

24/09/19



India and China top hot spots of antimicrobial resistance in animals



More than 70 per cent of antimicrobials sold globally are used on livestock and poultry. Copyright: CABI

Speed read

- Antimicrobial resistance (AMR) has worsened in animals and humans, reducing the efficacy of vital medicines

- Global study highlights Asia, where meat consumption has grown by 68 per cent in 20 years
 - All farmers need to be weaned off quick-fix antibiotics, says author
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By: Ranjit Devraj

[NEW DELHI] Asian giants China and India must take immediate steps to preserve antibiotics essential for human medicine by restricting their use in the livestock industry, recommends an author of a new study on antimicrobial resistance (AMR).

The study, published on 20 September in *Science* assessed the development of drug-resistant pathogens in developing countries. It found hot spots of multidrug resistance in animals in parts of China and India, as well as rapidly emerging ones in Kenya and Brazil.

Ramanan Laxminarayan, study co-author and founder-director of the Centre for Disease Dynamics, Economics and Policy, Washington, told *SciDev.Net*: “Immediate actions are required in China and India to mitigate the impact of AMR on both their own animals and citizens, and as part of the wider global community.”

“This study will help spread awareness among farmers and consumers that quick-fix solutions in animal husbandry may increase short-term profits but can have dangerous consequences that will eventually affect the whole community,”

Leima Chanu Shakti Yambem, doctor, Imphal, India

With 73 per cent of all antimicrobials sold globally being used on livestock and poultry, AMR has worsened in both animals and humans, reducing the efficacy of several vital antibiotic medicines, says the study.

AMR is defined by the World Health Organization (WHO) as the ability of disease-causing microorganisms such as bacteria, viruses, fungi and some parasites to defend themselves against antimicrobial medicines. As a result, standard treatments

become ineffective with infections persisting and often spreading to other animals or humans.

Over the past two decades, AMR in animals has increased dramatically, says Laxminarayan, who is also a senior research scholar at Princeton University, New Jersey, US. “Between 2000 and 2018, the proportion of antimicrobials that were more than 50 per cent resistant increased from 15 per cent to 41 per cent in chickens and from 13 per cent to 34 per cent in pigs,” he said.

According to the study, the transition to high-protein diets in low- and middle-income countries (LMICs) was made possible by intensive animal production systems that routinely make use of antimicrobials to maintain health and productivity.

Global snapshot

To map resistance trends in food animals across LMICs, researchers working on the study developed a geospatial model using data from the 2008-2018 point-prevalence survey that gave a global snapshot of rates of antibiotic resistance in animals and food products.

“We hope to draw attention to the fact that resistance is not just a problem for humans but also a problem for sick animals,” Laxminarayan said. “The study provides policymakers and scientists with a comprehensive mapping of AMR in animals across LMICs for the first time.”

Over the past 20 years, meat consumption has plateaued in higher income countries but grown by 68 per cent, 64 per cent, and 40 per cent in Asia, Africa and South America, respectively, the report states. Asia is home to 56 per cent of the world’s pig population and 54 per cent of the world’s chickens.

“Rising AMR is likely to have economic consequences for farmers and knock-on effects on food prices for consumers, thereby impacting Asia’s ability to feed its rapidly growing population,” Laxminarayan added.

Commenting on India's recent action banning Colistin – a WHO reserve antibiotic – from being used in livestock and poultry farming, Laxminaryan believes it was only a start, adding: “One-time flashy announcements won't solve the problem. We need to educate farmers on how to raise poultry and livestock without antibiotics and progressively phase them out.”

Food contamination

Resistance was found to be highest in antibiotics commonly used in food production, including tetracyclines, sulfonamides and penicillins. Rates of resistance varied among medically important antibiotics, from 20-60 per cent for ciprofloxacin and erythromycin, and 10-40 per cent for third- and fourth-generation cephalosporins.

By conducting 901 point-prevalence surveys during 2000-2018, the research team narrowed down on common food-borne pathogens that show AMR including *Escherichia coli*, *Campylobacter spp.*, non-typhoidal *Salmonella* and *Staphylococcus aureus*.

According to a WHO paper these AMR bacteria, carried by animals, can also cause disease in people and can contaminate food supply from farm to fork through slaughtering and processing. “Fruits and vegetables may also be contaminated by such bacteria at the farm or later through cross-contamination,” the paper said.

Hot spots of drug resistance in animals were also found in northern Pakistan, Iran, eastern Turkey, the Nile River Delta, the Red River Delta in Vietnam and areas around Mexico City and Johannesburg, as well as north-eastern India and north-eastern China.

Leima Chanu Shakti Yambem, a medical doctor from Imphal, capital of India's north-eastern Manipur state, believes the study could influence a policy shift in the north-eastern region of India, where the consumption of meat is higher than in the rest of the country.

“People already understand the dangers from AMR in humans but this study will help spread awareness among farmers and consumers that quick-fix solutions in animal husbandry may increase short-term profits but can have dangerous consequences that will eventually affect the whole community,” Yambem told *SciDev.Net*.

“It is well-established that AMR infection in humans cause longer illness terms, increased hospitalisation and treatment failures that often turn fatal.”

Making changes

While the study focuses on mapping AMR in low- and middle-income countries, it calls on high-income countries – which have been using antimicrobials in farming since the 1950s – to assist poorer countries in shifting to safe and sustainable animal production – especially because the consumption of meat has been growing rapidly in the developing world.

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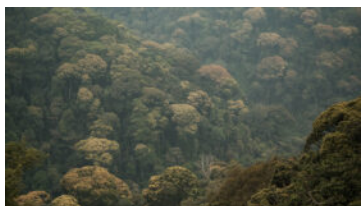
Laxminarayan cautions that while it is important to recognise that poultry and livestock farmers in China, India and other countries in the Asia Pacific are currently overdependent on antibiotics and need to be weaned off of them, care should be taken not to harm their livelihoods.

Where African countries are concerned, Laxminarayan believes that any international response to AMR will need to consider sparing them from aggressive measures to restrict access to veterinary drugs since that may undermine livestock-based economic development.

“Finally, antibiotic resistance is a global problem, and it is pointless making efforts to reduce resistance in some parts of the world while allowing it to increase in other areas,” he said.

Read the full study in *Science*.

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