Guest Editorial

UPSTREAM AT THE WATERSHED MOMENT

The research assistant wrapped a clean washcloth around the end of the faucet to avoid scratching it. Then she clamped a wrench over the faucet's spout, turned on the water, and drew each sample into its respective bottle. After securing the samples into a small cooler, the research assistant headed back to town. She understood the 30-hour protocol window; if the samples arrived at the state laboratory within 30 hours, they would be viable. However, missing the FedEx truck and/or the deadline would mean that the samples would need to be discarded. In that case, another visit would need to be scheduled.

The goal of collecting the water samples was to document the extent of household environmental health risks in rural low-income families. The results were then folded into the delivery of a tailored research intervention based on each family's risk profile.[1] The families in this study all lived in Gallatin County, Montana (ie, Bozeman), or Whatcom County, Washington (ie, Bellingham). From a national or international perspective, the families lived in some of the least populated and supposedly pristine areas on the planet. It was not unusual in this study for families to live in mobile homes that had million-dollar views of mountains and forest. Families often told us that the view was the reason they lived in the country; despite these tough times, they would rather pay the gas money than move into town.

Even though my public health lens seems to autofocus at the population level, I know that in the end, environmental health is personal. It plays out in the family. The families we saw whose wells were contaminated needed to decide where to situate those risks into the demands of their daily lives. How did they decide where the paycheck went? Should they use their money to buy bottled water, a point-of-use filtration system, or do nothing and hope for the best. Parents in our study needed to consider the immediate demands of rent and daycare in the context of theoretical risks associated with arsenic- or nitrate-laced water. To ease these decisions, we provided families with a pop-up book describing each finding as well as a list of no-cost/low-cost options for different risk scenarios. As the study investigators, we characterized the risks, using the scientific language we know so well. However, what we often heard from families was "what is 'nitrate' and how did it get into our well water?"

Environmental health lives in a complex duality and a rapidly changing context. As thought leaders in nursing, we need to recognize this multidimensionality; in this editorial I lay out several (5 actually) facets of environmental health and a charge for our profession to move forward on several fronts simultaneously.

The *first facet* of environmental health is for us to consider the role that environmental risks play in individuals and thus in the creation of future patients. Each of us has friends whose lives have been cut short by Parkinson's disease, cancer, or other conditions. They are not outside of us; they are us. We should never lose sight of that perspective. A *second facet* addressing environmental health is to reflect on the totality of economic and societal costs due to environmentally associated disease. Trasande and Liu[2] recently recalculated the costs of environmentally associated diseases in US children; the 2002 estimate of $54.9 billion was upgraded to $76.6 billion for 2008.[2] Sobering data, even when we see the data in terms of dollars versus human capital. A *third facet* of environmental health to consider is the regulatory environment. Our nation's decisions to evolve (or devolve) environmental regulations has a direct impact on its citizenry. Families most affected by local messes often need to launch their own crusades for cleanup; they work hard to navigate a sea of ambiguous policies at the local and state levels. Local regulations addressing factory farms vary widely. At what point does the burden of keeping up with information addressing the discharge of tons of antibiotic- and hormone-ridden animal waste become the responsibility of the government versus the factory farm's unfortunate neighbors? A *fourth facet* of environmental health is to situate the current mix of risks at this point in time within its evolutionary context. Many of today's environmental risk-reduction solutions are rooted in 19th-century technology and

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thinking. To a remarkable degree, national water pollution control efforts still reflect "dilution as the solution to pollution." These policies persist, despite recent findings quantifying pharmaceuticals and pharmaceutical by-products in the drinking water of major American cities. At the present time, our planet's saturation point for "dilution" will come well in advance of our collective ability to prevent pollution. The latter will require a fundamental redesign of the way our civilization lives and defines progress.

And, last but not least (*fifth facet*), nursing needs to consider the portfolio of risks and benefits associated with the health care system itself. Persistent chemicals, ionizing radiation, and biohazards are central to the business of health care. Health care services are incredibly resource-intensive and deeply enmeshed in a production-consumption economic model. So as a profession committed to health, we have our own work to do. Every site of care warrants redesign, from waste generation to product selection. Those we educate must understand and have the fundamental tools they need to engage in environmental risk reduction. We can no longer justify leaving environmental health content on the periphery of nursing, under the guise of overcrowded curricula. Without a working knowledge (beyond superficial content) of environmental health, the graduates of 2012 and beyond will be missing an essential tool of nursing practice. Nurses will either assume leadership of health care redesign efforts or by default they will be supplanted by those with a weaker understanding of health care and those it is intended to serve.

Back at the ranch (literally), the public health nurse visits a family to share the results of their water testing with them. The analysis took about a month; the water was analyzed for bacteria, heavy metals, pesticides, and other solvents. This time the news is good; no contaminants were found to be above the threshold level. The mother is relieved to find that all family members, including the baby and toddler, can drink the water. In actuality, "good" means "good for now"; what it doesn't mean is that today's pristine water will be pure next year or the next.

Taken as a whole, our findings and those from other health scientists are beginning to provide evidence that sooner or later, what gets poured or sprayed or buried in the ground ends up in our drinking water. Some risks, such as those from agricultural run-off and mine waste, are easily seen. Other risks from illegal dumps and methamphetamine-associated solvents are highly site-specific. Thus, sooner or later a derailment of chlorine-filled railcars into the river, a small and underregulated foundry, or a windblown pile of last century's mine tailings has the potential to end up in all of our drinking water. In the end, environmental health is personal as well as political; it is embedded in our daily work but warrants a global vision.

The watershed moment is upon us. The truth is becoming more than inconvenient. We are finding contaminants in the most remote parts of our country, where we least expected it . . . where we have never considered looking before. Fortunately, as a profession, nursing has the ability to embrace the multidimensional complexity of environmental health; we are also blessed with the numbers and talent to solve problems on many fronts simultaneously. Let us broaden and deepen our efforts to ensure a future worth having. Our nation and planet can ill afford to perpetuate a reactive approach to environmental health; nor should we wait to see downstream effects manifest themselves as lives are lost. We should turn our efforts upstream, where the real problems lie.

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