

A young girl with dark hair, wearing a dark blue patterned sweater and pink pants, sits on a concrete block wall. She is looking down at a small white and tan dog sitting next to her. In the foreground, several brown chickens are pecking at the ground. The background shows a rustic wooden structure and a concrete block wall. The scene is outdoors, with sunlight filtering through the trees.

Antibiotic Use in Small-Scale Livestock Producers in Ecuador

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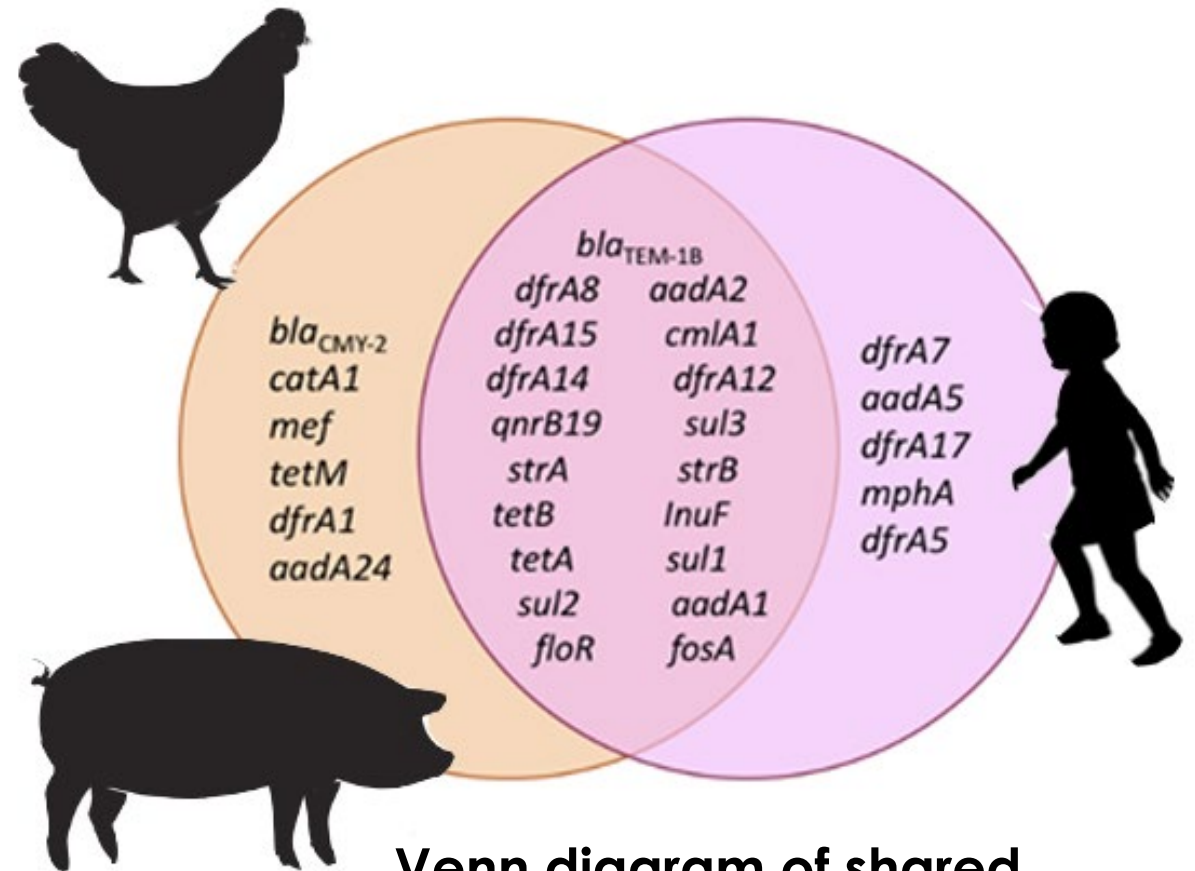
Global livestock and poultry production

- Smallholder farming in low- and middle-income countries
 - Approximately 500M farms with livestock and poultry
 - Small and medium farms (≤ 50 ha) produce 51–77% of nearly all commodities and nutrients
- Growth in demand for animal-source nutrition
- Promotion of small-scale food animal production in LMICs
 - Livelihoods
 - Nutrition



Pilot study of antibiotic resistance in children and animals

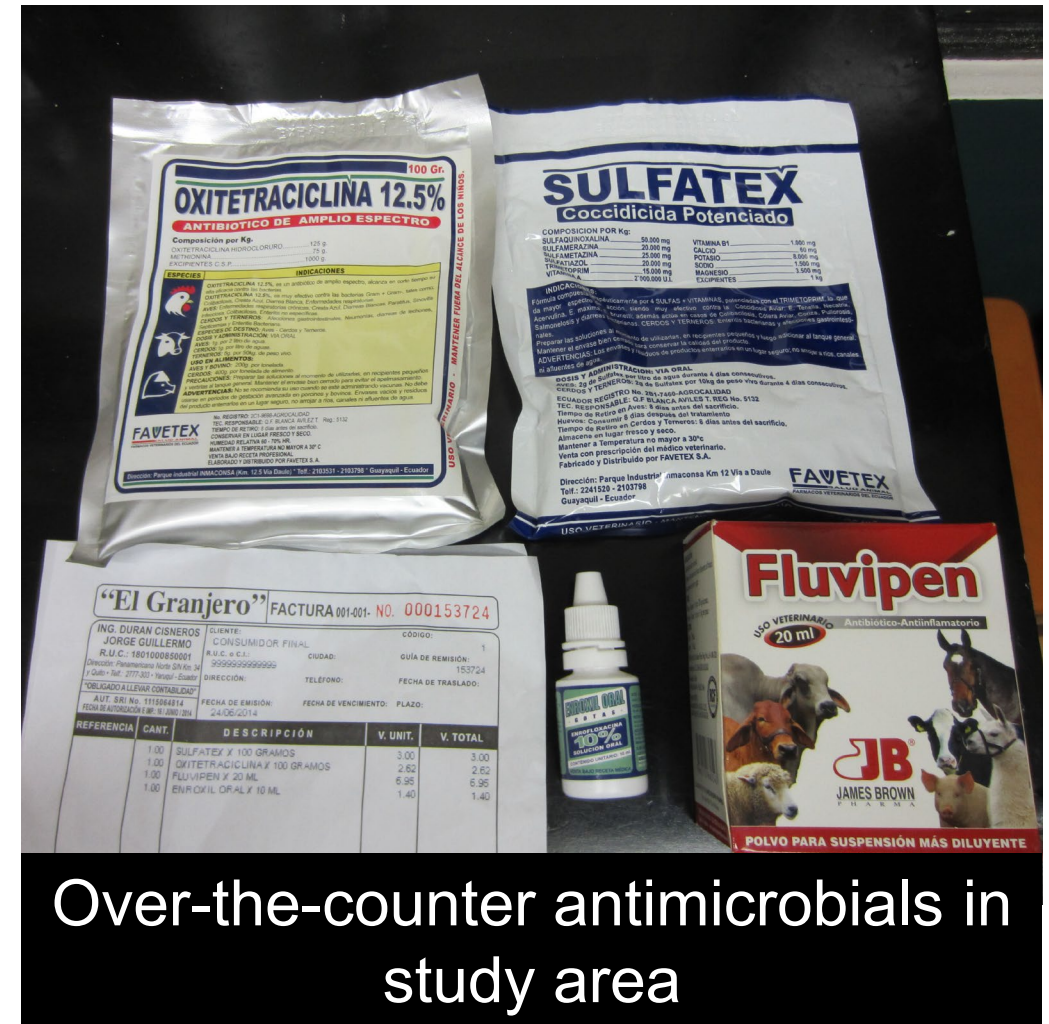
- Surveys in households with children and small-scale livestock and poultry
- Collected fecal samples from children, livestock and poultry
- Tested antibiotic susceptibility of *E. coli* isolates
 - Children (n = 64)
 - Livestock and poultry (n = 174)
- 35% of *E. coli* from children and livestock and poultry were resistant to three or more classes of antibiotics
 - Shared the same plasmid types and resistance genes



Venn diagram of shared antimicrobial resistance genes identified

Antibiotic use common among small-scale livestock and poultry producers

- Conducted in-depth interviews with small-scale food-animal producers (n = 25)
- Nearly half of producers interviewed considered antibiotics important for growth promotion
- Multiple respondents claimed that their animals rarely get sick and credited antibiotics with animal health
- Producers had a limited understanding of antibiotic resistance



Antimicrobial use in small-scale livestock and poultry

“The feed has antibiotics, vitamins. Because of that the animals grow faster. We use medicines more because we raise them inside, because otherwise they die. The animals that are in the fields don’t get sick.”

-- Small scale producer

Lowenstein C., Waters W.F., Roess A., Leibler J.H., J.P. Graham*,
Animal husbandry practices and perceptions of zoonotic infectious disease risks among livestock keepers in a rural parish of Quito, Ecuador
American Journal of Tropical Medicine and Hygiene, 95(6), 2016.



Veterinary shop where antimicrobials are sold over the counter

Summary from our research and others

- Antibiotics readily available for small-scale livestock and poultry
- Lack of veterinary capacity
 - Antibiotic prescribing carried out by untrained individuals (i.e. not vets)
- Small-scale production occurs in the household environment
 - Spillover of antibiotic resistance likely
- Small-scale livestock and poultry producers' decisions driven by household economics, not societal consequences



Small-scale livestock producer in Quito, Ecuador

Recommendations

- Need to understand community-acquired antibiotic resistance
 - Environmental reservoirs
- Develop models to assist LMICs in expanding prudent access and use of antibiotics
 - Prescription-only legislation
 - Collaborative and informal regulation
 - Professional bodies
 - Provider incentives
- Interventions to improve prescribing practices of veterinary shop sales agents
 - Focus on critical antibiotics
- Interventions to change consumer behavior



Veterinary shop where antimicrobials are on display and sold over the counter

Acknowledgements

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