

Summary brief

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High levels of antimicrobial resistant bacteria in healthy pigs in Ghana: a necessity for prudent measures!

Reference: Ohene Larbi R., et al. Antimicrobial, multi-drug and colistin resistance in *Enterobacteriaceae* in healthy pigs in the Greater Accra Region of Ghana, 2022: a cross-sectional study. IJERPH 2022, 19, 10449. doi.org/10.3390/ijerph191610449

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An apparently healthy pig in our study

Key Messages

- In all 20 pig farms in the Greater Accra region of Ghana, antimicrobials were used mainly to treat individual animals with symptoms of infection.
- Of 200 pigs studied on these farms, 23% of the bacterial isolates showed MDR (resistance to three or more classes of antimicrobial drugs). While the finding is better than those of two previous studies in the Ashanti region of Ghana, this still poses a significant public health threat to humans.
- 10% of bacteria showed resistance to colistin, a WHO reserve antimicrobial used to treat severe infections in humans.
- Officers from the Veterinary Services Directorate and Livestock Extension Officers from the Ministry of Food and Agriculture need to encourage and undertake tailored education for pig farmers on proper antimicrobial use in animals.
- The Veterinary Services Directorate and the CSIR-Animal Research Institute should strengthen regular collaborative surveillance and research on antimicrobial use and resistance in pigs and other farm animals.
- The Ghana AMR committee must collaborate with other responsible institutions to strengthen regulatory policy about rational use of antimicrobials in animals.

What is the problem and why is it important?

Multidrug resistance (MDR), defined as resistance to three or more classes of antimicrobial drugs, is increasing globally in both human and animal populations. Two previous studies in the Ashanti region of Ghana showed high levels of MDR varying from 40%-95% in pigs, possibly related to poor farming practices. Colistin, which is an important reserve antimicrobial for treating severe bacterial infections in humans, has also been used in animal farming in Africa for many years. There are growing concerns about increasing levels of colistin resistance passing from animals to humans through the food chain and the gene pool. There have been no published studies on colistin use or resistance in animals in Ghana. To get better information about the scale of MDR and colistin resistance, we collected information on farm practices and studied the prevalence and factors associated with antimicrobial resistant bacteria in healthy pigs in the Greater Accra Region of Ghana.



Plating out bacterial isolates at the Animal Research Institute

In 200 healthy pigs, 23% of bacteria exhibited MDR and 10% showed colistin resistance.

Between Animal and Human Health, there are no dividing lines, nor should there be: the “One Health” approach is essential to reduce the threat of antimicrobial resistance.

How did we measure it?

This cross-sectional study was carried out in 20 farms from four selected districts of the Greater Accra Region from January to March, 2022. Basic farm practices in relation to antimicrobial use were documented by farmers completing a structured questionnaire under supervision. Based on a simple random sampling method, rectal swabs were collected from 200 healthy pigs on these farms. Standard microbiological techniques were employed to identify antimicrobial resistant *Escherichia coli*, *Enterobacter spp.* and *Klebsiella pneumoniae*. Molecular mechanisms of colistin resistance were explored by assessing whether the *mcr-1* gene was present or not (its presence indicating easy transmission of colistin resistance between bacteria).

What did we find?

- On all 20 farms, antimicrobials were mainly used to treat individual animals with symptoms of infection. Colistin was only used on one farm. No antimicrobials were added to farm feeds.
- Nearly all 200 healthy pigs had bacteria isolated from rectal swabs. Of these, 23% exhibited MDR phenotypes, and in particular, resistance was found to tetracycline, ampicillin and amoxicillin-clavulanic acid.
- 10% of these bacteria showed resistance to colistin and in half of these, the *mcr-1* gene was detected.

Implications and recommendations

- Despite a lower MDR prevalence in this study compared to previous studies, one quarter of bacterial isolates from healthy pigs exhibited MDR and a significant proportion also showed colistin resistance. This poses a major public health threat to humans.
- We make three recommendations:
 1. Officers from the Veterinary Services Directorate and Livestock Extension Officers from the Ministry of Food and Agriculture need to encourage pig farmers to adhere to good practices on antimicrobial use.
 2. The Veterinary Services Directorate and CSIR-Animal Research Institute can collaborate to undertake regular on-going surveillance of antimicrobial use and resistance in pigs and other farm animals. They should also engage in more research to better understand the causes of resistance in order to develop evidence-based solutions.
 3. The Ghana AMR committee must collaborate with other responsible institutions to strengthen regulatory policy about rational use of antimicrobials in animals and ensure that they are not used as growth promoters in the animal industry.