

Characterization of bacterial and viral causes of severe and respiratory disease in smallholder chicken farms in The Mekong Delta of Vietnam

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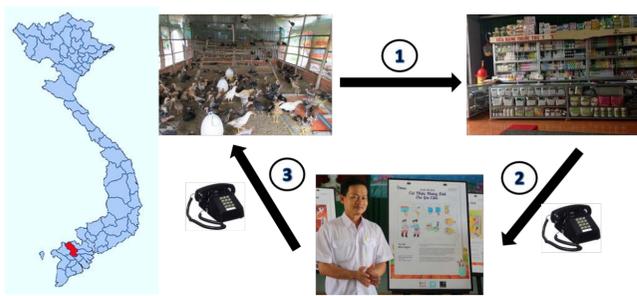
Background

- Small-household chicken farming systems are common in the Mekong Delta region of Vietnam
- Levels of morbidity and mortality due to infectious diseases are high due to poor biosecurity and husbandry practices
- In an attempt to limit the losses, farmers typically resort to the use of antimicrobials and vaccines without basis
- There is a lack of knowledge as to what infectious causative agents are present in the area

Aims

- To investigate the main causes of respiratory and septicaemic disease among smallholder (<2,000) chickens farms in the Mekong Delta of Vietnam
- To evaluate the prevalence of antimicrobial resistant from isolated pathogens

Methods



Pathogens	Tissue for culture	Tissue for PCR
APEC	S+B	-
SAL	S+B	-
PM	RT	RT
AVI	RT	RT
ORT	RT	RT
MG	-	RT
IBV	-	RT
HPAI	-	S
GB	-	BS
ND	-	S



- Veterinarian officers were informed by veterinary pharmacists farm seeking therapy advice
- Farms with chickens experiencing either high mortality or signs of severe respiratory disease were eligible

- Post-mortem examination of two chickens
- Systemic collection of tissue for diagnostic

- Screening of 10 pathogens by culture and PCR methods
- Isolated bacteria were identified by MALDI-TOF

- Disk diffusion sensitivity tests for ORT
- Breakpoints of sensitivity test followed CLSI instruction

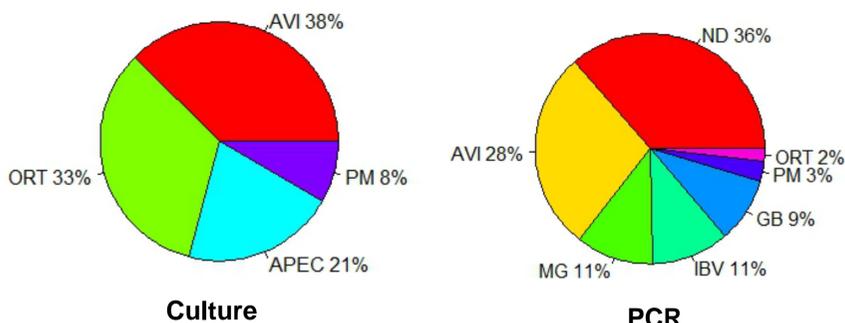
Key: APEC=Avian Pathogenic *Escherichia coli*, SAL=*Salmonella Pullorum/Gallinarum*, PM=*Pasteurella multocida*, AVI=*Avibacterium paragallinarum*, ORT=*Ornitobacterium rhinotracheale*, MG=*Mycoplasma gallisepticum*, IBV=Infectious Bronchitis virus, High pathogenic avian influenza, ND=Newcastle Disease, S=Spleen, B=Bone marrow, RT=Respiratory tract, BS=Bursa.

Results

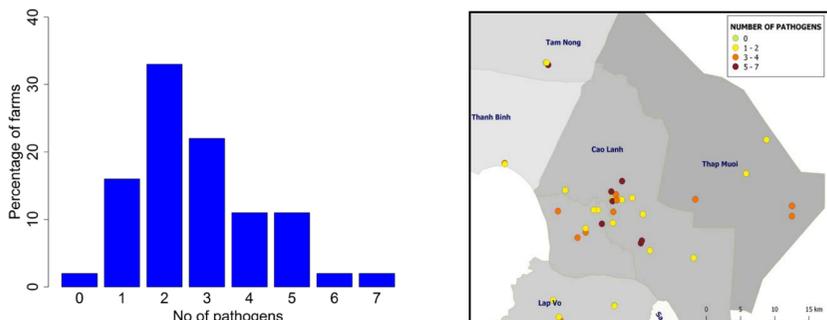
- 45 farms were investigated (median farm size 150 chickens [IQR 90-300]; median age 7 weeks [IQR]. Cumulative mortality over previous 2 weeks 3.8% [IQR 1.5-13.3%])
- 8/10 pathogens detected by both methods.

- 32 farms (71%) used antimicrobials
- 12 antimicrobials were used: ampicillin, amoxicillin, colistin, lincomycin, gentamicin, neomycin, doxycycline, enrofloxacin, erythromycin, florfenicol

Distribution of pathogens

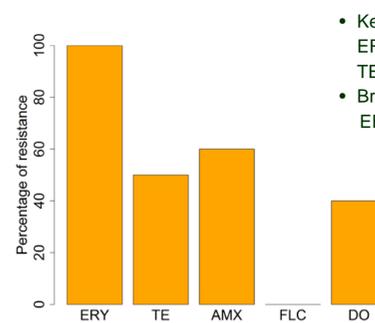


Number of pathogens per farm



Prevalence of resistance in ORT isolates

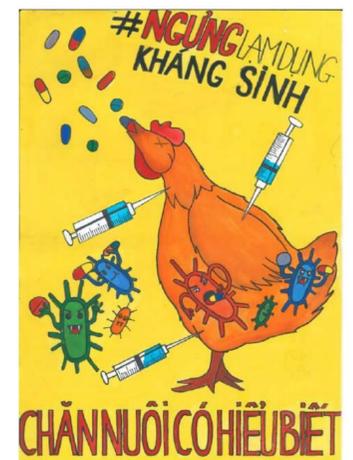
- 10 ORT isolates tested



- Key: AMX = amoxicillin (25µg); DX = doxycycline (30g); ERY = erythromycin (15µg); FLC = florfenicol (30µg); TE = tetracycline (30µg)
- Breakpoints (Inhibition zone) (mm): AMX (27), DX (23), ERY (27), FLC (24), TE (23)

Detectable bacteria versus antimicrobial usage

- Bacterial pathogens were detected from 24/32(75%) farms that used antimicrobials and 9/13 (69%) farms that not used antimicrobials over previous 2 months) (p=0.875)



Discussion and further work

- High prevalence of detection of ND (95%), AVI (68%) on farms
- 2/3 of farms have chicken infected with multiple pathogens
- High proportion of ORT isolates non-susceptible to erythromycin, amoxicillin, tetracycline and doxycycline

- Further study to compare vaccine and field strains of ND using molecular method
- Further investigate antimicrobial resistance bacteria (AVI, PM, APEC, ORT)
- Evaluate relationship between antimicrobial usage and isolated bacteria

References

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