Longitudinal Assessment of Antibiotic Resistance in Fecal *Escherichia coli* in Tanzanian Children

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**BACKGROUND**

- Antibiotic-resistant bacterial infections are a major public health problem, and children in low-resource settings represent a particularly high risk group.¹
- The gastrointestinal tract is the primary reservoir as well as the source for most invasive *E. coli* infections, yet little is known about the dynamics of and risk factors for gastrointestinal colonization with resistant *E. coli* in these populations.²
- Using archived *E. coli* isolates and stools from a birth cohort study in Haydom, Tanzania, we therefore sought to characterize the antibiotic susceptibility profile of *E. coli* in these settings and to identify risk factors for the acquisition and carriage of drug resistance.

**METHODS**

- 262 children were enrolled in the MAL-ED Tanzania site.
- We selected 100 children from those that had complete follow-up to 2 years of age, defined as *E. coli* isolates archived from stool samples collected at 6, 12, 18, and 24 months of age.
- We tested pooled *E. coli* isolates from up to 10 stools per child, collected every 6 months starting at 6 months of age and continuing until 5 years of age.
- Antibiotic susceptibility testing of 18 antibiotics was performed by disk diffusion.
- To identify risk factors for acquisition and carriage of drug-resistant *E. coli*, we created 10 antibiotic classes. We then calculated the number of antibiotic classes to which each *E. coli* pooled isolate was resistant.
- To assess for risk factors for carriage of drug-resistant *E. coli*, we used generalized estimating equations to fit a multivariate linear regression model.

**RESULTS**

- 837 *E. coli* isolates were tested.
- Most were resistant to ampicillin (89.5%), cefazolin (88.6%), and cotrimoxazole (86.1%).
- Only 1.8% (15/837) met criteria for extended-spectrum beta-lactamase production. 82.6% (691/837) met criteria for multi-drug resistance.³
- High antibiotic use (0.26 additional resistant antibiotic classes; 95% CI: 0.05, 0.47) and high income (0.28 additional resistant antibiotic classes; 95% CI: 0.06, 0.50) were associated with carriage of antibiotic-resistant *E. coli*.

**CONCLUSIONS**

- In this setting, carriage of antibiotic-resistant *E. coli* was common.
- Other than recent antibiotic exposure and high income, individual risk factors for the acquisition and carriage of resistance could not be identified, suggesting that population-level interventions are needed.

**REFERENCES**