Antimicrobial resistance in animal production workers, a serious challenge

With 73% of human-use antibiotics also used in food-animal production, antimicrobial resistance (AMR) is a pressing global health concern, particularly in contexts where humans and animals are in close proximity, such as in animal production facilities. This issue is exacerbated by the widespread use of antibiotics in livestock farming, which not only promotes resistance in bacteria but also poses direct risks to farm workers.

Antimicrobial resistance in farm workers in Denmark

In Denmark, a country renowned for its robust agricultural monitoring systems, significant strides have been made in tracking AMR. A comprehensive report from 2015 emphasized the occurrence of antimicrobial-resistant bacteria, particularly in livestock-associated methicillin-resistant Staphylococcus aureus (LA-MRSA). The Danish Integrated Antimicrobial Resistance Monitoring and Research Program (DANMAP) highlighted that farm workers frequently came into contact with these resistant pathogens, which posed occupational hazards and public health challenges (Bager et al., 2015). The program found that 88% of pigs carried LA-MRSA, and farm workers had significantly elevated exposure risks, particularly in intensive swine operations (DANMAP 2015 Report).

Antimicrobial resistance in farm workers in the US

Studies in the United States have revealed even more alarming statistics. Farm workers in intensive animal farming environments were found to be 32 times more likely to develop antibiotic-resistant infections than the general population. This increased risk was attributed to prolonged exposure to resistant bacteria and antibiotic residues in animal feed and the environment (Silbergeld et al., 2008). The close interaction between humans and animals in confined spaces fosters the transfer of resistant genes, making these workers a vulnerable group.

Mechanisms of resistance spread

The spread of AMR from livestock to humans can occur through several pathways:

- Direct contact: Handling animals and exposure to manure or bodily fluids.
- Airborne transmission: Dust particles containing resistant bacteria.
- Contaminated food: Consumption of undercooked or improperly handled meat products.
- Environmental contamination: Water and soil contaminated with antibiotics or resistant bacteria.

What can be done?

Even in countries where antimicrobials reduction legislation has been in place for almost two decades, such as Germany or Sweden, new resistance cases are constantly discovered. In supermarkets around the world, meat contaminated with antibiotic-resistant superbugs is still a common occurrence. And in antibiotic resistance hot spots, “from 2000 to 2018, P50 increased from 0.15 to 0.41 in chickens—meaning that 4 of 10 antibiotics used in chickens had resistance levels higher than 50%. P50 rose from 0.13 to 0.43 in pigs and plateaued between 0.12 and 0.23 in cattle” (Dall, 2019). These hot spots are spread across the globe, from south and northeast India, northeast China, north Pakistan, Iran, and Turkey, to the south coast of Brazil, Egypt, the Red River Delta in Vietnam, and areas surrounding Mexico City, Johannesburg, and more recently Kenya and Morocco.

Globally, antimicrobial use in animals is projected to increase by 67% by 2030, especially in low- and middle-income countries where regulatory frameworks are weaker. Denmark provides a successful model for mitigating these risks. Policies such as the “Yellow Card” scheme have reduced antibiotic use in pigs by promoting alternative husbandry practices and strict monitoring. This approach has also reduced the prevalence of resistant bacteria in animal populations, offering a replicable strategy for other nations (Alban et al., 2017).

Recommendations for mitigation

- Strengthening surveillance: Programs like DANMAP should be implemented globally to monitor antibiotic usage and resistance trends in animals and humans.
- Reducing antibiotic use: Phasing out non-therapeutic uses of antibiotics, particularly as growth promoters, and avoiding Critically Important Antimicrobials for Human Medicine.
- Protecting workers: Providing personal protective equipment (PPE) and regular health screenings for farm workers.
- Public awareness: Educating communities about the risks of AMR and promoting safe food handling practices.

The evidence from Denmark and the U.S. underscores the urgent need to address AMR in animal production settings. Protecting farm workers from AMR not only safeguards their health but also prevents the spread of resistant pathogens across the wider public.

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