

## ABSTRACT

### **Solid Wastes Provide Breeding Sites, Burrows, and Food for Biological Disease Vectors, and Urban Zoonotic Reservoirs: A Call to Action for Solutions-Based Research**

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Desiree LaBeaud<sup>1</sup> The world is in a solid waste and plastic predicament (1–15)—single use-plastic packaging is increasing in an urbanized (11, 16–20) and globalized economy in which production of food happens farther from the consumer and packaging enables consumption far from the source; yet, plastics lack a circular economy (21–23) that would incentivize responsible management (3, 24–28), resulting in large accumulations of solid waste, specifically plastics which do not biodegrade (29).

The most common approach to eliminating accumulated trash in low- and middle- income countries is open burning. For example, in sub-Saharan Africa, more than 75% of waste is openly burned and worldwide an estimated 600 million tons are openly burned annually (30). Open burning of trash is dangerous for human health (6, 31–33) and the planet, as burning releases toxins into the air that pollute the environment and increase greenhouse gases which contribute to climate change (30).

Policies are slowly catching up to reduce single-use plastic supply, but these policies are only one part of a complete solution (34–37) to single-use plastic production, demand, and disposal (29) and these policies often face poor enforcement, especially in LMICs (29).

At the same time, the risk of zoonosis has increased with urbanization (38) and immunologically naïve populations are newly at risk for vector-borne disease transmission due to changing geographies of suitable vector climates (39–41). Vector-borne diseases such as dengue—transmitted by container breeding *Aedes* spp.—threaten about half a billion people in densely populated areas (42). One very important mosquito vector, *Aedes aegypti*, which spreads dengue, Zika, chikungunya, and yellow fever, prefers to breed in man-made containers (43, 44), such as recyclable plastic containers, tires, and trash. The 2,050 projections of over 6 billion people living in urban areas (45) suggest an impending increase in the risk of infectious disease transmission.

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