Health Professionals on the Front Lines

by Stephenie Hendricks

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This course is an Environmental Humanities curriculum. Its research uses a Scholarly Personal Narrative (SPN) methodology, meaning stories are used as data, including the researcher's own story. With SPN, research is subjective, and stories are anchored to larger themes and other scholarly research. The stories here are about some of those who have discovered and held emerging science and knowledge about environmental health.

Ughhh, Such a Downer!

When faced with the fact that manmade invisible toxic exposures might be contributing to rising rates of illnesses among the global population, some people shut down, put their fingers in their ears, scrunch their eyes closed, and say "NANANANANA! I don't want to hear about it!" Others just flat out deny the science. And still others say, "Well, the world is going to end anyway, I might as well pollute and use things I know are making myself and my family sick. I don't want to change my lifestyle; I want freedom!" Why? Part of the reason is sheer ignorance. Many people buy and sell things without thinking about the unintended hazards from harmful elements such as BPA, PFOS chemicals, lead, and other exposures that are not required to be labeled or have not been tested. Others become overwhelmed by the enormity of the problems and just shut down.

And then there are other people: environmental health defenders. You are about to hear the work they engage in, which is not for the faint of heart. Here, we focus on stories from a few physicians, nurses, and health researchers I have had the honor to work with or know over the years, or whose work I've come to know. As you will discover in this essay and the companion

podcast, health care professionals working on environmental health and environmental justice face enormous challenges. They are the ones identifying the association between toxic exposures and suffering, and they are trying to educate others about these issues. They are "first responders" to this huge conundrum, especially in communities close to polluting areas that experience the most illnesses. However, you do not have to live near a chemical plant or landfill to have your health or the health of your family members impacted, because some chemical culprits lurk in consumer products while others can travel long distance on wind, water, and dust with the "Grasshopper Effect" that is described in the podcast for this module.

The Impact of Toxic Exposure

Ubiquitous chemical and radiation exposures are leading to rising rates of asthma, obesity, diabetes, thyroid disease, neurological problems like autism, learning disabilities, Parkinson's Disease, and such (DiRenzo et.al 219, Lavezzi 5764). Rates of cancers in children and young adults are also increasing, including thyroid cancer among young women (Reynolds, van Gerwen). Leukemia, often thought to be linked to environmental exposures (Carlos-Wallace, Frolayne M., et al. 1, Hernandez and Menendez 10), is the leading cause of death among children (Siegel 1, Ugai 656). Why are these rates of illness *rising*? One potential explanation is that products are introduced into the marketplace and the environment globally without adequate scientific review for unintended human health and environmental impacts (Shapiro).

That's why it is so important that we have physicians, nurses, and health researchers who document evidence of harm linked to manmade toxic chemicals. With hundreds of manmade toxic chemicals in our bodies, it is virtually impossible to know which ones are causing harm and how much harm occurs due to the combination of all those chemicals. For example, researchers examining umbilical cord blood have demonstrated that babies are born "pre-polluted," with

hundreds of manmade toxic chemicals in their bodies (*Lancet*). This followed an Environmental Working group study of infant cord blood that found more than 230 chemicals in a newborn's blood ("Body"). There is no 'control' group of babies born without chemicals in their bodies with which to compare. Add to that the attacks from industry and their 'downstream' users on researchers who are documenting harm, and you have tremendous challenges in diagnosing illnesses linked to toxic exposures (Michaels 35, Oreskes 151). More on this aspect of environmental health and environmental justice in the "Complexities" article in this module. More and more people are becoming sick with illnesses linked to toxic exposures, even before they are born.

When we can directly make connections between exposure and illness, it can take years for the complete health impacts to become known (Boekelheide et al. 1353). I found this out with my youngest daughter when she started experiencing extreme fatigue. Our family physician did not have answers, but she did have questions. Looking back, I see I had unwittingly dosed my daughter with a synthetic sex hormone, bisphenol A (BPA), when she was a baby. I had no idea that BPA lurked in the can linings of the baby formula and plastic baby bottles we used. I may have unknowingly contributed to my daughter's thyroid becoming impaired later in life with exposure when she was at a vulnerable age.

When the thyroid gland stops working properly, it can trigger illness, including obesity, impaired neurodevelopment in utero, failure to carry pregnancy to full term, autoimmune disease, and more (Serrano-Nascimento, et al. 1). Discoveries are emerging as environmental health researchers identify even more illnesses linked to thyroid dysfunction (Calsolaro 1). In the United States, thyroid cancer has "spiked" among women (Reynolds) and has risen "by almost 6 times in women and 5 times in men" in Canada during a 43-year study (Topstad E62).

Once I started working with health researchers investigating the impacts of bisphenol A (BPA), clues to my daughter's thyroid problem, as well as insights on the rise in thyroid diseases, came to light with many peer-reviewed studies (Wazir 1422) providing evidence for the hazard. Years after the discovery of Sarah's thyroid disease, Bobbi Chase Wilding at Clean and Healthy New York said something on a conference call that helped ease the guilt I felt:

> Why do we mothers have to be responsible for knowing the science and the chemistry of the foods we buy from the stores? How is it that the responsibility for protecting our children's health from invisible and unlabeled toxic chemicals falls on us? Why do we have to feel guilty? (Wilding)

Why, indeed. This is a wicked question aloft in a sea of broader issues.

The Role of Frontline Workers in Combating Environmental Toxins

While some governments such as Canada and the U.S. have a process for assessing toxic exposures for workers with health care professionals proving exposure forms, ("Environmental Illness"), for everyone else, nurses, physicians, and health researchers are often the first to become aware of and pursue knowledge about illnesses and injuries arising from toxic exposures; they are keen observers of the relationship between their patients and their patients' environments. Spurred on by what they see on the front lines of their work, they often launch into investigations of these problems and seek solutions of their own.

When you stop and think about it, it makes perfect sense for hospitals to look inwardly to see if they are inadvertently deploying practices that not only harm patients but effect people who work there as well. For example, environmental health advocates at Kaiser Permanente (KP) realized that the polyvinyl chloride (PVC) tubing and drip bags they were using might be leaching dioxin into their patients (Gerwig 2). Dioxin is one of the most carcinogenic substances

yet discovered (Kurwadkar 90), and it can trigger cancer and other serious illnesses. Kathy Gerwig was Vice President of Employee Safety, Health, and Wellness and the Environmental Stewardship Officer at KP when she realized the hazards from PVC products. As a result, Kaiser ordered their drip bag suppliers to make drip bags and tubing out of something less toxic, or they would not buy the bags. The suppliers innovated and came up with less toxic drip bags and tubing, and KP subsequently banned those made with PVC. You can find a link for the seminal book Kathy wrote for hospitals, *Greening Health Care, How Hospitals Can Heal the Planet*, in the book section of this module's Curated Materials. However, the innovations made by Kaiser remain siloed.

When I have the rare cause to be in other hospitals, I look at their PVC drip bags and tubing. I wonder about the likelihood of the bags being PVC, and think about having toxic flame retardants in their curtains and furniture. Then there is ubiquitous non-ionizing radiation from all the wireless technology (more on this from Joel Moskowitz in the companion podcast for this module) they use. I marvel at hospitals' blind eye for how they might contribute to illnesses and injuries among staff and patients. I am always tempted to suggest to hospital workers that they connect with Health Care Without Harm (HCWH), the group that supported Kathy Gerwig and others on raising awareness in hospitals and health care settings. HCHW assists hospitals with identifying exposure hazards and figuring out how to replace them with safer substitutions. The link for this group can be found in the Curated Materials section for this module.

Because children are most vulnerable to toxic exposures (Hauptman and Woolf e466), pediatricians are often among the first medical professionals to recognize health impacts. One of the leading pioneers in pediatric environmental health, Dr. Philip Landrigan, has devoted his entire career to raising awareness among other physicians and health researchers. A public health

physician and epidemiologist, Dr. Landrigan is director of the Global Public Health Program and Global Observatory on Planetary Health at Boston College, where he uses "the tools of epidemiology to elucidate connections between toxic chemicals and human health" (Landrigan, "Biology Department"). His early research revealed the toxicity of lead for children "even at very low levels" (Ibid). This prompted the removal of lead from paint and gasoline around the U.S., reducing lead levels in the average U.S. citizen (and perhaps many others in the world) by 90% (Ibid). His work documenting harm to children from pesticides played a part in reforming U.S. pesticide policy. I saw this firsthand working with legislative staffers of either federal or state legislators who used Dr. Landrigan's studies to inform policy. While in his position as co-chair of the *Lancet* Commission on Pollution & Health (between 2015 and 2017), he gathered a worldwide team of experts that identified pollution as the cause of more than 9 million deaths annually; they labeled pollution "an existential threat to planetary health" (Landrigan, "Environmental Pollution").

In their seminal 2017 work, the world's oldest peer-reviewed medical journal, *The Lancet*, published the *Lancet Commission on Pollution and Health* report, in which they state: "Pollution endangers planetary health, destroys eco-systems, and is intimately linked to global climate change" (Landrigan et al. "The Lancet Commission" 462). The esteemed scientists and physicians on this Commission identified ubiquitous global toxic chemical exposures such as lead, mercury, chromium, DDT and more as culprits that have "repeatedly been responsible for episodes of disease, death, and environmental degradation" (Ibid.).

Few physicians understand this more deeply than Dr. Paul Saoke of Physicians for Social Responsibility – Kenya. Dr. Saoke explained to me how toxic exposures from plastic waste is a

ubiquitous hazard. Plastic is so bountiful in Kenya that some people use it as fuel for cooking, exposing them to carcinogens. Saoke explained that:

> You can see this direct correlation between the environmental origins of cancer, especially as it relates to the release of dangerous chemicals into the environment, and the cancer incidence in a third world country like Kenya. So, what we're dealing with here is multifaceted. We are dealing with the issue of educating the public so that they get involved in safe environmental practices, so that we reduce the cancer incidences. And then we're also involved in trying to manage the cancer incidences with cost resources. (Saoke)

Dr. Saoke has worked tirelessly on policies about chemicals that travel long distances, called Persistent Organic Pollutants (POPs). POPs last a long time, drifting north from where they are applied (Hung 1577). POPs are not well-known, and yet policy work on POPs is meaningful for all life on earth due to the mobility of POP chemicals. No one is immune. And most all of us are complicit in the creation and use of these and other man-made toxic hazards. They originate from *somewhere.* In the "On the Fenceline" module, we hear from Yupik elder Vi Waghiyi and biologist Pam Miller about how Indigenous communities in the Arctic are experiencing sickness from POPs chemicals applied in the Global South. This is corroborated by other researchers (Cordier et al. 10).

Health care professionals on the ground where the pollution originates work to stop it while attending to their sick patients. However, economic and political influences hinder regulations on chemicals. When Dr. Mark Mitchell was Director of the Hartford, Connecticut Department of Public Health, political pressures leaned toward removing regulations, not increasing them, for public safety. In the companion podcast to this module, you can hear him

describe the increasing awareness among Black physicians about the links between their patients' illnesses and environmental exposures. Even so, Dr. Mitchell, whose responsibilities included the health of all residents of Hartford, expressed his frustration to me about the influence of politics on what should have been a basic scientific and health-centric identification of environmental exposures from a landfill that were making people sick:

> The only people that I heard about around the environment were businesspeople saying that they were being over regulated. And the politicians who responded to them also echoing that the businesses were overregulated. When it was clear to me from what I was seeing that we were not regulating businesses enough … people were getting sick from … toxic exposures, things like air pollution and water pollution, and particularly people in low-income communities and communities of color. (Mitchell)

Dr. Sean Palfrey at Massachusetts General Hospital in Boston also saw impacts from environmental exposures in his patients. In his observations, lead was the culprit, and it was hurting children. Lead is a neurotoxin associated with learning disabilities, lower IQs, and other neurological problems that are seemingly on the rise (Aschner 142). I contacted Dr. Palfrey to ask for a comment for a news release for the Campaign for Safe Cosmetics about the discovery of lead in certain types of red lipsticks (Reuman). He stays on top of research about health impacts from lead exposure, so he is a great resource for reporters. Dr. Palfrey did not hesitate when I asked him to be the expert for our news release. Pregnant women who wear this kind of lipstick (most often the brighter red shades), are unwittingly dosing their fetus with lead during vulnerable stages of development for the fetus' brain and nervous system. Dr. Palfrey generously gave his time to speak with the reporters who I was able to interest in the story.

The 2007 report on lead in lipstick by the Campaign for Safe Cosmetics may have sparked a similar study by the U.S. Food and Drug Administration (FDA) in 2009. We contacted reporters when the new FDA study came out (which, by the way, reported higher levels of lead in lipstick than our 2007 tests). Amanda Gardner, a reporter with coveted news content provider *Healthday,* took us up on our suggestion to contact Dr. Palfrey as a physician expert. This is the quote he gave her:

> If you put this on your mouth every day, or little kids' mouths or when you're pregnant, is this small amount of lead building up in a way that would affect infants, fetuses, and young children significantly over time? ... it could, so why do it? (Gardner)

Dr. Palfrey went so far as to assert that there is *no* safe level of lead. Considering recent revelations of lead contamination from aging water pipes found in Flint, Michigan, Jackson, Mississippi, and many other communities, the presence of lead is a tragic reality that has put the cognitive capacities of many generations in harm's way. In a report to the City of Boston years ago, Dr. Palfrey implored local officials:

- Educate every parent, every landlord, every realtor that lead is still a problem and know risks, signs, and symptoms.
- Screen, routinely, at 9 mos, 18 mos, and yearly till 6 years of age if child remains with elevated levels or at risk.
- Screen immigrants up to 10 years of age who come from rural areas and/or developing countries where gas is still leaded, children and adults work and play around lead.
- Insist that any housing unit a parent rents or buys be deleaded.

- Advocate that all other places children are (day cares, schools, shelters, churches) be deleaded (some funds available, but we cannot require this to happen).
- If we are not insistent, this problem will not be solved. (Palfrey)

We should ask: Did the petrochemical industry *know* that their gasoline and paint products contained lead, a substance that lowers IQs in children and impairs neurological systems? According to Kat Eschner, writing for the Smithsonian, the answer is yes (Eschner). With this historically callous view toward public health, it perhaps should not have been surprising when the chemical industry attempted to create a rule within the U.S. Environmental Protection Agency (EPA) that would codify intentionally dosing pregnant women, infants, incarcerated men and women and "orphaned" children with pesticides (Sargent). Lobbyists from Dow Chemical and Bayer wrote these points during a meeting with EPA. More about this in "More to the Story: 'They Want to Do *What?*!'" in this module.

Many health care professionals are understandably invested in figuring out how to prevent illness in the first place by helping to create regulations and laws to protect the public. One such organization is the Alliance for Nurses for Healthy Environments (ANHE). Their e-textbook, *Environmental Health in Nursing, Second Edition*, is an Open Source (free) textbook that supports nurses to understand the environmental health hazards and their links to health impacts. (See the Curated Materials for a link). Dr. Barbara Sattler is a co-founder of ANHE. When I asked her what led her to working in this field, she responded that she wanted to figure out how to keep people from getting sick in the first place: "We can keep repairing people, we can keep repairing our environment, or we can prevent them from being damaged to begin with" (Sattler). She first started seeing workers who were sick from mysterious exposures, and this started a lifelong dedication to working for the 'Right to Know' policy that workers, consumers,

and residents of a community – everyone – has a right to know what is in their environment and the products they use, and how their health might be impacted. Unfortunately, companies do not label their products with lists of the harmful chemicals in them.

Like Dr. Mark Mitchell and many other health care professionals, Dr. Sattler believes that the health of her patients is enmeshed with the health of the planet, climate change, and extreme weather events, along with basic factors, such as food safety and security. One of her foci has been on what environmental hazards threaten nurses specifically. She is working with a non-profit organization to poll 1,500 nurses about the impacts on their health from working in environments where they are exposed to toxic chemicals and radiation. They found that nurses have very high rates of asthma, and researchers believe that this may be because nurses are having to clean counter surfaces repeatedly (Sattler). Her investigation found that janitors have high rates of asthma, too, posing the question: Are cleaning products triggering asthma in janitors and nurses? (Sattler)

Dr. Sattler's team also looked at nurses' exposure to pharmaceuticals. Nurses often must crush or split pills for patients. This results in particulate from the pharmaceutical going into the air and leading to potential inhalation or dermal absorption, so this is another environmental health hazard that Dr. Sattler, and her team are researching.

With so much work to document exposures to nurses, I asked Dr. Sattler what keeps her going when the work to prevent harm seems so daunting. You can hear what she says about that and more in the companion podcast for this module.

While Barb Sattler has been working with nurses to improve environmental health protections through policy protections, others continue to work directly on documenting exposures in communities. Dr. David Carpenter of State University New York, Albany, runs a

World Health Organization (WHO) lab. His team has been studying health impacts from polychlorinated biphenyls, better known as PCBs. PCBs are linked to a variety of illnesses, including neurological harm, infertility, hormonal disruption, and cancer ("Polychlorinated"). He shared with me how he came to understand the threat they posed. In the podcast for this module, Dr. Carpenter relays a story about people who are sick from the PCBs that were made many years ago. I think about the myriad rising rates of illness linked to PCB exposures. Obesity, for one, is an epidemic. I think to myself, is this because of PCBs? Dr. Carpenter shared more information about these chemicals:

> PCBs are a group of chemicals that are 209 different PCBs, and they don't have all the same properties … and they don't have all the same health effects. So, a lot of my work, for the last 30 or 40 years, has been trying to understand what PCBs do to health. I started out focused on the nervous system. Most of my work more recently has been on the chronic diseases of older age, of cancer, of heart disease, and diabetes. And these chemicals, because they, they cause induction of many different genes, they alter the risk for so many different diseases, it's hard to understand, [how] one group of chemicals can change your IQ and your attention span, increase your risk of diabetes, increase your risk of high blood pressure, alter your sex hormones, alter your thyroid gland. And they do this because they change the expression of many genes that are important for just about every biological function. … for a number of years, we studied lead poisoning, and its effect on the brain. And then it became clear that PCBs also reduced IQ. (Carpenter)

Dr. Carpenter has worked with the Yupik Indigenous people of St. Lawrence Island in the Bering Sea. When I went to Anchorage, Alaska, to meet with folks from St. Lawrence Island, my laptop was stolen, and I was bereft. I was working remotely, and all my work was on that laptop. I was

in a bit of a state of shock at my subsequent meeting with Vi Waghiyi, a Yupik elder. “I am sorry your computer was stolen,” she said, gently. “But we have babies being born without brains and we need to do something about it.” The magnitude of my laptop loss diminished instantly as I took in what she was saying. The situation on St. Lawrence Island is addressed in more detail in the “On the Fenceline” module, which also shows how dedicated Vi and her team are to reclaiming the health of their people and their land. I bring it up now to demonstrate the importance of Dr. Carpenter’s work in the field and as an academic researcher.

Other researchers who also work in medical schools are studying the links to illness from chemical exposures. Dr. Tracey Woodruff is the Director for the Program on Reproductive Health and the Environment at the University of California, San Francisco. In our conversation, she emphasized the conundrum that there are so many manmade toxic chemicals in our bodies that we don’t know what the impacts are in a cumulative manner. In addition, other factors such as stress and poverty can figure in triggering illness combined with the “body burden” of multiple toxic chemicals: “We know that people have dozens and dozens of these chemicals inside their body … that’s what cumulative exposure is in the narrow sense related to chemicals” (Woodruff). Dr. Woodruff and her team have been instrumental in documenting reproductive health impacts from toxic exposures (Woodruff, “Science based …”). Their studies call for increased protections to be included in policy.

While the folks mentioned so far are focused on exposures from manmade toxic chemicals, others are working on a relatively more recent manmade hazardous exposure: non-ionizing radiation from wireless technology. At the University of California, Berkeley, Dr. Joel Moskowitz is the Director of the Center for Family and Community Health at the School of Public Health. Early in his career he was concerned about illness from tobacco, alcohol, and

harmful drug abuse. Today, he has compiled every peer-reviewed study on the impacts from non-ionizing radiation. Dr. Moskowitz believes that toxic chemical exposures are made worse by non-ionizing radiation, and that emerging science is documenting health impacts. He is not alone in this concern. Dr. Martha Herbert, a neuroscientist at Harvard, is researching the connection between wireless radiation and autism (Herbert) Silicon Valley surgeon Dr. Cindy Russell started a group called Physicians for Safe Technology, which has listed all peer reviewed health impact studies on their website (Russell). University of California San Diego researcher Dr. Beatrice Golumb has identified links between non-ionizing radiation and the "unexplained" debilitating illnesses at the American Embassies in Cuba and China (Golumb 2882). Hundreds of health professionals signed a letter asking for protection from wireless technology hazards, called the EMF Scientists Appeal; it was sent to key agencies in the United Nations in 2015 (EMFScientists). Why are so many physicians concerned? One issue that has emerged is that nonionizing radiation weakens the blood brain barrier, making it easier for manmade toxic chemicals to access the brain (Salford et al. 881). Dr. Moskowitz explains:

> We are paying the price but it's just being unseen currently. But it's going to catch up with us eventually. And [nonionizing radiation] interacts with other chemical toxins, these exposures, increasing our risks to adverse health, harm from these other chemical exposures. For example, even very low intensity exposure to radiofrequency radiation can open the blood brain barrier. So, if you have low levels of chemical toxins in your circulatory system, they can now penetrate your brain and cause brain tumors. (Moskowitz)

Dr. Moskowitz has been collecting and analyzing hundreds of peer reviewed papers on health impacts from nonionizing radiation. He reports that researchers:

> ... found significant evidence [of] reproductive health effects … in both the male and female, to sperm, harm to the fetus, increase miscarriage rates, variety of cancers including, besides brain cancer, cancer of the thyroid and salivary gland, [and] breast cancer … we're faced with a global challenge. (Moskowitz)

Non-ionizing radiation and toxic chemical exposures linked to rising rates of health impacts are unintended consequences from the inventions for modern life. I believe we will look back and wonder why taking into account the effects on human health and the environment was not just a common-sense approach to our pursuit of new technology and ways to advance our quality of life. I am grateful for the many unsung health researchers, physicians, and nurses working hard to identify exposure hazards and figure out how to protect us. It is impossible to tell you all their stories. Please check out the Curated Materials section for this module and explore this fast-growing area of health professions working on environmental health.

Perhaps some of these people in your own community have stories that deserve to be told? Folks at organizations listed in the websites section of the guide for this module might help you connect with other environmental health professionals in your area. For now, I hope that you are even a little reassured that there are altruistic and experienced health professionals