

SYMPOSIUM ESSAY

PROTECTING HUMAN HEALTH AND
STEWARDING THE ENVIRONMENT:
AN ESSAY EXPLORING VALUES IN U.S.
ENVIRONMENTAL PROTECTION
LAW

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"An animal is the sum of its behaviors. Its community dynamics. Not just the physical body."

"What makes a monarch a monarch is what it does, you're saying."

. . . .

"Interactions with other monarchs, habitat, the migration, everything. The population functions as a whole being. You could look at it that way."

She did, often. This butterfly forest was a great, quiet, breathing beast. Monarchs covered the trunks like orange fish scales. Sometimes the wings all moved slowly in unison. Once while she and Ovid were working in the middle of all that, he had asked her what was the use of saving a world that had no soul left in it. Continents without butterflies, seas without coral reefs, he meant. What if all human effort amounted basically to saving a place for ourselves to park?¹

The purpose of this conference is to explore "the relationship between environmental protection and public health and how it should inform our efforts to become better stewards of the environment."² No one would disagree with the assertion that during the last forty years of federal environmental protection, air and water quality have improved and led to concomitant improvements in human health. Exploring the contours of this

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1. BARBARA KINGSOLVER, FLIGHT BEHAVIOR 317 (2012).

2. David M. Uhlmann, *Welcome*, introductory page of 2013 *Environmental Law and Public Health Conference*, U. MICH. SCH. L., <http://www.law.umich.edu/centersandprograms/environmentallaw/lecturesandforums/conference/Pages/default.aspx> (last visited Nov. 29, 2013).

“relationship,” Environmental Protection Agency (EPA) Administrator Gina McCarthy said in her keynote speech that “[t]he thing is, the word ‘relationship’ is too neutral. The link between the health of our planet and the health of our families is inextricable. The quality of our environment dictates the quality of our well-being, and our lives.”³

An article in the *New England Journal of Medicine*—a publication aimed at clinicians and not public health practitioners or environmental regulators—affirms the Administrator’s assertion about the environment-human health relationship: based on four decades of air quality monitoring mandated by the Clean Air Act, U.S. life span has increased by 0.4 to 0.8 years due to government-mandated reductions in particulate matter.⁴ By setting human health-based standards prescribed by legislative language and then enforcing them, environmental protection has clearly improved human health by limiting the amount of pollution that may enter our natural environment.

With this starting premise, our panel contributes to the conference discussion by focusing on the ethical underpinnings of why we enact laws to protect, conserve, and restore the environment. These environmental values, usually characterized as human-centrism, biocentrism, and ecocentrism,⁵ separate the human, fauna, and flora at play when making law to protect “the environment.” To debate whether the current public health-based approach in U.S. environmental law strikes the right balance between protecting humans and the environment that surrounds us, our panel was specifically asked: “Should environmental laws focus even more than they already do on public health benefits, so that we might reclaim bi-partisan support for environmental protection efforts? Or have we focused on human health to the detriment of preserving bio-diversity and healthy ecosystems?”⁶

But is it as easy as picking an asthmatic child over a polar bear? Administrator McCarthy implicitly picked up this theme when she used one disease—asthma—to illustrate climate change effects:

[C]limate change is about clean, healthy air for us to breathe. Carbon pollution and hotter weather can worsen levels of pollen and smog, leading to longer allergy seasons, increased heat-related deaths, and direct threats to those who suffer from lung and heart

3. Gina McCarthy, Keynote Remarks at the University of Michigan Environmental Law and Public Health Conference, 3 MICH. J. ENVTL. & ADMIN. L. 243, 244 (2014).

4. C. Arden Pope III et al., *Fine-Particulate Air Pollution and Life Expectancy in the United States*, 360 N. ENGL. J. MED. 376, 384–85 (2009).

5. David M. Uhlmann, *Environmental Law, Public Health, and the Values Conundrum*, 3 MICH. J. ENVTL. & ADMIN. L. 232, 234 & n.20 (2014).

6. Uhlmann, *supra* note 2.

illnesses. And it's not just adults and the elderly that suffer from air pollution, so do children—especially children in lower income families and communities of color. Did you know that today, one in ten children in the United States live with asthma? That's right, one in ten. The urgency to act on climate change couldn't be more clear.⁷

There is no doubt that environmental ethics often involve hard tradeoffs among competing values. But if we've learned nothing else in the last forty years of federally mandated and funded data collection and analysis, we now know that more often than not, improved air quality that lowers the incidence of childhood asthma also means decreases in greenhouse gas emissions that lead to global atmospheric warming, melting polar ice, and stranded bears. Just as Barbara Kingsolver's protagonist learns to see the monarch population functioning as a whole being and playing a role in its ecosystem through its collective behavior, we humans can no longer subscribe to a narrow, anthropocentric view that places our interests outside those of our ecosystem. We've learned too much to be this ignorant.

I am not naïve enough to misunderstand the tension and regular tradeoffs between economic development and human health and environmental protection. Having lived and worked in the developing world,⁸ I've watched governments make choices about poverty reduction that lead to short-term increases in pollution and long-term human health impacts. But in an industrialized country like the United States, the tradeoffs are measured more in domestic distribution of wealth than in whether a citizen will live another day. While many in the United States are not willing to protect the snail darter per se,⁹ I think that a greater number are increasingly aware of the nexus between environmental and human health, and that this link motivates them to protect ecosystems in which endangered species live because in the not-so-long run, it will better protect them and their children.

In this short essay, I advocate for the continued use of human health-based standards to measure environmental pollution limits. Doing so presents several advantages. First, it builds on environmental public health research that is just now hitting its stride, as the length and depth of data sets permit more certain conclusions that in turn support evidence-based policymaking. Second, it provides a public health lens through which individual citizens may assess the value of their ethical tradeoffs: as this body of research is translated from public health analysis to individual medical

7. McCarthy, *supra* note 3 at 245–246.

8. See *About*, SIMMERING SENEGAL, <http://simmeringsenegal.wordpress.com/about/> (last visited Nov. 29, 2013).

9. ZYGMUNT PLATER, *THE SNAIL DARTER AND THE DAM: HOW PORK-BARREL POLITICS ENDANGERED A LITTLE FISH AND KILLED A RIVER* xii (2013).

practice, patients cum voters and consumers receive new information that they may act on. Finally, it provides a pragmatic way to ensure political support for environmental protection laws, as voters perceive environmental protection as part of our health and safety laws and are thereby more motivated to support them. In this way, using humans as the proverbial canaries-in-coalmines, we seek to ensure human health and the well-being of the larger ecosystem in which it exists.

I. HEALTH DATA AND THE FIRST WAVE OF FEDERAL ENVIRONMENTAL LAWS

One of the primary accomplishments of the federal environmental laws enacted in the 1970s and 1980s was direct funding for monitoring. In order to understand the scope of the pollution problem and set evidence-based emission and discharge limitations, the Clean Air and Clean Water Acts mandated data collection and funded it.¹⁰ Monitoring stations in metropolitan areas across the United States made it possible for researchers to conclude that limits on fine particulate matter contributed to a longer life span.¹¹ Likewise, funding through the National Institutes of Health and the Centers for Disease Control, via the National Institute for Environmental Health Sciences (NIEHS) and the National Center for Environmental Health/Agency for Toxic Substances and Disease Registry (NCEH/ATSDR),¹² respectively, has pushed that research agenda to track soil contamination and disposal practices, as well as components of manufactured products.

Just as the *New England Journal of Medicine* featured research on the Clean Air Act's success in lengthening the lifespan, it also alerted clinicians to the need for more strict regulation of ambient air pollution. Using air quality monitoring data on ozone, nitrogen dioxide, and particulate matter collected over ten years in California and correlating it with lung development in children as they aged from puberty to adulthood, researchers concluded that current, legally permitted levels of air pollution have adverse effects on children's lung capacity. Specifically, during the high-growth period from ages ten to eighteen, lung development was reduced in children

10. See Clean Water Act, 33 U.S.C. § 1254(b)(6) (2012); 33 U.S.C. § 1256(a) (2012); 42 U.S.C. § 7403(b)(6) (2012).

11. See Pope, *supra* note 4, at 377 (providing a brief description of the EPA's Inhalable Particle Monitoring Network).

12. Originally established under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) as the public health agency for Superfund sites, this office was merged with the Centers for Disease Control and Prevention (CDC) as its mission expanded to include epidemiological studies beyond listed dumping grounds. *ATSDR Background and Congressional Mandates*, AGENCY FOR TOXIC SUBSTANCES & DISEASE REGISTRY, <http://www.atsdr.cdc.gov/about/congress.html> (last visited Nov. 29, 2103).

exposed to higher levels of ambient air pollution.¹³ Thus these public health researchers advised physicians that “[g]iven the magnitude of the observed effects and the importance of lung function as a determinant of morbidity and mortality during adulthood, continued emphasis on the identification of strategies for reducing the levels of urban air pollutants is warranted.”¹⁴

In 2011, *Health Affairs*—the leading journal of peer-reviewed research on health policy—devoted an entire volume to the latest findings in environmental public health. In its introduction, Editor-in-Chief Susan Dentzer noted that “[o]ur nation’s approach to health and health care is so famously siloed that we’ve long neglected the obvious: The environment plays a role in nearly 85 percent of all disease.”¹⁵ Linda Birnbaum of the NIEHS pointed out that the modern study of environmental health has moved beyond the simple toxic-nontoxic dichotomy to the more subtle paradigm of understanding the effects of low-dose and chronic exposure to multiple pollutants over a lifetime, especially as they impact vulnerable populations like infants, pregnant women, and the elderly.¹⁶ Other researchers in this volume investigate the link between air pollution around schools and poor student health and academic performance,¹⁷ how environmental exposures may alter genes,¹⁸ chemical use in industrial food production and its impact on reproductive health,¹⁹ and how using electronic medical records can decrease the environmental impact of health care practice.²⁰

Despite this impressive research record, the President’s Cancer Panel in 2010 called for stronger regulation of Americans’ exposures to toxic commercial chemicals and more research on the relationships of specific environmental materials and cancer.²¹ The Panel, which was established under the National Cancer Act of 1971, asserted that the burden of environmentally induced cancers has been historically underestimated. This lag

13. W. James Gauderman et al., *The Effect of Air Pollution on Lung Development from 10 to 18 Years of Age*, 351 N. ENGL. J. MED. 1057, 1062 (2004).

14. *Id.* at 1063.

15. Susan Dentzer, *Embarking on a New Course: Environmental Health Coverage*, 30 HEALTH AFFAIRS 810, 810 (2011).

16. Linda S. Birnbaum & Paul Jung, *From Endocrine Disruptors to Nanomaterials: Advancing Our Understanding of Environmental Health to Protect Public Health*, 30 HEALTH AFFAIRS 814, 816, 818–19 (2011).

17. Paul Mohai et al., *Air Pollution Around Schools is Linked to Poorer Student Health and Academic Performance*, 30 HEALTH AFFAIRS 852 (2011).

18. See Kenneth Olden et al., *Discovering How Environmental Exposures Alter Genes Could Lead to New Treatments for Chronic Illnesses*, 30 HEALTH AFFAIRS 833 (2011).

19. See Patrice Sutton et al., *Reproductive Health and the Industrialized Food System: A Point of Intervention for Health Policy*, 30 HEALTH AFFAIRS 888 (2011).

20. See Marianne Turley et al., *Use of Electronic Health Record Can Improve the Health Care Industry’s Environmental Footprint*, 30 HEALTH AFFAIRS 938 (2011).

21. David C. Christiani, *Combating Environmental Causes of Cancer*, 364 N. ENGL. J. MED. 791, 791, 793 (2011).

becomes even worse as the paradigm shifts from studying and regulating the one-time, high-volume, and single-chemical exposures of adults (usually in the workplace) to doing the same with chronic, low-level, and multiple-chemical interactions with all segments of the population, including vulnerable groups like children and the elderly. While much recent progress has been made on understanding the genetic factors at play in cancer detection and treatment, the Panel pointed out that the incidence and mortality associated with cancer have not declined as much as with other leading causes of death. Consequently, it concluded that “the most valuable approaches to reducing cancer morbidity and mortality lie in primary prevention—avoiding the introduction of carcinogenic agents into the environment and eliminating exposure to carcinogenic agents that are already there.”²² To that end, the Panel called for reform of the Toxic Substances Control Act (TSCA) to ensure more registration, study, and ultimately regulation of the some 80,000 synthetic chemicals used in commerce²³ so as to move from reactive regulation to primary prevention.

Overall, the research benefits of the first wave of environmental laws are manifest. The air and water quality monitoring required by these federal acts has enabled informed analysis of the impacts that various pollutants have on human health. In turn, as the data deepens and uncertainty about association and causation decreases, more precise standard setting occurs. In this manner, the health-based standards in the Clean Air and Water Acts have set the research and analysis stage for the next wave of environmental public health regulation.

II. TRANSLATION FROM PUBLIC HEALTH POLICY TO PRIVATE MEDICINE PRACTICE

While environmental and public health laws struggle to keep pace with this growing body of environmental public health research, the medical literature and professional associations are embracing it. In the past few years, medical journals including the *New England Journal of Medicine*, *The Family Physician*, and *Obstetricians & Gynecologists* have put this data into their readers’ hands and taken public positions about the health risks posed by a variety of environmental pollutants.²⁴ In addition, professional associations like the American Medical Association (AMA) and the American

22. *Id.* at 792.

23. For more on Congress’s response to this call, see Tracy Bach, *Better Living Through Chemicals (Regulation)?*, 15 VT. J. ENVTL. L. 393 (forthcoming Spring 2014).

24. See Gauderman, *supra* note 13 and accompanying text; THE AM. COLL. OF OBSTETRICIANS & GYNECOLOGISTS, *infra* note 25; *Environmental Chemicals Harm Reproductive Health*, *infra* note 28; COMM. ON HEALTH CARE FOR UNDERSERVED WOMEN, *infra* note 30; AM. MED. NEWS, *infra* note 33.

Congress of Obstetricians and Gynecologists (ACOG) have taken the next step, encouraging physicians to act on this research when treating patients, despite the absence of government direction to do so.

Most recently, the October 2013 issue of *Obstetricians & Gynecologists* warned women and their physicians about the risks that toxins pose to pregnant women and their fetuses.²⁵ This opinion, prepared by the ACOG Committee on Healthcare for Underserved Women, pointed to data collected during the past fifteen years indicating that exposure to environmental toxins before conception and during pregnancy “can have a profound and lasting effect on reproductive health” over a fetus’s lifetime.²⁶ ACOG identified reproductive and health problems associated with exposure to toxic environmental agents, including miscarriage and stillbirth, impaired fetal growth, low birth weight, preterm birth, childhood cancers, birth defects, cognitive and intellectual impairment, and thyroid problems.²⁷

ACOG President Dr. Jeanne A. Conry said that “[t]he scary fact is that we don’t have safety data on most of these chemicals even though they are everywhere—in the air, water, soil, our food supply, and everyday products. Bisphenol A (BPA), a hormone disruptor, is a common toxic chemical contained in our food, packaging, and many consumer products.”²⁸ Moving from research and analysis to policymaking, the ACOG publication urged its physician readers to advocate for government policy changes to identify and reduce exposure to toxic environmental agents. As Dr. Conry advised, “[t]o successfully study the impact of these chemical exposures, we must shift the burden of proof from the individual health care provider and the consumer to the manufacturers before any chemicals are even released into the environment.”²⁹ ACOG encouraged its physician members to educate patients about how to avoid environmental toxins, document environmental exposure histories during preconception and first prenatal visits in patients’ medical records, report environmental hazards to appropriate governmental agencies, and advocate for policy changes to reduce human exposure to toxic agents.³⁰

25. THE AM. COLL. OF OBSTETRICIANS & GYNECOLOGISTS, COMMITTEE OPINION: EXPOSURE TO TOXIC ENVIRONMENTAL AGENTS (2013), *available at* http://www.acog.org/Resources_And_Publications/Committee_Opinions/Committee_on_Health_Care_for_Underserved_Women/Exposure_to_Toxic_Environmental_Agents (last visited Mar. 17, 2014).

26. *Id.*

27. *Id.*

28. *Environmental Chemicals Harm Reproductive Health*, AM. COLL. OBSTETRICIANS & GYNECOLOGISTS (Sept. 23, 2013), http://www.acog.org/About_ACOG/News_Room/News_Releases/2013/Environmental_Chemicals_Harm_Reproductive_Health.

29. *Id.*

30. THE AM. COLL. OF OBSTETRICIANS & GYNECOLOGISTS, *supra* note 25.

Although a relatively new environmental threat, climate change is already viewed by environmental policymakers and health providers as one of the most significant public health threats of our time. Administrator McCarthy summed it up well: “Carbon pollution and climate change—without question—endanger public health and welfare. Not just today, but for generations to come.”³¹ Just as with health data culled from decades of air, water, and soil pollution monitoring, the medical community is playing an important role communicating climate change impact research to the larger population.

For example, “[t]he American Medical Society has hosted state-based courses on climate change since 2011, educating doctors about how to prepare for and respond to climate-related illnesses and injuries,”³² as well as how to reduce their practices’ contribution to the problem via medical waste and energy consumption.³³ Recent courses in Florida have focused on increased cases of asthma, respiratory illnesses, heat stroke, and exhaustion, given the state’s elderly population, as well as the appearance in the Florida Keys of the tropical disease dengue fever. In contrast, a Maine climate-change continuing medical education course hosted by the AMA focused on how changes in climate are affecting the number of heart attacks and problems related to extreme snow, ice, and cold. For Maine, the migrating illness is Lyme disease, which has increased tenfold in ten years. Given their place on the “front lines” of climate change, the AMA advises its physician members that “[p]atients are sicker or developing new conditions as a result of changes in the weather. Greater awareness and understanding of the situation, from a medical perspective, is a proper priority.”³⁴

It is particularly interesting that policymakers, as well as physicians themselves, see medical providers as agents for change on environmental public health issues. A December 2012 Gallup Poll confirms that individuals trust their health care providers more than they trust their elected representatives. Nurses and doctors ranked first (85% of respondents saying that they would rate their trust of people in particular jobs as high or very high) and third (70%), respectively, in honesty and ethical standards ratings, as compared to members of Congress, who ranked second to last (10%), just ahead of car salespeople.³⁵ Seizing this opportunity to communicate the

31. McCarthy, *supra* note 3, at 245.

32. Courtney Subramanian, *Rebranding Climate Change as a Public Health Issue*, TIME (Aug. 8, 2013), <http://healthland.time.com/2013/08/08/rebranding-climate-change-as-a-public-health-issue/>.

33. AM. MED. NEWS, *Confronting Health Issues of Climate Change* (Apr. 4, 2011), <http://www.amednews.com/article/20110404/opinion/304049959/4/>.

34. *Id.*

35. Frank Newport, *Congress Retains Low Honesty Rating*, GALLUP (Dec. 3, 2012), <http://www.gallup.com/poll/159035/congress-retains-low-honesty-rating.aspx>.

impacts of climate change through trusted intermediaries, the Obama White House's Champions of Change program honors medical and environmental professionals for "working on the front lines to protect public health in a changing climate."³⁶ Some of the named "champions" are practicing physicians and nurses, treating conditions like asthma that are directly affected by climate change, while others are working to reduce the carbon footprint of hospitals by encouraging them to "green" their energy and waste management practices. By interacting with patients in the treatment room, as well as modeling how to reduce one's greenhouse gas emissions while doing so, health care providers translate complicated data about the environment and public health into individual medical communication.

Although I have focused on how the medical community interacts with patients about the human health impacts of climate change, I cannot overlook this group's acknowledged awareness of the large ecosystem impacts. As Administrator McCarthy pointed out in her speech, "[c]limate change is about water. It's about ensuring clean drinking water. It's about storm surges and floods that overwhelm stormwater systems, letting pollution attack sensitive regions, spoiling our nation's iconic ecosystems Taves of research—including from right here at the University of Michigan—shows how a changing climate threatens Great Lakes fish and wildlife."³⁷ Climate change draws a straight, attacking line from clean water for human survival to clean water for fish, wildlife, and the greater ecosystem. In an even tighter connection, climate change's impacts on biodiversity can have profound impacts on human health. As Richard Ostfeld of the Cary Institute of Ecosystem Studies in Millbrook, N.Y., put it, "[b]iodiversity loss is a well-established consequence of climate change In a number of infectious disease systems, such as Lyme disease and West Nile virus, biodiversity loss is tied to greater pathogen transmission and increased human risk."³⁸ While the direct communication to patients may not reflect this message, the research conveyed from epidemiologists and public health researchers does.

36. *Champions of Change: Public Health and Climate*, THE WHITE HOUSE, <http://www.whitehouse.gov/champions/public-health-and-climate> (last visited Mar. 17, 2014).

37. McCarthy, *supra* note 3, at 245.

38. Press Release, Univ. of Ga., As Climate, Disease Links Become Clearer, Study Highlights Need to Forecast Future Shifts (Aug. 1, 2013), *available at* http://www.ekalart.org/pub_releases/2013-08/uog-acd073113.php.

III. MAKING HUMANS CARE ABOUT PROTECTING THE ENVIRONMENT

As the snail darter and spotted owl cases show, environmental regulation that does not more directly link to human health benefits can elude widespread political support. A 2013 article in *Time* magazine about climate change underscores the popular, human-centric perception of environment problems. Observing that few people act when climate change is portrayed as polar bears floating on melting bits of ice, it queries “[b]ut what if climate change were instead about an increase in childhood asthma, or a surge in infectious diseases, or even an influx of heat-induced heart attacks?”³⁹

A June 2012 study sought to answer this question by testing the “framing” of climate change as a public health problem. To determine what makes people in the United States become concerned about climate change, it tested segments of the population who are not or are only mildly engaged in the issue. Using a nationally representative sample of over a thousand people, study participants were asked to read news articles about climate change that emphasized risks solely to the environment, national security, or human health. This kind of single-subject “framing,” according to social scientists, sets the context for both perception and discussion of complex issues, and provides a means for understanding the causes of the problem, policy responses to it, and the risks and benefits of each action: “The frame used suggests both the diagnosis of the problem as well as prescriptions for what should be done about it.”⁴⁰

In this way, the study tested how framing climate change as an environmental, national security, or public health issue affected people’s emotional reaction to the issue. Social scientists report that emotions can serve as “affective prompts for engagement” and can “lead to forming predispositions for action.”⁴¹ Negative emotions, like anger and fear, can in some measure incite us to become informed and take action, but they also can be perceived differently by segments of the population and elicit an angry backlash among some. Positive emotions, like feelings of hope and efficacy (the perception that one can do something about the problem), can lead us to support climate change policies and actions. Feeling hopeless and ineffective about climate change can lead to ignoring the issue or rationalizing our choice not to act.⁴²

39. Subramanian, *supra* note 32.

40. Teresa A. Myers et al., *A Public Health Frame Arouses Hopeful Emotions about Climate Change*, 113 CLIMATIC CHANGE 1105, 1106 (2012), available at <http://link.springer.com/article/10.1007%2Fs10584-012-0513-6#page-1>.

41. *Id.* at 1107.

42. *Id.*

The results showed that across all study audience segments, “the public health focus was the most likely to elicit emotional reactions consistent with support for climate change mitigation and adaptation.”⁴³ The traditional environmental frame, which emphasizes climate change impacts on ecosystems, and the national security frame, which underscores the risks to U.S. national security posed by climate change, generated less hope than the health frame among the least engaged segments of the U.S. population. In addition, these two framing devices elicited more anger across the board than public health.⁴⁴ Taken together, the study suggests the high potential for explaining and justifying the need for climate change regulation in terms of human health. Just as with using medical providers to communicate the ACOG and AMA messages, U.S. policymakers have not ignored this study’s conclusion that people in the United States connect with climate change when it’s framed in terms of public health impacts. The Centers for Disease Control and Prevention launched a Climate and Health Program in 2009 that advises states and municipalities on regional climate change problems and the public health issues they entail.⁴⁵

IV. FOSTERING ENVIRONMENTAL STEWARDSHIP THROUGH ENVIRONMENTAL PUBLIC HEALTH LAW

As Administrator McCarthy concluded when closing her keynote speech, the “goals of protecting our environment and public health are not distinct—they’re joined at the hip. The future vitality of our lives and our economy depends on clean air, clean water, and a stable climate.”⁴⁶ The examples highlighted in this short essay seek to underscore this point. Although we use human health-based standards to measure permissible levels of pollution, we do so in light of the fuller relationship of humans and their collective actions within their ecosystems.

Environmental public health law today sits at the confluence of environmental and public health laws. The signature U.S. environmental laws of the 1970s and 1980s defined pollution limits in terms of baseline public health impacts and sought to enforce them via the EPA and the courts. As a result of this foundational work, we now have a more clear understanding of how the environment affects human health and a deeper appreciation of our place within our ecosystem. Public health law has traditionally enabled health officers to collect data, conduct research, investigate illness and its

43. *Id.* at 1105.

44. *Id.* at 1109.

45. *Climate and Health Program: About Our Program*, CTDS. FOR DISEASE CONTROL & PREVENTION, <http://www.cdc.gov/climateandhealth/about.htm> (last visited Mar. 17, 2014).

46. McCarthy, *supra* note 3, at 248.

root causes, and educate by disseminating best practices. Now, almost forty years after the first wave of these laws, we see a growing body of research on environmental public health out of the NIEHS and NCEH/ATSDR, and a growing public awareness of it via non-governmental environmental organizations like the Environmental Working Group and Natural Resources Defense Council and medical and public health associations and their members.

Taken together, this collection of responses to environmental pollution represents a community dynamic. Accepting as true that law both codifies and shapes behavioral norms, I see the next wave of environmental public health law aiding the United States to find more solid middle ground between economic development activity and its attendant pollution, and human health and environmental impacts. As Administrator McCarthy reminded us, “decades of Clean Air Act history prove we can protect public health and grow a strong economy. We’ve already set reasonable limits for toxic pollutants like mercury, lead, and arsenic from power plants—which, among other things, will prevent as many as 130,000 cases of childhood asthma symptoms each year.”⁴⁷ As environmental public health law moves forward, the parts of environmental law that have proven effective—mandated monitoring, funded research and analysis, scientific standard setting, and administrative, civil, and criminal enforcement—can be enhanced by using public health law’s signature strengths, namely ongoing risk assessment and management, identification of uncertainty, and evaluation of alternative actions. In this way, we can continuously refine our understanding of the true costs of economic development, and foster a community dynamic of law that values human health and incites human support for it, but within—not apart from—our ecosystem.

47. *Id.* at 246.