Challenges with Water and Sanitation Infrastructure in the United States: Failures in Service Provision and Racial Inequalities in the Resultant Impacts on Community Health

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In the aftermath of the drinking water crisis that impacted Flint, Michigan (MI) between 2014 – 2106 and resulted in an unknown thousands of children being exposed to dangerously high levels of lead (Pb) in drinking water, the city of Flint has inspected and replaced thousands of drinking water service lines, the state of MI has negotiated a proposed $600+ million dollar financial settlement for affected families and indictments have been handed down against 9 local and state officials on charges including misconduct in office, willful neglect of duty and perjury.[1-4] While the service line replacements, financial reparations and legal indictments are necessary actions in light of the social neglect and technical mismanagement that created and perpetuated the drinking water crisis, it is important that we do not take these recent announcements regarding settlement as suggestion that the health emergency in Flint has either been fixed or that it was unexpected.

Regarding the extent to which service line replacements and financial reparations can *fix* what has occurred, the impacts of lead (Pb) exposure on neurological development in children may be permanent and, as such, will likely have far-reaching repercussions for their own, and their families', lives and livelihoods.[5] With respect to *unexpected*, a 2017 report by the Natural

Resources Defense Council (NRDC) has highlighted the widespread extent of failing drinking water infrastructure in the United States, noting that almost 80 million people in the U.S. are currently served by drinking water systems that have demonstrated at least one failure of compliance with the US EPA Safe Drinking Water Act (SDWA).[6] Failures of compliance have included insufficient frequency of drinking water testing, elevated levels of metals (not limited to lead [Pb]) in drinking water; and lack of reporting of results (and implications of results) to the public.[6] Moreover, as summarized by NRDC regarding data from the U.S. Centers for Disease Control and Prevention (CDC), approximately 19.5 million Americans are sickened yearly from pathogen exposures resulting from contamination of public drinking water supplies.[6]

Geographically, drinking water systems in sparsely populated and/or rural areas account for nearly 70 percent of all violations of either/both health-based standards and/or requirements for drinking water monitoring and reporting.[6] With a parallel focus on rural and small-community health, an additional concern with respect to the state of water- and health-related infrastructure in the U.S. is a growing challenge with the maintenance of household and community-level wastewater treatment. A 2019 report by The Alabama Center for Rural Enterprise (ACRE), The Columbia Law School Human Rights Clinic and The Institute for the Study of Human Rights (Columbia University) has highlighted the near-failing status grade (D+) the American Society of Civil Engineers has recently given U.S. wastewater infrastructure.[7] In this report examining the extent to which infrastructure shortfalls disproportionately impact rural communities, ACRE effectively argues that through impacts on physical and mental health, as well as the impact that fines and legal penalization have on the framing of poverty itself as a criminal activity for homeowners unable to afford infrastructure upgrades, a lack of adequate

sanitation perpetuates marginalization by restricting social access, as well as limiting opportunities for education and employment.

With significant relevance to this near-failing wastewater status grade, Catherine Coleman-Flowers, ACRE founder and 2020 recipient of a MacArthur Fellowship, and a team of researchers at the National School of Tropical Medicine at Baylor College of Medicine have documented the presence of hookworm in the rural Alabama counties in which Ms. Coleman-Flowers works.[8] Hookworm is an intestinal parasite, the persistence of which can result in impaired cognitive development, iron-deficiency anemia and growth stunting in children. As the research team noted, 19 of the 55 people (34%) who agreed to be tested for parasites for the study were infected by hookworm as well as other parasites.[8] These results highlight a disturbing reality in our nation, namely, that hookworm – a parasite that thrives in resource-limited countries as the direct result of absences of sanitation service provision – exists within the United States as well. In the chain of cause and effect that links exposure to environmental contamination with resulting impacts to health, this is a reality that should not be ignored.

Regarding this cause and effect, if the conditions that serve as the first link in this chain (i.e., the lack of – or failures in – functioning sanitation) are present in the U.S., and the parasite that can result from these conditions has been confirmed to exist (the second link), then the third link in this preventable chain – namely, malnutrition, growth stunting and the inability for children to reach anywhere near their full potential – is also very likely to be present. While we may think of malnutrition resulting from poor sanitation and exposure to parasites as a problem that challenges other countries with more rudimentary infrastructure, the results of Ms. Coleman-

Flowers' work should serve as warning that the global picture of deficits in childhood nutritional needs does not exclude the United States. As with the critical concern for the potentially irreversible impacts of lead (Pb) exposure on childhood neurological development, researchers have suggested that early childhood intestinal diseases that result from poor sanitation can have significant and long-lasting bearing on children's nutritional status, growth and cognitive development.[9,10] The conclusions of this sobering research should serve as a direct call to action in this country.

As the NRDC has also noted in their U.S. water infrastructure review, fixing problems with clean water supply, as well as with sanitation service provision, will reduce the occurrence and severity of water- (and sanitation-) related illnesses – including intestinal illnesses – and will save lives (in addition to very likely creating jobs in communities in which these jobs are most needed).[6] A widened understanding of this current reality in the United States can serve to create necessary momentum towards both addressing the technical challenges with water and sanitation service provision in this country as well as making progress toward the fundamental goal of supporting children everywhere in physical, mental, emotional and social wellbeing.

References

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Image Caption:

Drinking water infrastructure in Flint, MI; Septic tank/infrastructure deficiencies and dooryard flooding in the rural United States. [Shutterstock | Used with permission]