A City Built on a Mine: The Extent and Impacts of Residual Lead Contamination on Environmental Health in Kabwe, Zambia

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Zambia has vast mineral resources that contribute to the country's gross domestic product, but often have negative impacts on the communities that surround mining operations due to poor regulation. Kabwe, Zambia is the location of a former zinc and copper mine open between 1906 and 1994, and is marked now by hundreds of thousands of metric tons of extremely lead-rich tailings and slag debris intermingled with communities. Despite numerous remediation efforts in the past 20 years, individual studies repeatedly have shown Severely high levels of lead poisoning of children and widespread soil contamination. Given that people live in the impoverished areas surrounding the mine, it is critical to understand the pathways of exposure. To that end, we are pursuing a multi-pronged appraoch of soil and dust sampling, and are in the process of deploying a drone-based hyperspectral imaging system to remotely sense lead contamination (Pandit et al., 2010) and distributing simple kits for citizen-scientists to measure their own soil lead (Landes et al., 2017). The goal of this work is to pinpoint areas of greatest concern for mitigation, to engage a community that has become disenfranchised, and to pilot novel technoligies to rapidly determine geochemical compotion of surface soils of a large area.

Landes, F. et al. (2017). Developing and deploying a field kit for lead in soils in NYC and Peru. Goldschmidt Paris
Pandit, C., Filippelli, G.M., and Li, L. (2010). An estimation of heavy metal concentration in soils using reflectance spectroscopy and partial least squares regression. *Inter. J. Remote Sensing*, 31: 4111-4123, doi:10.1080/01431160903229200