

## The Association between Antimicrobial Usage and Biosecurity Practices on Commercial Chicken Farms in Bangladesh

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**Abstract :** Commercial chicken production is an import livestock industry in Bangladesh. Antimicrobials are commonly used to control and prevent infectious diseases. It was hypothesized that inadequate biosecurity practices might promote antimicrobial usage on commercial chicken farms. A cross-sectional study was carried out to evaluate antimicrobial usage and farm biosecurity practices implemented on 57 layer and 83 broiler farms in eight sub-districts of the Chattogram district in Bangladesh. A questionnaire was used to collect data on antimicrobial usage and biosecurity practices on these farms. A causal framework was used to guide the development of a multi-level mixed-effects logistic regression analysis to evaluate the total and direct effects of practiced biosecurity management on prophylactic and therapeutic administration of antimicrobials. A total of 24 antimicrobials were administered in the current production cycle at the time of the survey. The most administered antimicrobials on layer farms were ciprofloxacin (37.0% of farms), amoxicillin (33.3%), and tiamulin (31.5%); however, on broiler farms, colistin (56.6% of farms), doxycycline (50.6%), and neomycin (38.6%) were most used. Only 15.3% of commercial farmers used antimicrobials entirely for therapeutic purposes, whereas 84.7% administered antimicrobials prophylactically. Inadequate biosecurity practices were more common among commercial broiler farmers compared to layer farmers. For example, only 2.4% of broiler farmers used footbaths before entering sheds compared to 22.2% of the layer farmers ( $p < 0.001$ ). Farms that used antimicrobials only for therapeutic purposes (vs prophylactic) implemented more frequently adequate disease control measures, such as separating sick birds from healthy birds. This research highlighted that the prophylactic application of antimicrobials is often conducted to substitute poor biosecurity practices on commercial chicken farms. Awareness programs for farmers are crucial to inform them about the risk associated with antimicrobial usage and to highlight the economic benefits of implementing cost-effective biosecurity measures to control infectious poultry diseases.

**Keywords :** antimicrobial, biosecurity, broiler, layer

**Conference Title :** ICVMB 2021 : International Conference on Veterinary Medicine and Biosecurity

**Conference Location :** Vienna, Austria

**Conference Dates :** June 21-22, 2021