Antimicrobial Susceptibility and Resistance Patterns of *Salmonella* Typhi During the 2015 Typhoid Outbreak in Kampala, Uganda

Juliet Nsimire[1], Peter Hughes[1], Pontiano Kaleebu[1], Joshua Buule[2], Robert Downing[3], Issa Makumbi[4]

[1]Medical Research Council/ Uganda Virus Research Institute; [2]Uganda Virus Research Institute, [3]Global Health Security Agenda/UVRI, [4]Ministry of Health, Uganda

Introduction: Antimicrobial resistance (AMR) in *Salmonella enterica* serovar Typhi is a growing, global problem. In 2015, Kampala experienced a typhoid outbreak. Antimicrobial susceptibility and resistance testing was performed on confirmed strains.

Methods: From February to June 2015, at MRC/UVRI, blood cultures for 320 cases were sub-cultured and suspected colonies identified using biochemical tests and *salmonella* antisera. Susceptibility testing was performed following the British Society for Antimicrobial Chemotherapy, 2015 Guidelines. Ciprofloxacin, ceftriaxone, cotri-moxazole, chloramphenicol, ampicillin nalidixic acid and perfloxacin were tested. Quality control was done by CDC Atlanta. Testing for antimicrobial resistance genes was done using a DNA probe micro-array (Alere Technologies GmbH, Germany).

Results: 44 *Salmonella* Typhi strains were isolated. Susceptibility to ceftriaxone, cotri-moxazole, ampicillin and chloramphenicol were 100%, 77.3%, 77.3%, and 72.7% respectively. All strains showed reduced susceptibility to ciprofloxacin. Multidrug resistance (MDR) and AMR genes were detected in 22.7% of the strains. Integrase (int-l), Plasmid Vi (tviA) and Prob_intl-1 were virulence factors identified in resistant strains. One strain susceptible to cotri-moxazole, ceftriaxone and ampicillin had AMR genes to all the three agents.

Conclusions: These results indicate the presence in Uganda of *Salmonella enterica* serovar Typhi strains with reduced susceptibility to Ciprofloxacin, one of the frontline treatments of typhoid. The isolates are currently undergoing sequencing at the Sanger Laboratory UK. MDR Salmonella is widespread globally and is a threat to effective patient management. The development and implementation of strategies to contain the spread of AMR infections are urgently needed, not least the creation of national AMR surveillance systems linked to global systems.