

Original Research with Commentary

Suppression of environmental health scientists: real-world examples as a basis for action

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Pressures on epidemiologists, toxicologists, and on public health scientists to suppress their work are known to occur worldwide. In this article, we share six stories from environmental health scientists about the pressures they faced in their jobs after bringing public health problems to light. The method used to document each of the stories was to invite scientists who attended meetings of the International Society for Environmental Epidemiology to tell their own stories of having experienced research suppression. We then extracted the salient features of each experience into a coherent story, providing references as corroboration where possible. The specific purpose in going public with the six stories presented in this article is to open a conversation to better equip colleagues to stand up to pressures to suppress their work. By publicly sharing the pressures experienced by these scientists in attempts to suppress their scientific work, including intimidation, harassment, threats and/or bullying, other scientists may be better able to withstand such pressures. In the absence of a larger collection of stories, we are unable to identify common approaches taken against suppression. It appears that a focus on scientific excellence and tenacity are two major factors likely to have contributed to the ability to withstand pressure. We encourage others to tell their stories. Bringing examples of these instances to attention will make them familiar enough to be less intimidating should others experience anything similar. Additional documented experiences will expand the base of stories and thus help colleagues to withstand the pressures wielded by special interests. Shining a light on these pressures will remove barriers, not only to advancing the science, but also to protecting the public interest.

INTRODUCTION

Although refutation and controversy play crucial roles in scientific progress, whenever there is a threat to a power base by new ideas or enquiring minds, stakeholders and gatekeepers are known to have tried to suppress them. “Stakeholder” refers to a group or an individual with a vested interest in maintaining the *status quo*. A growing body of literature documents how powerful interests have manipulated information that has flowed from science to ensure that it supports the *status quo*.¹⁻⁹ There is sparse literature, however, on the suppression of scientific findings. This article attempts to fill this gap.

Scientists may be pressured to suppress their work by means of intimidation, threats, being silenced or physically harassed/bullied by their employers, the legal system, or by other stakeholders with interests that are not aligned with the public’s health. In this article, our reference to environmental health scientists also includes those scientists whose focus is specifically on the occupational environment.

THE INFLUENCE OF VESTED INTERESTS

Interests such as money, power, status, or privilege cause pressure to be exerted on the direction of research. Overt pressures, such as bullying and threats, can occur when scientists conduct, or propose to conduct research to test whether some factor is hazardous to human or environmental health. These threats can lead to suppression/oppression bias and repression bias.¹⁰ Suppression/oppression bias occurs when the act of obstructing the conduct or publication of research by using any of the above-mentioned strategies produces a bias in characterizing a risk factor-disease association. Repression bias occurs when the researcher is discouraged from conducting a particular study because, consciously or subconsciously, actively or passively, he or she does not want to be “at the center of the storm” in confronting powerful stakeholders; it often is easier to conform to the prevailing dominant social or research paradigm.

Usually, overt pressures are not necessary, nor is any “backlash”, but rather the academic system is structured such that research that conforms to the dominant research paradigm and does not go against the grain is incentivized, particularly when research that does not conform to the dominant paradigm could hurt bottom lines. Going against

the grain influences funding, promotion, and general job security; in that sense, subtle forms of pressure are more insidious, prevalent, and potentially more damaging than overt pressures.

Suppression/oppression and repression biases undermine public health because they distort scientific knowledge on health risks. In addition, they raise serious concerns about scientific freedom and may undermine public confidence in the objectivity of health authorities. Both suppression and repression bias are a subclass of publication bias.¹⁰

HOW COMMONLY ARE PRESSURES EXERTED?

Independent surveys recently published in *Nature*^{11,12} and *Science*¹³ documented the harassment of epidemiologists and scientists who studied COVID-19, an issue that involves policymaking and is part of the environmental epidemiologists' area of research. *Science's* survey reported that 38% of researchers who had published multiple papers on COVID-19 had experienced at least one type of harassment related to their COVID-19 work.¹³ The financial source of the harassment, expressed via individual contacts on social media, was not identified.

Climate change scientists also have been harassed over the last few years, as suggested in some publications of "real-life stories".^{14,15} A recent survey was conducted to evaluate the magnitude of the phenomenon among climate change and environmental scientists¹⁶ but the results of the survey have yet to be published.

In 2022, findings of a survey of members of the International Society for Environmental Epidemiology suggested that environmental health scientists all over the world experience threats,¹⁷ and that the prevalence of threats in the International Society for Environmental Epidemiology is similar to the prevalence from the *Science* survey. Threats appear to be commonly experienced in environmental epidemiology.

METHODS

To learn more about the stories of epidemiologists who have been pressured, in 2022 we gave presentations to members of the International Society for Environmental Epidemiology about assistance to beleaguered scientists available from the Society at several online meetings of the Ethics and Philosophy Committee of the Society and solicited individual stories from epidemiologists about any experiences of being pressured. We did not use a structured questionnaire; we invited scientists to share their stories in their own words. We then standardized, in the way presented here, the information conveyed, securing individual consent to proceed to publication as revised by us. With each experience being unique, forcing a flow of information would have failed; we considered it optimal to allow the free flow of memory in each scientist's own voice. We then extracted the salient features of each experience into a coherent story, added subheadings, and provided references as corroboration, where possible.

RESULTS

These six examples of pressures on scientists were offered by the affected individuals after our presentations to the Society. They are described in no particular order.

DR. RUTH ETZEL'S EXPERIENCE AT THE CENTERS FOR DISEASE CONTROL AND PREVENTION, ATLANTA, GEORGIA, USA (1994-1998)

PUBLIC HEALTH AGENCY CONTEXT

I was an environmental epidemiologist and Chief of the Air Pollution and Respiratory Health Branch at the U.S. Centers for Disease Control and Prevention (CDC) in 1994 when I received a telephone call from a pediatric pulmonologist in Cleveland, Ohio who told me that he was seeing an unusual number of infants with acute pulmonary hemorrhage. I consulted with my boss and the Ohio Health Department, and the CDC was immediately invited to conduct an epidemiologic assistance mission to Cleveland.

PUBLIC HEALTH IN ACTION

An Epidemic Intelligence Service Officer and I (both Commissioned Officers in the U.S. Public Health Service) flew to Cleveland the following day. Emergency CDC investigations at the request of state health departments are called Epi-aids in CDC parlance. My team of investigators and I quickly designed a questionnaire and set about doing a case-control study of the 8 cases and a set of age- and neighborhood-matched controls.¹⁸ The initial case-control study did not identify preventable risk factors for infant pulmonary hemorrhage.¹⁸

COLLEGIALITY AND SERENDIPITY AT THE LOCAL LEVEL

The team returned to Atlanta and continued to study the problem. I happened to be hosting a Brazilian epidemiologist and I told her about the investigation. The Brazilian epidemiologist said that she recalled something about some patients in Brazil being affected by mycotoxins. I then began exploring the health effects of mycotoxins and learned that exposure to some mycotoxins was associated with bleeding.

After consulting with the world's top mycotoxin experts, my team and I returned to Cleveland several weeks later to do supplemental data collection for the case-control study, including intensive home sampling for fungi. We measured concentrations of several fungi, including the toxigenic fungus *Stachybotrys chartarum*, in the indoor environment of the homes of case infants and homes of control infants and discovered something new: elevated concentrations of *S. chartarum* and other fungi in the home environment were associated with acute pulmonary hemorrhage. The supplemental results were reviewed and approved by CDC management for publication, and the findings were published in the *Morbidity and Mortality Weekly Report* (MMWR).¹⁹

INITIATION OF NATIONAL SURVEILLANCE

After the publication of the MMWR article, CDC was flooded with telephone calls from physicians and parents notifying us of additional cases. We began informal national surveillance and quickly received over 100 case reports in a few months. Of the more than 100 reports of infant pulmonary hemorrhage that CDC received, about 10% were fatal. We completed a manuscript describing the findings of the case-control study in Cleveland and submitted it through the CDC publication clearance process. We received approval from CDC to submit the manuscript for publication in a peer-reviewed journal.

DEVELOPMENT OF A NATIONAL STUDY PROTOCOL

My team and I developed a study protocol for a national case-control study to evaluate whether moldy home environments were associated with infant pulmonary hemorrhage nationally. After a year of protocol development and extensive peer-review and revision we were preparing to initiate it when I was abruptly moved from my job as Chief of the Air Pollution and Respiratory Health Branch to a job with no responsibility for air pollution or respiratory health. No reason was given. CDC immediately shelved the national case-control study.

CDC'S RE-ANALYSIS WITHOUT THE KNOWLEDGE OF THE INVESTIGATION TEAM

CDC then assembled a group of CDC epidemiologists with no experience in this subject area and who had not been involved in the study to re-analyze the data that my team and I had collected in Cleveland. This re-analysis group worked without the knowledge of the original investigators. When the re-analysis was completed, CDC asked specific questions of the original investigators. The original investigators objected strenuously to the secret re-analysis of the data and disagreed with its findings, but they cooperated fully to provide the answers to the questions posed by the re-analysis group.

The review group eliminated one infant's data and made some other changes, and finally concluded that the association was "not proven" even though their re-analysis continued to show a statistically significant association between moldy homes and infant pulmonary hemorrhage.²⁰ CDC then proceeded to manufacture doubt about the study findings of my team and to imply that our precautionary messages about the risks of moldy homes to infants were wrong. CDC failed to do additional etiologic research on acute pulmonary hemorrhage among infants.

OUTCOME

I was offered a higher-level position at another Federal agency and left CDC. Our peer-reviewed paper on the findings from the case-control study in Cleveland²¹ won two national awards: it was chosen as one of the top ten innovative developments in the United States for the year by *U.S. Medicine*, and it was awarded the Clinical Society Open

Award in 1998 from the U.S. Public Health Service Professional Association "for the most significant contribution in original health research". Since then, the association between exposure to moldy homes and infant pulmonary hemorrhage has been affirmed with multiple reports in the peer-reviewed literature²²⁻²⁸ but CDC continued to denigrate our work and deny the public health importance of the association. I retired from the U.S. Public Health Service after 20 years of service and in 2008 was awarded the Distinguished Service Medal "for continuous visionary leadership and outstanding accomplishments in achieving national public health objectives".

*DR. COLIN SOSKOLNE'S EXPERIENCE THROUGH AN EXXON-FUNDED PHD PROGRAM AT THE UNIVERSITY OF PENNSYLVANIA, USA (1978-1982)**STARTING OUT IN A SUPPORTIVE POLITICAL CONTEXT*

I was a PhD student in the late 1970s, when Jimmy Carter, a Democrat, was President of the United States. This context is important because the 1970s was a period when the Occupational Safety and Health Administration, the National Institute for Occupational Safety and Health, and worker protections were formed, a time when it behooved industry to be seen to be doing good by way of its workers. It was in that sociopolitical context that I secured funding from the *Exxon Corporation* in the form of a fellowship directed to the University of Pennsylvania. The funding was to conduct my PhD dissertation research addressing excess laryngeal cancers among workers on a synthetic ethanol production facility at Exxon's Baton Rouge, Louisiana, Refinery and Chemical Plant.

Commencing in 1979, my study initially enjoyed invaluable corporate support, including access to historic records and full Medical Department and Administration facilitation in Baton Rouge, and from Headquarters based in New Jersey and New York. Access was facilitated to archived work history records dating back to 1911, with rich industrial hygiene input that enabled the construction of an extensive job exposure matrix. This facilitated the conduct of a variably matched case-control study within a cohort that was awarded the Society for Epidemiologic Research Best Doctoral Dissertation prize in 1983.²⁹ Ultimately, this research contributed significantly to the International Agency for Research on Cancer designating that "mists from strong inorganic acids cause cancer of the larynx."³⁰

WINDS OF POLITICAL CHANGE

The journey to this positive contribution to public health was, however, not plain sailing. Timing matters and, unfortunately, the draft thesis was ready for corporate leadership review and comment only in January 1981, at about the same time that Ronald Reagan, a Republican, was elected President of the United States. In parallel with this review period, the Reagan administration began to dismantle many of the gains relating to both public and environmental health achieved in the prior decade.

SMART CONTRACT BETWEEN THE UNIVERSITY AND THE CORPORATE SPONSOR

Fortunately, to protect academic freedom, the contract between Exxon and the University of Pennsylvania denied any veto right by the corporation; it permitted only the right of a three-month period for review and comment.

THE CLASSICAL UNLEASHING OF THE BULLY'S PARADIGM

The corporate review and comment took the form of aggressive push-back to suppress the positive findings of harmful associations implicating Exxon's industrial processes in the causation of excess cancers. The classic paradigm of corporate bullying was invoked by subjecting me as the Principal Investigator to the so-called "Four-D's": Deny; Delay; Divide; and Discredit. Having one's research findings denied, then delayed, and then to have had division created, and then to be professionally discredited, resulted in adverse consequences, adding an additional half-year to the research and thesis defense, and its subsequent publication. Attempts were made to suppress the work, from its acceptability as a PhD dissertation to its publication.^{31,32}

OPERATING IN THE ABSENCE OF PROFESSIONAL ETHICS GUIDANCE

Coping with such push-back in the absence of professional association support, and certainly in the absence of professional ethics guidance, was no less than concerning for me as a fledgling professional. The only moral and material support at the time was that from my academic Supervisory Committee at the University of Pennsylvania.

REACTING ONLY SCIENTIFICALLY TO VARIOUS PRESSURES

As the Principal Investigator, I had responded respectfully to every postulated allegation of potential research bias put before me. And, when the corporate leaders could no longer argue their points, given the diligent care and delivery of my scientific responses, the corporation then tried to interfere with the publication of the research article. It did so by disallowing its main epidemiologist at the time, and who had been instrumental to the study's success, from being a co-author by use of her Exxon affiliation. She, however, overcame this obstacle by using her university appointment as her affiliation for publication purposes.²⁹

OUTCOME

As an epidemiologist who not only withstood pressures to suppress his research, but as one who established ethics writ large for the field of epidemiology,³³⁻³⁵ I was the recipient of the 2021 Research Integrity Award from the International Society for Environmental Epidemiology. The link between inorganic acid mist exposure and laryngeal cancer has withstood the test of time.

DR. ELIHU RICHTER'S EXPERIENCE AT THE HEBREW UNIVERSITY OF JERUSALEM, ISRAEL (LATE 80S-LATE 90S)

ACADEMIC APPOINTMENT TO INCLUDE TEACHING, RESEARCH, AND SERVICE

In 1987, I was selected to head the Unit of Occupational and Environmental Medicine at the rank of senior lecturer without tenure in the Hebrew University's School of Public Health and Community Medicine. The position included teaching, research, and service.

THE SERVICE CONSULTATION ROLE

I was asked by the academic search committee to develop a program of consultations inside the University and the community at-large. The consultations included work with the occupational health and safety committee of the University. Shortly thereafter, several academic researchers from the Pharmacy School approached me and told me about neurological problems which were not well defined. They drew my attention to an apparent hematolymphoid cancer cluster in the tumor immunology lab in the pharmacy school building.

IDENTIFICATION OF A CANCER CLUSTER

Together with a colleague who had a PhD in industrial hygiene, we identified a cancer cluster based on analyses of questionnaires, interviews, and a walk-through survey. The walk-through survey identified problems clearly related to the storage of highly toxic agents including aromatic hydrocarbons, poorly functioning hoods and exhausts, and the open storage of toxic chemicals in the labs and in the hallways, as well as strong odors. There were lapses in work practices including frequent spillages in very overcrowded and cramped workspaces. My colleague and I developed a protocol based on our preliminary observations and case-reports.

ORDERED BY THE DEAN TO CEASE ALL CONSULTATIVE WORK INSIDE THE UNIVERSITY.

We were then asked by the Dean of the medical school to stop our investigation. I shared my concerns about the problem with many of my colleagues at the University. Then, the Dean told me that my job was restricted to teaching and research, but not to consulting on occupational problems inside the University. The Dean told me that a second team would be doing the investigation of the suspected cancer cluster.

THREATENED WITH FIRING

A journalist approached me and asked me what my estimate of the excess risk for cancer in the cluster was, and to what degree the risk was higher than expected. I gave the journalist my estimate that the risk was higher than expected. I was not identified in the newspaper story, but the Dean suspected me. The Dean called me and told me that,

if he could have fired me, he would have. But I had tenure and he could not fire me.

THE REPORT OF THE SECOND TEAM

Meanwhile, the second team submitted its report. This report acknowledged a problem, but it did not pinpoint the hemolymphoid system as the target of highest risk. As time went by, there was increasing consensus that my colleague and my early warnings were correct.³⁶

OUTCOME

My promotion was delayed for many years, and I retired as an associate professor (with over 100 publications), and not as a full professor. Later, a new Dean let it be known that the story of the delay in my promotion triggered his decision to define a formal set of criteria for promotion to eliminate arbitrariness. The University made substantial engineering improvements in the ventilation and exhaust systems that greatly reduced workers' exposure in the building. There was a delay of ten years from recognition of the problem to the intervention.

DR. KEREN AGAY-SHAY'S EXPERIENCE AT DIFFERENT NON-GOVERNMENTAL ORGANIZATIONS IN ISRAEL (2013, 2015)

NON-GOVERNMENTAL ORGANIZATIONS AND THE PROMOTION OF PUBLIC HEALTH

In 2013, I was an environmental epidemiologist in the final year of my doctorate in the process of writing and publishing articles. In addition, I worked for the "Coalition for Public Health", a non-governmental organization that was established to promote public health in the Haifa Bay area of Israel.

Although the refinery complex in Haifa was established in 1938, there was never a city plan for that area, and as a result, most of the constructions were built without permits. In 2003, a process of regulation of the oil refineries began, as part of a request procedure to expand the Oil Refineries' facilities and offices area threefold. This plan was designed to guide the development in the area for the next 20 years. As part of this process, the Israeli Ministry of Health had given a directive to conduct an epidemiologic study to quantify the associations between pollutant emissions from the refineries in relation to morbidity and mortality in the area. Funding for the research and selection of the researchers was undertaken by the refineries. The report was completed by 2007 and was submitted to a governmental committee. During the discussions of the committee, the Ministry of Health commented on the findings.³⁷

RISK COMMUNICATION AND TELLING THE TRUTH

In 2013, the plan was deposited, years after the submission; there was a 60-day period of public comment, including objections and reservations. The appendices to the master plan, the epidemiological study and the environment risk

assessment of the expanded facility, had not been posted on the Internet. It became available only after the request made by the "Coalition for Public Health" to the ministries. In addition, the report on the epidemiological study was written in technical language that was difficult for the public at large to understand.³⁷ The summary of the findings in the report did not correspond with what was known in the environmental epidemiologic literature.

As part of my work at the non-governmental organization, I clarified the statements on risk to make them consistent with standard environmental epidemiologic knowledge. In addition, as part of the opposition to the expansion of the refineries, I was responsible for simplifying the language of the report so that it could be understood by the public. The findings were presented to the head of public health services at that time, and an opposition letter to the expansion of the refineries written by the "Coalition for Public Health" was signed by thousands of residents from the area. An interview with me that included the findings of the report was published by a journalist (February 1, 2013).³⁸

About three weeks before this publication (January 8, 2013), I had been awarded a postdoctoral fellowship from the Environment and Health Fund. I had already received from the Environment and Health Fund a PhD scholarship and a travel grant and presented my work in conferences of the Environment and Health Fund.

PROFESSIONAL CONSEQUENCES OF TELLING THE TRUTH

After the journalist's publication (February 2013), I received an e-mailed letter from the Chief Executive Officer of the Environment and Health Fund. In the e-mailed letter, the Chief Executive Officer detailed all the financial and career support I had received from the Environment and Health Fund. The Chief Executive Officer called my actions unethical and unprofessional. I was told to keep the contents of the e-mailed letter confidential.

FOLLOW-UP WORK

After a post-doctoral year in Barcelona, I was accepted for a prestigious post-doctoral fellowship, within the framework of the Israeli Society of Ecology and Environmental Science, MIMSHAK.³⁹ The MIMSHAK Fellowship nurtures young scientific leaders to serve as advisors in government administrations, aiding in the evidence-based decision-making process. I was chosen to advise Professor Itamar Grotto, the head of the Israeli Public Health Service. I prepared a report together with the professional staff of the Ministry of Health on the excess morbidity in the Haifa Bay area, as part of the Ministry of Health objection to the expansion of the refineries. As part of the inter-ministerial discussions for the designation of the Haifa area as a "highly polluted area", legal designation with more strange regulation-some of the data leaked to the media. After the publicity, I again received inquiries from the Chief Executive Officer of the Environment and Health Fund with aggressive questions on the issue. The difference between the first and the second bullying events was that in the latter

I received strong support from both the Israeli Society of Ecology and Environmental Science and my mentor, Professor Grotto.

OUTCOME AND VINDICATION

Following the second event, the refineries did not receive approval to expand threefold as they had requested. We accepted a research grant from the Israeli Cancer Association to study the question regarding elevated risk of cancer in the Haifa Bay area. Our recent publication confirms increased cancer risks among those living near the Haifa Bay area's refineries and industrial complex.⁴⁰ We found elevated risk for different cancer types and populations, including in young adults, immigrants, workers with carcinogen exposures, and diverse ethnic groups.

DR. YORAM FINKELSTEIN'S EXPERIENCE SERVING IN ISRAEL'S JUDICIAL SYSTEM AS AN EXPERT WITNESS IN THE FIELD OF ENVIRONMENTAL TOXICOLOGY (1999-2002)

AN ATTEMPT AT SUPPRESSION

In 1999, I was Head of the Neurology and Toxicology Service and Unit at the Shaare Zedek Medical Center in Jerusalem, Israel. A Strategic Lawsuit Against Public Participation (SLAPP), a precedent-setting libel lawsuit to silence experts in Israel, was filed by a large industrial firm against me after my submission to the court of a report on hazardous pollutants emitted by an aluminum plant.

THE COMMUNITY CONTEXT FOR THE POLLUTING SOURCE

In 1999, I was invited to submit a medical expert opinion to the Haifa District Court at the request of the mayor of the Kiriath Motzkin township during the hearing of the municipality's suit against an aluminum plant for air pollution. I was asked to assess potential health risks from exposures to the plant's emissions.

The neighborhood at risk consisted of high-rise apartment buildings (approximately 5,000 inhabitants), two kindergartens, and an elementary school. The foundry's chimney was located 200 meters from the nearest buildings, and most of the apartments were encompassed in a 500-meter radius from the chimney. The stack emitted black smoke day and night. Residents complained of persistent headaches, cough, and strong odors.

The aluminum plant belonged to one of the strongest and most influential financial institutions in Israel and the housing project was built on land sold by the plant to a sister company contractor.

The plant was geared mainly to produce painted aluminum profiles, consisting of two main operations: the foundry and extrusion section that was operated using fuel oil with 1% sulfur, and the painting section, which recycled painted and rejected profiles, a major source of toxic and carcinogenic chromium trioxide.

Prevailing winds during nine out of twelve months of the year carried smoke and soot directly into the air of residents' homes. Unannounced in-stack measurements by the Israel Ministry of Environmental Protection detected volatile organic compounds and particulate matter, including toxic metals, in high amounts alongside the carcinogenic hexavalent chromium. Identical findings were observed concomitantly in three monitoring stations located on the rooftops of buildings by the residents' action committee.

THE BASIS FOR A RISK ASSESSMENT

My risk assessment was based on verified emissions data, meteorological data, residents' clinical symptoms, and the known toxicology of the agents, and both European and American air quality standards. My report pointed to major potential health risks for the residential population, including children. I recommended that the exposures be stopped immediately to prevent further potential health harms.

THE DEFENDANT'S RESPONSE

The defendant aluminum plant did not provide an alternative expert opinion. Instead, the plant managers contacted me, inviting me to pay a "private" visit to their site. The managers promised "reimbursement of the expenses" if I changed my medical expert opinion, which had been submitted to the court. I refused the offer and had no further personal dealings with the firm. Consequently, the firm sued me for libel, claiming damages to the extent of 500,000 Israeli shekels (about 150,000 U.S. dollars). Thereafter, all the other expert witnesses on behalf of the claimant municipality balked and withdrew their reports.

INTERVENING AND IMPACTING THE CASE

There was no precedent in Israel for such a deterrence claim – a lawsuit against a medical expert witness. Moreover, this claim was a SLAPP by definition: an abusive legal action filed by a polluting company to harass, vex, exert undue pressure, or stifle any legal recourse against an opponent of lesser means, aiming to exhaust the expert both materially and mentally, and thus silence him/her.

In response, several residents demonstrated outside the court during the legal hearings. The Israel Medical Association published a statement that completely supported my right to submit a professional opinion to the court without being intimidated, advertising it on the front page of a leading national daily newspaper. The Ethics and Philosophy Committee of the International Society for Environmental Epidemiology published a position paper supporting me. The local residents' committee, the National Toxicology Society, and the International Neurotoxicology Association all protested in writing. The International Center of Health, Law and Ethics of Haifa University convened a conference on SLAPP. I fought the suit with the assistance of the Israel Union for Environmental Defense (Adam Teva veDin), which provided me with legal representation.

Subsequently, the factory offered mediation and various payments in return to me if I would soften my position, but I refused. An expert on environmental law warned of the inherent illegality of suing an expert witness and its implications for repression and suppression biases. After two years, the factory annulled the suit, apologized, and was instructed by the court to pay my court expenses. Finally, the paint factory and the aluminum foundry closed in 2002.

LESSON LEARNED

Strong support for beleaguered experts can counteract the effects of SLAPP challenges. Although such challenges delay the assessment of hazard and risk and prevention by deterring other experts, strong support from national and international groups encourages local communities to continue to struggle for the removal of both hazard and risk.

EXPERIENCES OF AN ENVIRONMENTAL SCIENTIST WHO LIVED IN EUROPE AND STUDIED HEALTH EFFECTS OF ENVIRONMENTAL POLLUTANTS FOR DECADES (1990S - 2015)

INTIMIDATION TACTICS AND SYSTEMIC COMPLICITY

These experiences are anonymously shared because this scientist is afraid that what happened in the past could be repeated should his/her name be revealed.

SPECIFIC EXPERIENCES OF INTIMIDATION

My telephones — at home, at my office, at work, and later my first cell phones — were bugged for decades. They were bugged in a way that possible recordings started when words related to environmental pollutants were spoken.

Both my home and my office were burglarized, but the locks on the doors were not affected (likely accessed by sliding a credit card between the lock and the frame). On each of these four occasions, my computers had been tampered with, and my documents were left in a mess.

Regarding the first burglary in my home, a box with documents related to an investigation on pollution in a specific area were rummaged through and left in a mess. Of note, a cutting from a newspaper was placed on top of the box. That article reported that the scientist who was leading the investigation in this area had died in an accident.

TWO EXAMPLES OF HOTEL ROOM INCIDENTS

I was preparing for a next day meeting by reading scientific articles and making notes about the disease I was studying. Before falling asleep, I placed the papers on the bedside table. When I awoke in the morning, I found that all the papers were gone. Somebody had been in my room while I was asleep.

I was attending an international scientific meeting and had an evening appointment with another scientist. Before I left my room, I put my computer in the safe and locked it. When I later returned to my room, the computer was on the table and all of my documents were in a mess.

INSTITUTIONAL/SYSTEMIC COMPLICITY

When I published my first paper about a certain chemical and associated health effects, it was highlighted by the university communications department in a press release and a lot was written about it in the media. The press officer at the university then contacted me and said that the chemical industry had contacted them. After that, the university communications department was no longer interested in publishing any press releases about my research.

DISCUSSION

We have described six cases of pressure exerted on environmental epidemiologists.

Our examples include experiences across government, non-governmental organizations, health agencies, academia, and corporations. Of the six examples, one is anonymous because the contributor of this example would otherwise fear recrimination. Not all examples relate to early career experiences. These examples are not considered representative. In our discussion, we are limited to these experiences and are not making generalizations.

Attacks on scientists may take the form of harassment, bullying, threats, and/or intimidation, and can be delivered in the form of e-mail messages, letters, verbally, and even through forced entry and burglary. They also can be in the form of the 4D bullying paradigm of denying any possibility that what the research reported is true; instigating delay tactics by sending the scientist back to the drawing board to do more research and/or analysis; creating division among scientists by commissioning others to do an “independent” study to contradict the original study; and, finally, *ad hominem* attacks to discredit the scientist and/or the quality of the work. The perpetrators may or may not be known to the person being attacked. Their intent is often to exert pressure to suppress the findings to protect a vested interest. They also may wish to repress any possibility of questions that go counter to the *status quo* from being asked.

Whether overt or covert suppression is exercised, it results in either: (1) a human response to suppress one’s work or ideas by complying with the direction that the intimidation would require, or; (2) the scientist repressing any further pursuit of a line of inquiry because failure to do so could result in harm from the intimidator, such as seen in the 1983 movie “Silkwood” in which death resulted.⁴¹ Regardless of the nature of the suppression, the result is the introduction of one of two biases: suppression bias, or repression bias, both resulting in a form of publication bias. These ultimately can result in ongoing public health harm.

The [Figure](#) shows a pyramid of bullying actions that commonly start with verbal violence (e.g., oral, or e-mail messages written by those financing the research). The “bully” may call the researcher “unprofessional” and attack him/her for being “unethical”. In the middle of the pyramid are actions by research funders or data-information providers that, respectively, do not allow the researcher to publish the research, or to gain access to the data needed by

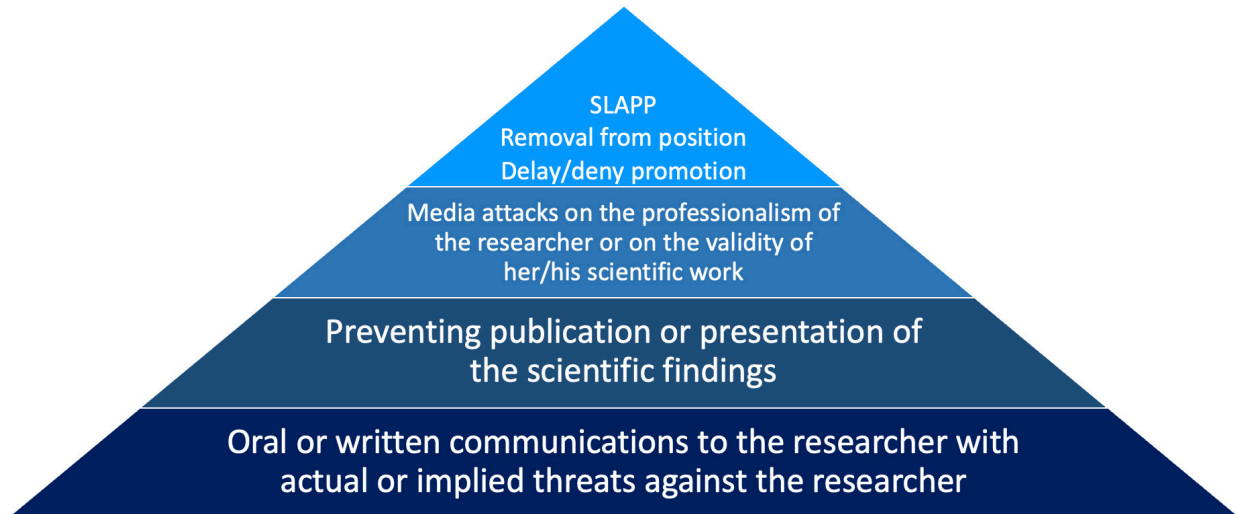


Figure. Hierarchy of how suppression can be expressed

the researcher. On the next level is media involvement resulting in public humiliation of the researcher or of his/her professionalism. And, on the top of the pyramid is financial or professional advancement damage that results from delay tactics and/or denial of the researcher's promotion, or the filing of a Strategic Lawsuit Against Public Participation (SLAPP), making life so unbearable that the researcher leaves or resigns, or directly firing the researcher.

In each of the six examples, the researchers experienced losses at different stages of the pyramid. Of note, because these scientists withstood pressures, public benefit resulted.

Some general questions emerge from these examples: How many in environmental epidemiology, especially in their junior years, would be prepared to stand up to pressure of the types noted in these six examples? How many would be tenacious enough in defense of the integrity of science to resist powerful government or corporate pressures intent on suppressing their research findings? How would an experience like this influence a career? How can professional societies provide assistance to scientists under threat? These questions need to be addressed if the public interest is to be protected.

ADVICE FOR SCIENTISTS UNDER PRESSURE

A recent study offers advice to would-be whistleblowers and attacked scientists.⁴² Earlier, Marwick and colleagues wrote an in-depth guide for researchers facing online harassment that covered protective measures, external resources, and guidelines for institutions and supervisors.⁴³ A few of the recommendations also are relevant to those already attacked:

- do not blame yourself
- expose attempts at suppression
- build a social movement to promote your publication

- contact experienced experts and obtain their advice or services
- find like-minded scientists to build a community of mutual support.

ACTION BY THE INTERNATIONAL SOCIETY FOR ENVIRONMENTAL EPIDEMIOLOGY TO SUPPORT BELEAGUERED COLLEAGUES

The International Society for Environmental Epidemiology offers support to colleagues who have been oppressed in any way or whose findings have been suppressed for demonstrating epidemiological associations that proved problematic to powerful special interests, or for proposing questions that powerful interests might not want to see addressed. In 2001, the Ethics and Philosophy Committee of the Society developed a procedure designed to provide an international service of support including advice and referral for beleaguered colleagues; it was revised in 2020.⁴⁴ The Society supports scientific objectivity in the public interest and recognizes that solidarity is required in resisting such pressures. The Society wishes, by intervening in such instances, to minimize both the frequency of attacks, and their impact when they do occur, as well as to provide moral support and advocacy for beleaguered scientists. In this way, the Society's mission to advance related disciplines of public health will be more assured.

The current strategic plan for the Society includes the following: Support of members who have experienced negative effects from publication of their work.⁴⁵ Because 20 years have passed since the Society developed the procedure to assist those under attack, scientists today may not be aware of it. The Society believes that more needs to be done to encourage scientists under threat to seek assistance and share their stories.

NEW CALL TO ACTION

The International Society for Environmental Epidemiology is launching an initiative for those epidemiologists currently being threatened, to try to find ways to end what we see as a “culture of threat” for scientists that negatively affects public health. Our initiative in seeking these stories from researchers was inspired by the #MeToo movement, which launched widespread discussion about the best ways to stop sexual harassment and abuse.⁴⁶ In the #MeToo movement, there is general agreement that the lack of threat-free reporting options is a major factor that drives unchecked sexual misconduct in the workplace. We are working to reduce stigma by showing that scientific intimidation is not uncommon. We aim to raise awareness and reduce stigma, especially among young and vulnerable early career environmental health scientists of any gender.

By sharing six stories, examples of real-world experiences demonstrating the kinds of pressures by stakeholders to suppress research questions and/or findings that go counter to their interests, we illustrate how harassment, threats, and intimidation materialized, and what outcomes resulted. Each of the examples reveals how individual scientists were targeted after voicing their scientific opinions and how they handled pressures to undermine the production and advancement of scientific knowledge. The impact of these pressures on their careers is also noted.

By encouraging the telling of such stories, we wish to help overcome the pressure of such forces so that otherwise suppressed work should see the light of day to promote the public’s health. Furthermore, telling stories is part of a healing process for individuals. In time, with the accumulation of additional stories, the Society will compile a compendium of stories to be available to environmental epidemiologists experiencing any form of suppression/oppression in the pursuit of their work. Most importantly, ad-

ditional stories will facilitate synthesizing key features that would be more generally applicable to a current experience. Making such information available could empower other professional organizations to better support their members when they experience pressures to conform to the *status quo*.

Science’s survey found that fewer than 10% of harassed COVID-19 researchers received legal (7%), technological (8%), security (5%), or mental health (6%) support from their employers. Respondents said that they hoped for — but did not receive — help or emotional support.¹³

We invite colleagues to share their own stories using the format in any of our six stories. Please send them to us at: MeTooSuppressedEHscientists@gmail.com

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The authors declare no conflicts of interest.

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