organic basis to MCS, as opposed to 137 papers that concluded there was a psychogenic basis. In other words, more than twice as many papers concluded that MCS has an organic basis, by a ratio of 2.26 to 1.

Drs. Brown-Gagne and McGlone (1998) showed that certain questionnaires used to help diagnose depression are not reliable in cases of MCS. They recommended that until the etiology of MCS is better understood, “caution should be used when estimating severity of depressive symptomology in individuals with MCS when measures include somatic items.” Davidoff and Fogarty (2000) reached similar conclusions, stating that “the use of psychometric tests in ill populations for the purpose of evaluating . . . psychogenic origins of illness was shown to be potentially misleading.”

The best way to diagnose MCS, Dr. Ross said, is to re-expose a patient to a suspected chemical, under environmentally controlled conditions, after appropriate withdrawal. Both inhaled and intradermal challenges can produce reliable, reproducible data. Binocular iriscorder printouts (precise measurement of autonomic neurological function) developed in Japan for ophthalmologists and SPECT (single photon emission computerized tomography) brain scans can also be used as objective, non-symptomatic measurements. Ross and Simon (1999) found that brain SPECT scans using the technique of Simon and Hickey indicate that over 90% of MCS patients have evidence of neurotoxicity. They also concluded that metabolic (SPECT) brain scans done before and after ambient or blinded challenges with very low concentrations of relevant chemicals show a high degree of neurotoxicity induced by the challenge in MCS patients. This pattern is not characteristic of psychiatric disease.

Dr. Ross showed a number of slides depicting SPECT brain scans, explaining that SPECT shows a profound deterioration of brain metabolism in the patient after exposure to low-dose concentrations of a chemical to which he or she had been sensitized. A subsequent slide showed SPECT scans before and after a chemically sensitive patient had undergone a sauna detoxification program, with dramatically improved results.

Dr. Ross described the sauna detoxification program and showed slides of the sauna interior and set-up. He said that chemicals can often be smelled coming out of patients (in breath or sweat) when they are in the sauna. He reported a court-mandated sauna detoxification program in Utah for repeat young offenders who are drug abusers. The results are being gathered, and the lower rates of recidivism have been very encouraging.

In summary, Dr. Ross asked participants to keep the total load theory in mind while remembering that medicine is a “work in progress.” It is important to remember the axiom,

“lower the total load,” and to do as the Minister of National Defence has suggested, which is to think outside the box. Each person is biochemically unique and metabolizes differently. Low levels of chemicals may actually be more harmful than higher levels, as they do not induce detoxification enzymes. Adverse effects can occur with both adaptation and withdrawal to either food or chemicals. The long-term synergetic effects are unknown, but the data on MCS is growing, and epidemiology studies suggest a significant prevalence.

Questions and Comments

Saying that he was a nonbeliever, an internist asked how many of the studies cited were double-blind and placebo-controlled. Dr. Ross replied that the better ones were, but acknowledged that certain therapeutic interventions, such as a sauna program, do not lend themselves to being double-blinded.

Another doctor asked what controls there were for the asthma study. Dr. Ross replied that the asthma patients were placed in a hospital unit in England where the air was highly filtered, and they were first placed on a strict water diet for four days to allow them to become de-adapted. Afterward, only one food at a time was introduced, allowing the patients to act as their own controls. Some foods triggered asthma in certain patients, and these food reactions were unique to each patient.

Testing for sensitivity to extremely dilute chemicals was done sublingually in a double-blind manner, and some patients reacted with asthma to certain chemicals while others did not. Yet another doctor suggested that gelatine capsules containing a single food could be used to double-blind the food experiments.

When asked how he would design a study to prove the total load theory, Dr. Ross replied that such a study would likely require a think tank of research designers and clinicians. However, the total load principle is virtually self-evident in everyday situations, he said, noting that many people reach their threshold and become ill, once they go beyond a certain number of stressors. He gave the example of university students at exam time who are under emotional stress, are not eating or sleeping properly, and succumb to a serious infection. He acknowledged that demonstrating the total load concept scientifically would likely be difficult.

The Medical Work-up of the Environmentally Ill Patient *Gunnar Heuser, M.D., Ph.D.*

“Good morning; *guten Morgen; bonjour*,” began Dr. Heuser, adding that it was “a pleasure to be here with such a distinguished audience.”

Saying that he was approaching MCS from the point of view of a clinical toxicologist, Dr. Heuser said that he sees patients from near and far who have been exposed to chemicals. Despite having already seen numerous doctors who could find nothing wrong, these patients still feel that they are sick. “We listen, and have a test for most symptoms. We take a protocol approach and do a thorough work-up. Almost every one of them has something wrong.”

The potential for chemical injury is acknowledged if the concentration of a given chemical is in excess of government-regulated limits for a specific time interval. However, Dr. Heuser said that although fewer people believe that one can get sick with lower levels of exposure, he does believe in chemical sensitivity and believes that MCS has a physical base. He said that he selected two concepts to cover in the 30 minutes allotted—mast cells and the limbic system. Both affect multiple organs and can manifest in multiple systems complaints.

Dr. Heuser recalled the history of one patient who came to him after repeated admissions to the emergency department at UCLA following exposure to very small amounts of chemicals. Despite testing and avoiding known triggers, she still suffered from very serious reactions. Upon questioning her, Dr. Heuser learned that she had a flushing sensation and a metallic taste in her mouth at the time of her reaction, both of which he knew may be symptoms of a mast cell disorder. Her history of exposure went back to an exposure to pesticides in the 1970s, and she was experiencing multisystem symptoms. A skin biopsy confirmed nests of mast cells in higher than normal concentrations. Suspecting that her son might also be affected, Dr. Heuser tested him as well. He too was positive, and proved to be “exquisitely sensitive to chemicals.”

Suspecting that there might be a connection between MCS and a mast cell disorder, Dr. Heuser contacted experts and support groups. The first issue he read of the *Mastocytosis Chronicles* described the triggers of a young boy with mastocytosis, triggers that sounded very similar to those for MCS. Communication by phone with many mastocytosis patients showed that more than half complained of sensitivity to small doses of chemicals (fumes, perfumes, others). Symptoms of mastocytosis include flushing and many dysfunctions of the central nervous system, and have a very similar symptom complex to that of MCS.

Dr. Heuser showed a slide entitled “Mast Cell Mediators and their Role in Interstitial Cystitis.” He said that elevated levels of one of the prestored mediators, tryptase, supports a diagnosis of mast cell disease. The diagnosis of both mast cell disorder and MCS has been confirmed by means of skin biopsies for close to 20 patients, a number that Dr. Heuser said was significant. When he attended a support group for those suffering from mastocytosis, Dr. Heuser said he noticed a button on display advocating a perfume-free environment, and was struck by how chemically sensitive mast cell patients are.

Dr. Heuser, who received his Ph.D. in Montreal under Dr. Hans Selye, author of a textbook on mast cells, said that he has now come full circle in his research. He urged others to allow for the possibility that those with MCS may in fact have mastocytosis, or at least a mast cell disorder.

The limbic system provides easy access to the brain when chemicals are inhaled. When one inhales through the nose, the little nerves in the roof of the nose—which Heuser described as “dangling in the wind”—pick up the chemical and, if the protective detoxification function of the mucosa fails, that chemical has easy access to the brain. The message will go through the olfactory bulb, which provides a pathway to the limbic system.

Dr. Heuser said the University of California at Irvine (UCI) has developed a baseline of over 60 normal PET (positron emission tomography) scans, answering the need for a control group. Twenty of Dr. Heuser’s patients have had PET scans at their own expense, and all were shown to

be “exquisitely sensitive to chemicals.” The scans he showed depicted abnormalities in colour. Blue showed a decreased metabolism and uptake of glucose and was present in the cortical areas. Yellow and red indicated an increased uptake of glucose. The slides showed a decreased metabolism in the periphery and an increased metabolism (or “hot” area) in the limbic and brain stem areas. Tests on the most severe patients showed a “striking imbalance between hot and cold.”

All of this shows that the amygdala (part of the limbic system) is hot, and not normal, commented Dr. Heuser. Olfactory stimuli from the olfactory bulb travel to the extended amygdala complex (EAC), which functions as a way station to other structures, including the hypothalamus. Visual, auditory, somatosensory, and other sensory inputs acquire emotional significance by being interpreted in the EAC, which controls reactions of fear and other strong emotions. Dr. Heuser said that a number of his patients “fall apart,” and have a dramatic reaction when exposed to chemicals. He recounted that in an experiment, a patient with epilepsy had a seizure triggered by a discharge from the amygdala and displayed a panic reaction. He suggested that perhaps the reason that some patients with MCS are so emotional is that their emotional reactions are linked to a discharge deep down in the amygdala.

The EAC is one of the most easily kindled structures in the brain, and once kindled, the resultant changes in EAC function are long term. Experiments with animals showed that when given low-level electrical shocks there was no reaction at first. After close to 20 doses, some animals react with grand mal seizures after the same low-level electrical shock. That is kindling, a process that can take place with chemicals, as well. EAC function has been shown to play a significant role in kindling in animals exposed to pesticides, xylene, and other chemicals.

In summary, Dr. Heuser said that mast cells and/or the limbic system and its connections appear to play a significant role in patients with MCS. Although their potential interaction remains to be studied, he said he was confident that one day it will be.

Dr. Heuser said that as he is in private practice he receives no grants for his research and can only acknowledge his patients. He expressed a debt of gratitude to his wife, Sylvia, who helped to put this presentation together. “*Merci beaucoup. C’était un grand plaisir d’être ici aujourd’hui,*” he said in conclusion.

Questions and Comments

Saying that he wanted to turn his attention to neurodiagnostic imaging, a doctor asked if it had been validated. He also asked about the baseline, and suggested that findings were concurrent with that of an anxiety disorder. He asked if there was a control group.

Dr. Heuser replied that UCI is one of the few centres with a control population.

Dr. Ross noted that Dr. Simon will discuss control groups later on at this conference.

International Developments in the Recognition of the Effects of Low-Level Chemical Exposures

Nicholas A. Ashford, Ph.D., J.D.

Dr. Ashford began by congratulating the Canadian government for holding this symposium. In contrast, he said, the way the United States has treated its veterans is a “national disgrace.” After taking 20 years to recognise Agent Orange, the best the Gulf War Commission can do is to say they “can’t eliminate with certainty the possibility of a problem.”

Dr. Ashford noted that chemical sensitivity accounts for about 3% of his work. He’s often asked whether he believes in MCS. This is not about belief, he said, but about guessing and testing. His intention is not to persuade anyone that MCS exists, but to put it in context, discuss how it can be approached empirically, and outline where things stand in terms of international recognition.

Dr. Ashford first got involved in this area as a consultant to the New Jersey Department of Environmental Health and Protection. Dr. Ashford said that after initially assessing the area he’d been assigned to study, he’d submitted a two-week consulting estimate for anticipated work. He and his colleague Dr. Claudia Miller, an allergist-immunologist, spent the next two years researching the site without receiving additional financial support. “This area turned out to be a real eye-opener into emerging public health problems,” he said.

As a lawyer and a scientist, he believes in full disclosure, Dr. Ashford said. He and his colleague Dr. Claudia Miller neither accept money nor testify for a patient, which keeps them free “to change our minds and say as we please.”

There is mounting evidence that human exposure to chemicals at low levels once thought to be safe is now linked with adverse biological effects, including endocrine disruption, chemical sensitivity, and cancer. These health effects could be related. Endocrine disruption can make the fetus more generally susceptible to cancer. These effects quite possibly emerge from an underlying process of toxicant-induced loss of tolerance (TILT) that results in a number of different diseases, one of which is MCS. Furthermore, the better we understand cancer, the more we understand the effects of low-level exposures. Dr. Ashford remarked that a modern revision of Paracelsus’s statement, “The dose makes the poison” might be, “The host *plus* the dose makes the poison.” Humans in their developing state warrant special consideration, in their own right and as sentinel indicators.

While an emerging science associated with low-level exposure is changing how we think of chemicals and health, new theories emerge with difficulty. Not long ago, scientists were convinced that acid caused stomach ulcers. Then a bacterial cause was found, which responds to a two-week course of antibiotics. It took some 20 years from the time the cause was first suggested for this to emerge. “If we can’t deal with an ulcer problem straightforwardly, imagine how we’re trying to struggle with this,” Dr. Ashford said.

Increasingly, evidence links chemicals and autoimmune diseases (including lupus, scleroderma, and rheumatoid arthritis), attention deficit hyperactivity disorder (ADHD), autism (one out of six children in the U.S. has autism, aggression, or ADHD), depression, asthma (which has doubled

in incidence in the last 10 years), and finally chemical sensitivity and its overlaps with sick building syndrome (SBS), chronic fatigue syndrome (CFS), fibromyalgia (FM), toxic encephalopathy, Gulf War syndrome (GWS), etc.

Six common threads provide a new perspective on disease. First, the nature of disease represents a departure from classical disease (e.g., tuberculosis, cardiac problems, etc.) in that communication systems or networks are the target, rather than specific organs (although they are ultimately affected). These networks include the endocrine, immune, and the neurological systems, all of which are mediated by the brain.

Second, no single cause has been identified, nor are there clear biomarkers for exposure or disease. Without these, classic epidemiology is unable to identify susceptible or sensitive subgroups.

Third, these emerging diseases are characterized by a multi-stage disease process, becoming manifest after two or more stages occur. Just as with cancer or infectious disease, there is “no evidence of a single disease entity” for MCS. We’re coming to believe, Dr. Ashford said, that MCS is a *class* of diseases. The distinction between a single disease entity and a class of diseases is crucially important. Imagine trying to distinguish between diphtheria and AIDS before infectious disease was understood. Physicians at the time could quite easily and correctly have said, “There is no evidence of a single disease entity.”

In many cancers, he continued, an initiation and alteration of the basic DNA/RNA structure is followed by a promotion to a recognized cancer. Similarly, TILT is postulated to have two stages: the original exposure to high levels (or repeated exposure to lower levels) of an initiating agent, followed by a triggering of symptoms by chemicals at everyday levels that don’t affect most people. Without knowing that the first step has taken place, one might think the cause is perfume, for example. “With MCS, we have unfortunately been concerned by the triggers,” said Dr. Ashford. “If we would focus on the initiating cause, we could eliminate many of the problems.”

The fourth common thread is time and timing. In cancer, the time from initiating cause to disease is measured in decades. Similarly with asbestos, only time ultimately revealed the relationship between cause and disease. That we can’t find an unequivocal causal relationship between chemical exposures and MCS doesn’t mean that one doesn’t exist. Part of the problem may be a focus on triggers rather than initiators. Also, the timing of initial doses is important. Smaller doses timed strategically can lead to a pathological loss of tolerance. There are animal models in which this is very clear, in work on time-dependent sensitization, Dr. Ashford said.

The apparent departure from classical explanations for disease is the fifth thread. Classically, a linear relationship would be expected between dose and response. Toxicological and epidemiological models are premised on single agents causing increasing levels of disease in a regular way. That does not explain *these* diseases. There is not a monotonic relationship between dose and response.

The final thread is that the underlying disease processes appear to differ from those underlying classical diseases. Endocrine disruption occurs at levels three to six orders of magnitude lower than what are traditionally associated with toxic effects. Furthermore, the disease processes underlying these emerging diseases may be interrelated. Endocrine disruption leads to immune system problems, which leads to cancer. It's not that endocrine disrupters directly cause cancer, but if they allow more receptors to be set up in the breast or prostate, for example, individuals become more susceptible to cancer.

Dr. Ashford said he and Dr. Miller have reviewed the psychogenic, psychological, and physiological literature. The main difference between the second edition of their book (1998) and the first (1991) is that more than twice as much literature was published on the subject—and in peer-reviewed journals—in the intervening seven years than in the previous fifty. Mainstream science is now looking seriously at the pieces of the puzzle.

However, Dr. Ashford said, the three dimensions of disease—causes (physiological or psychogenic), symptoms, and the success or failure of interventions—are confused in the literature. He said that he hoped his voice would remain in attendees' heads, whispering: "Is this author mixing up the success of psychological intervention with psychogenic cause?" Even though women with breast cancer live twice as long if they belong to a psychological support group, he said, that does not mean the disease is psychogenic. Likewise a psychological illness may respond to chemical treatment. "Advocates of the psychogenic origin of MCS sometimes deliberately obfuscate these three dimensions of disease," Dr. Ashford said.

TILT suggests a step that causes the loss of tolerance, with manifestations labelled in different ways, including MCS, ADHD, depression, or mast cell problems, Dr. Ashford said. Dr. Mark Cullen, who first defined MCS, eliminated diagnoses like asthma and rhinitis from the MCS category. "If one eliminates these symptom-disease complexes because they can be described by a diagnostic label, all you have at the end is the garbage you can't put a label on," said Dr. Ashford. "Then you have the most complicated patients, those with both physiological and psychological problems."

Dr. Ashford acknowledged that not only can chemicals change the brain—so does a traumatic event like an automobile accident. However, close scrutiny of the data from the last eight years reveals an overwhelming rejection of psychogenic initiators, and overwhelming support for chemical initiators. If there *were* a psychogenic origin, the amount of effort devoted to uncover it would have been successful. While Dr. Ashford noted that MCS can probably occur psychogenically, "those who see it may do so as a result of patient self-selection and physician bias, in the same way that allergists are self-selected as observers of certain patients."

It would be relatively simple to answer the question, "Are people exquisitely sensitive in a reproducible way?" Double-blind studies could be constructed that would eliminate the possibility of nasal conditioning and detect responses that might occur at levels far below classically recognized amounts, Dr. Ashford said, but it's difficult to get funding for this work. Physician observations are useful if there's a clue to the origin; if all in a group share an experience (e.g., the same neighbourhood or workplace); or in specialists' patients with problems uncharacteristic of general illness.

As a chemist, Dr. Ashford said, he respects correlations. With disease outbreaks, or new building or consumer products, those with the same experience can be followed in a timely manner. There is statistically significant agreement in the rank ordering of symptoms by Gulf War veterans and by those claiming to have been made chemically sensitive from either pesticide exposure or from home remodelling activity. Characterizing MCS as psychosomatic does not explain this consistent ranking in three diverse groups. For discovery purposes, it's better to follow people who have experienced the same event than to study patients with similar symptoms. "You can't do it by looking at who's sitting in your waiting room," said Dr. Ashford. You have to follow previously exposed cohorts (i.e., do event-driven research) or work up selected persons in a common environment.

Dr. Ashford added that before and after challenges must also be done. "I accept that MCS patients have abnormal brains," he said. "But what did their brain scans look like before?"

Finally, animal models may clarify the mechanisms for chemical sensitivity. "People don't read the literature," Dr. Ashford said. "'The science isn't there' means 'I haven't read it.'"

Prevention cannot wait. The number of substances that cause the initial conditioning and sensitizing is much smaller than the number of substances that later act as triggers. "Go to the *source* of the problem," he advised.

Dr. Ashford then mentioned the 1985 Thomson report ("still good reading"); his own New Jersey report, which was designed to be an objective evaluation of the then existing research; and a European study that found little MCS in southern Denmark, and a lot in neighbouring northern Germany, where pentachlorophenol wood preservative is used and a where disorder has been termed "wood preservative syndrome."

A 1999 United Kingdom health executive report concluded that while there was no unequivocal epidemiological evidence, "the collated evidence suggests that MCS *does* exist." It also states that "the available evidence seems most strongly to support a physical mechanism involving the sensitization of part of the midbrain known as the limbic system." In striking contrast, the recently released US report does not review literature past 1995 and is generally uncritical of the literature it did select to review.

The Dutch have also issued a report on MCS, but their experience with neurotoxic problems resulting from a notorious plane crash in Holland was suppressed. The report concluded that no objective evidence connected exposure and disease—"Of course not," Dr. Ashford said. "No one's done the studies!" MCS can't be looked at through the lens of traditional toxicology. Good peer-reviewed science must be done.

The evidence for a physiological basis has been strengthened over the last ten years, while the evidence for a psychogenic cause has not. The gestalt of the evidence confirms the obvious, as in global warming and mad cow disease (bovine spongiform encephalopathy, or BSE). A precautionary approach is needed. "You don't need ironclad evidence when a variety of disparate compass needles are all pointing in the same direction. In my 30 years in the area of

environmental health, I see that in *no* case have we been wrong about environmental problems. The problem either got worse, or the evidence became stronger. Only the most robust environmental and occupational problems ever get noticed: “*That’s* why we’ve never been wrong,” Dr. Ashford concluded.

Questions and comments

A participant from the Institute of Molecular Medicine spoke of the Bijl-mer crash in Holland. “We looked at three groups of patients,” he said—those living in the area, emergency personnel, and a group with no connection to the crash site who worked in the hangar where the remnants of the plane were reassembled. All came down with the same types of illnesses. Forty tons of cargo, which was never identified, was on its way to an Israeli government chemical warfare centre. Of the patients, 67% had chronic infections and fit the profile for CFS, as did a group located some kilometres distant. But while different types of infection were found in the control group, only one infection was found in all three Bijl-mer groups. Likewise, the percentage of Gulf War vets who test positive for infection is similar to civilians with CFS and MCS, where you find multiple species of infection. But 80% of Gulf War vets had the *same* infection. A lot of information is being withheld. This causes tremendous problems in identifying what’s causing the illness.

Neurotoxicity and Single Photon Emission Computed Tomography

Theodore R. Simon, M.D.

Dr. Theodore R. Simon began by taking Dr. Ashford’s “full disclosure” cue. He does testify for plaintiffs or defendants, though rarely, he said and, like Dr. Ashford, spends a “diminishingly small” portion of his time on MCS cases.

Dr. Simon said that he would explain how SPECT scans are used to confirm a diagnosis of MCS, CFS, or FM. SPECT is a huge umbrella, he said, adding that he would be talking about a particular test involving the localized distribution of radio tracers. A machine with three heads is used for its sensitivity, which is important when measuring counts. The machine’s moving parts (the size of a Volkswagen beetle) can be positioned to within a tenth of a centimetre in space.

A post-doctoral candidate used this particular protocol in her thesis for obtaining normal controls. These are hard to obtain, Dr. Simon said, and because they give him confidence in the data, he does not change the protocol. However, his images look similar to those obtained by a nuclear medicine physician who uses a different technique.

Before he knew anything about MCS, Dr. Simon said, there was interest in CFS. SPECT scans revealed a pattern a bit different from what is generally seen in neurotoxicity patients. SPECT stands for single photon emission computed tomography. It differs from PET scanning—another functional imaging technique—in which a positronium molecule or atom is created, which sends out gamma rays in almost opposite directions—thus, “dual photon.” A single photon travels in one direction.

Dr. Simon showed some slides of the machine. Electromagnetic fields, the amount of light, and the amount of sound inside the machine are all measured. “It’s over-controlled, if that’s

possible,” said Dr. Simon. So is the way the patient is prepared. The tracer is delivered with a Harvard pump, and precisely measured.

Dr. Simon explained that if a tracer is used to look at a large cardiac infarction, a donut shape will be seen, because the tissue at the centre is dead and does not see the tracer. This is why these are called “donut lesions.” The extraction fraction times the amount of activity delivered is seen; thus one has to know how much material has been presented, and how it was delivered.

Dr. Simon showed an “ancient” brain scan from a schizophrenic patient, at a time around fifteen years ago when scans were used to look at regional cerebral blood flow (rCBF). “This is the case that caused all my problems,” he said. He pointed out a cold area at an arterial-venous malformation (AVM). “They don’t have low flow,” Dr. Simon said. When he repeated the scan with xenon, a true blood-flow agent, the area that had been cold with the rCBF agent was bright. “I went back to the literature. The papers that had introduced this tracer said that it goes to glutathione,” Dr. Simon said. Glutathione is a “garbage collector”—i.e., it has a function. “AVMs have no function, they are pipes that deliver blood. It makes sense.”

Although this patient told the psychologist on the case that he was normal, he had inhaled Scotchguard over the weekend, and seemed obviously different. The psychologist asked Dr. Simon to do a scan. “It was the most abnormal brain scan I’d seen to that point,” said Dr. Simon. “But now I’ve got troubles: I can’t explain it.” His questions led him to patients with toxic exposures.

Dr. Simon described how the agent, [technetium-99m]exametazime, when injected into the blood, goes to the fat of the brain. There it encounters glutathione, which traps it by changing it from a fatty into a watery material. That is why it can be seen on the scans.

Dr. Simon then explained why the slides show two sets of pictures, one with a 64 x 64 matrix; the other 120 x 128. The smaller set must be taken within two minutes. The larger images are taken after the material has entered the brain and stuck there. “I’ve been very careful to use the same colours, etc.,” said Dr. Simon. “It’s fairer to show different sizes than to change the manipulation of the data.” The two sets of photos represent the early phase (predominantly flow) and the later phase (predominantly function).

This can be quantified, Dr. Simon said, by drawing wedges, and counting. In these slides, the images are back-projected onto a plane parallel to the canthomeatal plane, in a series of slices moving from bottom to top. He pointed out “punctate stuff” in the image in an area that is supposed to be smooth.

The pattern has four parts, he said:

- ∃ *a mismatch of flow versus function* (because tracer isn’t getting stuck in the brain by glutathione);
- ∃ “*salt and pepper*” (areas of increased and decreased activity);
- ∃ *shunting to soft tissues* (80% to 85% of the tracer should stay in the brain. What doesn’t encounter glutathione comes out again and will be seen in the soft tissues.); and
- ∃ *temporal asymmetry* (This should be less than 5%, “but we see *huge* asymmetry.”).

Dr. Simon explained that the top two lines on the next slide were in the transaxial (canthomeatal) plane, with the small images showing flow and the large ones, function. Two rows of sagittal views (left to right) again show flow and function, as do two rows of coronal views (front to back). Dr. Simon pointed out the mismatch between the small and big images. “We’re most of the way to neurotoxicity,” he said. “We see some salt and pepper, some shunting.”

A sequence of different scans illustrated the pattern. A normal scan is symmetric and homogenous, with the same density of activity in both sides. A patient who is very sick clinically will have less activity than the controls because the tracer diffuses out of the brain again, leaving a lower count. “We’re seeing significant differences between sick and normal patients,” said Dr. Simon, showing a slide on which this difference was quantified: 8,154,147 versus 17,549,354 counts.

Dr. Simon then showed a sequence of slides from patients with different kinds of problems, ranging from solvents to unspecified materials to pesticides. He mentioned that subgroups have not yet been defined, “although we have thoughts about them.” He showed slides from a Gulf War patient and a breast-implant patient, noting that they didn’t differ much.

“What is the effect of using patients as their own controls?” Dr. Simon asked. Patients get significantly more abnormal when challenged, and significantly better with therapy. Showing slides taken before and after therapy, Dr. Simon noted that while “you can recognize neurotoxic patients, the scans look better with treatment.” This involves taking patients out of their environments and detoxifying them with saunas, etc.

Questions and comments

When asked how the controls were chosen, Dr. Simon answered that they were “fanatically assembled” by a Ph.D. candidate. After psychological, medical, and social histories were taken, patients were recruited according to age and gender requirements. While Dr. Simon read the scans and identified in which patients the pattern was present, he was not told their diagnoses or “who was being slipped through when.” Dr. Simon said, “I never *did* crack the code, because I don’t think it’s right.” Imaging with other agents follows the same pattern, whether glutathione, blood flow, or glucose metabolism is followed—all yield hot and cold spots, diffuse cortical involvement, etc. “We’re all looking at the same image, through different windows,” Dr. Simon said.

Asked how many MCS patients he’s scanned, Dr. Simon responded that he’d stopped counting at 3,000 or 4,000, 90% to 93% of which were evaluated as neurotoxic. “Dr. William Rea found a high correlation between a positive Romberg sign and a positive brain scan.” Dr. Simon repeated that this pattern is different from those seen in seizures and other psychological diseases.

Responding to a question about acute neurotoxic injury, Dr. Simon explained that the material used in this test works slowly and is very expensive. A scan might be done at the time of insult or presentation, then six months later, and only as a deliberate attempt to get at the bottom of what’s wrong. “‘When she’s wrecked I’ll do the SPECT,’” he quoted. “That’s a long way of

saying we don't do acute patients. This is not a first-line defence." Long-term, he added, "I haven't gotten anyone who's gone back to normal, but I have seen significant improvement."

Dr. Simon was asked how saunas work to detoxify patients, but answered that he doesn't know what in the environmental doctor's therapeutic arsenal might be responsible, only that the patient improved. A participant explained that chemically contaminated patients have often used up their glutathione in detoxification. The body makes it from three amino acids, glycine, phenylalanine, and cystine. Often cystine levels are found to be depleted, thus the body can't make glutathione, and its detoxification ability is impaired. One treatment modality is intravenous glutathione, which the speaker said is marvellously effective.

MCS: The Rise of a Pseudodisease
Edward Shorter, PhD.

Dr. Shorter began his presentation with a slide showing a patient with pelvic tuberculosis. He used the disease as an example of physicians' ease with diseases that have always existed and their tendency for suspicion of new diseases. The general presumption should be wariness.

He spoke of the recent explosion of disabilities such as CFS, carpal tunnel syndrome (CTS), and SBS, adding that AIDS is obviously different. He illustrated his discussion of these disabilities with slides showing news reports of a worker bedridden by temporomandibular joint dysfunction and a lace maker disabled by CFS. He referred to an "illness attributions" epidemic over the last two decades.

Clemence von Pirquet, the Viennese doctor, coined the term "allergy," beginning with food allergies. He explained connections between food and illness as immunological mechanisms and claimed to speak with the voice of science. From the early 1920s vague symptoms were explained as food allergies. They were "asthma equivalents" and therefore as dangerous. "There was a whiff of alternative science already in the air," said Dr. Shorter.

Albert H. Rowe of the University of California argued in 1928 that food allergies were underdiagnosed. He said that skin tests were deemed unreliable, because patients failed the tests. He linked symptoms to diagnosis; for example, if patients throw up after eating pancakes, they must be allergic to them. Dr. Rinkle, another early specialist in food allergies, depended more on patient history for diagnosis of allergies.

The food allergy movement had one good scientist, Dr. Arthur F. Coca. He founded the *Journal of Immunology*, and was an illustrious scientific figure. In the late 1930s he fell into the "quicksand" of food allergies and in 1943 wrote a book on them. His views lent credence to the view that food allergies are responsible for much misery. Theron Randolph was his student in the 1940s. He launched the clinical ecology movement and his views became marginal to mainstream medicine. William Crook discovered the dangers of total body yeast infection, and the concept ballooned, with millions of people terrified that science stood behind such disabilities.

Returning to Randolph, Dr. Shorter gave a brief history of his career, noting that he became absorbed in his wife Tудie's symptoms. She later developed a real organic disease and Randolph told Dr. Shorter that she had forgotten about her MCS. Although Randolph reported her case at a meeting in 1952, which became the launch of MCS, it was not immediately accepted. During his treatment of patients with MCS, he declared the gas kitchen range dangerous and was responsible for the removal of over 800 of them from patients' kitchens. In 1958 Randolph used the word "ecology" publicly for the first time. At that time, when he wrote the founding document of the chemical sensitivity movement, he broke with the food allergies movement. From 1965 Randolph organized the clinical ecology movement and was not happy with the 1984 change of terminology to "environmental medicine."

Dr. Shorter asked what permitted these ideas to radiate to other doctors and the general public. He said that there has always been chemical pollution. Inorganic chemicals have been around for about 100 years—formaldehyde since 1867, and coal tar and natural gas for longer. The skies of industrial England were black. Many workers could have been expected to have symptoms of MCS, yet they did not complain. The chronically miserable people were the fashionable middle-aged ladies—*les dames ► chaises longues*—but they never blamed their symptoms on chemicals. It was only after the 1960s that concerns met epidemic proportions. The causes for this should be divided between manifest and latent ones. In the late 1960s a poll showed that 62% of Americans were concerned about the environment. Another poll showed that Canadians feared artificially manufactured chemicals more than natural ones. The massive social changes during the 1960s changed the nature of family life, which affected physical perceptions. In the past family discussions were more common. Tiredness and pain could be placed in the feedback loop of family experience. At present, half the households in Manhattan are one-person households. The television will assure these people of the existence of CFS or MCS and therefore people are somatically vigilant. At the same time, the doctor-patient relationship has changed. Doctors are perceived to have become more arrogant, more remote—"Why not drop in when you're feeling better?" People flee to alternative medicine. Their anger at the arrogance makes them less receptive to reassurance. The media's thirst for new diseases has staged a "psycho-circus" of suggestion. Without it, MCS would not have made its way into the world and taken over from CFS as it has.

There are similarities between GWS and MCS. There is the same media-inspired suggestion. Patients are convinced of the organicity of their complaints. They find the skepticism of the medical community offensive. They still have the right to be taken seriously; it is a question of spin control. But spin control in a medical context means the therapeutic use of the doctor-patient relationship. Another similarity is the political potency, which is probably the reason for this conference.

Speaking of the management of MCS, Dr. Shorter said that people do move on—that's the good news—to discover other pseudodiseases. Even true believers in MCS are sensitive to the weight of evidence. All the great psychosomatic illnesses are abandoned once the weight of evidence makes them look bad. That is the march of science.

Questions and comments

Dr. Ashford commented that Dr. Shorter's presentation was entertaining, if nothing else. He asked if Dr. Shorter believed that sick building syndrome, as defined by Scandinavian research, falls into the category of pseudodiseases. He also asked where the scientific basis was for Dr. Shorter's opinion. Dr. Shorter responded that he is speaking as a historian and the historic perspective is an illuminating one. The agenda is driven by public fears and by physicians wanting to carve market niches. "If science were allowed to drive the agenda," said Dr. Shorter, "we wouldn't be here today." In response to the first question, he said that SBS was propagated by the media.

A participant commented that, with regard to Randolph's removal of gas ranges, they are now shown to be important triggers of asthma. He asked whether Dr. Shorter had ever met Theron Randolph. Dr. Shorter responded that he had not. The participant said he wished to point out the "insulting phraseology" of his anecdote of Mrs. Randolph's "forgetting" about having MCS. In fact, she suffered from Alzheimer's disease in the years leading up to her death. Dr. Shorter replied that Theron Randolph had said in an interview that she also had a grave organic illness and intimated that it was cancer.

Exploring the Complex Relationship to the Immune System

Emil J. Bardana, Jr., M.D.

Dr. Bardana stated that although he is an academic, he sees patients and works mainly with people. He has seen hundreds of occupational illnesses, including problems related to indoor air quality. He said, in the spirit of disclosure, that he has to charge for everything he does for patients and to testify in court. The University of Oregon medical plan requires that every penny he earns goes to the Oregon Health Services, and Dr. Bardana earns a salary—"I am not a volunteer in life." He deplores Dr. Ashford's comment about how the American veterans were treated by the U.S. government. Dr. Bardana has respect for veterans; however Dr. Ashford's comments were unpatriotic.

Dr. Bardana quoted Winston Churchill's comment on Russia—"A riddle wrapped in a mystery inside an enigma." It applies to MCS, he said.

He said he would focus on the issues of immunology. There would not be time to cover the science behind what he was about to say. He would provide a syllabus with key references that would be important to read. The references should not be measured by number or by weight, but by quality.

Theron Randolph, who founded the Society for Clinical Ecology in 1965, first discussed MCS in the 1950s. MCS is now covered by the American social security system, and with the emergence of the American legal system, is the focus of much litigation.

It is a matter of trigger versus cause. Triggers are often pointed to as the actual causes. Dr. Bardana said there has been a vast amount of literature on this. Idiopathic environmental intolerance (IEI) is a better descriptor. Dr. Bardana said he would not disagree that chemical sensitivity actually occurs. There are such diseases that occur, but none of them applies to MCS. The theory of the total toxic load on the body is a concept so simple that it almost demands

acceptance. But it is an interesting theory with no back-up. All these things can happen, but it is like comparing apples and oranges. There is no scientific basis for MCS. He urged the audience to read the literature.

Dr. Bardana listed six parameters to study whether MCS is a true disease.

1. *Clinical features*

- ⊘ The symptom complex is usually presented as one with multiple symptoms, which are self-declared.
- ⊘ There is no homogeneity of the symptom complex.
- ⊘ Even some individuals without symptoms have been identified as having MCS.
- ⊘ Complaints are extremely variable and include recognized diseases such as asthma, migraine, bronchitis, etc, into the symptom complex referred to as MCS.
- ⊘ Hence, MCS cannot be defined as a disease using the usual clinical criteria.
- ⊘ One is entirely dependent on a claim of “environmental exposure” rather than a defined clinical presentation.
- ⊘ This self-declared approach results in any possible combination of air, food, or water in any amount and duration as a potential causative agent. The majority come in a litigation setting.

2. *Pathology*

- ⊘ There is an absence of clinicopathologic correlates to MCS in the literature.
- ⊘ The proponents of MCS claim the literature is replete with citations to the direct toxic effect of environmental agents, but do not cite histopathologic studies of MCS patients.

3. *Immunopathogenesis*

- ⊘ Hypersensitivity model: There is no evidence that MCS patients have specific antibodies to a vast array of environmental chemicals.
- ⊘ Autoimmune model: Currently there is no proven etiology for the well-accepted forms of autoimmune diseases.
- ⊘ Immunotoxic model: has not been demonstrated in patients with MCS.

Currently 25% of people could be found to have abnormalities. There are no consistent abnormalities in MCS sufferers. Smoking is clearly bad for people. It causes cancer and cardiovascular disease. MCS could be expected to be involved in smokers; in fact all smokers should be MCS patients.

4. *Laboratory Biomarkers of MCS*

- ⊘ Serum immunoglobulin levels are normal.
- ⊘ Circulating complement components are generally within normal limits.
- ⊘ Measurements of both T and B lymphocyte subsets fall within a normal range in most patients.
- ⊘ In reputable laboratories, antibodies to various chemicals (e.g. formaldehyde, trimellitic anhydride, isocyanate) are not consistently detected in MCS patients.
- ⊘ The diagnosis of an immunodeficiency disorder, hypersensitivity disorder, or an autoimmune disease requires both relevant clinical and laboratory data.

5. *Diagnostic Methodology*

- ☐ Self-declaration is always present.
- ☐ Practitioners do not use controlled diagnostic procedures.
- ☐ Galileo said, “If we look long enough, we will find the answer,” but we will not, because the studies are not worth doing.
- ☐ Everyone has pesticide such as DDT and a variety of chemicals in their systems. What does that mean? Chemicals are ingested. Do they cause illness?
- ☐ Diagnosis is often based on clinical presentation. Brain fog is a currently popular symptom. Dr. Bardana said he has brain fog every morning before his cappuccino.
- ☐ There are no objective laboratory tests.
- ☐ Dr. Bardana prefers the new name IEI.

6. *The Natural Course of the Disease*

- ☐ There is an absence of published reports describing the disease; no good data.
- ☐ MCS is like a toxic agoraphobia.

Dr. Bardana commented that most MCS patients have past experiences of psychopathology such as panic disorders and anxiety attacks. Dr. Ross suggested that the idea of MCS could cause psychosomatic illness. MCS overlaps with other syndromes. SBS is often diagnosed when looking for a cause for symptoms that cannot be found. It is often added to other illnesses. CFS/myalgic encephalomyelitis, SBS, and FM are all variations on a theme. The pitfalls in making diagnoses include a failure to recognize an explanatory pre-existing disease, and the fact that the doctor wishes to please his or her patient.

The impacts of MCS are tremendous. It has a significant effect on society. There are ramifications for science, the media, politics, and the individual. There is a need to relate better to patients, but with regard to veterans, doctors have to be honest and compassionate but not foolish. Dr. Bardana said that Dr. Shorter made a good point when he said we do not know what to call this disease. In fact it is not a disease—it is a complex that cannot be defined. It is inconsistent with the laws of chemistry and physics. The American Academy of Allergy and Immunology says that MCS is poorly defined. Dr. Bardana referred the audience to the abstract of his paper. He urged the audience to keep an open mind, but not so open that their brains fall out.

Questions and comments

In the question period, Dr. Ashford said that he respects Dr. Bardana’s work, and that he and Dr. Bardana are closer in their views than one might think. However, he said it is difficult to know how to rationalize Dr. Bardana’s authoritative presentation with what was said about MCS during the morning. When one looks through the lens of immunology, there may not be a strong case for MCS. However, resolving the origins of MCS does not come down to a choice between immunological and psychogenic causes.

Dr. Ashford said that the discovery of germs and viruses put infectious diseases “on the screen,” but they could not be diagnosed at first. Of course it is difficult to make sense of MCS. He also

said he wishes people would stop using the term “idiopathic.” It is not a consensus term. “Let’s stop playing games and try to educate the College,” he said. He finished by advising Dr. Bardana that he should separate his opinion from his good science.

Dr. Bardana responded that he had given his opinions as a clinician and Dr. Ashford could take them or leave them. With regard to the term “idiopathic,” he uses it as it is used in the United States. In courts of law there is never an issue that a disease is not known; the issue is the cause. “I still believe what I believe; I hope I am a good immunologist,” he said.

Maggie Meyer spoke from the point of view of someone who has had “this non-illness.” Two and a half to three years ago she suffered with CFS and FM and lost everything. She is familiar with all the symptoms and has learned a lot in the course of her many treatments. She reminded the participants that they are speaking of people, and said that she hoped the experts could get past their differences and work together. The focus of these two days should be on how to help people return to health, rather than on spending the time wrangling.

Dr. Bardana responded that he did not disagree. “Sometimes we can get people out of a system of beliefs,” he said.

Dr. Ross commented on Dr. Terr’s review of 50 cases of which only two recovered, which is mentioned in Dr. Bardana’s paper. It is important to know that all the cases were compensation cases. Further, he made a comment about Dr. Leznoff’s study, also mentioned in Dr. Bardana’s paper. He said that a reaction to hair spray that was interpreted as a panic attack could also be interpreted as having proved chemical sensitivity.

A comment was made about Dr. Bardana’s joking remark about brain fog. There is a substantial body of double-blind experiments of patients being exposed to chemicals below the detection limit. A study was mentioned in which a kiosk was set up outside a sick building. Passersby who volunteered to be tested on the air from the building showed neurocognitive deficits. Dr. Bardana responded by suggesting that participants read the studies carefully and judge them by their quality. There are only a few good ones.

Dr. Scott stated that no one believes that patients with MCS are not unwell. It is accepted that they have disabling complaints that affect their lives. They suffer. The conference was called to move beyond the fact that patients are unwell. Dr. Scott said he has made several trips to bases across Canada, and is able to compare them with the civilian world. He believes that the military has some of the best physicians in the country—75% of them graduate in the top percentage of their class. The purpose of this conference is to provide a forum in which military physicians can listen to the internationally reputed presenters in order to form their own opinions.

Position Paper of the College of Occupational and Environmental Medicine
Robert McCunney, M.D.

Dr. McCunney commended Dr. Scott on putting together such an esteemed group of panellists. “I have developed programs such as this, and it is not easy to provide a balanced perspective,” he said, adding that he was at the conference to present a position paper developed by the American

College of Occupational and Environmental Medicine (ACOEM). As a clinician, he is well aware of patients who come with symptoms and complaints, wanting a diagnosis and treatment. In his presentation, he will describe the ACOEM, the process it uses to arrive at a position paper, the nature of MCS, clinical evaluation, research needs, and a nomenclature, he said.

The ACOEM was established over 80 years ago and has as its focus the prevention of illness due to exposure to occupational and environmental hazards. Its origins are in rail, trucking, and heavy industry. In the 1930s those involved in occupational medicine became aware of hazards related to silica exposure; during World War II the concern was ergonomics, and the primary focus now is low-level exposure to certain compounds and the risk of cancer. Occupational and environmental health was designated as a specialty in 1954. Demographics show that 50% of its members are private practitioners, 20% practice in corporate settings, and the remaining 30% are divided among government, academia, the military, and consulting.

In 1991, Dr. McCunney and a number of his colleagues coauthored a position paper for ACOEM on MCS. The most recent position paper, released in April 1999, was authored by committees, although Dr. McCunney was president of the College at its release. He described the process as being similar to that of other professional societies: The prerequisite of consensus necessitates seeking the middle ground. Position papers are initiated in committees, and in this instance it was the chair of the Environmental Medicine Committee who wanted to revisit the topic of MCS. The paper was drafted and approved by the Environmental Medicine Committee, then submitted to the Council on Scientific Affairs for its approval, then to the Board Committee on Policy and Public Position, and finally, to the Board of Directors, a process that took a year. Others not involved in the various committees may comment on the document, but at all stages consensus is essential. Once the paper is fully approved, there is a press release, publication in a journal, and posting to the Web site www.ACOEM.org.

The ACOEM states that MCS refers to multiorgan symptoms that are attributed to low-level exposure to chemical, physical, and biological agents. There have been no consistent physical or laboratory findings noted. Immunological deficits have not been identified and, indeed, most researchers have concluded that the immune system is not at play. Finally, the evidence that would identify MCS as a distinct clinical entity is not available. Double-blind and placebo-control studies have not shown that chemicals are responsible for the symptoms presented.

Due to uncertainties about the etiology and pathophysiology of the condition, ACOEM feels that the term IEI more accurately reflects the current state of knowledge of the condition. Dr. McCunney said that allergists were the first to come up with this term at a conference in Berlin four years ago. The ACOEM has taken the position that a uniform case definition is lacking for IEI. There is no evidence that would support an immunological base for the disorder, and IEI appears to overlap with CFS and FM.

Some research on IEI and MCS points to an excess of anxiety, depression, and premorbid complaints in some patients. Dr. McCunney acknowledged that some researchers assert that this is a chicken-and-egg scenario, saying that anyone with MCS would be depressed. "Be that as it may," he commented, "there are some premorbid complaints. As well, a pattern of conditioned

response has been reported.” He gave the example of someone stuck in traffic who attributes a reaction to chemicals, when in fact it can be shown to be a conditioned response to the stimulus.

No one treatment modality has proven to be effective, and Dr. McCunney said that patients come to him having been treated with a variety of modalities, many of them ad hoc. The impact of this disorder on work and lifestyle can be dramatic, and many individuals who have it have applied for disability.

ACOEM advises taking a clinical approach that establishes a therapeutic alliance with a goal of functional restoration. This also includes performing a medical evaluation appropriate to the presenting complaints and physical findings. Dr. McCunney noted that if patients present themselves to non-traditional care providers, classic conditions such as lupus or arthritis can be missed. ACOEM also advises avoiding ineffective, costly, and potentially hazardous unproven diagnostic tests or remedies. If a lab were to take a blood sample from every person in this room, Dr. McCunney said that it would find trace chemicals in each one, but that these results would have dubious significance. “Avoid blanket testing,” he urged.

ACOEM’s suggested clinical approach also involves treating all diagnosable medical and psychological problems. Dr. McCunney acknowledged that it is hard to encourage patients to follow advice for psychological problems—once they hear the word “psychiatrist,” patients suspect the practitioner doubts the veracity of their symptoms. Individualize medical and behavioural coping strategies that a patient feels are useful in managing his or her symptoms. The possibility of a psychological basis does not mean that the symptoms don’t exist; rather, their cause may be different from what the patient thinks it is. Educating the patient about the current state of knowledge about MCS is also important, but “in my experience, understanding varies,” commented Dr. McCunney.

The College strongly supports scientific research into the phenomenon of MCS. Dr. McCunney noted that there is promising work going on at three or four centres with PET scans. Any research should adhere to established principles of scientific inquiry, beginning with a hypothesis and concluding with publication in a peer-reviewed, reputable journal. The similarities between CFS, FM, and MCS point to a need for a cooperative research agenda, although no assumptions should be made that these conditions represent the same phenomenon. Dr. McCunney remarked that there are many different organizations in the U.S. concerned with these disorders, and too often coordination of activities is lacking. As well, research is needed into the societal factors that influence the prevalence and natural course of MCS.

Consensus is needed on a clear case definition that establishes diagnostic criteria and specifies which individuals may be included in a study. Without one, it will be hard to build a knowledge base. Dr. McCunney commented that some proposed case definitions represent an effort in the right direction. Any research must be reproducible by others.

MCS and IEI are prevalent in both the military and the general population. Descriptive epidemiology would be helpful to determine the demographic characteristics, risk factors, and symptom patterns of those affected. Some of this has been done, but it would be helpful to have more. The pathological mechanisms should also be investigated, including a study of the

influence of the central nervous system on response to low-level chemical exposure. Dr. McCunney remarked that discovering the cause is an important step in both protection and prevention.

“First do no harm” is the translation of the Latin medical motto *prima non nocere*, and Dr. McCunney cautioned that long-term outcomes need to be monitored for their effectiveness. The good news is that this condition does not seem to affect mortality or morbidity for other diseases.

ACOEM supports the position that the relationship of MCS to environmental contaminants remains unproven. No scientific basis currently exists for investigating, regulating, or managing the environment with the goal of minimizing the incidence or severity of MCS. However, ACOEM recognizes that indoor air quality problems can exist that cause human illness and discomfort, and it supports the effort of regulatory agencies to provide national indoor air and environmental regulations to minimize risks. There are currently no indoor air quality regulations in the U.S. apart from guidelines of the American Society of Heating, Refrigerating and Air-Conditioning Engineers.

In summary, ACOEM recognizes that some people are severely troubled by MCS/IEI. The College stresses the need for compassionate clinical care, as well as research into the mechanisms, descriptive epidemiology, treatment, and prevention of this disorder. It stands by its position that IEI is a more appropriate term, although Dr. McCunney admitted that the College had received some criticism over this decision. He thanked organizers for the opportunity to present this position paper.

Questions and Comments

A neurologist questioned the ACOEM’s position that there have been “no consistent physical or laboratory findings” published in peer-reviewed journals. She said that the work of Dr. Simon with SPECT scans fulfills this obligation. Dr. McCunney replied that he did mention that there was promising work being done in the area of scans, but that this research was not ready at the time the paper was written. He also said that the SPECT scans show the presence of abnormality during symptoms but do not address the cause.

A conference participant asked if Dr. McCunney was familiar with research published in a British journal of occupational and environmental medicine that makes a strong case for a neurological basis for MCS. The questioner commented the ACOEM would not think about investigating instances of occupational cancer by looking at the promoters, and yet this position paper only looks at the triggers of MCS. Why was the precautionary principle not addressed? He also had a question about the process, asking how many committee members were working for industry, and how many were involved in the Berlin conference.

Dr. McCunney replied that he did not know the answer to the last part of the question, and repeated that College membership was composed of clinicians (50%), corporate medical personnel (20%) and others (30%). He argued that the precautionary principle was addressed, but not head on; rather, it was described under air quality.

Dr. McCunney was asked about his position on SBS. He replied that although the College acknowledges that a compromised indoor air quality can lead to health problems, it has no official position on SBS. He himself is a firm believer that indoor air quality can compromise health, but as president of the College, he felt he should not be involved in writing the position paper. Information about who contributed to the process and who sat on the various committees is public knowledge.

Dr. Ross stated that Canada Mortgage and Housing Corporation commissioned a study of indoor air quality over 12 years ago, and surveyed those identified as being sensitive. The most important factor cited in prevention was clean air. Maberly and Anthony conducted a global outcome study on chemically sensitive patients. The Nova Scotia Environmental Medicine Clinic, of which he was medical director, undertook an intake evaluation of all patients. The government followed with a statistical analysis that was produced as a monograph. Although this was an open, not a closed, study Dr. Ross contends that it was “a good first study.”

Wrap-up

Colonel Ken Scott, M.D.

Dr. Scott thanked participants for their interest, and promised that the debate would continue on the following day. A number of people have reviewed various theories and come to different conclusions. Dr. Scott noted that Dr. Iris Bell was unable to attend the meeting to present her theory of limbic kindling to attendees. He thanked Dr. Ross for summarizing some of the points of this theory in his earlier presentation.

Dr. Scott invited everyone to the barbeque scheduled later in the evening, reminding those not from Canada to bring a jacket. “If you’re not Canadian, you’re not a chosen frozen.”

May 17, 2001

Historical War Syndromes - Their Evaluation and Case Definitions

Captain Kenneth Hyams, M.D.

Dr. Hyams began by referring to a paper he wrote six years ago with Stephen Wignall and Robert Roswell on historical war syndromes, their evaluation and case definition. He said that in 1993 he had been assigned by the Department of Veterans Affairs (DVA) to the Persian Gulf War Veterans Coordinating Board, to coordinate the evaluation of Gulf War health problems. In addressing the question of whether these problems were similar to those after prior wars, he and his colleagues began their research. They wanted to rely on primary sources of information—doctors—so they began with the United States Civil War, as the data available from it was the first that is comparable to modern data.

Dr. Hyams and his colleagues looked at reports from the Civil War of unique illness and found two categories. The first had several names, including irritable heart and Da Costa’s syndrome (after the doctor who evaluated 300 patients suffering from it). It seemed to be a cardiac condition, with symptoms like shortness of breath, but Dr. Da Costa could not find a physiological cause. It was concluded that it was due to strenuous activities and infectious

disease as well as being idiopathic. The second illness was called nostalgia. It was observed in the youngest and least experienced soldiers and was thought to be a situational depression characterized by obsessive thoughts of home and loss of appetite. It was primarily psychological and was treated with home leave.

Examining the data from World War I, Dr. Hyams and his colleagues found two illnesses. The first was Da Costa's syndrome again, also called by several other names, notably effort syndrome. It was a physiologic disease affecting large numbers of troops. The symptoms were similar to those found during the Civil War. It was a problem all during World War I, both for the Allies and for the Germans as well. Its causes were thought to be multiple. The British thought that patients recovered faster if diagnostic labels were avoided. The second illness was termed shell shock and was probably what we now call acute combat stress reaction. By the end of the war, it was recognized as a psychological illness. Its symptoms were dramatic, including blindness, daze, startle response, and paraplegia. There were also somatic symptoms similar to those of effort syndrome. The cause was stress and the treatment was supportive. Again, it was thought to be helpful to avoid diagnostic labels for a faster recovery.

Returning to effort syndrome, Dr. Hyams said that it bears parallels to the problems evaluated in Gulf War veterans. It was the third leading cause of disability in World War I. It received massive government response, with three referral centres established and compensation for disability provided. A massive research effort saw a mail survey conducted several times over the five years after World War I. The research found no increase in mortality in sufferers of effort syndrome. However, there were many unanswered questions, similar to those surrounding Gulf War illness.

Dr. Hyams and his colleagues examined World War II and the Korean War data together, as the data from the Korean War was sparse. Effort syndrome was a problem in Britain at the beginning of World War II. There were no signs, and by 1939 to 1940 it was attributed to psychological factors. The British government enlisted cardiologist Paul Wood, who evaluated 300 soldiers and decided that the cause was psychological, not physiological. After that, effort syndrome "drops off the map." Dr. Hyams noted that combat stress reaction has the same set of symptoms, and also that the U.S. military had orders not to diagnose shell shock or battle fatigue, but rather to attribute symptoms to the natural reaction to extreme stress, in the interests of speedier recoveries and returns to the front.

Research into the Vietnam War revealed two specific illnesses. One was Agent Orange exposure. This differs from the others discussed so far in that there is a known toxic agent; however veterans who may have been exposed had more somatic symptoms than those who had not. Dr. Hyams noted that the "In-Country" effect has arisen since the writing of his paper. The second Vietnam War illness, post traumatic stress disorder (PTSD), became known at this time. It was first termed post-Vietnam syndrome and is defined as a long-term morbidity associated with acute stress. It is associated with the same war-related symptoms.

Research into the Gulf War produced, again, two unexplained illnesses. The first is GWS, with symptoms of fatigue, headache, muscle/joint pain, diarrhea, shortness of breath, chest pain, sleep

disturbance, difficulty concentrating, and forgetfulness. Treatment is supportive. The second illness is adjustment reaction/PTSD.

The conclusion from looking at all the documents reviewed in the study, and seeing the diverse injuries and conditions and the multiple somatic symptoms, is that a diversity of health problems occurs after wars. The major finding is that it was not just psychiatric illness that was seen. Two kinds of illness were seen, one a postulated physiologic disease and the other a psychological illness associated with acute stress, and they had the same set of somatic symptoms. Depending on various factors, a soldier could have been placed in either category.

There are several similarities among the illnesses Dr. Hyams researched. They involve unique populations singled out after exceptional traumatic experiences. Therefore, there can be no adequate control population (not even in the military), and there is a recall bias and a dependence upon retrospective studies. No other group is studied as intensively as veterans. There are two kinds of illness. In the clinical findings, there are no characteristics of physical sign or lab abnormalcy, and there are the shared symptoms of fatigue, shortness of breath, headache, sleep disturbance, forgetfulness, and difficulty concentrating. And finally, there is a long history of government concern for veterans with unexplained symptoms. There are special health care centres, there is a concerted research program (the U.S. has spent \$160 million on Gulf War health questions), and compensation has been provided.

There are two major differences between historical and recent war syndromes. The involvement of family members, perhaps through contact with clothing and equipment, started after Vietnam. Similar psychological symptoms have been experienced by family members. Also, a new research approach was started after the Gulf War, which enumerates and analyses symptoms.

Dr. Hyams displayed several quotations:

- ☒ A quote from the *Lancet* in 1918 used similar language to that describing GWS.
- ☒ Thomas Lewis, in the *British Medical Journal* in 1915, wrote of low-level strep or staph infections that could not be measured in blood. It was the same hypothesis as after the Gulf War.
- ☒ Another quote from Thomas Lewis in 1940 spoke of the possibility of pre-existing conditions and the faulty examination of recruits. While this probably does not explain all unexplained illnesses, it does point out the need for good baseline data. The U.S. has started heeding this now.

Dr. Hyams concluded that unexplained illnesses are not new, and that there are fundamental questions about health and illness, not just for veterans.

He said these syndromes will keep recurring, and he mentioned recent syndromes such as Balkan syndrome, Cambodia syndrome (occurring among the peacekeeping soldiers from the Netherlands) and Chechnya syndrome.

Dr. Hyams spoke of the difficulty in developing case definitions. His conclusion is that specific diagnosis is not possible. Symptoms alone do not provide enough information and these symptoms are really not very well understood. He closed by showing a slide of a Reuters headline from April 1999: "75% of Americans 'Diseased' Under New Definitions". Dr. Hyams said that these illnesses are about the human condition, and are not necessarily unique diseases.

Questions and comments

Dr. Cameron asked whether Dr. Hyams thought that making a diagnosis of PTSD would have a negative effect on the patient's progress. Dr. Hyams said that since there is no current urgency to get patients back to war and since PTSD is not overly diagnosed these days, such a diagnosis may not hurt.

Dr. Miller quoted some research by Spiegelberg that examined workers exposed to chemicals in Germany during the *Wermacht*. She mentioned that they had similar symptoms: delayed effect and intolerances to nicotine and alcohol. This problem was not apparent until after World War II, and synthetic chemicals were not much used before that time. Dr. Hyams agreed with her point but said that the literature was looking for different things before that time.

Dr. Miller pointed out that psychological symptoms do not necessarily have to be psychogenic. Before it was realized that fever could have many different causes, patients were grouped by the characteristics of their fever. Could the same thing be happening with chemical intolerances? It was not until the arrival of germ theory that it was realized that fevers could have different causes.

Dr. Hyams responded that some of Da Costa's subjects were suffering from infectious diseases, but no more than one third.

MCS and Chronic Fatigue Syndrome in British Gulf War Veterans *Steven Reid, M.D.*

Dr. Reid started with a brief background of the deployment of British servicemen and servicewomen in the Gulf War. The 1991 air campaign was followed by the ground war. Reports of illness did not surface until 1993. The Ministry of Defence set up an assessment program and 2,000 cases were reported. A number of symptoms such as chronic fatigue and pain were reported, but no new illnesses. The limitations of this research were that there was no control group and participants were self-selected. So the Gulf War Illness Research Unit at King's College, London, initiated a large-scale study that included a random sample of Gulf War veterans and two other cohorts: veterans of the campaign in Bosnia, and people who served during the Gulf War but were not deployed there. The study took place in two stages. A detailed postal health survey is now complete. Case comparison studies are ongoing.

The questionnaire stage was initiated in the summer of 1997. Dr. Reid showed a slide of the extensive symptom checklist it contained. There was concern about a low response rate, but after three mailings, a better than 60% response was achieved for the whole group, and over 70% for the Gulf War group. It is interesting to note that the early responders reported more symptoms.

The survey found that the British Gulf War veterans were two to three times more likely to report symptoms. Their subjective health perceptions were lower, but in terms of physical function the Gulf War veterans were still as good as the two other groups.

The popular explanation of these findings is that the symptoms are the result of biological hazards such as vaccinations, oil fires, depleted uranium, pesticides, and chemical weapons. However, the balance of evidence points against a distinct GWS. There have been similar patterns after other conflicts, and Gulf War illness has features in common with other unexplained illnesses.

MCS is not well known in England. Dr. Reid and his colleagues set out to establish whether MCS and CFS could explain the reported symptoms. The first step was to try to identify the cases from the data. They had no generally accepted case definitions of MCS, so they went with the 1993 criteria of Simon, et al. As well as investigating the prevalence of MCS, the authors aimed to explore the relationship between the presence of MCS and reported exposures during deployment.

The team was able to establish prevalence figures for CFS and MCS. They were found to be generally lower than what is found in U.S. studies. The CFS prevalence figures were greater when compared with civilian data, but MCS is not well known in Britain, so there is no civilian data for it. Comparing the cohorts, MCS was reported more frequently in the Gulf War cohort, while reports of CFS were not much more than in the non-deployed group.

With regard to other findings, the study did not find an association with the female gender, but this could be explained by the small number of women in the sample. It found a high incidence of psychiatric morbidity. It found a discrepancy between the self-reported and the operational criteria. CFS was more prevalent, which raises a question of whether CFS is associated with the military. MCS seemed to be particularly associated with Gulf War service. There was a strong association between chemical sensitivity and reported exposure to pesticides.

Dr. Reid related that in the U.K. BSE scare, reports of organophosphate poisoning related to sheep dip and concerns about modern agricultural practice have led to widespread public anxiety about the use of pesticides, which may have introduced a recall bias into the study.

He showed a slide of a newspaper report about a woman who is allergic to microchips. He said that people like this woman have sets of symptoms, but they are not labelled as MCS in the United Kingdom. Social and cultural factors play a role in people attributing their symptoms to a specific syndrome. For example, CFS is not widely recognized in France. There has been little formal study, although there has been an increase in reporting of symptoms attributed to the environment in the U.K. There is a perception that new developments in the U.S. have a tendency to show up in the U.K. five to ten years later, so MCS is likely to be seen soon.

Questions and comments

Dr. Miller directed a question to either Dr. Hyams or Dr. Reid. With the multiple symptom syndromes going back to wars that predated the increased use of chemical agents, what percentage of people reported?

Dr. Hyams responded that there is no good data, but effort syndrome was the third largest cause for compensation after World War I. For the other wars, the percentage is not known.

Dr. Ross commented on the woman allergic to microchips. There is some serious scientific work done in Sweden reporting that patients like her have different electroencephalographic patterns. He himself has worked with patients alleging electromagnetic sensitivity. It was found that the determining factor was the frequency with which the field is turned on and off.

Dr. Reid said he hoped it was not perceived that he was portraying the woman's symptoms as a joke. Clearly, they are real and causing distress. What is also clear is that experts differ on the attribution of symptoms in these cases, and that evidence presented as hard science is often open to considerable criticism.

Dr. Leznoff spoke of the influence of social media on the perception of disease. He asked how long after the Gulf War the surveys were made. Dr. Reid responded that he had a good point. There was a potential for recall bias, since the surveys were made six years later. Dr. Scott commented that the post-deployment clinics in Canada were flooded with veterans' concerns after the issue of contaminated soil in Croatia came up in the media.

Dr. Ashford said that he had conducted a study in nine European countries, including the U.K. In many countries, physicians were not familiar with MCS. However, when asked about any situational untoward responses to an event, they had stories to relate. Also, there may be an issue of under-reporting, because physicians have not made the connection between what they are seeing and MCS. Information is very powerful. Dr. Reid agreed, but said he did not regard the press as the sole cause of the rise of MCS. The medical profession should consider its own role in perpetuating medically unexplained syndromes.

Dr. Hughson asked if anyone had examined the North Sea firefighters who were involved in Kuwait. They may have been exposed to the same hazards without the military complication to the data. Dr. Reid said he was not aware of any studies, but Dr. Hyams said there had been research, showing no unusual health problems.

PCR Testing for Mycoplasma and Chlamydia in CFS/MCS *Professor Garth Nicolson, Ph.D.*

Dr. Nicolson said he would approach the problem of MCS from a biological direction. His involvement with Gulf War illness began when his daughter (who was serving there) experienced symptoms, but could find no help for them. She became unable to continue with pilot training in the Army and changed careers to medicine. In the process of trying to help her, Dr. Nicolson became involved in a large project on the diagnosis of chronic infections in a variety of fatiguing and autoimmune illnesses, including GWI.

Chronic infections by themselves can create illness, but they seem to act in conjunction with other factors, such as chemical and environmental exposures. Multiple biologic exposures also play a role in creating chronic illness. So does genetic predisposition, but little is known about this. Dr. Nicolson hypothesizes that a variety of bacterial and viral infections play an important role as causative agents, cofactors, or opportunistic infections. Together they provide an important source of morbidity in patients with a chronic illness. These infections are often opportunistic, as patients with chronic illness resulting from environmental or chemical exposures are more susceptible to them. He said that he did not intend to argue whether or not they are the sole cause.

Dr. Nicolson and his colleagues conducted a study of the signs and symptoms of 650 Gulf War veterans beginning in the early 1990s, before the media frenzy about GWS began. Dr. Nicholson commented that the label "Gulf War syndrome" presumed that medicine knew more than it did about the illnesses associated with the Gulf War. A survey form was distributed to veterans of the Gulf War, asking about signs and symptoms before, during, and after the war; where they served; what previous diagnoses they had had; their illness state; their environmental exposures; their vaccination record; what treatment they had had; and the condition of their family members. At the same time, a U.S. Senate survey was studying 1,200 families of Gulf War veterans, as there were indications that symptoms were spreading to family members. In this study, approximately 77% of spouses and 65% of children born after the war showed similar signs and symptoms to patients with GWI.

In the Gulf War there was a variety of potential toxic exposures: chemicals, radiologic exposures (and not just to depleted uranium); environmental exposures like sand and smoke; and biological exposures.

Many of the signs and symptoms of biological exposures are not easily separated from those of chemical exposures. The biological exposures are of particular interest because of the spread of illness to families. Nicolson and his colleagues focused on mycoplasma species, theorizing that these could lead to family members becoming sick. Family members would not likely become sick through handling the veterans' equipment, or if the illness was due to PTSD. The estimate is that at least 40% of GWI may be due to specific biological exposures such as mycoplasmal infections; so mycoplasmal infections do not explain everything, but could be a subset that causes illness to spread to families. Sixty families were studied. Most, but not all, the children were symptomatic and showed similar signs and symptoms as the family member who was a veteran. When the illness was passed to families there was a high incidence of similar infection found in every symptomatic family member.

Abnormalities in the patients' immune functions were seen in laboratory tests. Some tests are difficult to do and are not well known. Infections of a subclass of mycoplasma were seen (*Mycoplasma fermentans*), which interferes with cell metabolism. It can only be detected using molecular tests and is usually misdiagnosed, left untreated, or treated inappropriately. The types of infection reported in Gulf War veterans and people with chronic problems (usually mycoplasma, chlamydia, and other chronic bacterial and viral infections) do not usually stimulate an immune response, so there is no point looking for antibodies. These infections can be found using a polymerase chain reaction (PCR) that amplifies a small, unique sequence of

DNA. It is important that the sequence of the PCR product from each patient be confirmed by a back-hybridization reaction, something few other laboratories do.

Approximately 40% of the Gulf War veterans tested positive for any species of mycoplasma, and of these more than 80% were positive with *Mycoplasma fermentans*. Two different laboratories confirmed this. Of CFS and FM syndrome sufferers, more than 60% were infected with mycoplasma, but in contrast to the Gulf War veterans, these patients could have one or more species often different from *Mycoplasma fermentans*. Those who had been sick over a decade had multiple mycoplasmal infections, often along with other infections such as chlamydia. Those who had been sick for less than three years usually had one type of infection. These infections played a role in keeping the patients sick. It was shown that fewer than 8% of the long-term patients recovered fully without direct treatment of their chronic infections. Mycoplasmal infections and multiple infections caused by other bacteria also play a role in rheumatoid arthritis.

The reason these findings have not been seen before is that no one has looked for multiple infections. Molecular tests were also not available before. With molecular testing, reproducibility can be a problem and confirmation is necessary because of interfering agents in the blood; therefore, the DNA has to be purified first. Stability is extremely important in looking at the samples.

The Armed Forces Institute of Pathology claimed that no GWI sufferers tested positive for *Mycoplasma fermentans*. It could be that the laboratories were not keeping their samples at the appropriate temperature, because three other laboratories, including Dr. Nicolson's, found mycoplasmal infections in fresh blood samples at approximately the same incidence (about 40%) in patients with GWI.

Dr. Nicolson recommended six-week cycles of antibiotics (doxycycline) as treatment. Mycoplasmal infections are difficult infections to treat because they are slow growing and they are found inside cells. Multiple cycles of antibiotics are required. After one cycle, 100% of the veterans relapsed. Most recovered after several cycles. Those who did not recover seemed to be in the group who were sensitive to chemicals. Once they had recovered, patients reported that they were no longer as sensitive to chemicals, so there is a role for biologic agents in the process of chemical sensitivities.

Many patients have nutritional problems such as those caused by poor nutrient uptake and irritable bowel syndrome. Diet is very important in recovery, and the antibiotic treatment has to be complemented with dietary supplements. To control fungal and yeast infections, patients must avoid refined sugars and alcohol, stay active, take saunas, and follow nutritional recommendations for boosting their immune systems.

In a three-year follow-up of civilians with CFS, 80% of patients with confirmed mycoplasma infections responded, and more than 60% had recovered using the antibiotic and dietary regimen proposed by Dr. Nicolson.

Asking what potential role mycoplasma could play in disease, and whether it could cause disease, Dr. Nicolson listed these 1996 criteria:

- ☐ high incident rate
- ☐ high recovery rate
- ☐ antibody response
- ☐ clinical response suppresses the infection
- ☐ antibiotic response (Dr. Nicolson noted an adverse reaction to penicillin in patients not previously sensitive to it.)
- ☐ animal models (Monkeys infected with *Mycoplasma fermentans* developed a smouldering disease as in humans and then died, as did rodents. Veterinarians understand the role of mycoplasmas in animal illnesses.)
- ☐ human testing (as in the Texas prison system)
- ☐ antibody protection

In discussing where Gulf War veterans could have contracted these infections, Dr. Nicolson mentioned vaccines. Mycoplasma is a common contaminant found in 6% of vaccines. Some non-deployed veterans receiving multiple vaccines have similar symptoms to those of deployed veterans. Adverse reactions to the anthrax vaccine were reported by 50% to 60% of people vaccinated, but many did not report until after the 48-hour reporting time. There is also the possibility of vaccine failure.

In closing, Dr. Nicolson said that he does not know how MCS “fits into the picture.”

Questions and comments

Dr. Patricia Drolet asked if there are any good studies to prove the efficacy of Dr. Nicolson’s treatment protocol. Dr. Nicolson responded that the first and only funded study was the \$6 million DVA study, which is half finished. It is hard to obtain funding for these types of trials.

Toxicant Induced Loss of Tolerance

Claudia Miller, M.D.

Dr. Miller thanked “the Canadian hosts for putting together such a stimulating group of people.” She began her presentation with a slide showing volatile organic compounds (VOCs) from a building with SBS, a phenomenon that is new since World War II and the advent of synthetics, to illustrate that measurable low-level exposures are currently common.

In several population-based surveys, 30% to 40% of respondents said that they were bothered by odours. In a randomized survey of 4,000 households conducted by the California Health Department, 6.3% of respondents said they had been diagnosed by a physician as having MCS or environmental illness, a finding that surprised the questionnaire’s designers. The medical community acknowledges that certain people have a problem with chemical sensitivity, but opinion varies as to whether this is due to physical or psychological causes, or a combination of both.

Dr. Miller said that both she and Dr. Ashford have examined that question at length. Instances of MCS occur in over a dozen countries. She mentioned a group of women who worked at a casino and could barely count cards after several hours in the indoor environment. Multisystem symptoms (MSS) and multiple intolerances are still found in a subset of these women years later. Similarly, there were chemical weapons workers still sick fifteen years after World War II ended, agricultural workers so sick they could not even tolerate a “whiff” of pesticides who were forced to abandon their occupation, U.S. veterans of the Gulf War, homeowners in Germany who became sick from the preservatives used in their log homes, and hospital workers who became ill after exposure to various chemicals. Radiologists and radiographic technicians report developing “darkroom disease” from the chemicals used to develop x-ray film in unventilated areas. Thus people from diverse geographic locations report suffering from MSS and multiple new onset intolerances to similar chemicals, foods, and drugs (including alcohol and caffeine). Dr. Miller commented that people with MSS and multiple chemical intolerances come from widely divergent backgrounds: They don’t all watch Oprah, read the same books, or see the same doctors.

Dr. Miller said that a “compelling anomaly” exists because similar kinds of intolerances are being observed in demographically diverse exposure groups. There are parallels with addiction, with facets of chemical intolerance appearing to be a mirror image. This points to a possible new theory of disease, that of TILT.

Dr. Miller showed several slides depicting responses to the ingestion of certain foods before and after pesticide exposure or remodelling. The study involved people from all over the U.S. and, although those previously exposed to organophosphates had more severe symptoms, results showed a statistically similar ordering of symptoms and food intolerances regardless of the nature of the “initiating event.”

Most impressive of all to many veterans’ doctors is the inability of formerly heavy drinkers to tolerate even one beer. The loss of tolerance to alcohol is mentioned frequently enough as a symptom to warrant special note, Dr. Miller said, and if a physician does not specifically ask about this in a history, he or she is missing a potentially vital clue.

Dr. Miller uses a questionnaire that she developed, the Quick Environmental Exposure and Sensitivity Inventory (QEESI), to help identify health problems and examine responses to various exposures. Patients are asked to rate their symptoms and responses to various substances on a scale of one to ten. This questionnaire has been published and has demonstrated high sensitivity, specificity, reliability, and validity.

TILT involves an initiating event, followed by a subsequent loss of tolerance. Of 59 Gulf War veterans surveyed, 80% had new onset intolerances, with a number reporting that they reacted so severely to gasoline vapours that their spouses had to fill up the gas tank for them. One man reported that prior to being deployed in the Gulf War he considered WD-40 to be an ideal perfume—now it, and many other VOCs, make him sick. Dr. Miller said that many veterans who want to work are unable to return to the workforce because they are ill. Two-thirds of those surveyed reported adverse effects from drinking alcohol, and 25% said they now reacted to coffee. Conversely, others reported drinking up to 30 cups of coffee per day in an effort to stave

off fatigue. Three-quarters said that foods they had previously liked, and even food in general, now made them sick. Of the smokers, three-quarters had either quit smoking or reported that tobacco now bothered them. In total, 36 of those surveyed reported that they had new intolerances in all three categories—chemical inhalants, foods, and drugs.

“Could there be a different disease mechanism going on?” asked Dr. Miller. A subset of people appears to lose the ability to tolerate previously tolerated substances. As doctors, Dr. Miller said “We see something and make a diagnosis, but we don’t understand the etiology. How did it start? Could there be some event that triggered it? What keeps people from seeing it?”

Masking could be the answer, suggested Dr. Miller. For example, someone who lives in a clean environment would know that diesel fumes are a trigger if he or she reacts with specific symptoms every time a diesel truck passes by. Such a person visiting New York City would not know that, because symptoms resulting from background chemical noise would mask those from diesel engines. Patients travelling to large metropolitan cities have reported that they feel chronically unwell, almost as if they had the flu. Because of masking, both patients and doctors may fail to observe that everyday low-level exposures are triggering symptoms. Because responses are not always instantaneous, it is hard to identify specific causal exposures.

Once TILT is initiated, people respond with augmented stimulatory and withdrawal symptoms. In order to avoid withdrawal symptoms, they have a choice of taking that substance regularly or avoiding it altogether: addiction or “abduction.” Dr. Miller said that these may be closely related: The same Gulf War veteran who can’t stand the smell of gasoline or perfume now drinks a dozen cups of coffee a day.

Controlled environmental hospital units have been developed that use clean-room technology to isolate subjects from background chemical and food exposures. For the first few days, people go through “detox.” Only after they have reached a clean baseline can challenges be performed in a double-blind, placebo-controlled research study. Both Gulf War veterans with MCS and a control group were asked to rate their fatigue, headaches, shortness of breath, and depression on a scale of severe, moderate, mild, etc. Exposure groups reported high levels of severe symptoms, which were not amplified in the control group, said Miller. Yet over the past few decades, fatigue, migraines, shortness of breath, and depression have become much more prevalent among the general population in the U.S., where there is often shared exposure to indoor air contaminants and pesticides.

Dr. Miller suggested that we may be witnessing a new theory of disease. Rather than one illness, this could be a new class of illness that affects different organ systems in different ways, paralleling the germ and immune theories of disease. TILT appears to involve a two-step process in which a person first loses specific tolerance for a wide range of common substances following a chemical exposure event. This loss of tolerance might also predispose an individual to infection. Thereafter, everyday exposures trigger symptoms, thus perpetuating illness.

The history of medicine suggests that prevention can take place even before there is an agreed-upon understanding of the general mechanism involved, Dr. Miller said—in other words, “We

don't need to know the specific mechanisms before we act." Precautions to take include not using pesticides and not installing new carpet in day-care centres.

Dr. Miller said that she would be pleased to answer questions during the lunch break, as time did not allow for any now.

Functional Somatic Syndromes

Arthur Barsky, M.D.

"It's a pleasure to be here," began Dr. Barsky, saying that he intended to provide a broader context to the discussion by examining two contextual elements.

The first element is the unreliability and inconsistency of the evidence supporting MCS—many of the reports are subjective and as such cannot stand up to scrutiny. Secondly, Dr. Barsky said that it is important to see these conditions in a broader light. They should not be looked at just as a medical problem because many societal factors are involved.

Dr. Barsky said that functional somatic syndromes (FSS) are characterized more by a constellation of symptoms and suffering than by specific, demonstrable abnormalities of structure or function. Many doctors are confronted with patients who have arrived at their own diagnosis. The stature of MCS in the public domain far exceeds its stature in the medical community. In other words, FSS has major sociocultural and political dimensions that eclipse its medical status. FSS includes MCS, SBS, repetitive strain injury (RSI), FM, CFS, chronic whiplash, irritable bowel syndrome (IBS), GWS, food allergies, and complaints related to silicone breast implants. They all have a great deal in common, particularly in terms of sociocultural dimensions.

FSS shares a common symptom pool: The symptoms are diffuse, non-specific, and ambiguous, and are found in healthy populations. The list of symptoms includes fatigue, weakness, and sleep difficulties; musculoskeletal complaints; problems with the central nervous system like memory loss, concentration difficulties, anxiety, depression, and irritability; gastrointestinal problems including nausea and pain; heart palpitations; shortness of breath; and headaches and dizziness. Most if not all of these symptoms can be found in healthy populations.

Historically, there have been numerous examples of symptom constellations that have risen rapidly and fallen just as quickly. Railway spine, mercury poisoning from dental fillings, repetitive strain injury, and chronic mononucleosis are but a few examples of conditions that fell from favour when no medical basis was found for them. "This is not new," commented Dr. Barsky. "This has happened before."

What is different about this current FSS is that it is less responsive to reassurance and explanation. The symptoms seem to be more severe and long lasting, which may be attributable to the decline in medical prestige—the medical profession does not have the palliative effect it once did. Secondly, mass communication plays a part. Instances of MCS are portrayed with hyperbole, and personal anecdotes are taken as medical fact. Sensationalism and alarmism promote distress. Finally, there are prominent legal, financial, and political ramifications today,

much more so than in the past. Claims of MCS have been the basis of lawsuits, and that together with the proliferation of medical clinics and advocacy groups dedicated to a specific disorder have helped to shape public policy. Dr. Barsky said, “It’s an enormous social, political, and financial arena.”

MCS has a number of characteristics in common with FSS. First is its phenomenology: It doesn’t have a consistent symptom complex that distinguishes one disorder from another. Secondly is its co-occurrence. Individuals often receive more than one diagnosis, and the label given depends on which specialist is visited—an infectious disease specialist will decide it’s CFS, a gastroenterologist will call it IBS, and a specialist in rheumatoid arthritis will label it arthritis. The epidemiology began with sporadic outbreaks among people living in proximity to each other and then spread to other individuals. The pattern of the outbreak was originally pathogenic.

The area of psychiatric comorbidity is complicated and controversial. Although there are elevated rates of psychiatric comorbidity among the patient population, the chicken-and-egg debate—or which came first—has not yet been resolved. There is a prior history of psychiatric disorders among some, but by no means all, of the FSS population. More promising studies are comparing patients with IBS to those with bowel disease, and those with FM to those with rheumatoid arthritis. Finally, there is refractoriness to symptomatic treatment. Restricting activities does not seem to help, as it does in primary care clinics where there is a demonstrable illness.

“I’m not suggesting that in the majority of—or in all—cases, psycho-social factors cause the symptoms in the first place,” asserted Dr. Barsky. “They just maintain them.” Symptoms can come from a whole variety of causes, from an ill-defined incident, to stress, disease, or a predicament of living. “But what happens as a result of getting a label?”

One of the results is an intensification of original symptoms. Patients pay more attention to their bodies and the negative stimulus increases. They also notice new symptoms; something Dr. Barsky called a “confirmatory bias.” This sets in place a process of self-validation that in turn fosters a further amplification of symptoms.

Dr. Barsky identified four mediators of symptom amplification: a belief that one has a disease; negative expectations and the role of suggestion; the sick role; and stressful events and psychological distress.

Beliefs help to guide bodily perception. It is an automatic response to attribute normal occurrences such as a headache in an amplified way to a condition or diagnosis. The best literature on this is in the area of hypertension: People have three times as many symptoms following a diagnosis of hypertension than does a control population. The impact of receiving a diagnosis cannot be overlooked. Beliefs at the outset about how serious the condition is are a powerful predictor of symptoms to follow. Finally, beliefs bias the recall of past symptoms. Dr. Barsky shared the example of women asked to keep both real-time and after-time diaries of premenstrual symptoms (PMS): Those who believed in the existence of PMS retrospectively rated their discomfort much higher than real-time recording suggested, than did women who did not believe in PMS.

The second amplifier—expectations and suggestion—refers to the fact that “we perceive what we expect to perceive,” said Dr. Barsky. Studies have shown that suggesting adverse drug effects to study participants predisposes them to suffer those side effects. In one multicentre study, two of the centres required that participants be given full disclosure of all possible side effects, while the third centre had no such policy. The rates of GI upset were six times higher at the centres that had informed participants of that possibility, while the actual rates of GI disease did not differ from centre to centre. One’s expectations are a statistically predictable indicator of outcome, as evidenced by studies that induce symptoms by suggestion.

The sick role and secondary gain have a profound effect as an amplifier of illness. One only has to go to the Internet for evidence: litigation, compensation, and advocacy all play a part in prolonging recovery. A study of whiplash took place in Lithuania where there is no recognition of or support for the syndrome. It followed people involved in accidents and found that there were no increased incidents of upper body or neck injury. Dr. Barsky said that prolonged recovery can be highly correlated with the generosity of disability benefits.

Stress exacerbates symptoms, lowers the threshold for medical consultation, and fosters disease attributions. There is a statistically significant relationship between daily, recurring irritants such as repetitive stress injury or back pain and job dissatisfaction or having no peer support.

In summary, Dr. Barsky stressed that the medical profession needs to think about MCS in a broad context. It is not a new phenomenon. “We need to think about ways of labelling and treating patients. It has a huge impact on treatment, and a clinical course.”

Biologic Mechanisms Operative in IEI/MCS

Karen E. Binkley, M.D.

“IEI is a psychophysiologic condition that can be explained in part by panic disorder,” stated Dr. Binkley. She referred participants to a list of references provided for their perusal, of credible, peer-reviewed studies published in mainstream medical journals.

IEI looks like panic disorder, Dr. Binkley said. Patients with IEI have symptoms similar to that of panic disorder, including lightheadedness. They exhibit anticipatory anxiety and a phobic avoidance of perceived triggers. The psychological profiles of IEI include depression and anxiety.

IEI acts like panic disorder, said Dr. Binkley. In a study by Leznoff (1987), patients were challenged in an open fashion with their trigger substances. Patients showed evidence of hyperventilation with a rapid fall in carbon dioxide ($p\text{CO}_2$). Pulmonary function was unchanged. Recovery was rapid, helped in some instances by breathing into a brown paper bag. In contrast, when patients were not aware of being exposed to their trigger in blinded challenges (Staudenmayer 1993), they showed no consistent reaction to their purported trigger.

IEI reacts like panic disorder, Dr. Binkley stated. When tested with natural substances capable of inducing panic attacks in patients with panic, but not in normal individuals, patients with IEI also

had panic attacks. In one study, all five IEI patients who received sodium lactate had panic attacks, but none reacted to a placebo. These findings are consistent with the diagnosis of panic disorder. Independent psychiatric assessment confirmed the presence of panic disorder in all five of these patients.

In another study, patients with self-reported IEI and a control group were challenged with CO₂ inhalation in a single-blind experiment. The results again were similar: 71% of the IEI patients fulfilled the criteria for panic attack following CO₂ inhalation, compared to only 21% of the control group.

IEI may have the same genetic characteristics as panic disorder, said Dr. Binkley. Eleven patients with IEI and a matched control group had genotyping performed at the cholecystokinin B (CCK-B) receptor allele. CCK-B receptor allele 7 has been associated with panic disorder. There was a significantly higher prevalence (9 out of 22, or 41%) among the IEI subjects than among the control group (2 out of 22, or 9.1%).

“There is also anecdotal evidence that patients with IEI get better when treated like patients with panic disorder,” Dr. Binkley said. Effective anti-panic treatments of IEI include relaxation training, stress management, psychotherapy, pharmacotherapy, and graded exposure to the purported triggers (i.e., a psychological desensitization).

“There’s an old expression. If it looks like a duck, walks like a duck, and quacks like a duck, then it probably is a duck,” said Dr. Binkley. IEI looks like panic disorder in terms of symptoms and psychological profiles. IEI acts like panic disorder on open exposure to purported triggers with hyperventilation, and it reacts like panic disorder with exposure to sodium lactate or carbon dioxide. IEI may have the same genetic characteristics as panic disorder, and IEI, in at least some cases, gets better when you treat it like panic disorder. “The conclusion that one can draw from the available scientific evidence seems obvious,” Dr. Binkley concluded.

Provocative Challenges in Patients with IEI

Arthur Leznoff, M.D.

Dr. Leznoff said that he had planned to present his own data but after listening to and reading data from presentations over the past two days he felt it would be more relevant to discuss the various theories presented.

Today, there is an amalgamation of theories. CFS is not MCS—there is no overlap, he asserted. If patients with CFS are put on a tropical island or in environmentally secure chambers they would still have CFS, but those with MCS are better or fine in secure chambers or on the island.

“What is toxic exposure?” he asked. Clearly, exposure to pesticides in factories can be at a toxic level, as it can be for farmers using pesticides without precautions. “However, my brother spraying his front lawn in Florida is not receiving a toxic exposure, and nor is a new carpet toxic. ‘Dose is the poison’ is the dogma of toxicology.”

Dr. Leznoff referred participants back to the position statement by the ACOEM that there is no evidence identifying MCS as a distinct clinical entity. Participants have heard over the past two days that there is some scientific basis to support MCS; yet prestigious organizations say that there is not, and the dichotomy remains. Dr. Leznoff quoted Shakespeare from the *Merchant of Venice*, saying, “All that glisters is not gold.”

The SPECT scan argument is a very convincing one, said Dr. Leznoff—the difference between the before and after pictures is “very persuasive indeed. The Workers’ Compensation Board has been persuaded to the tune of millions of dollars.” However, Dr. Leznoff said that grossly abnormal scans are often found in “normals”—indeed, normality is the most common condition associated with abnormal SPECT scans. “The evidence is now not so strong,” he concluded.

Both SPECT and PET scans have been featured in dozens of papers in induced panic reactions and show gross changes from before and after. “The papers with the beautiful pictures are more in support of the work of Dr. Binkley than they are in support of a claim for chemical intolerance,” he asserted. Referring to the study Dr. Binkley mentioned in which patients hyperventilated dramatically when openly exposed to their trigger substances but failed to do so in blinded challenges, he said, “There is no other explanation other than a panic attack. Carbon dioxide levels fell. This reduces cerebral blood flow. Naturally they got a brain fog. Naturally the SPECT scan will change. It would be surprising if we did *not* have abnormal SPECT scans with this group.”

Dr. Leznoff recalled that several speakers mentioned using questionnaires, some eliciting subjective responses, as in, “If you smell this, what happens?” There is a certain degree of reluctance in the medical profession to use questionnaires, he said, particularly among Canadians. “Canadians know that when a highly motivated group designs a questionnaire or a referendum question and phrases the question a certain way, it can get any answer it wants,” he said, “à la mode de M. Bouchard.”

The total load theory needs to be backed up by good data, or it will remain just speculation and not theory. Dr. Leznoff suggested taking twenty chemicals or factors, adding them up, and comparing IEI patients to normal. “Maybe they have a problem with how they get rid of the chemicals, but there is no evidence of that. Indeed, people who have given a kidney and one-third of the liver have no problem detoxifying.”

As for sauna therapy, Dr. Leznoff said that he can prove mathematically that it’s of no value, and yet it costs the people undergoing it thousands of dollars. He invited anyone interested to contact him after the presentation.

He asked participants to think back to the first time they ever heard about a case of MCS. The first case he heard of was a woman reported in the paper with such a severe case of MCS that she couldn’t meet anyone else face to face and spoke to the reporter through the door. She couldn’t answer the telephone for fear of emissions and watched her television through a glass partition to avoid electromagnetic waves (which unbeknownst to her travel through glass). “You probably said, as I did, ‘Oh, come on—this lady is psychologically challenged!’ But now you believe in a

new and wonderful disease? Go back to your basic instincts,” he urged. “The emperor isn’t wearing any clothes!”

Dr. Leznoff said that any theory must be backed up by scientific evidence that is reproducible, sound, and built on good logic, or it will not pass the test.

When patients were openly challenged, they hyperventilated. Then, after being given a paper bag to blow into they reported feeling better despite the fact that the smell was still in the air. They failed the test. Provocative skin tests are similarly invalid. Dr. Leznoff said that he could continue giving examples. “Most of the theories crap out—they fall down with egg all over their faces. Why don’t the chemical sensitivity advocates accept reality?” He concluded by quoting Monty Python: “Your parrot is dead.”

The MCS/IEI Outbreak at Camp Hill Medical Science Centre in Halifax, N. S. - WCB Perspective

Dr. Donald Haigh

Dr. Haigh said he would tell participants about a health event—not science, and not opinion. He is an advisor on chemical claims and therefore has a good knowledge of studies.

He showed slides of the layout of the Camp Hill site and its three buildings: the infirmary, the Abbie J. Lane building (the Lane) and the Veterans Memorial Building (the VMB). He outlined the sequence of events that happened at the site, from the perspective of the Workers’ Compensation Board of Nova Scotia (WCB). The challenge was to ascertain whether this was one event with many parts, or many events.

- ☒ 1984: first cases in the Lane
- ☒ 1986: first Ministry of Health Special Committee Report on Environmental Illness (EI)
- ☒ 1986: first outbreak in the VMB kitchen
- ☒ 1990: first environmental clinic opens in the QEII complex; first case in occupational therapy and physiotherapy in the VMB
- ☒ 1991: the second VMB outbreak escalates throughout the year
- ☒ 1992: complete industrial hygiene report published
- ☒ 1993: Ministry of Health agrees to build environmental clinic
- ☒ 1994: second environmental clinic opens, run by Department of Community Medicine and Public Health, Dalhousie University, in Fall River
- ☒ 1995: expert presentation to WCB; first WCB policy on EI adopted
- ☒ 1996: WCB policy on EI revised
- ☒ 1998: second Ministry of Health report on EI; third environmental facility opens in Fall River (“the cleanest building in the world”)
- ☒ 2000: EI test case results released (WCB had stopped paying compensation for EI in 1993; the procedure was external appeal by test case).

The clinical features fell into two groups: the kitchen cases in the VMB (22 complaints of eye, skin, and upper respiratory tract irritation with multiple diagnoses); and the larger number of VMB cases (more than 600 complaints of skin and respiratory irritation, GI and GU upset, and brain fog). Neither was ever systematically studied.

Cases were not classified as MCS as there was no definition for it. All trauma cases were eliminated from the total. Claims were counted, not persons, and they were counted in terms of lost work time. One would expect more claims from female workers because it is a hospital setting, but there was only a slight predominance. The median age of claimants was 37. Older people did not tend to declare, which Dr. Haigh said “flies in the face” of MCS. Duration is not relevant, as these statistics involve the duration of payment rather than duration of the illness.

The total working population of the Camp Hill site was about 1,100 from 1990 to 1994. Complainants numbered 600 to 825 from 1991 to 1993. Of the complainants, 66% took sick leave or were compensated..

There were four major studies done on the industrial hygiene and heating/ventilation/air conditioning (HVAC) of the VMB. Not much analysis was made of the other buildings.

- ⊘ The first study was made in the kitchen in May/June 1989. It reported 14 to 17 air changes per hour, 100% outside air, and problems with drafts. Sodium hydroxide was detected in wipe tests, but not in the air. Airborne fibres were within normal limits, as were volatile organic compounds.
- ⊘ The second study was done on the upper floors of the VMB in June 1990. The first floor, housing geriatrics, the cafeteria, and ambulatory care showed a low number of air changes per hour. The second floor, housing geriatric education, occupational therapy, and physiotherapy, showed 25% to 100% outside air and only one air change per hour. There was also the discovery of formaldehyde in the carpentry room, and ethylene dibromide, phenol, and xylene, most of which were explainable by circumstance (e.g. xylene in the splint room from the fibreglass casts).
- ⊘ The third study was conducted by Public Works Canada on the HVAC of the VMB. It found that some areas of the VMB fell below standards for fresh air. It found inappropriate damper settings on the air intake; possible cross-contamination at the intake and exhaust; poor maintenance practices; poor air flow balances; and a white powder in the air handling units, which became a *cause célèbre*. These are not unusual findings in large buildings.
- ⊘ The fourth study carried out the work of the second study, but used different technology. Freon and tetrachlorine were found. Carbon dioxide levels were the same as the atmosphere, although carbon monoxide was high near the garage intake, probably a result of leaving engines running outside. The white powder was examined and found to be a mixture of morphine, diethylaminoethanol and cyclohexylamine. All these have irritant properties, but analysis by MIRAN1B2 could only measure the morphine. The VMB stopped using amines on February 27, 1992 and the WCB decided it had not been enough to cause injuries.

The response of the Ministry of Health was to establish a compensation-in-lieu fund for people turned down between 1990 and 1997, to a total of approximately \$30 million. It also commissioned two expert committees; funded the first, second, and third environmental clinics; and offered “Return To Work” and rehabilitation services.

Of the two special committees, the first (1986) reported that there was no scientific evidence for MCS, but that those claiming to be sufferers might be helped by a Texas-like environmental centre. The 1997 committee reported that environmental illness sufferers are sick and require

supportive treatment. It also concluded that EI is a CNS disorder that could be a variant of other conditions such as stress and depression. There is no symptom, sign, or laboratory test to support EI. Peer-reviewed research is needed.

The initial response of the WCB was to deal with the issue when claims started to build between 1991 and 1992. They were dealt with on an individual basis, rather than through a policy, and only conventional therapy was funded. Compensation was paid over periods ranging from weeks to years. In 1993, the WCB judged that corrective measures had been taken and further claims were not accepted.

In 1995 the WCB adopted an EI policy and ordered a yearly review of the EI literature. The policy established:

- ⊘ the levels of exposure, routes of absorption, and specific chemicals required to make a claim;
- ⊘ that causal relationship between the injury and exposure required support by literature;
- ⊘ that only scientifically supported therapies would be funded;
- ⊘ that all claims for neurotoxicity had to meet Bradford-Hill criteria.

There were 243 cases turned down by the WCB and appealed externally. Of them:

- ⊘ 85 (35%) were allowed, and six weeks to two years of benefits were granted, but it was decided that there was no permanent medical impairment;
- ⊘ 54 (22%) were allowed in part, and one week to 3.5 years was granted at 75% of net salary;
- ⊘ 84 (35%) were denied completely;
- ⊘ 12 (5%) were treated as chronic pain;
- ⊘ 8 (3%) were permanently impaired.

There was a test case, to give direction to the commissioners, but they were not obliged to listen to it. The WCB policy was struck down as too severe. The Board of Directors of the WCB is elected, half by employers and half by employees. It is run by a public act, with private money. The test case also decided that EI is psychological and not covered under the act. It concluded that temporary chemicals exposures did occur at Camp Hill and that there were no longer such chemicals present. All costs for Camp Hill claims including appeal cases totalled about \$60 million.

Dr. Scott announced that the question period would be deferred until after Dr. Staudenmayer's presentation and at that time questions for all the speakers would be encouraged, especially from the military physicians present.

Psychological Aspects of Idiopathic Environmental Intolerance (IEI) **Dr. Herman Staudenmayer**

Dr. Staudenmayer said that he started work in the field of IEI in the late 1970s. The question about chemical sensitivity is open and people have been naive about the allergy aspects. The traditional medical establishment in the early 1980s was hostile toward investigating this phenomenon so scientific methods were applied. Dr. Leznoff had made an important observation when he suggested that members of the audience ask themselves what they thought the first time they saw an MCS case.

The first part of Dr. Staudenmayer's talk was an analysis of causality. Using the nine Bradford-Hills criteria, he compared the toxicogenic and psychogenic theories for each. Dr. Staudenmayer noted that he said "psychogenic," not "psychosomatic," which implies that the underlying disease exacerbates psychological symptoms. In purely psychogenic disorders, there is no identifiable underlying disease.

1. *Strength*

Toxicogenic:

- ∃ population undefined;
- ∃ no strong epidemiological risk factors;
- ∃ no exclusion criteria;
- ∃ scientific bodies reject it as a diagnosis.

Dr. Staudenmayer showed a slide from the scientology community, listing ten symptoms, which several presenters had shown. The revealing part, he said, is that the slide says that with three symptoms or fewer one could have low-level toxins. There are no exclusions: Therefore we all have it.

Psychogenic:

- ∃ psychiatric disorders in case and family;
- ∃ developmental trauma (child abuse) or neglect;
- ∃ ineffective stress responses;
- ∃ personality disorders, usually longstanding.

2. *Consistency*

Toxicogenic:

- ∃ double-blind, placebo-controlled provocation studies negative;
- ∃ open challenges elicit signs and symptoms of panic.

Dr. Staudenmayer showed slides of a chamber in which these studies had been conducted.

Psychogenic:

- ∃ studies from 1983-2001 consistently identify co-morbid and pre-morbid psychiatric and psychological disorders.

In 1983, Brodsky wrote a paper about eight people analysed for chemical sensitivity. It is still a classic. There have been numerous studies since. In the German literature, scientists in München, Bavaria, studied over 400 patients and found that they all had psychiatric conditions.

3. *Specificity*

Toxicogenic:

- ∃ no specific exposures;
- ∃ no unique physiologic symptoms;
- ∃ no specific symptoms;

- ∃ no objective signs of disease.

Specificity is the hallmark of toxicology.

Psychogenic:

- ∃ psychiatric disorders;
- ∃ stress physiology;
- ∃ general malaise symptom amplification;
- ∃ vigilance for exposure.

4. *Temporality*

Toxicogenic:

- ∃ no specific time course;
- ∃ precipitating event often by history alone (“I think I was exposed”);
- ∃ *post hoc, ergo propter hoc* (after the fact, because of the fact), in other words, expecting to find something.

Psychogenic:

- ∃ stressors at the time of onset;
- ∃ the delayed effects of developmental or personality disorders are a well-understood phenomenon.

5. *Biological Gradient*

Toxicogenic:

- ∃ no dose-duration-response curve;
- ∃ linearity of effects assumed down to one molecule.

Psychogenic:

- ∃ dose-related developmental trauma, post-traumatic stress disorder and so on (abuse, for example, is not usually a one-time event);
- ∃ adult sequelae: low sensitivity for stress-responses and poor coping with stress.

6. *Biological Plausibility*

Toxicogenic:

- ∃ immune dysregulation;
- ∃ limbic kindling/cacosmia (it is important to note that this is not a mechanism; it can be caused by psychological factors);
- ∃ time-dependent sensitization;
- ∃ reactive airway disease syndrome and reactive upper-airway disease syndrome;
- ∃ neurogenic switching (this is a phenomenon like the one described by Heuser the previous day);

In the measurement of the swelling of the sinus for detection of a stimulus, the MCS group responded falsely; their thresholds were higher.

Psychogenic:

- ∃ stress-response physiology;
- ∃ hypothalamic pituitary adrenal axis;
- ∃ autonomic nervous system;
- ∃ neurotransmitters
- ∃ genetics

7. *Coherence— natural history and biology*

Toxicogenic:

- ∃ alarmist media;
- ∃ social contagion;
- ∃ iatrogenic suggestion;
- ∃ primary and secondary gain (primary means avoidance of anxieties and projection on to external sources);
- ∃ no reliable treatment.

Psychogenic:

- ∃ developmental history;
- ∃ adverse life events;
- ∃ personality traits;
- ∃ somatization;
- ∃ learned sensitivity.

8. *Experiment: prevention or intervention*

Toxicogenic:

- ∃ provocation/neutralization testing (this is totally bogus; the Jewett study was definitive);
- ∃ sauna depuration;
- ∃ vitamins/supplements—“tri-salts” (Hickman catheter for feeding, also an intravenous drip with salts);

Dr. Staudenmayer related an anecdote in which a patient he was interviewing began to have a reaction and he turned to adjust the stopcock on her IV; he was delayed by the mechanism and while he was trying to figure it out, the patient experienced profound relief, thinking that he had increased her salts.

- ∃ “safe house” (there are various forms; for example, a porcelain-lined trailer in the desert or mountains);
- ∃ social isolation (this happens, but it is not an appropriate treatment).

Dr. Staudenmayer showed slides depicting various rituals:

- ∃ a woman reading through a glass-topped box so that she would not be affected by the book’s fumes;
- ∃ a woman wearing a mask and living in a car because she could not tolerate a building;
- ∃ a woman airing her mail on a clothes line.

“It is sad, not funny, why they go so far—and that is the key question,” he said. He also showed a slide of a book titled *Clear Body Clear Mind* by L. Ron Hubbard, who he said was previously a science fiction writer.

Psychogenic:

- ∃ psychophysiological therapy;
- ∃ behavioural desensitization;
- ∃ psychotropic medication;
- ∃ psychotherapy.

9. *Analogy: to known disorders*

Toxicogenic:

- ∃ no known disease to compare with;
- ∃ poor coping, unlike known chronic disease (people with chronic disease often cope well);
- ∃ invalidism, entitlement;
- ∃ sick role is centre of life.

Psychogenic:

- ∃ functional somatic syndromes (e.g. FM, IBS, CFS);
- ∃ symptoms of depression and anxiety.

In conclusion, Dr. Staudenmayer said that testimonials are the empirical foundation of MCS. Perception is reality; the symptoms are the disease; and the attribution is the basis of causality. The theory is untestable—nothing is predicted not to occur. To perpetuate this pseudoscientific theory, a paradigm shift is needed to replace the methods of science and medicine as we know them. IEI is a functional somatic syndrome—labelling is difficult, but definition is required. It is a somatoform disorder characterized by an overvalued idea with comorbid psychiatric disorders.

Dr. Staudenmayer said that the real problem is in the treatment of the individual. MCS is a real phenomenon that has to be addressed. The medical cult represents exploitation, both personal and financial. It involves indoctrination and rationalization. MSC patients form an empathic community of regimented believers and advocates in which membership serves primary and secondary gains. It allows for psychological defences such as denial and projection onto the environment. Preoccupation with rituals obviates insight. It encourages contempt for science and medicine and the practice of alternative, fringe medicine. Some of the indoctrinated become advocates and the cycle continues.

With exploitation of vulnerable patients a chronicity develops. Social and vocational impairment develops, and families are destroyed, producing a poor quality of life and mortality. Bill Rea said he knew of 20 patients through his clinic who died of chemical sensitivity. A number of others committed suicide. This is a sobering statistic.

There are two major obstacles to treatment. There is the iatrogenic component, and the social stigma of stress reactions and psychological vulnerability. This latter must be changed or there will be a continued resistance to a psychiatric diagnosis.

General Question Period

Dr. Scott thanked the Environmental Illness Society of Canada and particularly Judith Spence for her help with suggesting the speakers. He thanked Capt. Denis Jetté and Marie-Hélène Dubé. He had had feedback from participants that they were impressed with the speakers and would like to thank all of them. He thanked the Department of National Defence for funding the conference and the audience for taking time out of their schedules to attend.

Dr. Scott said that the purpose of the meeting was to have speakers present information to the audience, who in turn could become more knowledgeable, and be allowed to ask questions. Therefore priority would be given to audience members rather than other speakers, in the question period. He asked questioners to identify themselves, keep their questions brief and to ask questions rather than make statements.

Dr. Gervin directed a question to either Dr. Staudenmayer or Dr. Binkley. Functional somatic syndrome patients are reluctant to be assessed and reject the suggestion of psychological cause. Are there suggestions for a therapeutic alliance?

Dr. Staudenmayer responded that he has a several-step treatment model that is successful for him, but there is no one successful therapy or sequence. The open avenue is the relief of suffering. The patient has a belief system that cannot be restructured from the outside. Medicine has to get inside the patients' world and find the path they will take out. Often patients are so closed that they will not entertain another explanation for their symptoms. He referred to a woman shown on one of his slides. It took eight years to penetrate her belief system, but she recovered and went back to school. She now has a degree in molecular biology. A variety of techniques can be used to help control the symptoms, but it takes time. There is little else that can be done. In fact doing nothing is an advantage the psychiatrists have; just listening is important.

Ms. Meyer prefaced her two questions with some comments about the arguments among the presenters. Depression is a symptom of a layered problem. Environmental factors can cause psychiatric conditions. It is important to come to an agreement. This has not been an objective discussion and there has been no opportunity to debate. It is not a constructive debate to have presentations based on newspaper articles showing mail hanging outside. Discussion on the existence of MCS just adds to the problem. There has been no discussion of treatments—people do not know what is available. Is progress stuck because MCS cannot be classified? Why not call it “other” and get on with dealing with people, not cartoon characters? Her two questions were:

- ∃ Women and children seem to be more affected. Is research being done on this?
- ∃ Do any of the presenters act as expert witnesses for companies, and are companies funding research?

Dr. Ross responded that he receives no funding from companies and has acted as an expert witness for about 20 patients. With regard to the male/female question, while the majority of his patients are women, he has seen some horrible cases in children. He related some details of a case of a Florida child who was pesticide sensitive. The family asked their neighbours not to use

pesticide, but they would not cooperate and the child came in contact with it. He developed gangrene in his toes and feet and, at risk of amputation, ended up in the Dallas clinic, which Dr. Staudenmayer has vilified and slandered. Dr. Ross takes personal offence at this. The child went into an environmentally controlled unit and only lost the tops of his toes. Cases like this are not to be laughed at.

Dr. Miller responded to Ms. Meyer's questions that while clinical studies have shown 80% of MCS cases are women, she feels it is closer to 50:50 now. Women may be more willing to cooperate with studies. As far as support from companies is concerned, Dr. Miller stated that she does not do expert witness work, and encouraged other speakers to state if they do. She said it is difficult to obtain funding in this area.

Dr. Ashford called for full divulgence of funding. The New Jersey report in 1991 was funded by the New Jersey Department of Health at less than \$10,000. Because he believes the appearance of objectivity and actual objectivity are just as important, it is necessary to divulge sources of funding. He commented that he has compassion for interested physicians who came to the conference to be educated. Dr. Ashford said he regards this conference as a manipulation of science and debate. The challenge for the physicians is not to take the authority of the statements—"speaking with enough authority can convince the devil himself," he said. He urged attendees to go back to the literature and the comments and critiques of the literature. People who came to the conference with a certain predilection will have heard what they wanted to hear. Partial truths were said at the conference; for example, the comments on the social construction of the disease and secondary gain. Fraudulent generalizations have been made. "Let's see the data," he said. He has no vested interest, but as an educator he is insulted by the audience's lost opportunity to see MCS debated.

Dr. Burke said he is a physician whose money comes from the Department of National Defence and specifically the navy in Halifax. He said he did not wish to be told what he should come away with at this conference. It was billed for providers of health care, and he did not expect a debate. He said he has heard from all aspects and can now draw on "a bunch of tools from the toolbox." He asked Captain Hyams whether he finds PTSD after the shorter missions of the U.S. military. He himself sees a lot of it, due to the small size of the Canadian force and the high NATO commitment. Capt. Hyams responded that he does see stress reactions and undiagnosed symptoms but that they have not become a big political issue. The U.S. missions may not be shorter, but the Canadian ones may be more frequent.

John Gibbon, a general practitioner, asked for inexpensive treatment options that could be used in his office, for his patients who are on welfare. Dr. Ross suggested that he and Dr. Gibbon sit down together and discuss this afterwards. Dr. Miller said that avoidance of exposures and foods that trigger symptoms can allow people to regain their tolerance, given time. It is also important to become the kind of practitioner who is willing to admit a difference of opinion among the experts. If physicians go away from the conference with anything, they should go away with the idea that there is a difference of opinion. If the patient is open to psychiatric support, that would be important to do—devastation is there, whether it is psychogenic or not. Another suggestion is that the patient keep a diary, to see whether there is a pattern and to see responses after one week. Patients will become well-read. Physicians can point them to patient groups. In the U.S.,

the question of whether MCS is real has been set aside by employers; they realize they have to do concrete things that will help patients work.

Ms. Meyer commented that she had noticed that patients are not aware of their own food allergies. She suggested they see their doctor and undergo Vega testing as well as writing down what they eat. She recommended a local doctor, Dr. Armstrong.

Dr. Ashford commented that he had heard that with a long delay, the disease can take on a life of its own, whereas people who are caught early seldom end up in a clinic.

Dr. Simon commented that the research he presented was a blinded control study. He asked what study Dr. Leznoff used. Dr. Leznoff responded that he is not a radiologist and his authority comes from Dr. Waxman at Cedars/Sinai. The feeling is that those who are treated late are harder to treat because they have become true believers. Often their diagnosis has been confirmed by pseudo testing (like Vega). He has had great success with people who have symptoms but negative skin tests. They are brought back day after day and given ever-greater doses of whatever they are allergic to. "Yes, we have sympathy; yes, we can treat them," said Dr. Leznoff. He related an anecdote about a male patient with whom he went every day to the perfume department at the Bay, increasing the amount of perfume the patient was exposed to each time, to the point where he and Dr. Leznoff made themselves quite fragrant. The patient improved. Once patients realize that their first sensitivity is not real, they learn to accept that other sensitivities do not have an organic basis.

Dr. Scott thanked everyone for coming and closed the conference.