



Summary brief

11th May 2022

High levels of resistance against critically important antibiotics from fresh poultry excreta in Sierra Leone

Reference:

Mansaray, A.H.D.; Yankson, D.P.Y.; Johnson, R.A.B.; Moses, F.L.; Kanu, J.S.; Kamara, I.F.; Zachariah, R.; Kumar, A.M.V.; Selvaraj, K. Bacterial Isolates and Antibiotic Resistance of *Escherichia coli* Isolated from Fresh Poultry Excreta Used for Vegetable Farming in Freetown, Sierra Leone. *Int. J. Environ. Res. Public Health* 2022, 19, 5405. <https://doi.org/10.3390/ijerph19095405>

Contact: e-mail:
aliemans270@gmail.com

Key Messages:

- There is recent emerging evidence that antimicrobial resistance (AMR) can be transferred from livestock to humans.
- A recent study from four poultry farms in Sierra Leone showed the ubiquitous presence of *E. coli* (93%) and to some extent *Salmonella* spp. (8%) in fresh poultry excreta.
- *E. coli* strains had complete resistance to some of the critically important antibiotics such as erythromycin, cefoxitin and streptomycin.
- More than 95% of these *E. coli* strains that were resistant to more than four types of antibiotics in the Essential Drug List for human use is a cause for concern.
- As fresh untreated poultry excreta are widely used as manure, there could be a potential risk of passing antimicrobial resistance from poultry to humans.
- We recommend the following:
 - Establish and expand routine AMR surveillance to monitor antibiotic resistance in poultry
 - Build multi-sectoral partnerships among One Health stakeholders for regular monitoring of AMR status
 - Monitor and regulate the use of antibiotics for mass prophylaxis and growth promotion in the poultry industry.

What is the problem and why is it important?

- Antibiotics in minimum concentrations in poultry feeds are used for growth promotion. In developing countries, these antibiotic-containing poultry feeds are still in use as there is as yet no ban on these products. Sierra Leone is no exception to this practice.
- The use of antibiotics in livestock and farming plays a major role in increasing AMR.
- Poultry excreta, being a cheaper and widely used manure, carries the potential risk of AMR transfer from livestock to humans.
- Research studies from African countries had shown widespread AMR in poultry excreta. This current study assessed the magnitude of AMR in poultry excreta in Sierra Leone.

How did we measure it?

If bacteria isolated from excreta are resistant to three or more types of antimicrobials, this is called Multi Drug Resistance (MDR).

The WHO AWaRe drug categorization classified antibiotics into three groups.

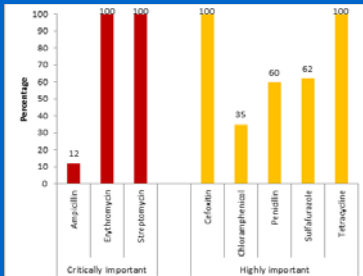


Fig 1. Antibiotic resistance as per WHO AWaRe* classification for *E.coli* isolated from poultry excreta in Free Town, Sierra Leone 2021

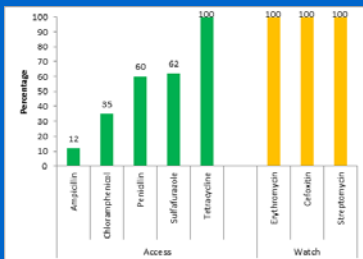


Fig 2. Antibiotic resistance as per WHO Critically important* classification for *E.coli* isolated from poultry excreta in Free Town, Sierra Leone 2021

- In this study, fresh poultry excreta were collected from four poultries located in Freetown, Sierra Leone.
- During June to September 2021, 100 fresh poultry excreta samples were collected.
- We transferred the packed excreta samples to the regional certified laboratory on the same day to test for the presence of any bacteria and the response to various antibiotics (antibiotic resistance).
- The laboratory procedures to investigate antibiotic resistance were carried out in line with standard methods.
- In cases where the bacteria were resistant to the antibiotics, we further investigated to know whether they were resistant to a limited number of drugs or more than three drugs (Multi-drug Resistance).

What did we find?

- Of 100 poultry excreta samples tested, 93 showed the presence of *E. coli* and 8 showed *Salmonella* spp.
- All bacterial samples showed resistance to at least one of eight antibiotics studied.
- For some of the important antibiotics such as erythromycin, streptomycin, cefotaxime, and tetracycline, there was 100% resistance.
- More than 95% of the bacterial samples showed resistance to more than three antibiotics which is widely reported as Multi Drug Resistance.

Implications

In conclusion, there was widespread presence of *E. coli* (93%) in poultry excreta, with some excreta showing *Salmonella* spp. as well. Most of the *E.coli* isolates were resistant to more than three antibiotics. Possible reasons for this could be (i) use of antibiotics for mass prophylaxis in poultry; and (ii) regular use of poultry feeds containing antibiotics.

We recommend the following:

- Establish and expand routine surveillance to monitor antibiotic resistance in poultry.
- Build multi-sectoral partnerships among One Health stakeholders for the regular monitoring of AMR status.
- Educate farmers on using poultry excreta as manure only after treatment.
- Monitor and regulate the use of antibiotics for mass prophylaxis and growth promotion in poultry feeds.