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Science Can Help Define and Defend the Human Right to Clean Water

3 February 2017 Kathleen O'Neil

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In 2010, the [United Nations](#) recognized a human right to safe, clean, accessible and affordable water in sufficient quantities for the public's personal and domestic use.

It may be surprising it took so long to be added to the list of human rights, since it seems so obvious to most people, said Inga Winkler, a lecturer in human rights at Columbia University. But figuring out how exactly to define each aspect of that right is less obvious and will require help from social and physical scientists, she said.

Scientists and engineers can, and should, also play a role in protecting people's access to clean and safe water, speakers said during the 26-27 January meeting of the [AAAS Science and Human Rights Coalition](#). The meeting, held at AAAS headquarters, gathered scientists, engineers, health professionals, human rights advocates, community activists and policy makers to discuss water and human rights.

Under the existing system in the United States, poor cities and towns get the water they can afford, which may not be safe or clean, said [Marc Edwards](#), professor of civil and environmental engineering at Virginia Tech. Edwards delivered the meeting's keynote address focusing on U.S. public water health crises, including the ongoing lead water crisis in Flint, Michigan that began in 2015 and the lead water crisis in Washington D.C., in 2000-2004 both of which he helped uncover.

"Old infrastructure, old pipes in particular, can kill people," Edwards said. A century ago, many U.S. cities preferred or even required lead pipes to be used for water and sanitation because they were easier to install and more durable than concrete or steel. The health effects of water lead exposure were not well understood at the time, despite warnings dating to Roman times, Edwards said. We now know that there is no safe level of lead exposure, he said, and the problem of using lead pipes will only get worse if they are not replaced.



VIRGINIA TECH PROFESSOR MARC EDWARDS SPEAKS AT THE AAAS SCIENCE AND HUMAN RIGHTS COALITION MEETING. | ANDREA KORTE/AAAS

In 2014, Flint's water system managers changed the system's water source to save money, but failed to add an inexpensive anti-corrosive inhibitor to the water to protect its pipes. As the city's pipes were exposed to corrosive water, lead leached out, and iron was released that consumed the chlorine that was supposed to disinfectant the water. The problem was compounded by the fact that they city had lost 50% of its population since the 1960s, but still needed to maintain its infrastructure. These factors caused Flint's water rates to be very high, among the most expensive in the country. That led its customers to use as little water as possible, which meant less water was moving through the pipes, leading to even more corrosion.

The loss of chlorine disinfectant and release of iron, which helps bacteria grow, was also deadly. The combination allowed pathogens including Legionella to reach dangerous levels—the city had several outbreaks of Legionnaires disease that led to 12 deaths. Environmental regulators compounded the health problems by failing to acknowledge them and take steps to protect the public's health. A dozen people have been criminally charged in the Flint water disaster to date, Edwards said.

A similar story played out years earlier in in the nation's capital, but on a much larger scale – one that was "30 times worse than Flint," Edwards said.

"In many cases, consumers are being told our water is safe to drink when it's not," Edwards said. He referenced a news report that found 33 U.S. cities used procedures such as "pre-flushing" pipes or taking additional samples to lower lead levels in the test results. "The regulatory system lacks checks and balances, and there is a price to be paid for scientists who speak out," Edwards said. In fact, they often face retaliation, as he did when District and federal agencies cut his research funding and tried to discredit his research.

One attendee asked Edwards if he thought citizens should form a group to do regular monitoring of drinking water. "Scientists can't be everywhere at once, so yes, unfortunately, I think that might be necessary," he said.

Panelist [Brian Shmaefsky](#), a professor of environmental science at Lone Star College in Kingwood, Texas, described his work helping residents in Bangladesh get relief from water pollution created by tanneries without losing their jobs in those plants. He agreed that scientists can, and should, go beyond being just an objective information source.

"They can become advocates for human rights, which is what I prefer," Shmaefsky said, by being subjective and advising the use of the precautionary principle to help protect people. "Unfortunately, as we saw with the Flint experience, scientists can also serve as oppressors."

[Associated image: USDA/Flickr CC BY 2.0]

