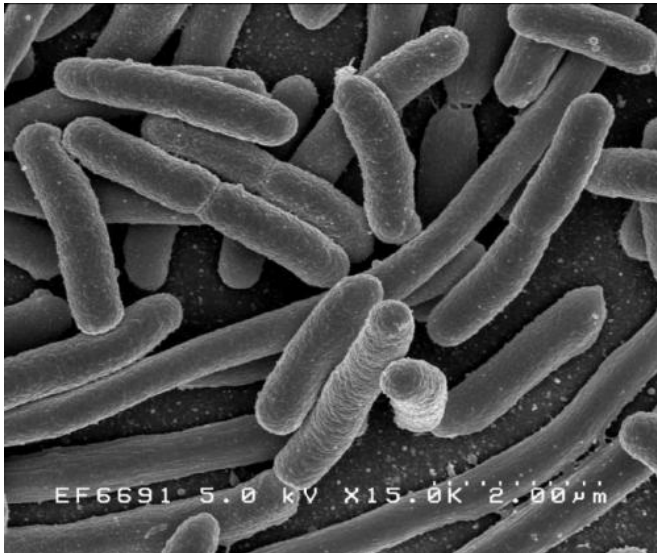


# Colistin-resistant multidrug-resistant bacteria pervasive in rural Vietnam town

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Escherichia coli. Credit: Rocky Mountain Laboratories, NIAID, NIH

A new study has found that the majority of residents in a rural village of Vietnam harbored multi-drug-resistant (MDR), colistin-resistant *E. coli* bacteria. Colistin is typically used as a last-resort treatment when there are no other therapy options available. The research is presented at ASM Microbe, the annual meeting of the American Society for Microbiology, held from June 7th to June 11th in Atlanta, GA.

"These results revealed the dissemination of MDR colistin-resistant *E. coli*, harboring the colistin-resistant mobile gene *mcr* among commensal [bacteria](#) of residents, in a rural community in Vietnam," said Yoshimasa Yamamoto, Ph.D., Osaka University, Osaka, Japan, presenting author on the study.

The colistin-resistant bacteria were detected in 71.4% of the residents in Nguyen Xa village in Vietnam. All the colistin-resistant isolates were

identified as *E. coli*.

The proportion of households that had members possessing colistin-resistant *E. coli* was also quite high (80.6%). Sixty-nine of the 70 colistin-resistant *E. coli* isolates possessed either *mcr-1* and/or *mcr-3*. Only one colistin-resistant isolate did not contain any *mcr-1* to *mcr-5* genes. The minimum inhibitory concentrations of *mcr* (+) isolates to colistin were  $\geq 8 \mu\text{g/ml}$ . Pulsed-field gel electrophoresis analysis indicated no clonal expansion of any specific strain. The majority of *mcr* (+) isolates showed that the rate of multidrug resistance (MDR) of colistin-resistant *E. coli* isolates was 91.4%, which means that they show resistance to at least one antibiotic drug in three or more antibiotic classes.

"It is a remarkable finding from a public health viewpoint that most households that participated in the study had colistin-resistant *E. coli* carriers," said Dr. Yamamoto, "Thus, this requires urgent public health attention."

The researchers conducted the study in Nguyen Xa village, Thai Binh province, Vietnam, from November 2017 to February 2018. The village, a representative rural community in Vietnam, had 7,730 residents in 2,008 households in 2015. A total of 98 healthy participants from 36 households were enrolled (an increase from what was recorded in the abstract). The researchers obtained one stool specimen from each participant to test for the presence of colistin-resistant *E. coli*, using a selective medium.

Current reports show an increase in colistin-resistant bacteria worldwide due to the abuse of colistin in the livestock sector. Furthermore, the discovery of mobile antibiotic resistance genes, such as *mcr-1*, in 2015 indicates the possibility of further spread of colistin-resistance to other bacteria. Extensive studies on colistin-resistant bacteria possessing *mcr* are being carried out on

infectious disease specimens and livestock. The colistin-resistance with mcr represents an emerging global health threat.

"The susceptibility and exposure of local residents living in the areas of frequent usage of colistin in livestock to the colistin-resistant bacteria remains to be studied," said Dr. Yamamoto. The carriage of colistin-resistant bacteria with mobile resistance genes by human residents may increase the risk of acquiring intractable infections.

Provided by American Society for Microbiology

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