Seattle Forecast:

Tear Gas Clouds

and **Chronic** Health Problems

Acknowledgments

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"Mad River of People Floods Streets of Seattle" announced a Seattle newspaper headline during the massive organized protest at the 1999 World Trade Organization summit. Not since the days of the Vietnam War and the civil rights movement has the entire downtown core of a major American city been seized by popular political uprising. Rarely has so diverse an array of groups linked arms against a common enemy, in this case the faceless forces of trade liberalization. Tens of thousands of environmentalists, labor union representatives, spiritual leaders, teachers, students, and human rights activists stunned political pundits by forcing a postponement of the opening ceremonies for the summit meeting of the World Trade Organization, scheduled for November 30th.

Mike Orr

More than 30,000 people gathered in Seattle in December, 1999 to protest the World Trade Organization.

Startled by the success of the protesters, city officials soon initiated drastic measures to compensate for their lack of preparedness. No one guessed that over 30,000 people would exercise their first amendment right of peaceful protest. Police employed concussion grenades, pepper spray, rubber bullets, and blanketed parts of the city with plumes of tear gas. Seattle Mayor Paul Schell declared a civil emergency and instated a 7:00pm-to-dawn curfew. Washington Gov. Gary Locke called for 200 National Guardsmen and an additional 300 state troopers to occupy the streets. Having exhausted their original supply of gas within the first few days, Seattle police brought in supplementary chemical weapons from outside of the city in order to continue gassing protestors. These severe steps added a sober, war-like atmosphere to what would have been a constitutionally protected, peaceful demonstration. The actions of the Seattle Police Department and National Guard during the three days of the WTO Conference in 1999 constituted the single largest deployment of chemical weapons in the history of North America.

Physicians for Social Responsibility physician, Kirk Murphy M.D., treated victims of the police actions as a member of the Direct Action Network medical clinic. The clinic provided first aid to protestors and other civilians (onlookers, media, residents, and anyone else requesting assistance) in Seattle during the WTO meetings. The collective members provided care for hundreds of casualties from November 30th through

December 3rd, and hundreds more have requested treatment and information in subsequent days. While working with victims of pepper spray and tear gas exposure collective members acquired extensive expertise in the recognition and treatment of symptoms arising from exposure to pepper spray (Oleoresin Capsicum, known as OC) and tear gases (O-chlorobenzylidene malononitrile, known commonly as CS, and 1-chloroacetopheonone, known as CN).

The use of force at the WTO demonstrations has come at a great cost to the health and welfare of thousands. Those subjected to chemical agents—activists as well as local residents—have evinced symptoms ranging from the inconvenient to the serious. In several cases Medical Collective members identified a subset of casualties with symptoms consistent with exposure to neurotoxins—nausea, dizziness, confusion, fatigue, and other symptoms of central nervous system depression. In many people, these symptoms lasted for days, sometimes weeks, after exposure. Irritant agents such as pepper spray and tear gas, which ostensibly cause only temporary discomfort, do not fully explain the chronic effects felt by many people. In response to floods of phone calls, the Washington Toxics Coalition requested material safety data sheets from the City of Seattle. They were shocked to discover that methylene chloride, a suspected carcinogen, composed 50% of the gas dispersed in Pike's Place Market, the center of the chronic health problems experienced by those exposed.

The actions of the Seattle Police Department and National Guard during the three days of the WTO Conference in 1999 constituted the single largest deployment of chemical weapons in the history of North America.

The Seattle situation is not the first, nor the last incident of riot control agents being used against peaceful demonstrators in recent American history. Not six months after the WTO protests, protestors in the nation's capital were treated in a similar fashion by Washington, DC police while demonstrating against the annual World Bank/IMF meetings. Aside from infiltrating demonstrations and conducting mass arrests, the District's police force used clubs and pepper spray indiscriminately in order to 'control' non-aggressive protestors.[1] The events were caught on camera by several major news broadcasts, oddly enough there were no members of the media who thought to question the possible toxicity of crowd control chemicals.

PSR-LA's investigation into the toxicity of the crowd control weapons used in Seattle found that CS, CN, OC, and methylene chloride (the solvent used to disperse these

agents) are responsible for acute and chronic health effects ranging from severe flu symptoms, to pulmonary edema, to chromosome aneuploidy in germline and somatic cells, the last leading to birth defects and cancer. These effects are even more pronounced in unhealthy people or those exposed in closed spaces. The irresponsible dispersal of tear gas in crowded downtown streets caused thousands of people, irrespective of whether or not they were protesting, to fall ill. These people lost thousands of man-hours of work, which comes at a nearly incalculable price for employers and municipalities. Even more important is the fact that we will not know the full extent of the health effects of these gasses for many years, when young people who were exposed begin having children with birth defects or develop tumors in their livers and lungs.

PSR-LA calls for the full disclosure by manufacturers and police departments of the material data safety sheets of all chemicals used in crowd control. Manufacturers must be held responsible for the health effects, both acute and chronic, of the chemicals they create. Police officers must be educated about the risks of the chemicals they disperse and be held responsible for the aftercare of those they expose. Finally, PSR calls for a domestic ban on the use of supposed 'non-lethal' weapons as they are banned by the Chemical Weapons Convention for use in international warfare.

Purpose of the Report

The question of the nature of the chemicals deployed in Seattle is troubling for several reasons. Not only were the agents sprayed more or less indiscriminately amongst people in downtown Seattle, but the effects of some chemicals were felt by citizens several miles from downtown. As important are the short and long-term health effects of the ostensibly temporary irritants, CS, CN, and OC, which were used as crowd control agents in Seattle. Even more troubling is the labeling of methylene chloride as an 'inert' solvent, although it is widely documented as a toxic chemical.

OC, commonly known as pepper spray, was introduced as a 'less lethal' alternative to CS and CN in 1976. It has been used as a disabling weapon by police officers engaged in hostile encounters with citizens since 1987.[1] It is also a common ingredient in personal defense sprays. The resin of the Capsicum, the cayenne pepper plant, is extracted and mixed with a liquid solvent, such as methylene chloride, in order to be dispersed as a spray. The intended use of OC is a single short burst aimed at the eyes from several feet away, causing acute irritation and temporary loss of muscle control. However, many people in Seattle reported being sprayed continuously at short range by police. OC came under fire in Los Angeles in

1993 when it was exposed as the cause of several deaths of suspects in custody who were not treated after being arrested.[2] The inhalation of OC, it turns out, can be fatal for people suffering from asthma or heart problems. The indiscriminate use of pepper spray against large groups of people increases the probability that someone in the crowd will die as a result of exposure.[3]

CS and CN, the common forms of tear gas used against protestors in Seattle, are actually not gases at all: CN is a liquid and CS is a solid. CN was first produced by the European manufacturer Graebe in 1871. It was developed for use by the military and police for use in war and riots. CS was produced by the American company Corson and Stoughton in 1928 as an alternative to CN that was more chemically stable and up to five times more potent.[4] It subsequently replaced CN in virtually all war and riot-control activities. During the Vietnam conflict, the US army developed many different ways of deploying CS, from sprays to exploding grenades. In 1969, eighty countries voted to include tear gas as among the agents banned for use in war under the Geneva Protocol. The USA was among the signing countries, however the substances were not banned for use domestically.[5] There are currently 108 manufacturers of CS and CN products in North America.[6] This accounts for 41% of all the CS and CN manufactured in the world.

In order for either to be dispersed as a gas, they must be mixed with a solvent agent that creates a gassy form that can be released from canisters. The solvent is supposed to be inert, meaning it has no singular effects on the target of the gas. The only immediate physical symptoms displayed by a victim of tear gas are ostensibly the irritating and immediately debilitating effects of the CN or CS itself. These symptoms are limited to acute conjunctivitis causing the target to inadvertently close his or her eyes, and irritation of the throat and nasal passage. Both of these effects trigger acute fear in the victim. The person will either lose voluntary control of their muscles and fall to the ground (this is also the intended effect of Oleoresin capsicum, a.k.a. pepper spray), or run blindly away from the gas. Ostensibly, the immediate acute effects of the gas wear off within ten to fifteen minutes.

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Harassing agents are very common crowd control tactics in police departments. According to the Justice Department, over 90% issue pepper spray to their officers as an effective and non-damaging way of taking people

into custody. Many also store tear gas on-site for use in riot situations.[7] Chemicals issued to police departments are treated administratively as 'weapons,' therefore they are not subject to the same level of monitoring, testing, or regulation as those sold publicly as personal defense sprays.[8] This means that police-grade products are sold to departments who rely on the manufacturers' information alone. As a 1995 Army report found, the manufacturers' literature may not always be correct, and can often be misleading.[9] Defense Technologies (Def-Tec), the manufacturer responsible for selling products to the Seattle Police Department during the WTO protests, refuses to release any product information. As with other industries, companies will often charge that another manufacturer's product is hazardous while their own is harmless. However, if manufacturers refuse to release material data safety sheets, it is impossible to verify any of their claims without testing the product directly.

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After several deaths occured during the Los Angeles riots in 1993 due to OC exposure, it became apparent the chemical can be fatal to people suffering from asthma.

Not only is there a wide spectrum of gases being used by police departments, but individual departments are allowed to set their own use guidelines. While Seattle Police are authorized to use tear gas against anyone engaged in a demonstration, including peaceful disobedience, the Boston PD outlaws its use. Boston officers are allowed only to use pepper spray, and this only when they are being attacked. As each city has its own police academy, officers around the country are trained to respond to crowd control differently and have varying degrees of expertise with chemical weapons.[10]

Even with department guidelines regarding chemical weapons, it is nearly impossible for police officers to monitor their use during an actual deployment. In Seattle, clouds of tear gas affected protestors and bystanders alike. The chemicals were used on healthy and ill individuals—advised against by most manufacturers—and the police did not take responsibility for aftercare of exposed people. There was great potential for overexposure, especially among people who were close to exploding canisters who were unable to escape quickly. The King County Council in Washington received countless reports of police causing deliberate

pepper spray over-exposure, then arresting the victims without decontaminating them. Police also used many different chemicals on crowds, spraying them first with pepper spray before unleashing canisters of tear gas. There has been very little research conducted on the synergistic effects of chemicals, which may be extremely toxic when released in conjunction with one another.

In Seattle, the hoped-for scenario—dispersing a crowd with individuals not suffering any chronic effects—was clearly not the outcome. Some felt ill weeks after exposure, experiencing symptoms associated with exposure to nerve agents. Many of the people exposed were not participating in demonstrations; they were, in fact, local residents and workers who happened to be in the wrong place at the wrong time. Dr. Kirk Murphy, an attending physician at the protests, assembled testimonies from people who had been victims of the gas. The amassed data and continued inquiries by various organizations into the nature of the chemical weapons were the impetus for this report.

Once the Washington Toxics Coalition discovered that the 'inert' solvent used in the CS deployed in Pike's Place Market on December 1, 1999, contained a high percentage of methylene chloride, PSR-LA began a medical investigation into the known effects of the chemical. Because concentrations of CS were less than usual in canisters, the acute effects of the gas were in fact weaker than is the case with 'normal' tear gas.[11] However, once people had dispersed from the area, they began coming down with flu-like symptoms that sometimes lasted for over a week (see the 'Acute Effects' section). These chronic neurological symptoms, including confusion, lethargy, and inability to concentrate, caused hundreds of people to flood local hospitals. Emergency rooms were often unable to cope with the sheer numbers of people requiring treatment. Of those exposed to crowd control gasses, most returned home without being seen by a doctor. In testimonies collected for this report, every person lost at least a few days of work; many individuals were, for a period of weeks operating with impaired mental and emotional capabilities.

Testimonies for this report were collected first by Dr. Murphy at the Collective medical center. Dr. Murphy also encouraged exposed people to report their symptoms to him on e-mail for several weeks after the demonstrations. PSR-LA conducted follow-up interviews over the phone and compiled a database of acute symptoms experienced by exposed people. This database comprises the frequency table of symptoms, and the e-mail testimonies comprise the 'Voices from Seattle' section.

Methylene chloride is a solvent used in paint thinners and varnish stripping agents. The EPA classifies it as a

probable human carcinogen, and it has been documented in several dozen medical studies as a causing liver and kidney damage, lung tumors, cell mutations and birth defects, among other life-threatening effects.[12] Methylene chloride is also responsible for central nervous system depression: the fatigue, muscle aches, confusion, and headaches reported by many protestors.

Acute exposure led to hundreds of people missing work for days after they returned home and found themselves battling flu symptoms. Pike's Market vendors lost thousands of dollars when they were forced to shut down operations during the gassing; many vendors had to throw out display items when gasses coated their products. Fresh fish, vegetables, books, and clothing were coated with a film of CN and methylene chloride.

Thousands of people, from steel workers to lawyers, lost work days due to exposure to purportedly temporary irritants. It is difficult to calculate precisely the loss of productivity and merchandise, but the deficit must conservatively run into the tens of millions. The more that is understood about methylene chloride, OC, and other irritants and their 'inert ingredients,' the more one realizes that these costs, monetary and more importantly health, may be felt long into the future. The details of these acute and chronic effects will be discussed in a later section.

12 Andersen et. al. 1987 "Physiologically-based pharmacokinetics and the risk assessment process for methylene chloride" Toxicology and Applied Pharmacology 87(2) 185-205

Horowitz 1986 "Carboxyhemoglobinemia caused by inhalation of methylene chloride" American Journal of Emergency Medicine 4(1) 48-51

Buie et. al. 1986 "Diffuse pulmonary injury following paint remover exposure" American Journal of Medicine 81(4) 702-704

11 Washington Toxics Coalition, Winter 2000, Alternatives p. 5

10 Allen, ibid.

9 Allen, ibid.

8 Allen, ibid.

7 Allen, T. 2000 "Chemical Cops—Tear gas and pepper spray can be deadly. No one is protecting the public." In These Times

6 STOA ibid. Technical Annex appendices

5 Hu et. al. 1989 "Tear Gas—Harassing agent or toxic chemical weapon?" JAMA 262

4 STOA Panel 1998 "Crowd Control Technologies—Crowd Control Technology Options for the European Union" STOA working report

3 ACLU of Southern California 1995 Pepper Spray: More Fatalities, More Questions

2 ACLU, 1993 ibid.

1 ACLU of Southern California, 1993 Pepper Spray: A Magic Bullet Under Scrutiny

The Acute Effects of Crowd Control Chemicals

The ostensible purpose of crowd control weapons is to cause temporary discomfort, most often irritation of mucous membranes. Irritation of the eyes and respiratory system trigger fear and dislocation, causing the individual to either fall to the ground in pain or to flee from the location. The effects of the chemicals are intended to be painful but wear off in a few minutes, causing no permanent damage in the exposed person.

When deployed, CS and CN affect several different parts of the body. Tear gas entering the eyes causes irritative conjunctivitis, which includes redness, tearing, and swelling (hence the popular name). The ocular pain triggers the body's response of closing the eyes to shut out the offending chemical. When inhaled, tear gas causes a similar irritation of the nose, throat, tongue, and lungs.[1] The effects include uncontrollable coughing and sneezing, acute headache, shortness of breath, increased heart rate and blood pressure, and tightness of the chest. The stomach may also be irritated, triggering acute nausea, vomiting and diarrhea.[2] The exposed person experiences an increased and more erratic heartbeat, as well as high blood pressure.[3] A person will feel some or all of these symptoms to a greater or lesser extent depending on proximity to the gas. Some effects may be much more severe. When someone is exposed at close range, they experience burning and blistering of the skin, which can be severe enough to cause third degree burns in people hit by exploding canisters. The explosion may also cause blindness if the eyes are severely burned. Recent studies have found that tear gas is fatal to humans at much lower concentrations than for mice, on whom most studies have been conducted.[4]

Exposure to CS and CN can cause a 'tear gas cold' lasting up to several weeks. This set of immediate symptoms includes runny nose, sneezing, sore throat, cough, and shortness of breath; namely a continuation of the intended, supposedly temporary irritant effects of the gas.[5] Other respiratory effects incurred by heavy exposure include pneumonia, prolonged upper respiratory illnesses, and pulmonary edema (which may be latent for several hours and often leads to death). It also causes respiratory failure (at high exposure levels) and a chronic asthmatic condition known as Reactive Airways Dysfunction Disorder.[6] These latter symptoms are often precipitated by pre-existing lung conditions. At high concentrations it may cause necrosis of respiratory tissue.[7]

Methylene chloride, the 'inert' solvent used in the CN gas deployed at Pike's Place Market on December 1st, also has acute effects documented in the medical literature. When a

person is exposed to methylene chloride, they experience irritative conjunctivitis, headache, nausea, coughing, and vomiting.[8] The exposed person begins to feel dizzy and agility is lost. Confusion begins to set in, followed by a feeling of panic. They may also be sensitive to light and sound for several days and their skin will crack. At high doses methylene chloride inhalation can trigger cardiac arrest, pulmonary edema, unconsciousness, and possibly death, especially in people with heart or lung conditions.[9] It also causes muscle fiber hyperactivity during exposure, which leads to the body aches felt by many exposed people after they had escaped from the acute effects of the gas.[10] At high doses, inhaled methylene chloride causes convulsions of the head and body, uncontrollable shaking, and death.[11] Fortunately, no one in Seattle was exposed at extremely high doses or in very close quarters.

Several of the acute effects of inhaled methylene chloride or tear gas are felt for days, sometimes weeks, after exposure. One is depression of the central nervous system, which begins at exposure and can continue for days afterward.[12] This is the cause of the symptoms which mimicked nerve gas exposure in Seattle protestors: the body aches, headaches, forgetfulness, dizziness and tremors experienced by so many people who were in Pike's Place Market on December 1st. The cold-like symptoms, especially rhinorrhea, coughing, shortness of breath, and sneezing, can linger for weeks in heavily exposed people.[13] Even after the symptoms have dissipated, the gas has not finished it's work. It may have left the beginnings of tumors all over the liver and lungs. The process is described below.

Methylene chloride, when inhaled by itself or as a solvent for another chemical, causes hypoxia and central nervous system depression.[14] The central nervous system depression is a result of solvent-related narcosis. This is what causes the neurological symptoms commonly attributed to nerve gases. Symptoms include confusion, sedation, loss of memory, slurred speech, hallucinations, and loss of agility.[15] Central nervous system depression is a condition more commonly seen in people who imbibe too much alcohol. The lasting effects of the depression are akin to the symptoms of a bad hangover, though unlike a hangover, will persist for up to a week. Neurons increase activity after exposure to chemicals that depress the central nervous system, which results in the intense body aches and back spasms experienced by people who were most heavily exposed in Seattle.[16] A majority of them described their exposure as the worst flu they had ever experienced, often lasting for days after exposure and subsiding only slowly. At high enough concentrations, methylene chloride can cause death.[17]

Thirty-five percent of the women interviewed who were

exposed to the methylene chloride-CN mix in Pike's Place Market on December 1st experienced spontaneous menstruation within several hours. There is no existing clinical evidence supporting the connection between exposure and inducing menstruation.

Pepper spray, like CS and CN, requires a liquid solvent as a carrier. Therefore, the acute effects of the spray will vary from solution to solution. Acute symptoms of inhalation are characterized by the mucous membrane irritation triggered by the pepper.[18] This includes burning of the eyes and throat, cough, shortness of breath, gagging and nausea, fear, and disorientation. The eyes often close involuntarily, and the skin burns.[19] Exposes persons often feel weak at the knees and fall to the ground immediately.[20]

The acute respiratory effects of OC, namely shortness of breath, gagging, and gasping, may trigger respiratory arrest, pulmonary edema, and chemical pneumonitis, especially in susceptible people.[21] Several studies conducted by the ACLU of Southern California have investigated the increasing number of instances of in-custody deaths of people who had been exposed to pepper spray during their struggle with the police. Most of these deaths occurred in people with previous histories of respiratory or cardiac problems who were sprayed and transported in positions that compromised their ability to breathe.[22] This raises troubling questions with regards to police actions in Seattle, as many people who were sprayed by police were immediately taken into custody.

These acute symptoms also vary as the concentrations and contents of the chemicals vary. Those exposed at close range will also exhibit more serious symptoms than those exposed at a distance. Healthy individuals may exhibit fewer and less severe symptoms than those individuals with pre-existing health conditions. OC, CS, CN, and methylene chloride have all been documented as the cause of respiratory attacks and pulmonary edema in susceptible individuals.[23] These effects can also occur in healthy individuals at higher doses. Central nervous system depression, as caused by inhalation of methylene chloride, is a series of symptoms, leading from loss of agility to a loss of consciousness to death at high doses. Unless all the above factors: the content and concentration

Mike Orr

Short-term effects of tear gas include body aches, headaches, forgetfulness, dizziness and tremors—all symptoms experienced in Seattle.

of the chemicals, the distance of deployment, and the health of all exposed individuals, can be standardized, chemical agents will always have the potential to cause serious, perhaps life-threatening, acute effects.

23 Kim et. al. 1996 “Two fatal cases of dichloromethane or chloroform poisoning” Journal of Forensic Science 41(3) 527-529

Mahmud and Kales, ibid.

ACLU, ibid.

Hu et. al. ibid.

22 ACLU of Southern California, report released 1995

21 Smith et. al. ibid.

20 ACLU of Southern California, report released 1993

19 Long Beach Police Department, report released 1996

18 Smith et. al. 1999 “Health hazards of pepper spray” NCMJ 60(5) 268-273

17 Mahmud and Kales, ibid.

Leiken et. al. 1990 “Methylene chloride: report of five exposures and two deaths” American Journal of Emergency Medicine 8(6) 534-537

Kim et. al. ibid.

16Taken from reports submitted to Direct Action Network medical clinic during the WTO protests

15 Tariot 1983 “Delerium resulting from methylene chloride exposure: case report” Journal of Clinical Psychiatry 44(9) 340-342

14 Buie et. al, ibid.

Horowitz 1986 “Carboxyheomoglobinemia caused by inhalation of methylene chloride” American Journal of Emergency Medicine 4(1) 48-51

13 Physicians for Human Rights, ibid.

12 Mahmud and Kales, ibid.

11 Laham et. al, ibid.

10 Kjellstrand et. al. 1990 “Tolerance during inhalation of organic solvents” Pharmacological Toxicology 66(5) 409-414

9 Buie et. al. ibid; Mahmud and Kales, ibid

8 Duenas et. al. 2000 “CO poisoning caused by inhalation of CH3Cl contained in personal defense spray” American Journal of Emergency Medicine 18(1) 120-121

Mahmud and Kales 1999 “Methylene chloride poisoning in a cabinet worker” Environmental Health Perspectives 107(9) 769-772

Buie et. al. 1986 “Diffuse pulmonary injury following paint remover exposure” American Journal of Medicine 81(4) 713-720

Laham et. al. 1978 ‘Toxicological studies on dichloromethane, a solvent simulating carbon monoxide poisoning” Toxicology European Research 1(2) 63-73

7 ChemArmor data sheet

6 PHR ibid.

Brimblecombe et. al. ibid.

5 PHR ibid.

Hu et. al. ibid.

4 material data safety sheet provided by ChemArmor

3 Brimblecombe et. al. ibid.

2 Hu et. al. ibid

Brimblecombe et. al. 1972 “Pharmacology of o-chlorobenzylidene malononitrile (CS)” British Journal of Pharmacology 44, 561-576

1 Hu et. al. 1989 “Tear Gas—Harassing Agent or Toxic Chemical?” JAMA 262:5, 660-663

Physicians For Human Rights 1987 The Use of Tear Gas in the Republic of Korea: A Report by Health Professionals 1-16

Chronic Health Effects of Chemical Agents

In a material data safety sheet, the CS and CN solid and liquid are considered the 'active' ingredients, and the solvents used to disperse them are 'inert.' They ostensibly have no effects of their own other than to disperse the active ingredient, the tearing agent. To disburse CS or CN, a solvent turns it into gas, and it is difficult to determine precisely where the effects of the tear gas end and the effects of the solvent begin. Methylene chloride has been extensively researched, as it is a main ingredient in paint and varnish stripping agents. Unfortunately, it is not uncommon for workers in poorly ventilated areas to be overcome with methylene chloride fumes.

Due to the original non-gaseous natures of the CS and CN chemical agents, the literature fails to report tests specifically on CS or CN without also documenting the effects of the solvent involved. It must further be considered that these solvents and agents may induce other non-identified chemicals to react, potentially producing synergistic effects. Bearing this in mind, it is necessary to look not merely at the effects suffered by people in Seattle, but also look at the medical evidence of the health effects that CS, CN, methylene chloride, and OC may induce.

High levels of exposure to methylene chloride was found to cause chronic neuro-psychiatric problems such as persistent anxiety, delirium, erratic mental and emotional behavior, and sometimes dementia in exposed people. These effects are caused possibly by brain toxicity incurred by constant high levels of CO in the bloodstream.[1] In one case of fatal methylene chloride poisoning, significant concentrations of the chemical were found in the brain.[2] In another study, methylene chloride hypoxia was linked to learning impairment.[3] At the current time, the literature fails to conclude definitively on the long-term effects on the brain and behavior on people who were at one time exposed to high concentrations of methylene chloride. It has not been studied whether or not the concentrations of methylene chloride in the brain subside over time, or if they continue to adversely affect emotional behavior and mental ability.

The most frightening long-term effect of exposure to methylene chloride is mutations in reproductive cells, organs, and in somatic chromosomes.

Methylene chloride is metabolized in the liver and kidney and released into the bloodstream as carbon monoxide (CO). This causes the acute effects of light-headedness, fatigue, shortness of breath, inability to sleep, fever, and

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At high concentrations, methylene chloride can cause death.

increased heart rate.[4] Methylene chloride remains in the liver and kidneys until it is completely metabolized, so these symptoms can persist for over 24 hours as CO is continuously released into the bloodstream, causing hypoxia. The liver, lungs, and kidneys may be severely, permanently affected by their constant exposure to methylene chloride. As a result of the muscle hyperactivity caused by the central nervous system depression, injured muscle tissue may break down and be released into the bloodstream. The proteins collect in the kidneys, where they may shut them down on a temporary or permanent basis.[5] The solvent has been listed by the EPA, National Toxicology Program, OCHA, and International Agency for Research on Cancer as a probable human carcinogen.[6] It has also been proven in many of the following studies to cause cancerous tumors at high exposure levels. Methylene chloride is both toxic and mutagenic in the lungs and liver.[7] It is toxic to liver cells,[8] and will also cause tumors on both the lungs and liver. A heavily exposed person may experience permanent loss of growth control in normal lung cells.[9] It causes decreased pulmonary bactericidal activity, which may result in permanent increased susceptibility to respiratory strep infections and pneumonia.[10]

The most frightening long-term effect of exposure to methylene chloride is mutations in reproductive cells, organs, and in somatic chromosomes. High levels of exposure are known to cause cancerous tumors in the mammary glands.[11] Several men who were exposed to methylene chloride were rendered infertile due to decreased sperm density, motility, and morphologic mutations.[12] It is also responsible for chromosomal abnormalities in mammary cells.[13] It is clear that effects on the reproductive system, and other effects on women in particular, must be investigated in the future.

CS and CN can be disbursed with a variety of solvents, which is important to keep in mind when analyzing the chronic effects of exposure. Many of the chronic effects felt by people who were exposed in Pike's Place Market may have been a result purely of the exposure to methylene chloride. However, CS and CN used with various solvents have been consistently linked to several chronic effects. For the purposes of this report, the chronic effects of all 'tear gases' are being reported.

Methylene chloride aside, tear gases are toxic to organs, including the reproductive organs. They are responsible for liver and brain damage, as well as heart failure,[14] the latter of which is the result of severe central nervous system depression. CS and CN are documented genotoxins. Tear gas has been associated with increased instances of stillbirths and miscarriages in exposed pregnant women.[15] This is due to the toxic effects of the gas on chromosomes, which mutate after exposure.[16]

CN, the agent used against protestors in Seattle, is more toxic to the eyes and skin than CS. It is more likely to cause permanent corneal damage, usually in the form of lesions, when the liquid form comes into contact with the eye.[17] This may lead to diminished vision and even permanent blindness.[18] CN is also known to cause severe skin reactions that last well beyond the immediate exposure. It causes second and third degree chemical burns on the skin of people close to exploding canisters, as well as contact dermatitis and severe allergic reactions, which cause persistent skin irritation.[19]

Oleoresin capsicum, also known as pepper spray, is not well regulated among makers of defense and police sprays. Concentrations of the extract may vary as much as 15% among brands, which translates into a 30-fold increase in risks associated with exposure in people who are sprayed with the most potent concentrations.[20]

However, most chronic effects are caused not by the pepper product itself, but by the solvent carriers, such as methylene chloride.

The latency period for such health problems as cancer, long-term dementia, and chromosome aneuploidy raises troubling questions about the Seattle situation. It will be difficult to track the exposed population for the time necessary to discern whether or not they were exposed to chemicals at highly toxic doses; it is equally troubling that a single exposure due to the irresponsible activities of the Seattle Police Department may cause exposed people serious health problems for the rest of their lives. It is imperative that more research be conducted on the chronic problems associated to exposure to chemical agents.

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19 Zekri et. al. 1995 “Acute mass burns caused by o-chlorobenzylidene (CS) tear gas” Burns 21(8) 586-589

Hu et. al. ibid.

18 PHR ibid.

17 Hu et. al. ibid.

16 Ziegler-Skylakakis et. al. 1989 “Mutagenicity and cytotoxicity of 2-chlorobenzylidene malonitrile (CS) and metabolites in V79 Chinese hamster cells” Archives of Toxicology 63(4) 314-319

15 Hu et. al. ibid.

14 PHR ibid.

13 Maronpot et. al. ibid.

12 Kelly 1988 “Case reports of individuals with oligospermia and methylene chloride exposures” Reproductive Toxicology 2(1) 13-17

11 Andersen et. al. ibid.

10 Aranyi et. al. ibid.

9 Maronpot et. al. ibid.

8 Minzutani et. al. 1988 “Hepatotoxicity of dichloromethane” Journal of Forensic Science International 38(1-2) 113-128

7 Andersen et. al. 1987 “Physiologically based pharmacokinetics and the risk assessment process for methylene chloride” Toxicological Applied Pharmacology 87(2) 185-205

Aranyi et. al. ibid.

6 Washington Toxics Coalition, report released December 2000

Mahmud and Kales ibid.

5 Horowitz ibid.

4 Horowitz ibid.

Duenas et. al. ibid.

Kim et. al. ibid.

Laham et. al. ibid.

Mahmud and Kales ibid.

Aranyi et. al. 1986 “The effects of inhalation of organic chemical air contaminants on murine lung host defenses” Fundamental Applied Toxicology 6(4) 713-720

3 Alexeeff and Kilgore 1983 “Learning impairment in mice following acute exposure to dichloromethane and carbontetrachloride” Journal of Toxicological Environmental Health 11(4-6) 569-581

2 Kim et. al. ibid

1 Buie et. al. ibid

Tariot ibid.

Appendix: Voices from Seattle

“I was one of the folks in Pike Place Market getting nailed by the police on Wednesday. [I] began feeling weak and sore that evening and throughout Thursday. [I had] diarrhea, face burning and continued weakness into Friday.

[I] thought it was the flu but couldn’t explain burning sensation, [I] just thought it was from a lot of tear gas. [I] went to Providence hospital around 10 pm checked in, but they had too many emergencies to see me. [I] left at 1 am without being seen. By this time I couldn’t even carry on conversations my mind was so scattered.

I laid down at my friends house and couldn’t get up until late Saturday night and that was only to go to the bathroom. Throughout Saturday my nose kept bleeding and when I was able to brush my teeth my gums bled too.

I do not have overly sensitive gums nor do they bleed often. I was able to move around a little more midday Sunday. I spent the better part of Saturday and Sunday flat on my back. [I] had a high fever all day sat. [I had] chills, muscle cramps and twitching. My eyes ached as well. It was like having the worst flu in my life times ten.”[1]

—male, 36 years old

Since the WTO talks in December 1999, PSR-LA and the Direct Action Network have been in contact with people who were within the vicinity of the gas canisters in downtown Seattle. Many have given accounts of the

physical symptoms they exhibited when inhaling gas as well as for days, sometimes weeks, later. What is remarkable about these accounts is the similarities of the acute and chronic effects felt by people who were exposed to gas. Flu-like symptoms, namely congestion, body aches, fever, and fatigue, have never been documented as being associated with CN or CS use, and yet they were the most common effects mentioned by people from around the country who came into contact with the gas.

"Hi, I... took part in the anti-WTO demos last week in Seattle. On Wednesday, 12/1, the gas affected me quite strongly as my bandanna fell down while some CS gas was shot quite near me and I inhaled it. This was a little bit east of the Pike Market.

My lungs hurt a lot last Wednesday, 12/1. On Thursday, 12/2, I returned [home] to Olympia and couldn't stop coughing. On Friday, 12/3, I felt slightly better although my lungs seemed irritated as I coughed a lot.

On Saturday, 12/4 I had strong stomach cramps, which are very unusual, and diarrhea. On Sunday and Monday, 12/5 and 12/6, I was quite congested, felt very lightheaded (dizzy) and really tired.

I began to feel better on Tuesday, 12/7, although tired, and feel recovered by today, Wednesday, 12/8 at Noon."

—male, 37 years old

Even more perturbing is the consistency of neurological symptoms, such as forgetfulness, dizziness, and tremors. These symptoms are usually consistent with exposure to cholinesterase inhibitors, known commonly as nerve agents. PSR does not think such agents were used against protestors in Seattle. However, it is possible that CS and methylene chloride, the solvent used in Seattle to discharge CS, when put together can have synergistic effects that are chronic and include neurological symptoms.

"I want to give my account of being gassed and my symptoms from the Pike Place Market area on Wednesday afternoon, Dec. 1, 1999. I am a 32 year old healthy male, who exercises frequently. I was gassed the previous day by Seattle Police downtown, which was an unpleasant experience to say the least. The gas I experienced at the locations of Pine St. and 2nd Ave. felt ten times worse than that the previous day. Police began the gassing at 3rd ave. and Pine, (outside the no-protest zone) on a group of hundreds of very peaceful marchers. Police continued to gas them back towards 2nd street, gassing north on 3rd to Stewart St., then West on both Stewart and Pine to 2nd Street, then this block of 2nd street was gassed, as well as the intersection of Pine and Pike. I was caught in the middle of the gas at the intersection of 2nd and Pine, and ran west to escape it. I was blinded for minutes, and very disoriented.

I fell to my knees at 1st and Pine, and crawled around the NE corner to escape the gas. I screamed for a few minutes for help, but no one came with water, so I groped around and found a small bottle in my backpack to wash my face off. I think it was about 10 minutes before I could walk again, but

I'm not sure. The gas canisters were smaller than the previous day, but far more potent.

I don't have asthma, but experienced asthmatic-like attacks for the remainder of the day, about every 8 minutes (past midnight, over 6 or 8 hours). I had trouble getting deep breaths, my lungs felt tight, and would cough a bit after trying to get deep breaths. The following morning, my body hurt like I was beaten all over. I exercise regularly, and have never experienced the deep muscle soreness and aching, and tired feeling like I did Thursday morning even after a full day of exercise, and despite a full night's sleep (about 9 hours).

[I] couldn't get up until late Saturday night and that was only to go to the bathroom. Throughout Saturday my nose kept bleeding and when I was able to brush my teeth my gums bled too.

I suffered a severe sinus headache all day Thursday, making my temples, neck and shoulders stiff and sore as well. My eye sockets were painful to the touch.

I was trying not to focus on my body Friday, assuming any pains I was feeling from this gas would eventually go away. Saturday, Dec. 4 through today, Dec. 7 I have been experiencing blood in my mucous when I blow my nose. I have also been coughing up some green phlegm. I have had sinus headaches for the past 2 days, which began late Sunday, and my head feels clogged.

I witnessed several people gassed at the locations I described above on Wednesday, including a man who was in a wheelchair being helped by others.

About 3 hours after the gas attack, I experienced some nausea as well. I think I forgot to mention that. I was exposed to some gas at the intersection of 3rd and Pine, and the mid block of pine between 3rd and 2nd Ave, in case that was not clear."

—-male, 32 years old

There were thousands of people exposed to extremely dangerous gases during the WTO talks. However, the police did not provide any of them with post-exposure care, nor were most people at the protests prepared to cope with the possibility of being gassed.

"I was in Seattle and received a very large dose of gas at close range on Tuesday between 3 and 6. I am not quite sure of the time. Since that exposure, I have run a low grade temperature on and off, experienced terrible confusion and forgetfulness, irregular heart beat, dizziness, tremors and a facial rash. I thought I was just traumatized by the experience but when the symptoms persisted I asked my brother, who is in the national guard and is routinely exposed to tear gas about the symptoms. He said tear gas wears off within a day. I went to the university clinic and saw a nurse practitioner but she really couldn't offer any help or advice.

I am a graduate student at the University of Massachusetts and I have to defend my thesis on Wednesday the 15th but I can't even remember what I wrote about."

—-female, 37 years old

There were not enough enough doctors on-site to cope with the number of people exposed. The local hospitals were so swamped with exposure victims that many of them left without being treated, and it was not uncommon for doctors to deal lightly with exposure victims and treat them in a manner improper for methylene chloride exposure.[2]

"I was gassed both Tuesday (Morning and afternoon, at 6th and Pike) and Wednesday (afternoon, various places downtown including the market). Immediately after each time I was gassed Wednesday, I experienced temporary blurring of vision, which lasted maybe 10-15 minutes. There was also eye irritation, and a bit of coughing. After returning from Seattle on Saturday 12/4, I have felt flu-like symptoms: clogged sinuses, headache, lots of body aches, sore throat, fever, and serious fatigue. As of 12/10, I remained slightly sick."

—male, 37 years old

This last account is particularly striking, as the exposed woman documented the mental and emotional problems she was having after inhaling the gas.

"Hello, I was gassed N[ovember] 30 and Wed[nesday] and now I am sick along with everyone I was in Seattle with who were exposed to chemical agents, at different times and for different durations...but I can only speak for myself. N[ovember] 30 I was not exposed that much, [meaning] directly to too much gas. It was mostly drift, but for a period of 25 minutes was fairly constant. Wednesday, we got it good, above the market... at that time I saw people convulsing and throwing up in the street, I washed my eyes and throat and coughed a lot but was fine. We washed a bunch of other people then kept moving to keep ahead of the riot cops. While I was in Seattle I felt little; I was on a huge adrenaline high. As soon as I returned home to Victoria, British Columbia, I fell apart.

I have been having [very] real nightmares, sweats, fevers, dizziness, and dehydration. When I try to drink I feel nausea, [I have] diarrhea, I have a cramping knot in my abdomen that is painful, I keep having this flash back to sliding and falling along the grates that are on the sidewalks on Denny way on the hill. Usually as I am about to fall asleep, it jerks me awake and my feet and toes twitch. I can't concentrate.

I got very little sleep while I was in Seattle (n[ovember] 20 to dec[ember] 6) so this could be sheer exhaustion. I am coughing up lots of multi-colored phlegm. I keep hearing radio transmissions in my head, and that bloody helicopter... I am usually more coherent in my writing, sorry....i have slept [a] lot since I returned but I am so low energy. I feel weak and mono like. My mind seems fuzzy, conversation is difficult....

Anyway, some of my friends got their periods N[ovember] 30, and were nauseous and [throwing up] and have persistent headaches... among other things but I don't want to talk about them. I am going to go sleep now... I feel so sketched out and funny...but I am so tired too, I can't think ."

—female, 25 years old

The following page is a table listing the symptoms described by 55 people who were exposed to tear gas in Seattle. The most common symptoms are those that people exposed at any range may feel, those that are less common tend to occur at very high exposure levels, with people who were close to exploding canisters or were exposed in a more enclosed space. Symptoms such as asthma and numbness in limbs could possibly be exacerbations of pre-existing conditions.

1 E-mail syntax has been edited for the purposes of the report.

2"Hoffman" personal report and medical examination reports.

Symptoms Described by 55 Victims of Tear Gas and Pepper Spray in the Seattle WTO Protests

Symptoms Described	Number of Victims	Percentage
EYES / NOSE / THROAT / EARS / SKIN		
Sore throat	15	27%
Redness in Eyes	9	16%
Nose Congestion	9	16%
Swollen Sinuses	9	16%
Skin Irritation	8	14%
Temporary Blindness	7	12%
Nose irritation	7	12%
Tearing	6	10%
Voice lost	6	10%
Nose Bleed	3	5%
Earache	2	3%
Lumps on tongue	2	3%
Swollen glands	1	1%
GASTRO-INTESTINAL		
Nausea	7	12%
Diarrhea	7	12%
Cramps	4	7%
Vomiting	3	5%
RESPIRATORY SYSTEM		
Coughing	13	23%
Chest constriction	11	20%
Coughed-up phlegm	9	16%
Breathing difficulty	7	12%
Asthma	2	3%

Symptoms Described	Number of Victims	Percentage
COGNITIVE DISTURBANCE		
Difficulty focusing	11	20%
Dizziness	9	16%
Disorientation	9	16%
Coordination problems	4	7%
Difficulty finding words	4	7%
Hallucinations	3	5%
Nervousness	1	1%
Numbness in limbs	1	1%
MISCELLANEOUS		
Fatigue	14	25%
Body aches	13	23%
Fever	9	16%
Headache	8	14%
Emotional distress	7	12%
Difficulty regulating body temp.	7	12%
Hot/Cold flashes	6	10%
Restless sleep	1	1%
Menstrual irregularity (of 26 women)	9	34%

Troubling Questions about the Seattle Situation

The events that took place in Seattle may be critical in our understanding of the nature of the people's relationship with the U.S. government. Never in our history has an international meeting been met with such a massive popular response, never has the government responded on such a massive and brutal scale. The official response is indicative of what happens in a supposedly democratic country when the will of the people is strong and organized, instead of small, apathetic, and weak. Police who deal with protests are used to the latter response, which they usually allow. We now see that this is completely protected under the Bill of Rights. However, when the right to organize and demonstrate peacefully is acted upon in a powerful, visible way, it is no longer protected. This is because it has become a strong statement of what the people actually want. Nowhere was this as amply demonstrated as in Seattle.

In response to massive inquiries regarding the legality of the police actions in Seattle, which included gassing, rubber bullets and concussion grenades dispersed incautiously throughout the busy downtown area, the Seattle City Council conducted an investigation of the police and national guard actions. The most surprising findings were the police's irresponsible obtainment and use of chemical weapons. Journalist Terry Allen uncovered evidence of the Seattle PD going to outside sources to replenish their stocks once their original supplies of gas had run out. The supplier, Def-Tec, refused to release information about the chemical make-up of their agent, which was released in the Pike's Place Market on December 1st. In response to the overwhelming number of inquiries from people who were ill days after being exposed in the market, the Washington Toxics Coalition requested material safety data sheets from the Seattle PD for all chemicals used against protestors. While the effects of each of these chemicals, including OC, CS, CN, and the solvent methylene chloride, are widely documented in the medical literature, their synergistic effects have not been studied, nor have the results of these studies been considered in national chemical agent policy.

In 1970 the National Security Council approved the Pentagon's new definition of 'chemical warfare.' It is "the employment of chemical agents which result in prolonged incapacitation or death, in contrast to the temporary nature of riot control agents (CS) whose effects are not lasting and dissipate quickly." From the evidence presented in Seattle, we can conclude that the

police department and National Guard were indeed waging chemical warfare against everyone in downtown Seattle.

It is interesting to note that at the time the definition was approved, CS was considered a safe and temporary irritating agent. As we have shown here, in the intervening years it has been proven in many medical studies that it can in fact cause weeks of incapacitation, and in some cases death. This definition, and the police, also neglected to address the synergistic effects of releasing many different agents together. There were people in Seattle who were pepper sprayed one minute and exposed to blankets of tear gas the next. The indiscriminate use of chemical agents, in many combinations, against young and old, weak and healthy, constitutes an irresponsible declaration of war against the public. CN, the chemical used by police in Pike's Place Market, was removed from use in war by the U.S. Army and NATO because it is highly toxic. However, because it is categorized as a 'police-grade weapon,' the Seattle PD was legally able to use it domestically. It seems this country treats its perceived enemies better than it treats its own people.

The STOA panel recently released its 2000 working report entitled "Crowd Control Technologies: An Appraisal of Techniques of Political Control." The panel decided that chemical weapons in the EU, especially pepper spray (the least controlled in terms of allowable concentrations of OC) should be banned for use in member nations until their entire chemical compositions could be standardized and released for scientific study and public information. Apparently, like the US it is also the case in the EU that chemical agents, though potentially deadly, are not rigorously monitored by any government agency. The STOA panel did not consider the synergistic effects of chemicals when released in conjunction with one another, indeed it is probable that it is extremely uncommon in recent EU history has more than one chemical agent been used against people simultaneously. Indeed, the combined effects of pepper spray and tear gas may cause respiratory arrest and permanent eye damage, among other effects, in otherwise perfectly healthy individuals. In light of the events that took place in Seattle, it behooves the scientific community

James Greer

Seattle police officers spray tear gas at protesters from several feet away.

to begin a serious inquiry into this matter, especially considering that the ostensibly 'inert' solvents used to disperse the gases might in fact be their most deadly component.

It behooves the scientific community to begin a serious inquiry, especially considering that the ostensibly 'inert' solvents used to disperse the gases might in fact be their most deadly component.

The Seattle situation brings up many troubling legal, ethical, medical, and economic questions. In light of the potential toxic and carcinogenic natures of the weapons used against people, the long-term health effects, including birth defects and chromosomal abnormalities, may not be completely evident for several years. The question arises whether the heavily exposed population, indeed this must necessarily include all residents and workers in the Pike's Place Market area, should be monitored closely for symptoms. Using responsible police ethics, the answer should be yes. As the saying goes "when you spray them, you own them", according to a program manager at the National Institute for Justice. There is a requirement for aftercare; so far this requirement has not been met. With or without monitoring of exposed people, we have already seen people lose thousands of man-hours of work, disability cases, etc. There is great potential for massive litigation on behalf of exposed people whose work and lives were, and may still be, affected.

As we see the high economic costs of irresponsible actions, who should pay for them? Should it be the city of Seattle, whose mayor declared martial law and unleashed irresponsible police to act as they saw fit? Should it be the officers themselves? Perhaps Def-Tec, among other manufacturers, should bear the burden of compensating people. These are the companies responsible for creating mixtures of CN and methylene chloride, and unregulated mixtures of OC. As it stands, only the exposed people are paying the price, and may be doing so for the rest of their lives. If the companies themselves were held responsible for the health of the people sprayed with their products, perhaps they would test their products more carefully, educate their customers about the possible effects of their use, and take the health of the people whose lives they affect seriously.

Conclusions

The actions of the Seattle Police Department and National Guard during the three days of the WTO Conference in 1999 constituted the single largest deployment of chemical weapons in the history of North America. The deployment of these weapons, which were used against young and old alike, healthy and infirm, en total in the city of Seattle, are prohibited by the International Treaty on Chemical Weapons for use in warfare.[1] Warfare is a situation where one is dealing with ostensible enemies, attacking men readied for combat who are healthy and expecting to fight. The people exposed to these chemicals in Seattle were both peaceful demonstrators and uninvolved residents. They came from all walks of life, for many different reasons, and were met with official force that would otherwise be illegal. It is almost more frightening to think that this act of chemical warfare, as it is indeed warfare as defined by the Pentagon, came at the hands of local authorities acting mainly of their own accord.

Thousands of innocent people were exposed to potentially deadly chemicals. This exposure came at a very high price. This price is not only directly monetary, though the taxpayers of Seattle paid for the chemicals used against them, but had indirect costs as well. Thousands of hours of work were lost by people made sick by gas, hundreds of insurance claims were made, and lawsuits were filed. These court battles may be fought well into the future, with the cost being borne directly by taxpayers. More importantly, thousands of exposed people will be paying with their health. Innumerable people were seriously ill in the weeks following exposure, but the full effect of the carcinogenic 'inerts' may not be felt for many years. We will know if exposed people have children with birth defects, develop tumors on their livers and lungs, or suffer from unexplained emotional problems, exactly what is the price of this exposure.

Physicians for Social Responsibility is forwarding to the American Public Health Association a resolution pertaining to the use of chemical weapons in this country. PSR is calling on all state medical associations to seek state legislation to oppose the use of chemical agents in populated areas where general exposure is possible. In order to protect the health of many, law enforcement must be compelled to find other ways to control the behavior of a few. It is imperative that when dealing with chemicals as dangerous as tear gas that officials be forced to think carefully about their chosen methods. To protect the public from serious harm, PSR supports the implementation of new laws and resolutions mandatory for all chemical constituents.

- **Material data safety sheets of all materials**, including supposed 'inerts,' of any chemicals used by law enforcement must be disclosed, both to law enforcement and the public, as a condition of their purchase.

- **Manufacturers should be held economically liable** for the damages arising from the acute and chronic health effects caused by their products. This requirement would push for more responsible research on the health effects of chemicals, as well as for more responsible manufacturing policies and practices.

- **PSR seeks the prohibition of indiscriminate, non-targeted discharge of chemical weapons.** This includes a prohibition on delivery grenades, exploding canisters, or any other device that allows for the effectively random deployment of harmful chemical agents.

- **Education of law enforcement authorities** is crucial to ensure the public safety and rights to sound health. Law enforcement officers, the National Guard, fire fighters, and anyone else who might be called upon to expose another human being to chemicals must be made aware of the toxicity and potential long-term effects of the chemicals involved.

- **Health care professionals such as the ER technicians, primary care physicians, and emergency room physicians should be briefed about the toxicity of all the various chemical agents present in tear gases.** Health professionals can treat exposed people more effectively if armed with this knowledge, and perhaps can prepare themselves to counsel people whose exposure levels may make them susceptible to chronic adverse health effects. Most importantly, patients need to know if they have been exposed to a toxin.

- **Manufacturers should pay into a medical education effort** to brief various health professionals on the acute and chronic health effects of crowd control chemicals.

Changes in domestic chemical weapons policy may prevent such political and public health debacles as seen in Seattle. From the manufacturer to the authority directly responsible for the control of a crowd, each entity must be held accountable for their actions and held responsible to the people whose health they may affect. The Nuremberg Code states

...the person involved should have legal capacity to give consent; should be so situated as to be able to exercise free power of choice, without the intervention of any element of force, fraud, deceit, duress, over-reaching, or other ulterior

form of constraint or coercion; and should have sufficient knowledge and comprehension of the elements of the subject matter involved as to enable him to make an understanding and enlightened decision.

People are not simply obstructions to a conference, annoyances that must be dealt with in order to proceed. Their freedom to exercise choice, to be healthy and free and express opinions safely are guaranteed under the Constitution. Unless steps are taken to protect these freedoms, then freedom itself may be the ultimate casualty in the use of crowd control chemicals.

2 The ACLU of Washington has a class action suit pending against the Seattle Police Department.

1 STOA 2000, ibid.

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