Quantifying the use of antimicrobials across the poultry production system in South and Southeast Asia

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ONE HEALTH POULTRY HUB

Novel antimicrobial drug (AMD) residue detection methods aim to provide insight into the use of drugs within the poultry production system in South and Southeast Asia, a current global health concern due to links with antimicrobial resistance (AMR).

Current methods of AMD residue detection in meat e.g., **LC-MS** & **ELISA**

❌ Expensive
❌ Time consuming
❌ Specialist training

Most importantly;

❌ " snapshot" of AMD use

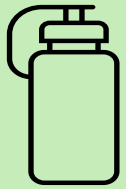
Novel detection methods via **Lateral Flow Tests (LFT)**

✅ Historical drug use over the production cycle

<u>Validated LFTs for LOQ in feather samples</u>

ROSA® Lateral Flow Test (Charm, Inc)
Panel 1: Sulfonamides, tetracyclines, beta-lactams, quinolones
Panel 2: Aminoglycosides: neomycin, kanamycin, streptomycin, spectinomycin

0.3g feather
Cut into 1cm pieces



Add 1.8mL negative control buffer

Add 300µl to the LFT strip and incubate for 5 minutes

Read the results on EZ reader

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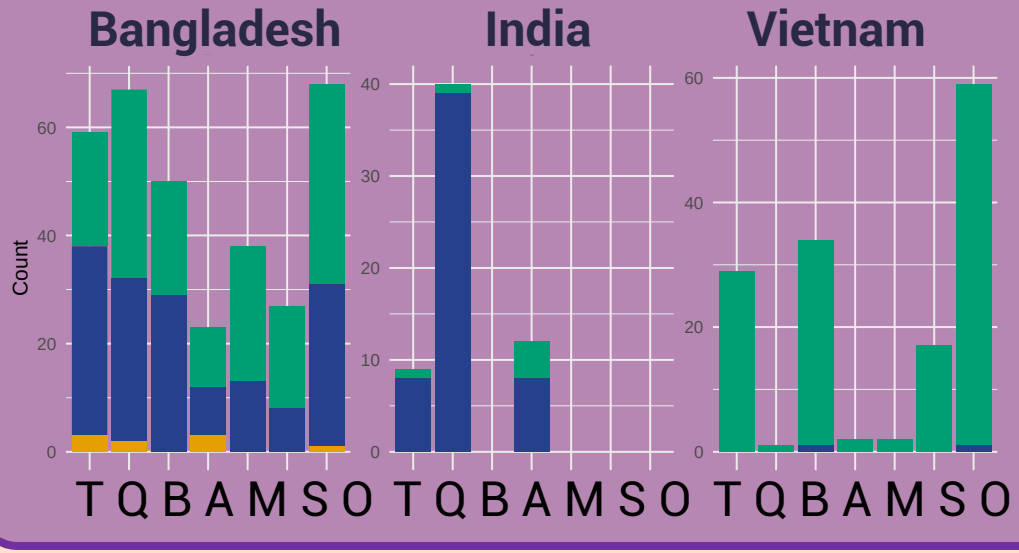
Antimicrobial Use – Declaration

Farm sites in **Bangladesh** (100), **India** (50), and **Vietnam** (49) were sampled. 88% reported use of at least 1 AMD. One AMD was the most common practice (31%) and no significant difference in timing/duration ($p<0.05$). AMU for **growth promotion** was only observed in Bangladesh alongside a mix of **therapeutic** and **preventative** measures.



Methods:

Questionnaires were given to farms to ask about their AMD use during the production cycle.

Class, duration, timing, dose.

T - Tetracycline
Q - Quinolone
B - Beta-Lactam
A - Aminoglycoside
M - Macrolide
S - Sulfonamide
O - Other

Vietnam reported use for mostly **therapeutic** reasons whereas India reported use primarily for the **prevention** of disease. Bangladesh showed the greatest range of AMDs used in the three countries.

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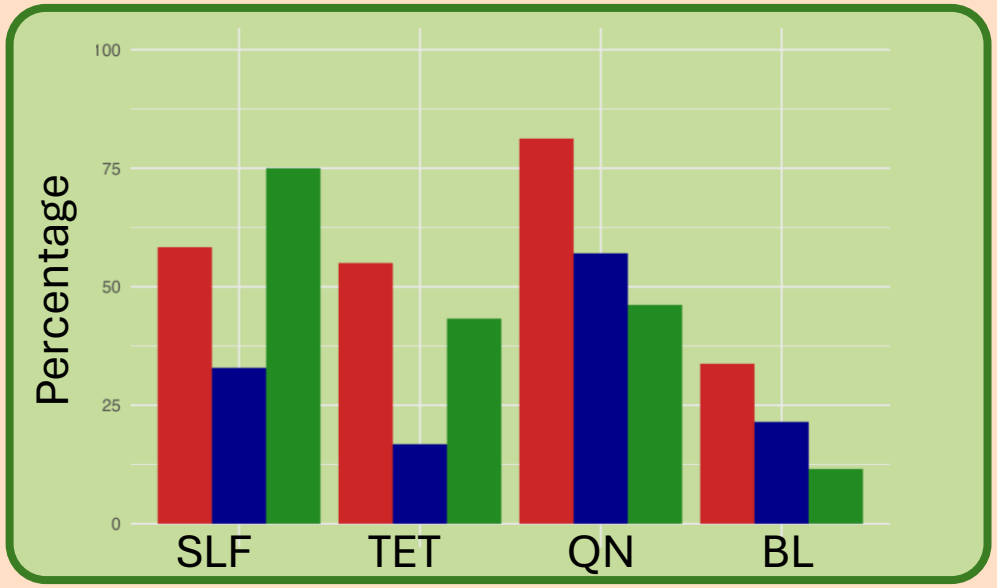
Feather Lateral Flow Test Results:

- Farm sites
- Bangladesh, India, and Vietnam
- n=199
- 5 AMD classes detectable



Panel 1 Results:

Quinolones (QN) were the most detected AMD in **Bangladesh** (81%) and **India** (57%). Sulfonamides (SLF) were most common in **Vietnam** (75%). Beta-Lactams (BL) were the least recovered AMD from feathers.

Panel 2 Results:

Aminoglycosides were rarely detected across all the countries (0-10%). India detected the most residues, mainly spectinomycin and neomycin.

The LFTs (n=40) were cross-validated against **LC-MS** results per AMD class. From this, priors for the **Sensitivity** (Se) and **Specificity** (Sp) of the tests can be evaluated.

Ongoing: regression models accounting for test sensitivity and specificity to identify risk factors associated with AMD residues in feather samples.