

Circulation of Highly Pathogenic Avian Influenza A/H5N1 in Savar and Dhamrai Upazila, Dhaka, Bangladesh

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Introduction

- Bangladesh has experienced outbreaks of avian influenza frequently from 2007 until 2012 and thereafter only sporadic outbreaks were reported.
- On January 16, 2017, the outbreak in Dhamrai started with a report of sick and dead poultry.
- Upon receiving notification from the poultry farm owner, the government reference laboratory tested and confirmed Influenza A (H5N1) and notified OIE.
- Following the report of a H5N1 mortality event in a commercial poultry farm in Bangladesh, an investigation was conducted in Savar and Dhamrai to determine the extent of the outbreak and whether avian influenza (AI) has been circulating in LBMs or among wild birds and to identify the possible sources of AI for the reported event.

Methods

- The team surveyed all nearby live bird markets (LBM) in Savar and Dhamrai upazila in Dhaka District for a 24 km radius around outbreak areas.
- Oropharyngeal and cloacal swab samples from dead crows (N=3) and environmental swab samples from LBMs (N=77) were collected.
- All swabs were tested by real-time RT-PCR for Influenza-A (M gene) H5, H7, H9 and N1.
- All crows and subset of LBM samples were tested using consensus PCR for Influenza and Flavivirus. PCR products were sequenced to confirm positive PCR results.

Results

- The team observed crows feeding on poultry waste in the LBMs and 100% (n=3; 95% CI: 29-100) of the crows were positive for influenza A/H5N1
- None of the LBM or crow samples were positive for H7 subtypes-
- Of the 77 environmental samples, 40% (n=31; 95% CI: 29-52) were positive for influenza-A, including: A/H5 19% (n=6; 95% CI: 7-37), A/H9 23% (n=7; 95% CI: 10-41), 3% A/H5/H9 co-infection (n=1; 95%CI: 1-17) and A/untypable 58% (n=18; 95% CI: 39-75).
- Among different variables; LBM being within 7km of the index farm, types of market, location, presence of waterfowl and having sick or dead birds within last 7 days in the market were significantly (p<0.05) associated with influenza A/H5 using univariate analysis. Some other variables regarding household practices and biosecurity measures were found insignificant in the uni-variate analysis.
- Having dead birds within last 7 days remained significant following multivariate analysis.

Table 1: Prevalence of AI in LBMs of Savar and Dhamrai in Bangladesh

Location	Inf. A (n; 95%CI)	Inf. A/H5 (n; 95%CI)	Inf. A/H9 (n; 95%CI)	Inf. A/H5/H9 (n; 95%CI)	Inf. A/Untypable (n; 95%CI)
Dhamrai	29 (7; 13-51)	-	71 (5; 29-96)	-	29 (2; 3-71)
Savar	45 (24; 32-60)	25 (6; 10-47)	8 (2; 1-27)	4 (1;1-21)	67 (16; 45-84)



Figure 1, 2 & 3: LBM condition in Bangladesh



Figure 4: LBM sample collection

- H5 positive LBM samples were tested for N1
 - 50% H5 (n=6; 95%CI: 12-89) were positive for N1 and the remaining were negative which indicates that other N types might be co-circulating in LBMs.
- No evidence of transmission between animals and humans was found. No human cases were reported.
- None of the crow and LBM samples were positive for Flavivirus.
- Sequence from Consensus PCR product are more closely related to H9N2 subtypes which are being circulated in Bangladesh.

Table 2: Risk Factor analysis for Influenza A/H5 in LBM from Savar and dhamrai

Variables		OR	95% CI	P value	Adjusted OR	95% CI	P value
Markets within 7km of index farm	No	1					
	Yes	10	1-113	0.02	10.5	0.2-552	0.2
Types of market	Urban	1					
	Rural	0.2	0.02-1.6	0.1	1.6	0.03-84	0.8
Location	Savar	1					
	Dhamrai	0.1	0.01-0.9	0.04			
Presence of waterfowl	No	1					
	Yes	8	0.9-75	0.06	7.4	1-155	0.2
Any sick bird within last 7 days	No	1					
	Yes	9	1-59	0.03	0.5	0.01-20	0.7
Any dead bird within last 7 days	No	1					
	Yes	28	3-279	0.005	35.2	2-851	0.03

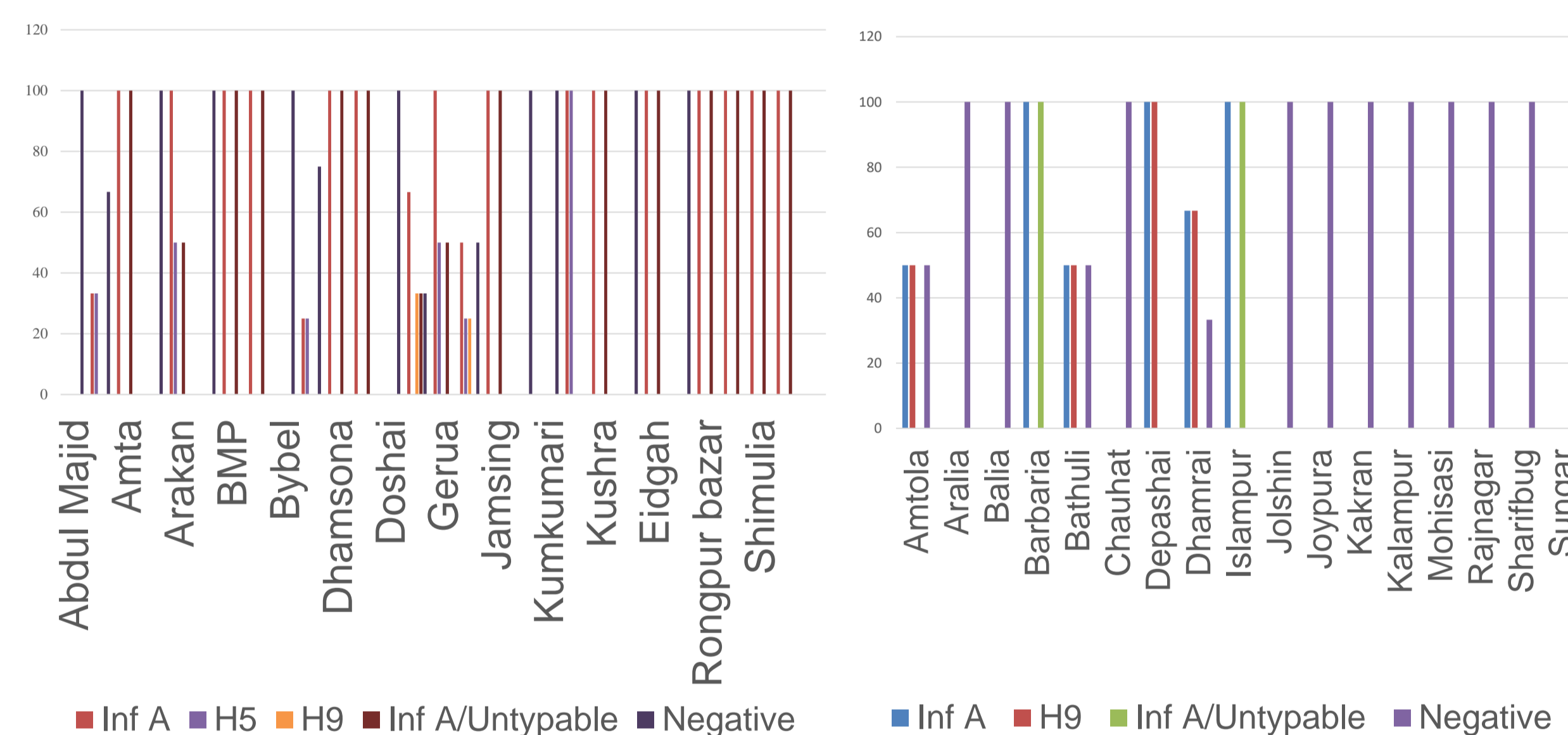


Figure 6: Prevalence of AI in LBMs, Savar Figure 7: Prevalence of AI in LBMs, Dhamrai

Conclusions

- Low pathogenic and highly pathogenic AI viruses are circulating in poultry sampled in LBMs in Bangladesh.
- AI outbreak in farm and in LBMs and crows may getting infection through feeding on poultry waste in LBM.
- N1 negative H5 infection demonstrating the value of active AI surveillance in LBMs and wild birds.
- Outbreak settings serves as an effective tool to detect the major AIVs that pose a public health risk and lays a foundation for both veterinary and public health officials in the event that one or more of these viruses causes outbreaks or significant disease in animals or humans

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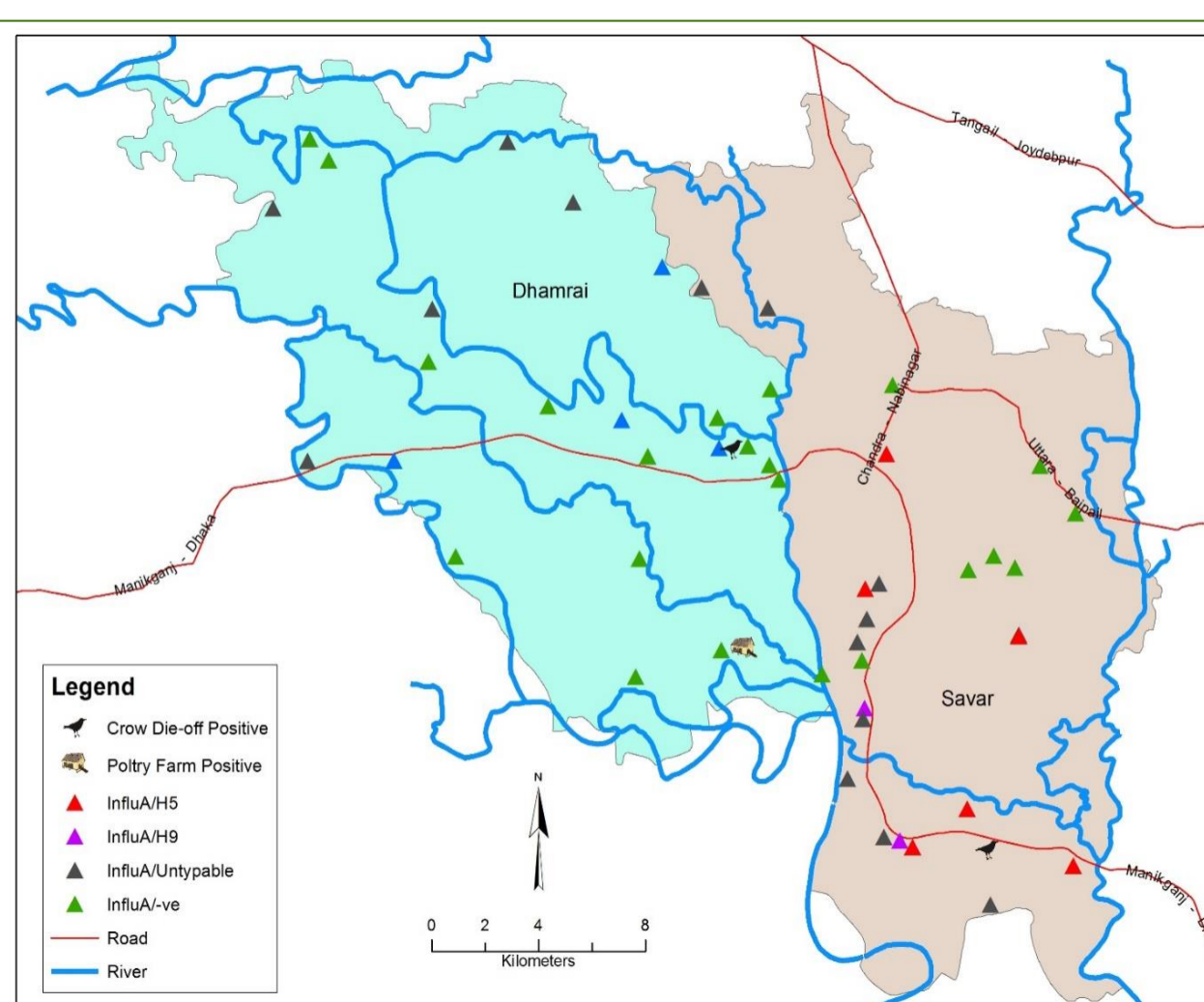


Figure 5: Spatial distribution of AI in LBMs of Savar and Dhamrai