

LETTERS

WATER STRESS AND WATER SCARCITY: A GLOBAL PROBLEM

Water scarcity is a result of an imbalance between the supply of and demand for water sources in a geographical area. A limited or inadequate water supply is one of the toughest issues facing the world's poorest countries, but the populations of these countries are not the only populations to endure the burden of water scarcity.^{1,2} As Levy and Sidel correctly point out, distribution in water-strained settings is the source of numerous conflicts globally.³ Most dialogues about this topic, either explicitly or implicitly, talk about water stress and conflict as an issue limited to the low- and middle-income tropical or subtropical countries, as most of their examples affirm.³ As a result, limited literature and discussion exists on the public health effects of water scarcity in wealthier countries or regions such as the United States,^{4,5} Europe,⁶ Australia,^{7,8} or the Asia-Pacific where water scarcity threatens regional food security through a number of ecological, political, and economic pathways.⁹ Perhaps this paucity of discourse stems from a false notion that these countries and regions do not currently and will not contend with the further consequences of

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A jar of water sits on a counter in the new science building at the Bertschi School in Seattle, WA, which is one of several dozen nationwide that recycle and manage rainwater and wastewater on site. Photograph by Ted S. Warren. Printed with permission of AP Wide World.

population growth, urbanization, and anthropogenic and natural climate change. However, such an assumption would be far from the truth¹⁰ as emerging empirical literature from these regions confirms.⁵⁻⁹

Insufficient access to water and ensuing water stress is undoubtedly a major global public health threat and challenge for our generation. As Levy and Sidel discuss, many roles exist for public health professionals in shaping and “ensuring equitable access to freshwater.”^{3(p779)} Where public health workers devote their efforts and pick their battles is often determined by the literature and surrounding debate. In this instance, I pose that a broader debate and research agenda is needed. The majority of collective public health efforts ought to be directed to those countries striving to attain Millennium Development Goal (MDG) Target 7C: “Halve, by 2015, the proportion of the population without sustainable access to safe drinking water and basic sanitation” (available at:

<http://www.un.org/millenniumgoals>). However, our dialogue and concern should not be limited to only those countries striving to attain MDG 7.C. By doing so we, as public health workers, risk not only overlooking a number of populations with imminent water issues in our own backyards^{4,5,7,8} but also missing some easy successes in populations with enormous per capita water consumption compared with those populations struggling with MDG Target 7C. ■

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EQUITABLE DISTRIBUTION OF PEPFAR-SUPPORTED HIV/AIDS SERVICES IN SOUTH AFRICA

Using an analysis of province-level indicators, Stuckler et al. highlighted inequalities in South Africa's health infrastructure that persisted after the end of apartheid.¹ Since 2004, the South African government has worked to increase access to HIV/AIDS and tuberculosis prevention as well as to care and treatment services, with extensive support from the US government through the US President's Emergency Plan for AIDS Relief (PEPFAR); the 2010 budget for PEPFAR in South Africa was more than \$550 million. We investigated the relationship between the PEPFAR response in South Africa and the need as defined by the burden of HIV/AIDS at the district level.

We calculated Spearman rank correlation coefficients to determine the associations among measures of HIV testing, treatment, and services for orphans and vulnerable children from October 2010 to December 2010 PEPFAR monitoring data and HIV/AIDS burden, healthcare infrastructure, socioeconomic status, and perinatal mortality. To indicate the HIV/AIDS burden, we used the number of persons living with HIV by district in 2008.^{2–4} We

midcentury one of every three US counties will face a greater risk of water shortage as a result of global warming.⁴ By substantially limiting greenhouse gas production, wealthier countries could reduce some of the water scarcity that they cause.

We also agree that greater efforts should be made to help countries striving to attain Millennium Development Goal (MDG) Target 7C: “Halve, by 2015, the proportion of the population without sustainable access to safe drinking water and basic sanitation” (available at: <http://www.un.org/millenniumgoals>). Achievement of this goal is linked to achieving other MDGs, including MDG 1: “Eradicate extreme poverty and hunger” (because access to water directly impacts poverty and food security); MDG 3: “Promote gender equality and empower women” (because access to water affects the social and economic capital of women); MDG 7: “Ensure environmental sustainability” (because, for example, adequate treatment of wastewater reduces pressure on freshwater resources); and MDG 8: “Develop a global partnership for development” (because reducing water scarcity requires international cooperation).^{5–7} The United States and other wealthy countries have the power and obligation to help poorer countries achieve these goals and to prevent water conflicts before they boil over. ■

Barry S. Levy, MD, MPH
Victor W. Sidel, MD

LEVY AND SIDEL RESPOND

We thank Harhay for his thoughtful comments. We agree with his warning that water scarcity also affects wealthier countries, including the United States.¹ As we stated in our editorial, laws and regulations, proactive cooperation, and mediation and arbitration are important approaches to resolve water conflicts before they boil over. Many examples of implementing these approaches exist in the United States, including the Interstate Commission on the Potomac River Basin, the mission of which is to “enhance, protect, and conserve the water and associated land resources of the Potomac River and its tributaries through regional and interstate cooperation.”²

Among the factors that contribute to water scarcity is climate change,³ which will likely cause increasing water scarcity as a result of drought and flooding. The Natural Resources Defense Council predicted in 2010 that by

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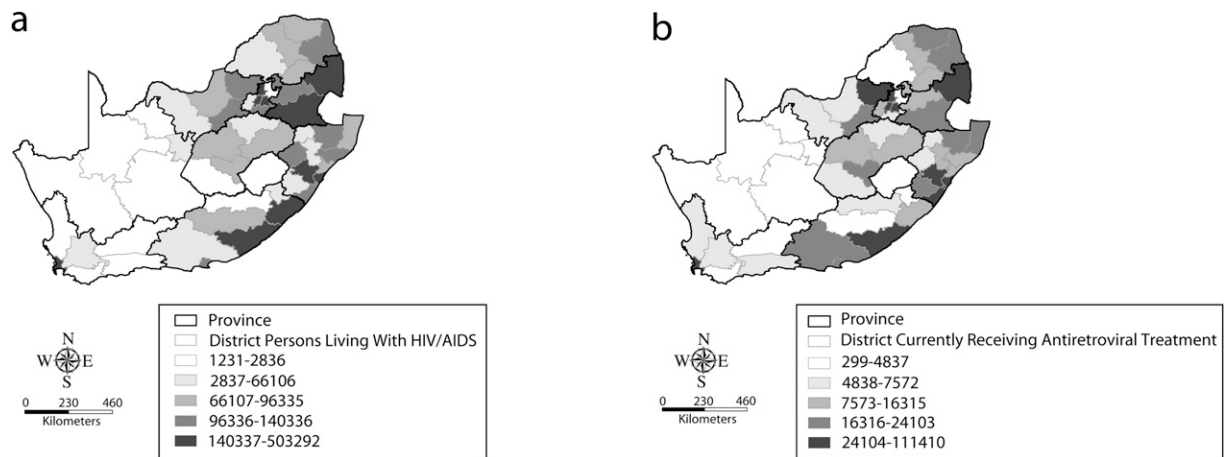


FIGURE 1—Number of Persons in South Africa (a) Living With HIV/AIDS, by District, 2008, and (b) Currently Receiving Antiretroviral Treatment for HIV/AIDS Through the US President's Emergency Plan for AIDS Relief-Supported Facilities, by District, 2010.

used the provincial health care infrastructure ranks per capita¹ to indicate health care infrastructure. District-level socioeconomic status and perinatal mortality were also derived from previous reports.⁵

We found strong associations between the HIV/AIDS burden and the persons reached with HIV testing (Spearman rank correlation coefficient [SRCC]=0.73; $P < .001$), the persons supported for HIV treatment (SRCC=0.83; $P < .001$; Figure 1), and the orphans and vulnerable children accessing services (SRCC=0.61; $P < .001$). We found no association between a district's socioeconomic ranking and HIV testing or HIV treatment (SRCC=-0.08; $P = .58$ and SRCC=0.02; $P = .92$, respectively). In districts with lower socioeconomic ranking, however, we found a trend toward more orphans and vulnerable children accessing services (SRCC=0.25; $P = .07$). No association was found between PEPFAR-supported services and perinatal mortality or provincial health care infrastructure rankings.

We found that PEPFAR-supported services at the district level significantly correlated with the burden of HIV/AIDS. Whereas Stuckler et al. used province-level indicators, we used district-level measures, which may be more precise. It is reassuring to note that services were delivered according to the burden of disease in the PEPFAR response to HIV/AIDS—South Africa's primary cause of morbidity and mortality.⁶ Although PEPFAR support largely strengthens

services in response to the epidemics of HIV/AIDS and tuberculosis, research has shown that such services positively affect the general health care infrastructure.⁷ Because PEPFAR is transitioning from an emergency response model to a capacity-building and health system-strengthening one, the underlying inequities in healthcare services could be further ameliorated.⁸ ■

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Contributors

E. Larson and H. O'Bra conceptualized the letter. E. Larson performed the analysis and drafted the letter. E. Larson and J. D. Klausner interpreted the data. H. O'Bra, J. W. Brown, T. Goldman, Y. Pillay, and J. D. Klausner revised the letter. All authors approved the final version.

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STUCKLER ET AL. RESPOND

We welcome the effort by Larson et al. to extend our analysis of inequalities in health care provision in South Africa¹ to an external disease-specific agency, the US President's Emergency Plan for AIDS Relief (PEPFAR). Although the analysis is interesting, the authors misleadingly suggest that their findings may be more robust because they used district level data. In fact, they are looking at something quite different. There is no a priori reason to expect that the distribution of funds by an international aid agency should be the same as that in the national government's healthcare budget. A larger question that the authors do not address is whether external agencies and private donors substitute for domestic spending on health care.² PEPFAR has gone to great lengths to avoid such a possibility, for example, by setting up matching initiatives with government finance. Yet one unresolved concern is that when external groups provide health care services to vulnerable groups, they may unintentionally relieve the pressure on those making domestic budgetary decisions to reverse historical inequalities in health care. Independent analysis and scrutiny is needed to understand how external bodies such as PEPFAR have perpetuated or helped alleviate historical infrastructure-inequality traps that we observed. While considerable effort is expended in public health research to assess the determinants of health outcomes and inequalities,³ an equal need exists for rigorous studies to understand how to address deeply embedded causes of institutional inequalities and their influence on the evolution of public health systems. ■

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