Annals of Global Health, VOL. 82, NO. 3, 2016
May–June 2016: 575–584

mean $PM_{2.5}$ emissions from households was 68 ± 36 g/hour, most of which was from space heating devices. In the time series model, an emission of ~1 g/hour $PM_{2.5}$ from household was associated with an 0.034 ± 0.025 μg/m$^3$ increase in hourly ambient $PM_{2.5}$ concentrations, adjusted for autocorrelation and other covariates. The predicted ambient $PM_{2.5}$ level from household $PM_{2.5}$ emissions was significantly associated with the DustTrak-monitored level, with a coefficient of 0.3 ($p < 0.001$) and explains 23% of the total variance in a simple box model.

**Interpretation:** Household space heating using biomass and coal emits a large amount of $PM_{2.5}$. This implies a significant contribution to AAP and health burden associated with AAP and HAP in China and many other developing countries using solid fuel for household space heating.

**Funding:** UCB's Center for Global Public Health and Center for Chinese Studies, and Tsinghua University's Dept. of Building Science.
**Abstract #:** *2.007_PLA*

### The role of enteropathy and mycotoxins in child stunting in low- and middle-income settings

*Stephanie Ly[1], Catherine Carpenter[2]; [1]Department of Community Health Sciences, UCLA Fielding School of Public Health, Los Angeles, CA, [2]UCLA Center for Human Nutrition, School of Nursing, Los Angeles, CA*

**Background:** The World Health Organization (WHO) estimated the prevalence of pediatric stunting at 171 million children, with 97.6% of the burden in developing countries [1]. Stunting is a form of chronic malnutrition leading to negative lifelong consequences such as cognitive impairment, poor educational performance and economic loss. Newly emerging research has shown links between stunting and environmental enteric dysfunction (EED) and mycotoxins [3]. EED is an autoimmune response malforming small intestinal villi and reducing absorption of nutrients. This condition is linked to environmental conditions with poor sanitation. Mycotoxins are chemicals released by fungal species that contaminate food sources [4]. While mycotoxins are known carcinogens, their gastrointestinal impact is being studied.

**Methods:** A systematic review was conducted to investigate primary research on EED and mycotoxins on stunting. A search strategy in PubMed and WHO Library databases resulted in 163 records narrowed down to 16 eligible articles. The inclusion criteria included: primary resarch, stunting topics, ability to translate to humans and topics related to EED and mycotoxins. Studies that were secondary research, solely laboratory studies or outside EED and mycotoxins were excluded. Among the final articles included, study designs varied from cross-sectional, genetic, cohort and randomized control trials.

**Findings:** In the selected primary research studies investigating environmental enteropathy (n = 6), study populations included childen in Bangladesh, Malawi, Kenya, and Tanzania. No significant findings were made with treatment interventions in micronutrients, fish oil and albendazole. Mesalazine, an immunosupressant used in other inflammatory bowel disases demonstrated safety and has potential for efficacy studies.

In the studies concentrating on mycotoxin roles in stunting (n=10), findings were also varied with populations in Benin, Cameroon, Gambia, Tanzania and Togo. Investigations confirmed an association between stunting and mycotoxin levels in the blood. One study trialed an oral medication used to reduce aflatoxin levels and found safe uptake.

**Interpretation:** As evidence strongly links EED and mycotoxins as contributors to stunting, efforts to understand pathways and treatment is needed. To combat the negative lifelong consequences of stunting among children in LMICs, efforts on improving environmental sanitation conditions and treatment of EED and mycotoxins also needs to be prioritized.

**Funding:** UCLA Graduate Summer Research Mentorship Program.
**Abstract #:** *2.008_PLA*

**References:**

1. de Onis, M., M. Blossner, and E. Borghi. 2011. "Prevalence and trends of stunting among pre-school children, 1990-2020". *Public Health Nutrition.* http://dx.doi.org/i:10.1017/S1368980011001315.
2. WHO, UNICEF and World Bank. 2013. "Levels & Trends in Child Malnutrition." *UNICEF-WHO-The World Bank Join Child Malnutrition Estimates.*
3. Jones, K.D., et al., Mesalazine in the initial management of severely acutely malnourished children with environmental enteric dysfunction: a pilot randomized controlled trial. BMC Med, 2014. 12: p. 133.
4. Hernandez-Vargas, H., et al., Exposure to aflatoxin B1 in utero is associated with DNA methylation in white blood cells of infants in The Gambia. International Journal of Epidemiology, 2015.

### Treatment outcome among newly diagnosed tuberculosis patients in Kenya

*Dennis Magu[1,2], Eunice Wambui[1], Kenneth Ngure[2], Simon Karanja[2]; [1]Jomo Kenyatta University of agriculture and Technology, Nairobi, Kenya, [2]Institute of Tropical Medicine and Infectious Diseases, Kenya Medical Research Institute, Nairobi, Kenya*

**Background:** Globally Tuberculosis (TB) affects one third of the world's population (2 billion people) and 9 million people developed TB in 2013 up from 8.6million in 2012. Kenya is ranked number 15 out of the 22 high burden countries that contribute 80% of the global TB burden. The objective of this study was to establish the uptake of TB treatment among newly diagnosed TB patients.

**Methods:** A cohort study design was used where 70 patients were enrolled in the study from selected sites. The clients were recruited and followed up for a period of one year from the selected health facilities.

**Findings:** The findings indicated that majority (51.4%) of the respondents had a favourable treatment outcome smear positive cure rate and (38.6%) treatment completion among smear negative patients. The treatment outcome was associated with patient's economic activity, substance use, severe TB symptoms, self-efficacy

and presence of a TB treatment DOT supporter. The self-employed patients were more likely to complete treatment than unemployed, smokers (50%) and alcohol users (98.3%). Chi-square was performed to test association between treatment outcome and potential factors / patient characteristics. There was a significant association between treatment outcome and main economic activity ($p < 0.001$) at 95 CI. There was no association between treatment completion and presence of other chronic infections, patient's knowledge of how TB is transmitted or prevented, nor their awareness of the clinic visit requirements ($p > 0.05$).

**Interpretation:** Analysis of results was complex due to loss of follow-up, death and migration of clients. The current devolution in Kenya has led to influx of clients in some counties leading to failures of health service delivery and infrastructure. There is need to, increase patient treatment literacy levels through health education, include drug and substance use counselling. There is unequal distribution of treatment completion rates and further longitudinal studies should be conducted to establish the treatment barriers.

**Funding:** No.
**Abstract #:** *2.009_PLA*

### A nutritional assessment of Haitians residing in a temporary resettlement camp turned permanent community following the earthquake of 2010

*M.C. McGregor, J. Burke, S. Wang; Department of Internal Medicine, Rush University Medical Center, Chicago, IL*

**Background:** In 2010, Haiti was struck by a catastrophic earthquake that displaced millions of Haitians, forcing them to move to temporary resettlement camps that have since turned into permanent communities. Jerusalem is a community of ~30,000 displaced Haitians outside of Port-au-Prince. There is no running water or electricity, and there is limited access to medical care. Little is known about the diet of those who live in these communities. We aimed to better assess their nutritional status. We hypothesized that Haitians eat fewer meals per day following the earthquake.

**Methods:** In a free clinic in Jerusalem in October 2015, 123 patients were randomly surveyed following their encounter with a physician. The survey consisted of 20 questions that assessed hunger, access to food, diet composition, and number of meals eaten per day. The Household Hunger Scale (HHS) was used to assess hunger. To assess the diversity of diet, participants were asked to report how often they consumed food in 10 different food groups on a weekly basis. SPSS was used for statistical analysis. A two-tailed t-test was used to compare the number of meals eaten per day.

**Findings:** Of the 123 participants, 97 (78.8%) were women and 26 (21.1%) were men. 42 participants (34.1%) reported little to no household hunger, 53 (43.1%) reported moderate hunger, and 24 (19.5%) reported severe hunger. Only 44.7% reported access to fresh fruits and vegetables. Participants reported consuming a mean of 4.8 (SD 2.0) different food groups regularly each week and 26.8% consumed 3 or less food groups on a regular basis. There was a significant difference in the number of meals/day recalled six months prior to the earthquake ($M = 2.5$, $SD = 0.67$) compared to one month preceding the survey ($M = 1.9$, SD 0.70); mean decrease 0.6, $p < 0.0001$.

**Interpretation:** Our findings suggest that displaced Haitians living in permanent resettlement communities continue to struggle with food access and quality. The study raises concern for ongoing nutritional deficiency that would benefit from further evaluation. Limitations of this study include recall bias and sample size. It is also difficult to determine if the statistically significant results are clinically relevant.

**Funding:** None.
**Abstract #:** *2.010_PLA*

### The impact of the community based environmental health promotion program in Byiringiro area development program

*M. TatahMentan[1,2], S.P. Marquez[1], A. Asmare[2], T. Nkurunziza[2], G. Gitau[2]; [1]Drexel University Global Public Health Initiative, [2]World Vision*

**Project Purpose:** The purpose of this project was to perform a 10-week quality improvement study on the impact of the Community Based Environmental Health Promotion Program (CBEHPP) on orphans and vulnerable children in Byiringiro Area Development Programme. CBEHPP is an initiative developed by Rwanda's ministry of health to reduce the burden of preventable diseases in Rwanda (Republic of Rwanda, Ministry of Health, 2010). The CBEHPP approach is critical as studies have shown that health promotion can reduce cases of diarrhea by 35 % (Republic of Rwanda, Ministry of Health, 2010). CBEHPP employs a Participatory Sanitation and Hygiene Approach (PHAST) (Corforwa, 2011) consisting of community hygiene clubs facilitated by village community health workers to provide health education courses on sanitation and hygiene (Republic of Rwanda, Ministry of Health, 2010).

World Vision Rwanda is a non-profit organization that has undertaken the implementation of CBEHPP as part of its efforts to improve the well-being of children from low-income communities in Rwanda. By targeting parents and caregivers, the CBEHPP approach ensures that orphans and vulnerable children can benefit from the resources provided by these community hygiene clubs.

**Method:** This study focused on improved hygiene practices, participation in hygiene clubs, health outcomes, school attendance, academic performance and economic benefits. Study participants were recruited from the community in Byiringiro Area Development Programme. Survey questionnaires, focus groups and key informant interviews were the primary data collection tools used in this evaluation.

**Outcome & Evaluation:** 97.5% of survey respondents stated that they participated in community hygiene clubs. 88.61% of respondents indicated that they always wash their hands before eating. Only 33.75% of respondents at the household level said that children in their household had been affected by water-related diseases.

**Going Forward:** World Vision Rwanda's CBEHPP implementation has positively impacted health outcomes, hygiene practices, and education for orphans and vulnerable children in Byringiro Area Development Programme. World Vision Rwanda should focus its resources on sustaining the positive outcomes associated with CBEHPP implementation.
**Abstract #:** *2.011_PLA*