

## Antimicrobial sensitivity of *Escherichia coli* isolated from hospital and livestock farming environments in the Gampaha District, Sri Lanka.

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**Introduction and Objectives:** The emergence of antimicrobial resistance (AMR) has been enhanced due to the widespread overuse and misuse of antibiotics in humans and animals. A significant amount of antibiotics contaminate both man-made environments and natural water sources. Hospitals and livestock farms, where most antibiotics are misused, are hypothesised to serve as major hotspots for the evolution of AMR. Thus, examining environmental samples is crucial for understanding AMR in the environment. The study aimed to investigate environmental contamination by resistant *Escherichia coli* in hospital and livestock farming environments in the Gampaha District and determine their antibiotic sensitivity (ABST).

**Method:** *Escherichia coli* was isolated from wastewater (open drainage systems, influent and effluent samples from wastewater-treatment plants) and soil samples (dumping sites/ manure-contaminated sites). A descriptive cross-sectional study was carried out by obtaining 44 environmental samples from four hospitals and 38 samples from livestock farms (two pig farms, three poultry farms, two dairy farms) in the Gampaha District. All samples were collected, transported, stored, and processed according to standard operating procedures. Colonies of *E. coli* were identified according to colony morphology using MacConkey and Salmonella-Shigella (SS) agar, Gram stain, and biochemical tests (KIA, indole). ABST was done according to the CLSI method using seven antibiotics.

**Results:** A total of 37 *E. coli* isolates (hospitals=13, livestock farms=24) were obtained from the 83 samples (wastewater [n=60], soil [n=23]). Of the 37 *E. coli* isolates, 23 (hospitals=9, livestock farms=14) exhibited resistance to at least 1 of the 7 antibiotics tested. The highest rate of *E. coli* resistance was to ampicillin (20/23, 87%), followed by co-trimoxazole (15/23, 65%), ciprofloxacin (7/23, 30%), cefotaxime (4/23, 17%), gentamicin (2/23, 9%) and co-amoxiclav (2/23, 9%). None were resistant to meropenem. Of the 23 *E. coli* isolates, 69.5% (16/23) were multi-drug resistant.

**Conclusion:** The study demonstrates the presence of AMR bacteria in the environment, indicating the necessity to implement environmental surveillance for AMR as part of the One Health approach.

**Keywords:** Antimicrobial resistance (AMR), One Health approach, *Escherichia coli*, Hotspots of AMR

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