Antibiotic resistant Salmonella causing urgent health threat in Africa

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Dit is de omschrijving

Bloodstream infections caused by the Salmonella bacterium in sub-Saharan Africa are a serious health threat. Salmonella bloodstream infections are estimated to cause more than 600,000 deaths per year, especially young children are at risk. These are predominantly caused by the specific Salmonella Typhimurium bacterium. A study published in Nature Communications by an international team of experts describes a novel Salmonella Typhimurium line which originated in DR Congo and which has unseen levels of antibiotic resistance hampering effective treatment. This study was coordinated by the Institute of Tropical Medicine (ITM) in Antwerp in close collaboration with experts from the University of Cambridge and the Wellcome Sanger Institute, both located in the United Kingdom, and the Institut National de Recherche Biomédicale (INRB), in DR Congo.

The Salmonella Typhimurium bacterium is common all over the world as a cause of diarrhoea. In sub-Saharan Africa, however, Salmonella Typhimurium is the leading cause of life-threatening bloodstream infections. These Salmonella bacteria in Africa are different from the global strains and have undergone evolution to specifically cause severe infections in humans. Salmonella bloodstream infections are assumed to account for more than three million cases per year in Africa, of which one in five patients die from the infection. The disease occurs mostly in vulnerable populations, such aschildren under five years old.

According to scientists from ITM, INRB, Cambridge University and the Wellcome Sanger Institute, this is the first time Salmonella Typhimurium causing bloodstream infections has emerged as ‘Extensively Drug Resistant (XDR)’. This means that the options to treat severe infections by XDR strains are becoming scarce.

ITM and its Congolese partner INRB have established bloodstream infections surveillance in the past ten years which has proven essential for the early detection of the extensively drug resistant Salmonella Typhimurium. “We isolated the Salmonella Typhimurium from patients in hospitals across DR Congo during our bloodstream infection surveillance activities. It’snow crucial that we closely monitor the bacteria and their progression,” says Prof Dr Octavie Lunguya of INRB, DR Congo. "The results of this study are worrying because they show that antibiotics are becoming less and less effective in the treatment of Salmonella Typhimurium bloodstream infections. The development of new strategies to control this disease will be crucial in the coming years.” warns Prof Dr Jan Jacobs of ITM.

Scientists from ITM, together with partners at the University of Cambridge and the Wellcome Sanger Institute have extensively analysed the Salmonella Typhimurium DNA and its behaviour to understand what’s driving these observations. Their analysis revealed that the XDR bacteria carry a new plasmid which causes the extreme resistance. “This is worrying because a plasmid is a mobile genetic element that could be transferred to other bacteria. While accumulating more antibiotic resistance, we discovered that the novel Salmonella Typhimurium line is also showing further genetic and behavioural changes which suggest ongoing evolution of the bacteria towards bloodstream infections,” says ITM Dr Sandra Van Puyvelde.

Dr Van Puyvelde closely collaborated with Cambridge University and the Wellcome Sanger Institute, world authorities in the field of invasive Salmonella research and genome analyses. “These types of studies are unique as we are closing the gap between the most important health issues observed in hospitals across the world with in-depth biological research for which we apply cutting edge technologies. Collaborations like this are key and will be

important in the future to gain further insights on emerging diseases," says Prof Gordon Dougan from the University of Cambridge.

Link to paper: https://www.nature.com/articles/s41467-019-11844-z