working memory, executive function, and attention. A cross-sectional study including physical exam, hair/urine/blood collection, and diet questionnaire was conducted on 114 Machiguenga volunteers living in the indigenous communities of Yomibato, Cacaotal, and Maizal. A subset (n=52) met criteria (age>10, and no pre-existing cognitive disorders) to undergo neurological and neurocognitive testing. Thus far, hair mercury levels have been analyzed for 39 participants. No physical findings of mercury toxicity were seen, but deficits were noted in neurocognitive tasks. 50% of our volunteers were underweight and 75% of adults presented with anemia (females <12 g/dL; males <13.5 g/dL). Initial data analyses suggest that increasing levels of mercury are correlated with declining performance on 6-sequence block tapping (testing visual short-term memory) and trail making (testing executive function and attention), but not 6-sequence word recall (testing auditory short-term memory) tasks. These findings need to be confirmed with higher level data analyses accounting for community variables. Malnutrition and lack of formal education could affect performance on neurocognitive assessments and will need to be considered in analyses. Further validation of this tool will require continued testing involving a broader population.

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CORRELATES OF FREQUENT HOSPITALIZATIONS IN CHILDREN DISCHARGED FROM HOSPITAL IN WESTERN KENYA (TOTO BORA TRIAL)

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Repeated hospitalizations are a significant burden to the families of children and to health systems in sub-Saharan Africa. Using baseline data from children under age 5 enrolled in a clinical trial of azithromycin given at hospital discharge at 3 hospitals in western Kenya (Toto Bora Trial, clinicaltrials.gov identifier NCT02414399), we evaluated frequency, admission diagnosis, and correlates of self-reported prior hospitalizations. Correlates were determined using log-binomial regression to estimate prevalence ratios adjusted for age and site (aPR) and 95% confidence intervals (CIs). Among 991 children enrolled to date, the most common reasons for hospitalization were pneumonia (29.5%), malaria (27.7%), diarrhea (17.5%), and sickle cell disease (SCD) (6.5%). One in 5 of these children (219, 22.1%) had at least 1 additional hospitalization in the past year, with 55.7% reporting 1 prior admission, 23.4% reporting 2, and 17.8% reporting 3 or more. Approximately half (110, 50.5%) were hospitalized in the prior year for the same condition as the index hospitalization. Of these prior hospitalizations that were due to the same condition as the index hospitalization, 13.3% were due to malaria, 11.9% to SCD, 11.1% to pneumonia, 8.3% to anemia, and 5.1% to convulsions. Children with SCD were more than twice as likely to report a previous hospitalization (aPR: 2.52 [95% CI: 1.74, 3.65]). Children diagnosed with convulsive disorder at the index hospitalization were also more likely to have been hospitalized previously (aPR: 2.29 [95% CI: 1.28, 4.06]). Neither HIV exposure nor infection were associated with prior hospitalization, nor were child's nutritional status, child's sex, breastfeeding history, or socioeconomic factors. Hospitalization presents an opportunity to identify children at high risk of subsequent re-hospitalization who are accessible for preventive interventions. In regions with high prevalence of malaria, pneumonia, and SCD, provision of tailored preventive interventions at discharge may have important public health impact in reducing hospitalizations.

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IN VITRO SUSCEPTIBILITY TESTING OF TEBIPENEM AGAINST EXTENSIVELY DRUG RESISTANT (XDR) *SALMONELLA TYPHI* ISOLATES

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The XDR typhoid outbreak in Pakistan is the first of its kind, with resistance to 5 different antimicrobial classes. This isolate is susceptible to azithromycin and carbapenem only. Consequently, treatment options for XDR are limited with no existing clinical data for its treatment. The currently used carbapenems have significant cost implications as these drugs are expensive and require administration in hospital. Azithromycin resistance, although not reported from Pakistan, it is a very commonly used drug and resistance is inevitable and likely to spread rapidly. Hence it is imperative to find alternative treatment options that can offer an advantage to patients in improving clinical outcomes whilst also reducing treatment costs. Tebipenem (Orapenem), a novel oral carbapenem has been found to be effective *in vitro* against *E.coli* and *klebsiella*. Successful use for the treatment of community acquired pneumonia, and otitis media is reported. We propose the use of oral Tebipenem for the treatment of XDR-Typhoid in phase 1; we plan to demonstrate *in vitro* susceptibility of archived XDR *S.typhi* isolates from the outbreak Hyderabad to tebipenem. The MIC (Minimum Inhibitory Concentration) for respiratory pathogens is reported as: 1 ug/ml, 2 ug/ml and 4 ug/ml respectively for susceptible, intermediate and resistant isolates. We will test 85 *S. typhi* isolates for sensitivity against carbapenem using the same cut offs. *Klebsiella pneumoniae* ATCC was used as positive control by inoculating $5x\ 10^5$ CFU/ml by Broth Micro dilution method. We have to date completed testing of 15 isolates and all were found to be sensitive to tebipenem with very low MICs. 4 (27%) have MIC of 0.25 ug/ml, 1(6.7%) has MIC value of 0.5 ug/ml and remaining 10 isolates have MIC of 0.12 ug/ml. Remaining 70 *S.typhi* isolates are being tested and results will be available by the time of presentation at ASTMH .We have screened tebipenem against MDR and XDR *S*. Typhi from Pakistan and found it to have excellent *in vitro* activity, making it a realistic oral treatment option for cases of XDR typhoid fever. However the results have to be validated in a randomized clinical trial.

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EFFECT OF LYMPHATIC FILARIASIS AND HOOKWORM INFECTION ON PREGNANCY COURSE AND OUTCOME IN WOMEN OF REPRODUCTIVE AGE IN THE DEMOCRATIC REPUBLIC OF THE CONGO

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We evaluated the associations between (i) *Wuchereria bancrofti* and hookworm infections and (ii) pregnancy course and outcome in a group of 82 women of reproductive age (WRA) living in a rural area of the Democratic Republic of the Congo. Standardized questionnaires were used to collect demographics and information on past pregnancies. *W. bancrofti* and hookworm infections were diagnosed using a filarial antigen-detection test and the Kato-Katz method, respectively. Analyses consisted of multivariable logistic regressions adjusting on age, number of deliveries and history of anthelmintic treatment (AHT). Median age of WRA was 35 [interquartile range IQR: 30-44], and their median number of deliveries was 5 [IQR: 3-7]. *W. bancrofti* and hookworm infection rates were 42% and 43%, respectively. Filarial antigenemia and hookworm infection were not associated with the number of deliveries (p=0.161 and p=0.141, respectively). The proportions of WRA with a history of pregnancy resulting in neonatal death, miscarriage, premature birth, and postpartum

hemorrhage were 56%, 44%, 23% and 36%, respectively. History of pregnancy associated with neonatal death was less frequent in WRA who had taken AHT (adjusted odds-ratio (aOR) (95% confidence interval): 0.19 (0.04-0.82), p=0.026), tended to be more frequent in WRA with filarial antigenemia (aOR=2.68 (0.65-11.1), p=0.172), and was not associated with hookworm infection (aOR=1.36 (0.33-5.58), p=0.668). None of the three other pregnancy or birth events studied were associated with filarial antigenemia or hookworm infection (miscarriage: aOR=0.77 (0.19-3.28), p=0.729 and aOR=0.74 (0.14-3.86), p=0.726, respectively; premature birth: aOR=0.70 (0.09-5.71), p=0.741 and aOR=1.62 (0.12-21.40), p=0.712; post-partum hemorrhage: aOR=0.38 (0.09-1.53), p=0.174 and aOR=0.40 (0.08-2.03), p=0.269). The positive association found between history of AHT and lower risk of neonatal death warrants investigation in larger groups of WRA. Should it be confirmed, further studies should be conducted to determine whether it is due to biological causes (eg, anemia) or other (eg, sociological) determinants.

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EXPOSURE TO HOUSEHOLD AIR POLLUTION FROM BIOMASS COOKSTOVES AND BIOMARKERS OF SYSTEMIC INFLAMMATION FROM DRIED BLOOD SPOTS AMONG WOMEN IN RURAL HONDURAS

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Household air pollution from the burning of solid fuels is estimated to cause 1.6 million premature deaths worldwide each year. Cardiovascular-related disease contributes substantially to the burden, although evidence is limited. In a community-engaged project in rural villages of La Esperanza, Honduras, we measured 24-hour gravimetric kitchen and personal fine particulate matter ($PM_{2.5}$) and black carbon concentrations for 106 female primary cooks using wood-burning traditional and *Justa* (engineered combustion chamber and chimney) stoves. As indicators of cardiovascular disease risk, markers of systemic inflammation (C-reactive protein [CRP], Serum Amyloid A [SAA], Interleukin 1-β [IL-1 β], IL-8, Tumor Necrosis Factor-α [TNF- α], Intercellular Adhesion Molecule 1 [ICAM-1], and Vascular Cell Adhesion Molecule [VCAM-1]) were measured from dried blood spots collected via finger-stick. We used linear regression, adjusting for age, body mass index, education, and household assets, to evaluate the cross-sectional associations between the pollutants and inflammatory markers. The 24-hour median personal $PM_{2.5}$ concentration was 80 µg/m³, IQR: 51-137 µg/m³ (traditional stoves: 115 µg/m³, IQR: 65-154 µg/m³; *Justa* stoves: 52 µg/m³; IQR: 39-81 µg/m³). Pollution concentrations were higher in kitchens (vs. personal) and among traditional stoves versus *Justa* stoves. In adjusted models, increased concentrations of pollutants were associated with increased levels of CRP (e.g., a 25% higher personal $PM_{2.5}$ concentration was associated with a 10.5% increase in CRP levels [95% CI (confidence interval): 1.2-20.6]). We observed similar results for SAA. We observed a positive association between kitchen black carbon and IL-8, IL-1 β, and TNF- α. Associations with ICAM-1 and VCAM-1 with all pollutants were consistent with the null association. The results are consistent with the ambient air pollution

literature and support the hypothesis that exposure to household air pollution is associated with increased systemic inflammation, which has been linked to cardiovascular disease.

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ACUTE FEBRILE ILLNESS SURVEILLANCE AT FOUR MILITARY SITES IN GHANA

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In malaria endemic regions, such as Ghana, acute febrile illnesses (AFIs) are often assumed to be due to malaria and presumptively treated with antimalarial drugs. The nonspecific clinical presentation of AFIs limit pathogen identification and epidemiology especially in resource-limited settings. AFIs require laboratory confirmed diagnoses which are cost-prohibitive and require special training which contributes to a lack of epidemiological knowledge in Ghana. Between July 2015 and December 2018, 284 patients were enrolled at 4 Ghanaian military treatment facilities. Inpatients or outpatients, 30 days to ≤65 years of age, with documented or reported fever (> 38°C) were eligible for the study. In addition to clinical and demographic information, blood specimens were collected for culture, serology and molecular testing. Among the 284 enrolled patients, 155 have been tested for *Coxiella burnetii* and *Leptospira* IgM and IgG with 8.4%, 4.9% and 0.7% sero-positive, respectively. Of 103 that were tested for chikungunya, 11.7% were positive for IgM and 7.8% for IgG. Of the 74 samples tested for West Nile Virus, 5.6% were seroreactivity for IgG and none for IgM. Out of 173 that were tested for dengue virus, 4% were positive for IgM and 39.6% for IgG. IgG reactive antibodies to spotted fever and scrub typhus *rickettsiae* was detected in 6% and 1% of the samples, respectively. 2.5% of blood cultures were positive for *Salmonella typhi*. This preliminary information demonstrates the requirement for expanded laboratory and diagnostic capabilities in Ghana to elucidate and understand the many potential etiologies of AFIs. Understanding the burden posed by both malarial and non-malarial agents in Ghana is essential for patient care and public health.

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ANTIPYRETIC USE AMONG FEBRILE PATIENTS ATTENDING EMERGENCY DEPARTMENTS IN RIO DE JANEIRO, BRAZIL: A CROSS-SECTIONAL, OBSERVATIONAL STUDY

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Fever is a common reason for seeking care in Emergency Departments (ED). Data about the prevalence of antipyretic use at arrival at the ED and how it may relate to outcomes is sparse. We did a cross-sectional analysis of patients presenting to two urban ED in Rio de Janeiro between October 2018 and March 2019. Eligible subjects had either a history of fever before arrival at the ED or axillary temperature ≥ 37.5 °C at arrival at the ED. Information about recent use of antipyretics, measured temperature at the ED, tests performed at the ED were collected. The outcomes were to describe the use of antipyretics preceding the ED visit, the measured temperature at triage, the rate of diagnostic testing, and the treatment administrated between subjects who had or had not received recent antipyretic prior to ED. Categorical variables were compared with the Fischer exact test, while continuous variables with the T-test or Mann-Whitney. We triaged 1551 subjects, and 374 [24.1% (95% CI 22-26)] had a history of fever at home or a measured fever at arrival at the ED. The mean age was 30.6 [0-84] years, adults (82.5%) and females (54.8%) predominated. 198 febrile patients had a suspicion of infection, and upper respiratory infection (42.4%) followed by undifferentiated febrile illness (15.7%) and urinary infection (14.6%) were the source of infection. 249 [87.6% (95% CI 83.1-91.1)] subjects reported taking an antipyretic

Campillo J., Chesnais Cedric, Tambwe J. P., Awaca-Uvon N. P., Boussinesq Michel, Pion Sébastien.

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