EPIDEMIOLOGY OF NON-TYPHI *SALMONELLA* BACTEREMIA IN A RURAL COMMUNITY OF NYANZA PROVINCE

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ABSTRACT

Non-Typhi *Salmonella* (NTS) are the most common cause of bacteremia in some countries in sub-Saharan Africa. Despite this, the factors associated with infection in developing countries are not well understood. In Kenya, especially in Nyanza Province of western Kenya where potential risk factors such as HIV, malnutrition, malaria and other environmental factors are more prevalent this information is not available. A study was conducted to determine the distribution, determinants and factors associated with NTS bacteremia in a rural community in western Kenya.

Clinical and demographic characteristics of all patients seen at Lwak Hospital between October 2006 and September 2009 in the population based morbidity surveillance project of the KEMRI/CDC's International Emerging Infections Program were examined and linked to HIV test results from the home-based counseling and testing program in the area and malaria test results. All NTS cases were then mapped spatially by GIS to determine their patterns and distributions.

From October 2006 to September 2009, 3,578 blood cultures were done. Among 156(4.4%) pathogen positive blood cultures, 63(40%) were positive for NTS --28/43(65%) among children under 5 years and 35/133(31%) among persons over 5 years. NTS accounted for a greater proportion of bacteremia among febrile patients (72%) than among SARI patients (30%, p=0.0024). Of NTS bacteremia patients, 36% had diarrhea compared to 17% of NTS negative

bacteremic patients NTS (p=0.0001). *Salmonella* sero-group B accounted for 86% and sero-group D for 10% of NTS isolates. Among NTS patients with HIV test results available, 18/42 (42%) were HIV-positive. Overall crude incidence was 82/100,000 person-years of observation (PYO) with an adjusted incidence-rate of 606/100,000 PYO. Adjusted incidence-rate was highest in <5 age-group (2,080/100,000 PYO) and lowest in the 10-17 age-group (22/100,000 PYO). More NTS bacteremia and malaria co-infected patients had illness severe enough to require hospital admission (50%) compared to NTS bacteremia infected patients (36%) and the mortality within 90 days was higher (17%) in the co-infected patients than the single pathogen group (10%). The 90-day mortality rate among NTS cases was 483/1,000 PYO compared to 16/1,000 PYO overall community mortality. The incidence of NTS bacteremia rose during the study period coincident with a rise in malaria incidence.

The burden due to NTS in rural Sub-Saharan Africa populations is substantial, with children under 5 years most affected. For each death in the community, 30 deaths among those who had an episode of NTS could occur. There is need to scale-up of antiretroviral treatment for HIV, improve malaria control and formulate simple treatment algorithms for NTS to mitigate the disease and improve treatment outcomes.