

SUPREME COURT OF THE STATE OF NEW YORK  
COUNTY OF NEW YORK

COLIN FRASER, et al,

Index No: 113586 / 02

Plaintiffs,

-against-

AFFIDAVIT

301-52 TOWNHOUSE CORP., et al.,

Defendants.

X

STATE OF WASHINGTON}

COUNTY OF THURSTON} SS:

Harriet M. Ammann, Ph.D., D.A.B.T., being duly sworn, deposes and says:

1. My name is Harriet M. Ammann, Ph.D., D.A.B.T. I am certified in toxicology by the American Board of Toxicology and have worked a senior public health toxicologist for the last sixteen years for the State of Washington Departments of Health (12 years) and Ecology (4 years). A copy of my Curriculum Vitae, which sets forth my education, training, qualifications and experience, publications, etc. in more detail, is annexed. As such I have been required to act to protect the health of Washington citizens through analyses of environmental exposures and real and potential health effects associated with such exposures. Potential health effects as determined from animal and human studies can be used to predict risk and prevent exposures of communities, while health effects that occur in individuals or communities can be analyzed and related to measured environmental exposures to serve in treatment of illness, and prevention of future harmful exposures. I was a member of the Committee on Damp Indoor Spaces and Health, of the Institute

of Medicine of the National Academy of Sciences, which produced the report on Damp Indoor Spaces and Health upon which the court relies. *Exhibit I*

2. I am very concerned about the lack of judicial understanding of the science of exposure determination, and the misinterpretation of scientific information in the recent Supreme Court, New York County Frye decision in *Fraser v. 301-52 Townhouse Corporation*. An overall lack of understanding of the meaning of epidemiological association and causality is apparent in almost every discussion of plaintiff references by the court. The court seems to have no understanding of the meaning of epidemiological causality.

3. Every epidemiological study is designed to determine the degree of association between an exposure and a health effect. No individual study can show epidemiological causality, since this can only be determined from a considerable body of scientific literature that meets some combination of criteria such as temporality, biological plausibility, strength of association, consistency and coherence among studies, specificity of effect, dose-response description, consideration of alternative explanations, among others articulated by Sir Austin Bradford Hill. Hill is very clear that not all criteria need be satisfied in order to establish causality, and that not all criteria apply in every case. Scientific causality can also be established through such procedures as Koch's postulates, which can be expanded from the original requirements to prove an organism infective, to determining whether a toxic or allergenic agent causes disease. Among the requirements of Koch's postulates is that when one withdraws the organism from exposure, it regains health, and when it is re-exposed, it becomes ill with the same or similar signs and symptoms. Deliberately exposing humans to an infectious or toxic agent that will cause harm is unethical. Therefore the toxicological sciences expose animals, and then appropriately extrapolate findings of experimental animal findings to humans. Absolute scientific causality is a very high

standard to achieve as is witnessed by the large number of studies explored before lung cancer and smoking were causally related.

4. I was a member of the Committee on Damp Indoor Spaces and Health, of the Institute of Medicine of the National Academy of Sciences, which produced the report on Damp Indoor Spaces and Health upon which the court relies. I served as toxicologist, authored a chapter on toxicity, and contributed to chapters on public health and building environments. In the report of the Institute of Medicine of the National Academy of Sciences on Damp Indoor Spaces and Health, association of respiratory illnesses, cough, wheeze, and asthma and exposures to damp spaces and their microbial growths and products were examined, and were determined by the to be sufficiently strongly associated with residing or working in a damp space as to be declared a significant public health problem warranting appropriate action. Association of such illness with the presence of bacteria and mold and their products was less strongly associated because of the difficulties of teasing our individual effects among the various allergens, irritants and toxins that are found in damp spaces. However, the common denominator of damp spaces was considered sufficiently associated. *Exhibit I*

5. The court seems to be confused by a matter of semantics, giving "legal" meanings to what are scientific concepts. The "causation" that we on the IOM Committee discuss requires a tremendous body of different types of scientific proof, to determine causation to an absolute scientific certainty. The various mechanisms involved must be learned and understood. In the case of damp building exposures, which are complex and multivariate, there is still more to be understood about pathways, cellular and molecular reactions, and other aspects of the science involved, which science practicing physicians and public health officials might consider somewhat arcane.

6. This (proof to an absolute scientific certainty) is a much higher standard than that utilized by physicians and public health officials in making real-life decisions about causal relationships in any given case or regarding public health activities. Were we to wait for such proof to an absolute certainty, for example, we would not give protective gear to the workers in New Orleans that are cleaning up after the flood, nor would the New York City Department of Health Mold Guidelines (1993 and 2000) require extensive worker protection in contaminated environments. Why should we give them safety equipment, if damp buildings do not "cause" illness? *Exhibit C, H*

7. The fact is that there comes a point where the body of medical and scientific literature, discussed further below, shows a strong enough association, and is consistent with clinical experience, that physicians utilize that knowledge to do their causal assessments in individual cases, and public health officials utilize that knowledge to take appropriate measures for public safety. *Exhibit C, D, E, F, G, H, N*  
When the health of the public is in question, strong association is "sufficient" as stated in the IOM report, for physicians, health agencies and public health personnel to take action to treat and prevent illness. IOM clearly stated in its Public Health Response chapter that:

- ***"Dampness is prevalent in residential housing in a wide array of climates (Chapter 2)***
  - ***Sufficient evidence of an association exists between signs of dampness and upper respiratory tract infections, cough, wheeze, asthma symptoms in sensitized persons (Chapter 5)***
  - ***Sufficient evidence of an association exists between signs of mold and upper respiratory tract symptoms, cough, wheeze, asthma symptoms in sensitized persons and hypersensitivity pneumonitis in susceptible person (Chapter 5)"***
- and concludes that this is a public health problem that needs to be addressed through intervention on a variety of governmental, professional and public health levels.

8. In the real world of physicians and public health officials, proof of causation to an absolute certainty is not the applicable standard. Public health officials and physicians know that occupants of damp buildings with excessive microbial contamination have a significantly increased odds ratio for respiratory illness, most studies showing the risk factor to be approximately double to triple (some studies are higher, some lower, and vary depending on the type of illness, etc.). To understand the relation of causation and association here requires only the application of common sense. The association is not random, and has nothing to do with a man in a suit. People with respiratory illness do not cause damp buildings – (the products of) damp buildings cause people to suffer respiratory symptoms and illnesses, to a high degree of scientific certainty.

9. The court seems to take authors of scientific articles statements that more research is needed to be a detrimental aspect of such studies. In fact almost every research article ends with such a statement, since the criteria for causality apply to a body of literature, not an individual study, and more studies can show coherency, strength and consistency of association, and can clarify mechanism, range of response in people and contributions of routes of exposure.

10. The court selectively quotes from a publication I authored, and in doing so not only fails to understand the specific point of the article, but describes something that appears to be the opposite of what the article actually addresses. I discuss the imperfection of measurement techniques for allergenic, irritant and toxic aspects of indoor microbial contamination (i.e., mold, bacteria and other biological organisms and their products). Attempts to measure mold exposure has almost relied on measuring spores suspended in air in quiescent rooms for very brief periods of time (i.e., 5 minutes). Such methods do not characterize exposure well, and the imperfection of the measurement technique has been used incorrectly to imply a lack of exposure. In fact, recent papers cited in the IOM Report, as well as papers published since the 2003 cut-off for articles examined by the report, indicate that allergens, irritants and toxins are found to be present as and on very small

particles generated by molds. Such fine particles represent a very significant source of exposure which had not been previously measured. When only spores are measured, this significant source of exposure is missed, and lack of correlation of health effects with spore number is erroneously cited by some researchers as evidence that *mold contamination with its spores, spore fragments and small particles, semi-volatile and volatile compounds* does NOT cause health effects. In fact IOM found that damp indoor spaces are strongly associated with respiratory symptoms and disease. Such spaces contain molds and bacteria, but especially smaller, more readily inhaled products. Moisture is rather obviously not the cause of illness, but what grows and is produced by microbes is, with a high degree of scientific certainty.

11. It should also be noted that, to a certain extent, the IOM report, with it's 2003 cut-off date, is somewhat out-of-date already. A tremendous amount of research has been done in the last several years, including epidemiological studies issued by the government agency NIH (National Institute of Health) and others which address a number of the scientific questions raised by the IOM report. I understand that some of these studies have been submitted to the court, but were dismissed by the court as being biased. It is not proper to dismiss a peer-reviewed study by respected researchers on the basis of bias where the study design and results account for the potential bias. Moreover, the results of the NIOSH and other studies are consistent with the body of scientific literature on the subject, including prospective cohort studies, which is an epidemiological design that limits confounding. These studies have borne out and added to the findings of the Damp Committee.

12. As discussed above, the weight of evidence required for scientific causation to an absolute certainty is many times greater than what is required or practical in real-world medicine and public health for physicians to do exposure and causation assessments in individual cases, and for public health officials to plan appropriate actions to protect the community. This is one of the

reasons that the IOM Damp book cautions against utilizing the book in evaluating any particular case, which is what the court did here. Epidemiological studies are observational, and determine association, not cause. Experimental studies can determine cause and effect, but experimental studies are ethically limited to non-human subjects. However, all of biology and specific disciplines such as toxicology use animal studies to determine cause and effect, and dose-response relationships that can then be extrapolated to health effects in humans. Clinical studies are important in looking at specific individuals and their reactions to exposures. Epidemiology studies are limited because they must have fairly large study populations to be able to find associations between specific toxic agents and disease, teasing such effects out from all the other exposures the study population may have. When epidemiological studies find strong association, the medical importance of such findings is very significant. Arguments related to epidemiological causality are often differences in semantics. The court should recognize, as does the IOM, practicing physicians and public health officials, that associations between damp spaces and the microbes and their products with health effects is "sufficient." This is especially true because the science relating such microbes and their products supports the epidemiological findings.

13. Medical causation is different from epidemiological causation. Determining medical causation is what physicians do when they perform examination of a patient and take a medical and exposure history leading to a diagnosis. Physicians rely on their knowledge informed by the scientific and medical literature consisting of biological experimental studies, clinical, and epidemiological studies that delineate the relationships between exposure and disease. Careful examination and consideration of history and exposure can rule out unlikely causes, and rule in those that are pertinent. Public health officials perform a process similar to this, although they look at susceptibility and exposure of people in communities, so as to determine whether exposures in question impact community health. Such causal relationships require a lower bar than

epidemiological causality to an absolute certainty since prompt action must often be taken to prevent further exposures and protect health. The fact that damp buildings and their components make people sick is not debated at flood scenes or in emergency rooms. Waiting for proof of scientific causation to an absolute certainty would be inconsistent with protecting the health of the public.


14. Incidentally, it should be noted that the AAAAI Position Paper that the court describes as prestigious and relies upon in its decision is nothing of the sort, and in fact was a great embarrassment to the AAAAI. It turned out that their "position paper" was written by scientists who worked as defense witnesses in mold cases. Moreover, so many of the members disagreed with the findings, and there was such an uproar among the members and other physicians and scientists, that the AAAAI was required to (1) disclose that the authors were defense witnesses; (2) change their conflict of interest disclosure policy, and (3) agreed to and did allow a certain number of doctors and scientists to publish their disagreements with the paper. I was one of them. I understand that the materials relevant to this issue are being provided to the court. **Exhibit L**

15. There are other scientific articles discussed in the decision with which I am familiar and as to which I believe that the court's summary or analysis is inaccurate; however, I have only addressed those matters that I was directly involved with, i.e., the IOM Damp Buildings book, of which I was a co-author, and one of my research papers.

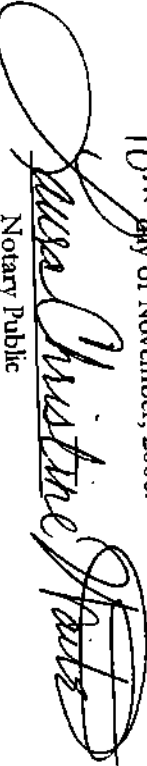
16. In summary, it is clear that the court, in its decision, misunderstands the scientific and medical concepts of causation and association, how knowledge of exposure and health effects is utilized by physicians and public health officials, and how exposure assessment is performed. There is no question, and it is both a fact and my opinion, that the products of damp buildings are strongly associated with and are a cause of respiratory symptoms and illness, to a high degree of scientific

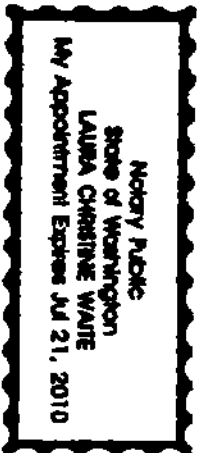


certainly. This fact is generally accepted in the public health community and, in my experience, in the medical community as well.

  
Harriet M. Ammann

Sworn to before me this  
10<sup>th</sup> day of November, 2006.

  
Notary Public



**HARRIET M. AMMANN, Ph.D., DABT**  
Toxicologist and Principal  
Ammann Toxicology Consulting LLC  
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Olympia Washington 98502-4945  
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#### CAPABILITIES

- Analyze exposure and risk for individuals and communities from environmental toxicants
- Analyze and interpret scientific toxicological and health studies
- Prepare expert reports to governmental, community and legal clients
- Provide expert testimony before pollution control commissions, advisory committees
- Testify about exposure and specific risk to commissions and in court cases
- Teach in workshops, classes and symposia on topics of ambient and indoor air pollution, toxic inhalation, ingestion and skin exposures
- Present health and toxicological information to communities in accessible yet scientifically rigorous manner
- Serve on scientific advisory committees regarding health effects from exposure to environmental toxicants
- Present information and testimony about building moisture and microbial growth, and health effects related to such exposure, as well as providing information on prevention
- Develop training in toxicology, health assessment, exposure evaluation for indoor/ambient air contaminants for office/local health departments, and national organizations, including ACGIH, AIHA and CDC; participates in UW symposia and classes as instructor
- Work extensively with tribes in NW and nationwide through NW Clean Air and through ITEP (Institute for Tribal Environmental Professionals) Northern Arizona University

#### ACHIEVEMENTS

- Board certified in Toxicology by the American Board of Toxicology 2004-2009 (diplomat since 1989, recertified every 5 years by examination)
- Served as Senior Toxicologist for the State of Washington Departments of Health (Office of Environmental Health Assessments, 1990-2002) and Ecology (Air Quality Program, 2002-2006):
  - Prepared Health Summaries for toxic air pollutants (and developed Reference Concentrations for 5 hazardous air pollutants) and a Health Assessment for H<sub>2</sub>S for the U.S. EPA Environmental Criteria and Assessment Office (now NCEA RTP)
  - Coordinated work of more than 50 scientists within and outside EPA and served as major author for EPA's Report to Congress: Preliminary Assessment of Indoor Air Pollutants
  - Wrote issue papers on wood smoke health effects and indoor air pollutant exposure assessment for EPA; developed risk reference doses for hazardous air pollutants
  - Co-authored EPA report on survival of pathogens from incineration of hospital wastes
  - Co-authored risk assessment from dioxins in fish for Washington DOH
  - Co-authored risk assessment on incinerator emissions; reviewed incinerator risk assessments for hazardous waste and municipal incinerators in Washington State; served on Technical Oversight Committee for Risk Assessment for Spokane WTE facility
  - Presented to Board and County Commissions for Puget Sound Clean Air Agency Technical Advisory Goal for PM<sub>10/2.5</sub>; advised Ecology on implementation; testified before EPA Science Advisory Board; Pollution Control hearings Board
  - Participated in assessment of health effects from pulp mill, smelter emissions in NE Washington, and drinking water contaminants and fish contamination across the state
  - Presented on mycotoxins, fungal VOCs to bioaerosol conferences; wrote chapter on MVOCs and contributed to chapter on mycotoxins for ACGIH Bioaerosols book

- ACGIH Bioaerosols Committee, appointed Vice-Chair of Committee, November, 1997-2003
- Published papers on health effects toxicity and risk assessment from exposure to indoor mold contamination, served on IOM Committee Damp Indoor Spaces and Health
- Developed toxicology training for annual statewide Environmental Health Education Conference, and two Governor's Conferences on Health and Safety.
- Presented on mercury and health at conferences across Washington State
- Presented at 5 Community Air Pollution symposia at the University of Washington, on topics of wood smoke, air toxics, diesel toxicology, indoor air contaminants, and health effects from mold; presented invited papers at 5 International Conferences on mold health effects
- Assessed effectiveness of microbial source tracking for 2 counties, DOH, and Ecology, for controlling microbial contamination in receiving waters
- Served on the National Academies of Science, Institute of Medicine Committee on Damp Indoor Spaces and Health, and authored the Toxicity chapter of the resulting report, as well as contributing to chapters on Public Health and the Building Environment
- Wrote Expert Testimony on Health Effects from Hydrogen Sulfide for the U.S. Department of Justice for a successful EPA enforcement action based on violations of the Clean Air and Water Acts, on a facility in Nebraska (2001)
- Wrote expert testimony and testified in a successful injury trial (Mammo v IBP, 2004)
- Testified in a trial and Industrial Hearings Board Judge related to mold and bacterial exposure in a residence for the State of Washington, and a successful case in Oregon and a case in California (settled successfully before trial).

**WORK HISTORY**

2006-present Principal, Ammann Toxicology Consulting LLC

2002-2006 Senior Toxicologist: Air Quality Program, Washington State Department of Ecology

1990-2002 Senior Toxicologist: Office of Environmental Health Assessment Services, Washington State Department of Health

1999 –2000: Developmental Assignment Washington Department of Ecology as Senior Toxicologist, Air Quality Program

1984-1990: U.S. Environmental Protection Agency: Environmental Criteria and Assessment Office, RTP, NC; Biologist; Health Scientist; Project Officer

1982-1984: North Carolina State University, Raleigh, NC, Zoology Department, Visiting Assistant Professor: Vertebrate Physiology, Comparative Physiology, Human Anatomy/Physiology

1976-1982: North Carolina Central University, Biology Department Associate Professor: Cell, Vertebrate Physiology; Human Anatomy and Physiology; Microbiology

1974-1976: St. Mary's College, Raleigh, NC: Biology Department Instructor: Human Anatomy and Physiology, Biology

1970- 1973: Bowman Gray School of Medicine, Division of Allied Health Programs, Assistant Professor: Human Anatomy /Physiology, Pharmacology, Biochemistry, Microbiology

1961-1970: Served as Graduate Teaching Assistant at North Carolina State University; and instructor at two colleges and a high school

**EDUCATION**

1978 North Carolina State University: Ph. D. Zoology/Biochemistry

1967 University of Virginia: NASA Biospace Training Program

1965 New Mexico Highlands University: M. S. Natural Science

1961 University of Dayton: B. S. Education, English, General Science

**LANGUAGE**

Fluent in reading/speaking/ writing German

**DIPLOMATE:**

1989 certified; 1994 recertified; 2000 recertified; 2004-2009 recertified: American Board of Toxicology Recertification is for 5 years.

**AFFILIATE ASSOCIATE PROFESSOR:**  
Department of Environmental Health, School of Public Health and Community Medicine,  
Department of Environmental Health Sciences, University of Washington, Seattle WA

**MEMBER**  
American Industrial Hygiene Association  
American Lung Association National Technical Committee for the Building Indoor Air Quality Program (BIAQP)  
National Academies of Science (Institute of Medicine) Committee on Damp Indoor Spaces and Health  
Sigma Xi: The Scientific Research Society  
Gesellschaft für Mykotoxinforschung (Society for Mycotoxin Research)

**AWARDS**

Award for work on Grandview Pesticide Warehouse Fire WA Department of Ecology 2005  
Ecology Director's award for presentation to State Board of Health: The IOM Report and Mold in Schools 2006  
Lifetime Achievement Award U.S. EPA Region X for outstanding work on air toxics 2003  
Outstanding Individual Achievement Award Washington Department of Health 1999. For outspoken leadership in setting public health priorities and accessible, scientifically rigorous public speaking  
Three U.S EPA "on-the spot" awards for work on RfCs for acetaldehyde, beryllium, and H<sub>2</sub>S 1989-90

**PEER-REVIEWED PUBLICATIONS**

Izidore, R., Jones, R., Townes, M.M., Ammann, H.M. (1983) Scientific instrumentation in chemistry, biology and physics. An interdisciplinary approach. J. Chem. Ed. 60: 1065-1067.  
Ammann, H.M., Terry, B. (1985) Effect of aniline on *Chlorella vulgaris*. Bull. Environ. Contam. Toxicol. 35: 294-239.  
Ammann, H.M. (1985) Respiratory response to hydrogen sulfide poisoning. Highly Toxic Chemicals: Detection and Protection Methods. Proceedings of an International Symposium. H.B. Schieffer (ed). Toxicology Research Centre, University of Saskatchewan, Saskatoon, Sask. Canada 1985. pp. 76-85.  
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Mariën, K., Patrick, G., Ammann, H.M. (1990) Health implication of TCDD and TCDF concentration reported from Lake Roosevelt Sport Fish. Washington State Department of Health, April, 1991

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Ammann, H.M. The dioxin puzzle. Years of research fail to resolve controversy. 1992. Washington Public Health vol. 10. pp. 14-15, 19.

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Harriet M. Ammann, author and project officer

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