

Use of Antibiotics in Livestock Sector of Pakistan and its Impact

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ABSTRACT

The Antimicrobial Resistance (AMR) is one of leading menace, the world is facing today among others like climate change, land-use change, zoonotic diseases, and food safety and security. The use of antibiotics in the livestock sector is a critical component of modern animal husbandry, yet it poses significant public health and environmental risks when unregulated leading to AMR. In 2019, it was estimated that AMR was associated with five million deaths globally among which 1.27 million deaths directly attributed to AMR (University of Oxford, 2022) and it is estimated that by 2050, up to 10 million people per year could die globally from drug resistant infections, with 90% of these deaths occurring in Africa and Asia. Moreover, AMR threatens development gains globally and achieving the 2030 Sustainable Development Goals.

Pakistan, currently classified as lower-middle-income, is the world's fifth most populous country. There are 255 million people, according to 2025 estimates and over 238 million livestock, 2,065 million poultry. Livestock contributes around 14.97% to its GDP, emphasizing the role of agriculture in its economy (Economic Survey of Pakistan, 2025). Health services delivery has been decentralized since June 2018 and delivered through a mix of public, private, and vertical programs with almost 70% of the patients procure health services from the private sector with a high Out-of-Pocket expenditure. There is an unrestricted access to over-the-counter antibiotics. Like other Southeast Asian and African countries, there is a high burden of AMR in Pakistan. Recognizing the challenges of AMR, the government committed to a National Action Plan on AMR in 2017, followed by (Antibiotic Footprint analysis, 2021) reported the estimated combined antibiotic consumption across sectors for 2019 in Pakistan was 3,072 MT. Human antibiotic consumption contributed 54% (1659 MT) and animal antibiotic consumption was 46% (1413 MT) (Antibiotic Footprint Analysis, 2021). The total consumption of systemic antibiotics in humans for 2019 in Pakistan was 18.60 Defined Daily Dose (DID), it means that the average daily dose of antibiotics consumed per person in Pakistan was 18.60 times the standard maintenance dose for that particular antibiotic. Key findings indicate that antibiotics, including those critically important for human medicine, are routinely employed for growth promotion, prophylaxis, and metaphylaxis, largely in the absence of veterinary supervision. The most commonly used classes include tetracyclines, fluoroquinolones, and beta-lactams. This practice is driven by a lack of awareness, economic pressures, weak regulatory enforcement, and the easy over-the-counter availability of veterinary pharmaceuticals.

There is a direct correlation between this misuse and two major consequences: (1) a high prevalence of antibiotic residues in meat and milk samples, exceeding maximum residue limits (MRLs) and posing a direct threat to consumer safety, and (2) the emergence and spread of antimicrobial resistance (AMR) in zoonotic and commensal bacteria, as evidenced by high resistance indices in *E. coli* and *Salmonella* spp. isolated from food animals. The environmental burden, through contaminated manure and runoff, is also identified as a significant concern. It is concluded that the current pattern of antibiotics use in Pakistan's livestock sector is unsustainable and represents a potent accelerator of the AMR crisis. There is an urgent need for a multifaceted One Health intervention, encompassing stringent regulatory reforms, enforcement of withdrawal periods, farmer and veterinarian education on prudent use, and the promotion of sustainable alternatives to antibiotic growth promoters. Without immediate and coordinated action, the escalating threat of AMR will severely undermine both animal and human health security in the country.

Keywords: AMR, Use of Antibiotics, Livestock Sector.

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