

## Containing an Outbreak of Human Pathogenic Avian Influenza Outbreak in Nadia district of West Bengal - India

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### Abstract

**Background:** On 12th September 2011, unusual poultry deaths were reported from a poultry farm at Putimari Christianpara under Tehatta Gram Panchayat. On 14th September there were more deaths accordingly, samples were collected and sent to the Regional Disease Diagnostic Laboratory, Kolkata. Preliminary reports confirmed the presence of avian influenza. High Security Disease Detection Laboratory at Bhopal confirmed avian influenza. The state Govt notified the outbreak as avian influenza on 19th September 2010. This outbreak was investigated and epidemiological characteristic & containment measures were described.

**Material and Methods:** Operational definition of avian influenza was established. Fever surveillance in animals and human beings was conducted within 10 kms radius of epicenters. Culling was conducted. All health workers, and cullers were examined and prophylaxis was administered.

**Results:** Out of total 56 Gram Panchayat 25(45%) were affected. Out of 568 villages 131(23%) were affected. Out of 131 affected villages 22 were in the core area and the rest outside. Population affected was estimated to be 400007. Mean population covered per day was 104603 (26%).

**Conclusion:** In all 217 cases were detected with upper respiratory tract but none matched the case definition of avian influenza.

**Key words:** Avian Influenza, H5N1, Surveillance, Culling, Nadia District, West Bengal

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### Introduction

Avian influenza or “bird flu” virus is an RNA orthomyxovirus that has been causing global concern as a potential pandemic threat<sup>1</sup>. Avian influenza was found in 1997 in Hong Kong. Since then, it has spread to over 60 countries and caused death of millions of poultry birds either through disease or by culling. It has killed millions of poultry throughout Europe; Asia and Africa. Co-existence of the virus with human viruses increases its virulence by genetic re-assortment or genetic mutation<sup>2</sup>. The infection is mainly seen in poultry farms where its case fatality rate is 100% and attack rates extremely high. Humans can get infected by direct contact or handling of the infected birds. Faeces, body fluids, meat, blood of the birds are all infective. It is enzootic (endemic in some bird population), epizootic (causing epidemic in non-humans) and panzootic (infecting many species). There is limited human-to-human transmission, secondary cases being mainly in the family or close contacts. However, fatality rates are very high<sup>3,4</sup>. Till date there have been 570 human cases

and 335 deaths in the world<sup>5,6</sup>. However, WHO surveillance suggests that the virulence of H5N1 has increased causing stable transmission in many mammals like cats, dogs, tigers etc. A strain of Clade 2.3.2.1, circulating mainly in South East Asia has acquired virulence levels capable of causing sustained community outbreaks if human-to-human transmission becomes efficient<sup>7,8</sup>.

Surveillance of H5N1 in humans, poultry, wild birds, cats and other animals remains very weak in many parts of Asia and Africa. Much remains unknown about the exact extent of its spread<sup>5</sup>. Intensive poultry farming fuels the spread of the disease due to close proximity of the birds, flouting of bio-safety norms and the economic market forces coming into play. This also results in resistance by the industry to containment ‘stamping out’ operations which is the current strategy of prevention in many countries including India as per WHO guidelines<sup>7-9</sup>. Avian influenza was first reported in India on 19th February 2006 in an organized poultry farm of Maharashtra. West Bengal reported its first Avian Influenza case in 2007 in Birbhum which soon spread to 8 districts causing high rates of mortality in poultry and huge financial loss. Since then along with other states, West Bengal is under pandemic preparedness for Avian Influenza. Animal Husbandry Department of West Bengal is constantly conducting regular surveillance of poultry as per protocol designed by WHO<sup>9,10</sup>.

**First Information Report:** On 30th August 2011, there were newspaper reports stating that some carcasses of dead poultry were found in river streams neighboring Bangladesh which passed through West Bengal. High alert to all districts bordering Bangladesh was announced by Govt. of West Bengal after receipt of the information from NCDC on 7th September 2011.

Nadia District is one of the districts sharing borders with Bangladesh. Following the information received from Govt. of WB the district Health & FW dept., Animal husbandry dept. and the General administration met to discuss the strategies to control the impending outbreak. Based on the pandemic preparedness guidelines the state task force with the animal husbandry department reviewed the implementation plan. On 12th September, unusual poultry deaths were reported from a poultry farm at Putimari Christianpara under Tehatta Gram Panchayat, Nadia. On 14th September there were more deaths in another area mainly in the backyard poultry at Nanshatala under Betai Gram Panchayat Accordingly, samples were collected and sent to the Regional Disease Diagnostic Laboratory, Kolkata. Preliminary reports confirmed the presence of avian influenza. High Security Disease Detection Laboratory at Bhopal confirmed avian influenza. The state Govt. notified the outbreak as avian influenza on 19th September 2010. This outbreak was investigated to describe the epidemiological characteristic & containment measures.

### Objectives

Outbreak was investigated with following objectives:

1. To describe the epidemiological characteristic of outbreak of avian influenza.
2. To describe the measures taken to contain the outbreak of avian influenza.
3. To recommend measure to prevent and control of such outbreaks in future.

### Material and Methods

Confirmation of the outbreak in the region prompted the Animal Husbandry Department and the Health department to initiate prevention strategies in the state. As per WHO response protocol, stamping out measures were initiated in birds to contain the infection. Culling of the entire poultry within a radius of 3 Kms of the epicenters (core area) was undertaken along with destruction of all eggs, poultry feed etc., disposal of all culled birds by burial and disinfection of the pits with lime. Provision of PPE and other protective gear for all cullers.

**Surveillance in animals:** Surveillance in the 3-10 (surveillance zone) area for any unusual bird deaths. In order to prevention the acquisition of infection in humans Health and Family Welfare Department provided quarantine of all persons involved in culling, burial etc. including officials who move and come in

close contact, admission and treatment of suspected cases in strict isolation, prophylaxis of all the cullers and staff involved in culling daily before culling.

**Surveillance mechanisms:** Cullers and staff involved in culling were examined after culling was over each day, daily surveillance for suspect cases in each house within 3 km of the epicenter, bi weekly surveillance of each house in the 3-10 area from epicenter (surveillance zone), close observation of all cases of Upper respiratory tract infected patients in both areas, keeping isolation ward equipped with ventilator and other lifesaving gear ready, daily prophylaxis of health staff involved in field visit and hospital were other activities<sup>6</sup>.

**General administration:** Ban on sale and movement of all poultry products, restriction of movement of vehicles to and from the core area, law and order maintenance and inter-departmental co-ordination were initiated by the District Magistrate and SDO.

### Operational definition

**Avian influenza human case:** We used the WHO case definition. We described a case as any person presenting with Fever (body temperature of 38 degree Celsius or high) with or without muscle ache, cough, abnormal breathing (unusual breathing difficulty) or suspected pneumonia by the physician, or influenza with history of direct contact with infected/ dead birds in past 7 days or contact with a known patient of avian influenza residing in the core area or surveillance area surrounding the two epicenters at Christianpara or Nanshatala from 8th September 2011 till 10 days after the last culling operation is over.

### Results

**Culling:** Culling started on 20th September 2011. There were 849 poultry deaths until 19/9/2011. However, attack rates could not be calculated because all birds were subjected to culling from 20/9/2011. 2 isolation camps were set up at 2 school buildings at the 2 epicenters. The target for culling was 51000 birds. 3 to 4 pits of 4mx 3mx3m were dug in the nearby area isolated from the inhabited place (**Table 1**).

**Table 1: Details of culling activities in avian influenza containment operation, Nadia, West Bengal, 2011**

Date	Birds culled			Eggs destroyed			Feed destroyed		
	Nanshatala	Putimari	Total	Nanshatala	Putimari	Total	Nanshatala	Putimari	Total
20-Sep	13384	527	13897	22	0	22	205	0	205
21-Sep	8953	7766	16719	0	84	84	0	0	0
22-Sep	2311	5296	7607	61	444	505	0	0	0
23-Sep	286	3817	4103	0	281	281	0	0	0
24-Sep	0	4094	4094	0	284	284	0	0	0
25-Sep	524	1615	2139	34	29	83	775	102	877
27-Sep	0	0	8	0	0	0	0	0	0
Total	25458	23115	48567	117	1122	1259	980	102	1082

On 26th September there was public unrest against birds culling so no activity.

**Fever surveillance:** Fever surveillance started on 21st September 2011. 25 Gram Panchayat out of 56 (45%) were affected. Out of 568 villages 131 were affected (23%). 22 of them were in the core area and the rest outside. Population affected was estimated to be 400007. This was only an estimate because the 3km and 10 km boundaries were cross cutting defined geographical areas and populations for part of those areas were not known. Mean population covered per day was 104603 (26%). In all 217 cases were detected with upper respiratory tract but none matched the case definition of avian influenza (Table 2).

**Table 2: Details of Upper Respiratory Infection surveillance activity during Avian Influenza outbreak, Nadia, West Bengal, 2011**

Date	Population Surveyed			Persons with URI detected				Incidence per 1000 population	
	In field (Kms)			In field (Kms)		In Hospital			Total
	0 - 3	3 - 10	Total	0 - 3	3 - 10	OPD	IPD		
21-Sep	18210	7124	25334	128	46	0	10	184	7.3
22-Sep	33471	24780	58251	192	0	65	6	263	4.5
23-Sep	20063	26608	46671	82	98	41	8	229	4.9
24-Sep	34119	4630	38749	77	35	36	4	152	3.9
25-Sep	43397	137190	180587	85	371	0	0	456	2.5
26-Sep	71980	76756	148736	67	133	189	5	394	2.6
27-Sep	51235	32726	83961	48	37	17	4	106	1.3
28-Sep	57682	0	57682	39	0	28	2	69	1.2
29-Sep	58351	122371	180722	37	59	49	1	146	0.8
30-Sep	57471	50206	107677	44	0	44	0	88	0.8
01-Oct	55983	32260	88243	32	37	0	0	69	0.8
02-Oct	54893	32197	87090	27	56	0	10	93	1.1
03-Oct	53895	205994	259889	31	414	114	5	564	2.2
04-Oct	54982	0	54982	32	0	23	6	61	1.1
05-Oct	54929	0	54929	23	0	247	7	277	5.0
06-Oct	52769	118327	171096	21	49	86	5	161	0.9
07-Oct	51621	82035	133656	20	185	174	6	385	2.9

- Total number of gram panchayat affected = 25/56.
- Total number of villages affected = 131/568, out of total 131 affected villages 22 were within the radius of 0 – 3 Kms while 109 villages were in the radius of 3 – 10 Kms.

**Prophylaxis of cullers and health workers:** In addition to the field teams, medical teams attended the quarantine centers and gave prophylaxis to the cullers. Each culler was examined and if found to be suffering from any ailment, he was debarred from going for culling. All others were given Ostelamavir tablet which was supervised directly observed dose. We also gave them training regarding hand washing and personal protection. However, many of the cullers did not attend the evening camp. They were local people and so went home. This made our task more difficult and URI surveillance was scaled up by adding more teams from day 3. We informed the Sub Divisional Officer of Tehatta and the ARD personnel. Immediate measures were taken to trace them back. 100% prophylaxis of the cullers was achieved (Table 3).

**Table 3: Prophylaxis activity among cullers and health staff during avian influenza outbreak, Nadia, West Bengal, 2011**

Date	Examined			Prophylaxis given		
	Cullers	Health Workers	Hospital Staffs	Cullers	Health Workers	Hospital Staffs
21-Sep	304	19	0	303	0	0
22-Sep	354	149	0	354	0	0
23-Sep	314	167	3	314	9	3
24-Sep	306	312	3	306	8	3
25-Sep	306	311	3	306	8	3
26-Sep	278	468	3	278	8	3
27-Sep	0	0	0	0	0	0
28-Sep	46	453	12	46	8	3
29-Sep	0	408	3	0	8	3
30-Sep	0	408	0	0	8	0
01-Oct	0	504	9	0	8	3
02-Oct	0	453	0	0	8	0
03-Oct	0	408	0	0	8	0
04-Oct	0	648	0	0	8	0
05-Oct	0	408	0	0	8	0
06-Oct	0	408	0	0	8	0
07-Oct	0	408	0	0	0	0

Prophylaxis coverage was 100 percent

### Direct Observation

A team from NCDC visited the area and we accompanied that team to different areas of operation. It was found that there was poor threat perception among cullers and the villagers. Cullers were in close proximity of the villagers. Some villagers were aggressive. They perceived the whole operation as a loss to their backyard poultry. In the pits local people were freely mixing with the people responsible for operation. We found the people burying the carcasses did not wear PPE. A meeting was convened and all concerned were educated about the need for precautions. There was no logistic deficit. On the 26th of September, there was a large unrest when some villagers backed by some poultry owners stopped work, tried to dig out the carcasses from the pit and snatch away poultry. Force had to be used to restore law and order by the SDO.

In spite of all odds, culling was completed on 25th September, and mopping operation which follows culling and consists of finding and culling any left out poultry, was completed on 27th September 2011. Fever surveillance continued for another 10 days. There were no human cases reported. Fever surveillance activity was completed on 7th October 2011.

### Discussion

Due to preparedness well in advance, the response to the outbreak was prompt resulting in wrapping up of culling and mopping operation early. No human case was reported but it is impossible to conclude whether each and every member in the 0-3 Km zone was examined. This was because there was no bar on movement in the area by local residents. So, when the team visits the household, some members were out of

house. As there was no human case detected, people were not sensitised to the threats of avian influenza. They perceive this as a disease of the birds and thus are reluctant to adhere to containment measures.

The economic point of view of such an epidemic is also worth mentioning. Many experts argue whether 'stamping out' is a sound strategy in containing outbreak. Many birds and eggs may be smuggled out or consumed by the people fearing loss. It was evident even in this outbreak by the very small number of eggs destroyed. It was argued that avian influenza had become rampant due to extensive mechanised farming. In the event of an outbreak, these bigger farms are in a position to apply political and economic pressure on containment measures. Stamping out in these farms will take longer time and the infection is fast to spread once it enters such farms. The traditional backyard poultry was easy to contain and even if the infection enters, it was likely to die out after killing only a few birds. Moreover, the people who were poor and rear poultry in their backyard were the marginalised victims of such a procedure<sup>3,11</sup>.

In UK there were very stringent measures to maintain Biodiversity. Yet even there biosafety norms were flouted by the industry because it was almost impossible to adhere to it considering the size of the farm. For example a farm had 55000 poultry which were to be examined twice daily and vaccinated<sup>11-13</sup>.

In a poor country like India, one cannot expect the average poultry farmer to hand over his poultry to the cullers when the average turnover of the poultry industry is Rs. 20 billion in West Bengal alone. Sustainable measures for regulated farming maintaining all biosafety rules could be a better option.

Some experts say that migratory birds are the ones who bring avian influenza to the farm poultry. Some experts argue that before 2003, there was not a single death reported in the wild bird population. The evolution of the deadly H5N1 Clade 2 viruses was the result of farming where Rimantadine and Amantadine were given to the chicken to prevent H5N1. In the process, a virulent strain resistant to those drugs was born<sup>5,11</sup>.

### Recommendation

1. Constant IEC of the general public regarding food safety and personal safety.
2. Mechanised farming should have some regulatory mechanism which should be strictly followed.
3. People should be counselled to keep pets and poultry away from the residence.
4. Hand washing and hygiene particularly during handling and washing of poultry products should be promoted.
5. Vaccines are available. Feasibility of introducing them for poultry should be considered.
6. As per WHO guideline, introduction of pneumococcal vaccination in the routine immunization schedule can be considered.

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