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Vaccine Impact on Diarrhea in Africa (VIDA)

Trends in Non-Typhoidal *Salmonella* Gastrointestinal Infections in Children Under Five from Three Countries in Sub-Saharan Africa

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Background

- Non-typhoidal *Salmonella* (NTS), an etiologic agent of gastroenteritis, is a risk factor for morbidity and mortality in young children.
- The two most common serovars that cause gastroenteritis worldwide are *S*. Typhimurium and *S*. Enteritidis.
- Additionally, variants of these two serovars, such as *S*. Typhimurium sequence type (ST) 313, also cause invasive disease in infants in sub-Saharan Africa.
- The Vaccine Impact on Diarrhea in Africa (VIDA) study evaluated the impact and effectiveness of rotavirus vaccine introduction and its effect on etiological agents of **moderate-to-severe diarrhea** (**MSD**) in children < 5 years of age at study sites in The Gambia, Mali and Kenya. Children were grouped in 3 age cohorts: **0-11**, **12-23** and **24-59 months**.

Objective

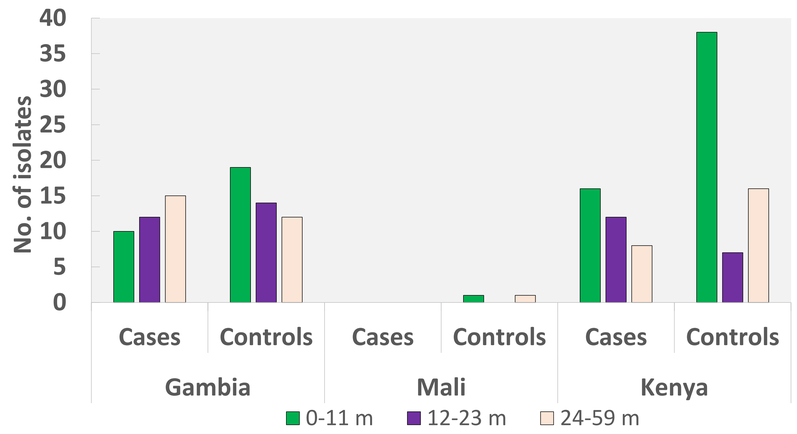
To evaluate the serovars, antimicrobial resistance (AMR) and genotypes of *Salmonella* isolated from stools of children < 5 years old with moderate-to-severe diarrhea (MSD) or matched community controls at sites in The Gambia, Mali and Kenya during VIDA (2015-2018) and compare data to isolates from the Global Enteric Multicenter Study (GEMS; 2007-2010) and the follow-up study GEMS-1a (2011).

Methods

- Identified *Salmonella* spp. using standard microbiological and biochemical tests.
- Identified serovars using agglutination and typing antisera.
- Determined antimicrobial sensitivity using the Kirby-Bauer disk diffusion method.

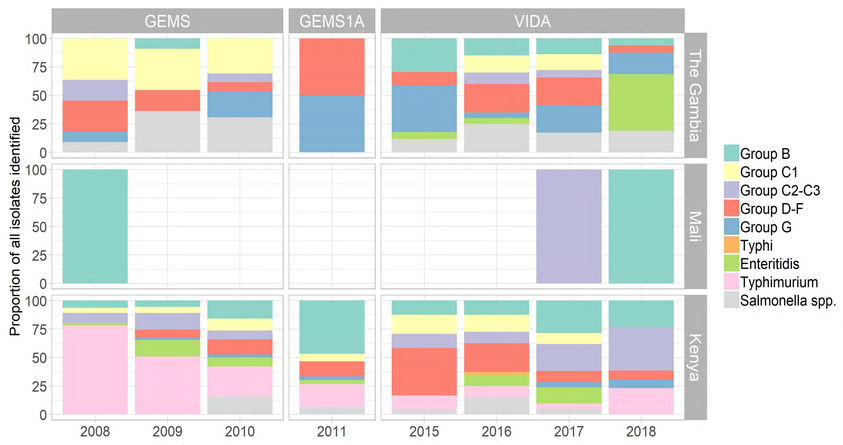
	The Gambia		Mali		Kenya	
	Cases	Controls	Cases	Controls	Cases	Controls
0-11 months	539	696	595	690	586	725
12-23 months	619	748	552	656	528	726
24-59 months	520	694	461	634	440	644

Frequency of NTS



- 191 NTS isolates were recovered from stools
- 44.7% were from The Gambia, 1.1% were from Mali and 54.2% from Kenya

Temporal shifts in NTS serovars

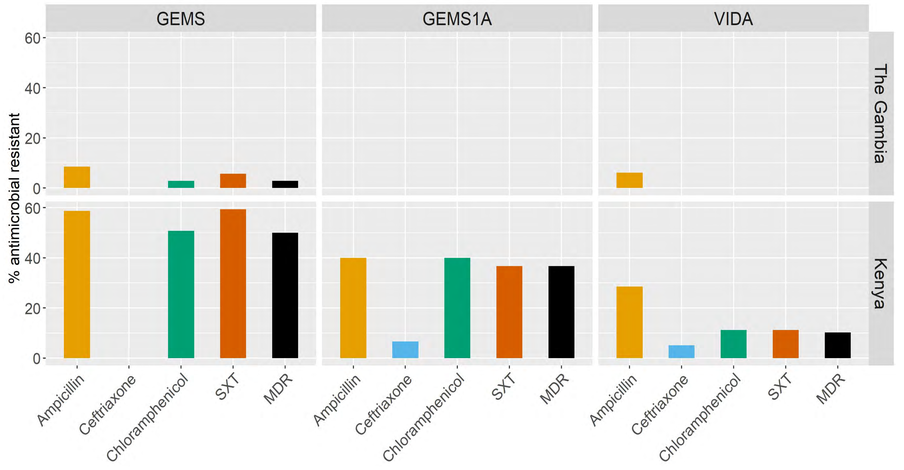


- During VIDA, the most common serovars were serogroup B (18.4%), serogroup C2-C3 (12.3%), serogroup F (11.7%), and serogroup G (11.2%)
- *S*. Typhimurium reduced from 38.2% in GEMS to 5.0% in VIDA
- *S*. Enteritidis increased from 6.3% in GEMS to 9.5% in VIDA

S. Typhimurium genotypes

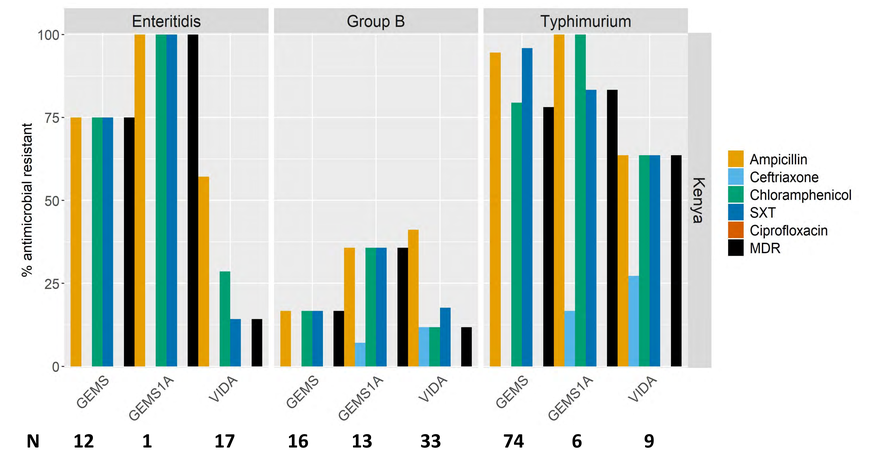
- Of 7 *S*. Typhimurium isolates:
  - 5 ST313 – all MDR
  - 2 ST36 – pan-susceptible to antibiotics

AMR in The Gambia and Kenya from GEMS to VIDA



- Isolates were pan-susceptible to ciprofloxacin
- Ceftriaxone resistance emerged during GEMS1A
- High rates of AMR in Kenya

AMR by serovar in Kenya from GEMS to VIDA



- AMR varies by serovar
- High % MDR for *S*. Typhimurium during all 3 studies
- % MDR for *S*. Enteritidis decreased during VIDA
- Ceftriaxone resistance observed amongst *S*. Typhimurium and other serogroup B

Summary findings

- NTS isolated from stools of MSD cases and healthy controls
- Shifts in the proportion of NTS serovars from GEMS to VIDA
- MDR *S*. Typhimurium were isolated in Kenyan stools; 98% were ST313 the genotype associated with invasive NTS disease in sub-Saharan Africa

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