

# Different kettles of fish: varying patterns of antibiotic use on pig, chicken and fish farms in Lao PDR and implications for antibiotic resistance strategies

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## Abstract

The rapid intensification of the livestock sector in Southeast Asia has been found to be associated with an extensive and expanding use of antibiotics. This raises concerns regarding the rise of drug-resistant bacteria in both animals and humans. Data on veterinary antibiotic use (ABU) and antibiotic resistance (ABR) are scarce in Lao PDR, as in most low and middle-income countries. This study aimed to explore the views of small to medium-scale pig, poultry and fish producers regarding the use of antibiotics. A total of 364 farmers were surveyed using a questionnaire and farm visits. Patterns of knowledge, attitudes and practices regarding ABU and ABR were explored with multiple factor analysis and hierarchical cluster analysis. Farms were assigned to one of three clusters in which specific farmers' views were overrepresented. Cluster 1 (in which pig farms were overrepresented) held a positive attitude regarding preventive measures and information about antibiotics. In cluster 2 (in which poultry farms were overrepresented), there was a view that antibiotics should be used for disease prevention. Finally, in cluster 3 (in which fish farms were overrepresented), knowledge about ABU and ABR was weak, and ABU was very limited. No specific attitude was under or overrepresented. Farmers mentioned that they were unfamiliar with antibiotics and were uncertain about details concerning ABR (such as whether or not to consume animal products just after they received antibiotic treatment). Farmers from cluster 3 who did not give antibiotics to their animal (90 out of 114) and did not use vaccines (100 out of 114) were overrepresented. A total of 65% (171/263) of the antibiotics found on farms were included on the World Health Organization's list of critically important antibiotics for human medicine. These critically important antibiotics were mostly found in clusters 1 (57/168, i.e., 33.8% farms had at least one critically important antibiotic) and 2 (63/171, 36.8%). These findings indicate that antibiotic stewardship strategies should tackle the use of critical antibiotics as well prophylactic treatments to prevent antibiotic misuse in small and medium- livestock farms.

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