



**WELCOME  
TO  
ONLINE TRAINING  
ON  
AVIAN INFLUENZA or BIRD FLU**  
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27-12-2020

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**AVIAN INFLUENZA or BIRD FLU**

Avian Influenza or Fowl Plaque, commonly known as Bird Flu, since 1<sup>st</sup> incident in Italy, 1878.

Avian Influenza affected almost all countries of the world with heavy loss to the poultry industry.

Finally in Feb'06 Avian Influenza officially found in India (Navapur, Maharashtra)

when

*Poultry industry appeared paralyzed for some time and Fear Psychosis of it's spread to human brought the industry to a virtual halt*

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**COST OF BIRD FLU EPIDEMICS IN POULTRY INDUSTRY**

Date/Location of Outbreak	Cost
1983/84 Pennsylvania, USA	17 million birds destroyed US\$ 350 million
1999/2000 Italy	14 million birds destroyed € 200 million
2003 Netherlands	30 million birds destroyed € 750 million
2004/05 Asia Countries	>120 million birds destroyed US\$ 10 – 15 billion
2008 W B, India	>18 million birds destroyed >US\$ 6 billion( INR 240 Crore )

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Cumulative number of confirmed human cases for avian influenza A(H5N1) reported to WHO, 2003-2020

Country	2003-2009* cases deaths	2010-2014* cases deaths	2015-2019* cases deaths	2020 cases deaths	Total cases deaths
Azerbaijan	8 25				8 25
Bangladesh	1	6 1	1		8 1
Cambodia	9 77	47 30			56 37
Canada		1 5			1 5
China	38 25	9 5	6 1		53 31
Djibouti	1				1
Egypt	80 27	120 50	149 43		349 120
Indonesia	162 134	35 31	3 3		200 168
Iran	3 2				3 2
Laos People's Democratic Republic	2 2			1	3 2
Myanmar	1				1
Nepal			1 1		1 1
Nigeria	1 1				1 1
Pakistan	3 11				3 11
Thailand	25 17				25 17
Turkey	12 4				12 4
Viet Nam	112 57	15 7			127 64
<b>Total</b>	<b>468 282</b>	<b>233 125</b>	<b>160 48</b>	<b>1</b>	<b>862 455</b>

\* 2003-2009, 2010-2014 and 2015-2019 total figures. Breakdowns by year available on subsequent tables.  
 † Total number of cases includes number of deaths.  
 ‡ WHO reports only laboratory-confirmed cases.  
 § All cases under 15 years of age.  
 Source: WHO/ISAP. Data as of 9 December 2020

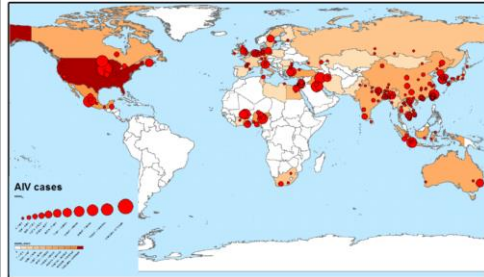


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**GLOBAL DISTRIBUTION OF AVIAN INFLUENZA VIRUS**



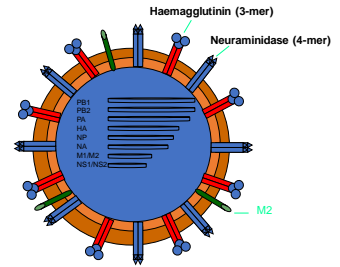
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**AVIAN INFLUENZA or BIRD FLU**

- AI is a fatal viral disease of wild & domestic birds including chickens characterized by extremely high mortality
- AI virus have been found from more than 90 species of birds
- Migratory birds, particularly ducks store more virus than others
- *Most infections do not produce clinical disease*



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**AVIAN INFLUENZA or BIRD FLU**

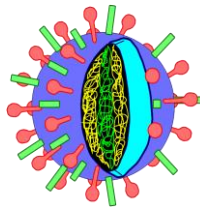
AI Virus is a RNA virus covered by 2 surface glycoproteins

- i) Rod shaped Haemagglutinin (HA) &
- ii) Mushroom shaped Neuraminidase (NA)

There are 16 diff HAs & 9 diff NAs

Each virus contains one HA & NA subtypes  
These all 144 subtypes are identified in birds

*Each subtypes differs in pathogenicity, ability to infect diff species & transmissibility*



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**AVIAN INFLUENZA VIRUS SURFACE ANTIGEN SUBTYPES**

Haemagglutinin:		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Human		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Equine																	
Swine		•	•														
Avian		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•

Neuraminidase:		1	2	3	4	5	6	7	8	9
Human		•	•							
Equine										
Swine		•	•							
Avian		•	•	•	•	•	•	•	•	•

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## AVIAN INFLUENZA HOST RANGE IN POULTRY



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## NATURAL RESERVOIRS OF AVIAN INFLUENZA VIRUS



*Wild  
Aquatic Birds;  
Ducks, Geese,  
Swans*

**Gulls, Terns & Shorebirds**

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## AVIAN INFLUENZA VIRUS TRANSMISSION

*Less of Air-borne, More of Man/Material carried in Character*

- Faeco - oral Route is most common after shedding of virus through faeces, saliva, nasal and lachrymal discharge
- Contaminated Eggs of infected Parents to chicks
- Transfer of infected birds from one shed to another & one farm to another
- Contaminated Shoes of Poultry Traffic
- Transfer of contaminated Equipment
- Broiler chicken vehicle carrying infections if not disinfected properly after carrying infected birds

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## NATURE OF AVIAN INFLUENZA DISEASE

Two pathotypes of AI viruses are demonstrated:

LPAI or Low Pathogenic Avian Influenza

&

HPAI or High Pathogenic Avian Influenza.

From the mortality patterns, symptoms & lesions, AI occurs in 4 diff forms:

1. Highly Virulent Form
2. Moderately Pathogenic Form
3. Mild Harmful
4. Asymptomatic Form

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**EXTREMELY HARMFUL OR HIGHLY VIRULENT FORM OF AI**



Infections of highly pathogenic H5 or H7 virus with morbidity & mortality almost 100%

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**MODERATELY HARMFUL FORM OF AI**



Moderately Pathogenic form by low pathogenic strain, associated with secondary infections involving 5 – 97% mortality, specially in young birds, laying hens & birds under stress

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**MILD HARMFUL FORM OF AI**



Mild Harmful Form by low pathogenic strain, associated with secondary infections involving up to 5% mortality, typically in older birds

Asymptomatic Form without any symptoms & mortality are common in wild birds

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**AVIAN INFLUENZA or BIRD FLU**

- > Initial outbreaks between 1901 – 61 involved mainly H7N1, H7N7, H5N9 & H5N3 subtypes which led to the wrong conclusion that all H5 & H7 AI viruses are highly pathogenic
- > Since 1971 numerous H5 & H7 low pathogenic virus have been isolated
- > All H1 – H4, H6 & H8 – H15 viruses are low pathogenic
- > Only a small % of H5 & H7 AI viruses are highly pathogenic
- > Recent Data shows Low Pathogenic H9 strains are very frequent globally and causing Huge Loss due to it's quickly changing Mutation capacity

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## AVIAN INFLUENZA or BIRD FLU

The usual incubation period is 3 days in naturally infected bird & up to 14 days in a commercial flock

The production of the disease, Incubation Period, Morbidity & Mortality% depends on

- Presence of Host /Reservoir Species
- Immune Status of the Chicken
- Environment (Stress)
- Species of Birds
- Age of Birds
- Dose of Virus

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## AVIAN INFLUENZA or BIRD FLU

Why Bird Flu is repeatedly coming in Winter? Or is AI a seasonal problem? & Why it is so common in WB? & Why it is a regular in Nepal & Bangladesh?

No, AI is not seasonal as noticed by me during last 14 years I can see this viral infection round the year. I feel, there is a continuous fight between Viral Antigenic Capacity & Chicken's Defence system

When the gap between these two shorten due to Extreme Climate like Heat, Cold or Increased virulency of already existing virus or Reduced Immune status of the Chicken or Overdose of Virus, the disease produces

During Summer/Monsoon, this virus is unable to produce Clinical Disease with high mortality due to it's reduced Genetic potential in hot climate but virus can be noticed from post mortem in low mortality farms.

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## AVIAN INFLUENZA or BIRD FLU

The symptoms (dry cough, mild rales, conjunctivitis, slow mortality) & Lesions (Tracheitis without exudate, haemorrhagic Proventricular papillae, etc) are like Mild Pathogenic form but I strongly feel this is with same virus with reduced genetic potential.

Otherwise, where are those HPAI viruses in summer?

From where it comes every year, if not existed in the area?

Why only huge mortality like HPAI in winter?

- AI does not comes from other area every year.
- The virus is very much present round the year in all poultry areas, not only India but in Bangladesh & Nepal. No country is free from AI, even developed nations like EU, Japan, China, USA, Korea, etc.

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## WHY AVIAN INFLUENZA COMING REPEATEDLY???

Why AI is so common in WB (we accept or not)?

The virus is continuously improving it's antigenic capacity to sustain against human threat (Survival of the fittest)

But, We are doing nothing:

- Vaccines only against H5 & H9 are only available. No vaccine against other existing serotypes. **NO VACCINES IN INDIA, Bangladesh have some**
- ZERO BIOSECURITY**
  - Zero Poultry Traffic control
  - Winter > Migratory Birds in SE Asian Waterbodies > Domestic Duck > Country Chicken > Poultry Chicken
  - Sale of Dead and/or infected birds to spread disease
  - Lack of awareness due to inactive concerned professional  
The Virus is growing without much resistance

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### WHY AVIAN INFLUENZA IS LIKE A WINTER FAIR???

- Presence of Natural Host like Duck & Country Chicken
- Absence of Biosecurity Concept; Spreading disease by selling dead/Live infected birds instead of disposal
- Zero Hygiene Concept – people does not care about their own health and we, the poultry Vets are trying to educate people about chicken's health maintenance
- Poor infrastructure to counter such dreaded disease
- Poor Brooding practice in winter giving stress to new born chicks resulting in to Unevenness, immuno-suppression favouring entry of virus
- Increased antigenicity of existing virus

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### LAST HP AI FARM VISITED BY THE AUTHOR



HPAI, Sainthia, WB, India dt 23 Dec 2019:  
 100% morbidity, 60% mortality in 48  
 hours, started 24th day age. Balance  
 birds were Prosthetic and died next day



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### AVIAN INFLUENZA VIRUS INACTIVATION

- AIV are not hardy; killed/inactivated by heat, drying, UV light & Chemical disinfectants e.g. Sodium Hypochlorite, Phenolic Compounds, Quaternary Ammonium compounds, Iodine compounds, Formalin & other Aldehydes
- AIV inactivated within 6 days in field manure at an ambient Temp (approx. 15°C) condition (Lu et al., 2003)
- AIV (H7N2) loss infectivity in 24 hours under 30 – 37°C & less than a week under 15 – 20°C Temp (Lu at al. 2003)

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### SYMPTOMS OF AVIAN INFLUENZA



The symptoms are extremely variable & depends on

- Species
- Sex
- Age
- Immunity status
- Associated secondary infections
- Environmental factors



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**LOW PATHOGENIC AVIAN INFLUENZA IN CHICKEN**

Respiratory signs of coughing, sneezing, abnormal **Respiratory Sounds (Rales)**, & ocular discharges



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- Layers & Breeders show increased broodiness & reduced Egg production
- Huddling
- Ruffled Feathers
- Depression
- Decreased Activity
- Reduced Feed & Water intake
- Occasional Diarrhea

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**HIGH PATHOGENIC AVIAN INFLUENZA IN CHICKEN**



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- In wild birds & ducks, HPAI virus grows poorly and produces no symptoms
- In chickens, symptoms depends on damage to specific organs/tissues
- **NOT ALL SYMPTOMS ARE PRESENT IN EVERY BIRD**
- Some birds found dead without showing any signs
- In severe cases 100% birds die in 48 - 72 hours

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**HIGH PATHOGENIC AVIAN INFLUENZA IN CHICKEN**



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**100% Mortality in 48 hours**

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**HIGH PATHOGENIC AVIAN INFLUENZA IN CHICKEN**



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**Huddling**

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**HIGH PATHOGENIC AVIAN INFLUENZA IN CHICKEN**



**Conjunctivitis & Head Swelling**

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**HIGH PATHOGENIC AVIAN INFLUENZA IN CHICKEN**



**Neurological Sign**

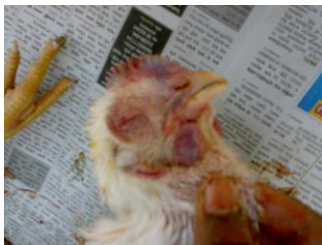
**Respiratory Sign; Rales, sneezing, nasal discharge**

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**HIGH PATHOGENIC AVIAN INFLUENZA IN CHICKEN**



**Swollen Cyanotic Comb & Wattle**

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**HIGH PATHOGENIC AVIAN INFLUENZA IN CHICKEN**



**Depression; typical posture**

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**HIGH PATHOGENIC AVIAN INFLUENZA IN CHICKEN**



**Cyanosis of Shank**  
(Subcutaneous Haemorrhage)

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**HIGH PATHOGENIC AVIAN INFLUENZA IN CHICKEN**



**Muscle**  
**Haemorrhages**

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**HIGH PATHOGENIC AVIAN INFLUENZA IN CHICKEN**



**Haemorrhagic Trachea with**  
**subcutaneous haemorrhages**

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**HIGH PATHOGENIC AVIAN INFLUENZA IN CHICKEN**



**Petechial hemorrhages**  
**of serosal surface**  
**(epicardium of the heart)**

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**HIGH PATHOGENIC AVIAN INFLUENZA IN CHICKEN**



Petechial hemorrhages on the serosal surfaces of Proventriculus , Gizzard. Mesenteries & Small Intestines are Haemorrhagic



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**HIGH PATHOGENIC AVIAN INFLUENZA IN CHICKEN**



Patchy Haemorrhages & Button Ulcers all over intestinal epithelium

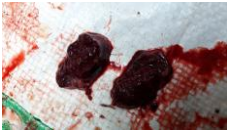


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**HIGH PATHOGENIC AVIAN INFLUENZA IN CHICKEN**



Hemorrhagic Organs



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**HIGH PATHOGENIC AVIAN INFLUENZA IN CHICKEN**



Hemorrhages on Proventriculus & Gizzard surface 2012

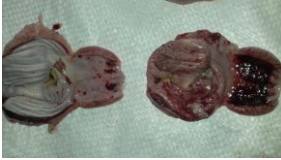


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**HIGH PATHOGENIC AVIAN INFLUENZA IN CHICKEN**



Hemorrhages on Proventriculus & Gizzard surface 2017

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**HIGH PATHOGENIC AVIAN INFLUENZA IN CHICKEN**



Hemorrhagic Proventriculus & Gizzard 2018



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**HIGH PATHOGENIC AVIAN INFLUENZA IN CHICKEN**



Hemorrhagic Proventriculus & Gizzard 2019

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**HIGH PATHOGENIC AVIAN INFLUENZA IN CHICKEN**



Caecal Tonsils

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**HIGH PATHOGENIC AVIAN INFLUENZA IN CHICKEN**



**Ulcers & Sluffing of intestinal wall**

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**HIGH PATHOGENIC AVIAN INFLUENZA IN CHICKEN**

11/12/20 Sukumar Chakraborty

Date	Age	Mortality	Feed Intake		Cum Feed		Body Wt (gm)	FCR	Medicine / Vaccine	Feed Reg.
			Std	Actual	Std	Actual				
11/12/20	1	0	11.12	11	111.2	11	0.94			
12/12/20	2	0	11.12	22	222.4	22	0.94			
13/12/20	3	0	11.12	33	333.6	33	0.94			
14/12/20	4	0	11.12	44	444.8	44	0.94			
15/12/20	5	0	11.12	55	556.0	55	0.94			
16/12/20	6	0	11.12	66	667.2	66	0.94			
17/12/20	7	0	11.12	77	778.4	77	0.94			
18/12/20	8	0	11.12	88	889.6	88	0.94			
19/12/20	9	0	11.12	99	1000.8	99	0.94			
20/12/20	10	0	11.12	110	1112.0	110	0.94			
21/12/20	11	0	11.12	121	1223.2	121	0.94			
22/12/20	12	0	11.12	132	1334.4	132	0.94			
23/12/20	13	0	11.12	143	1445.6	143	0.94			
24/12/20	14	0	11.12	154	1556.8	154	0.94			
25/12/20	15	0	11.12	165	1668.0	165	0.94			
26/12/20	16	0	11.12	176	1779.2	176	0.94			
27/12/20	17	0	11.12	187	1890.4	187	0.94			
28/12/20	18	0	11.12	198	2001.6	198	0.94			
29/12/20	19	0	11.12	209	2112.8	209	0.94			
30/12/20	20	0	11.12	220	2224.0	220	0.94			
31/12/20	21	0	11.12	231	2335.2	231	0.94			
1/1/21	22	0	11.12	242	2446.4	242	0.94			
2/1/21	23	0	11.12	253	2557.6	253	0.94			
3/1/21	24	0	11.12	264	2668.8	264	0.94			
4/1/21	25	0	11.12	275	2780.0	275	0.94			
5/1/21	26	0	11.12	286	2891.2	286	0.94			
6/1/21	27	0	11.12	297	3002.4	297	0.94			
7/1/21	28	0	11.12	308	3113.6	308	0.94			
8/1/21	29	0	11.12	319	3224.8	319	0.94			
9/1/21	30	0	11.12	330	3336.0	330	0.94			
10/1/21	31	0	11.12	341	3447.2	341	0.94			
11/1/21	32	0	11.12	352	3558.4	352	0.94			
12/1/21	33	0	11.12	363	3669.6	363	0.94			
13/1/21	34	0	11.12	374	3780.8	374	0.94			
14/1/21	35	0	11.12	385	3892.0	385	0.94			
15/1/21	36	0	11.12	396	4003.2	396	0.94			
16/1/21	37	0	11.12	407	4114.4	407	0.94			
17/1/21	38	0	11.12	418	4225.6	418	0.94			
18/1/21	39	0	11.12	429	4336.8	429	0.94			
19/1/21	40	0	11.12	440	4448.0	440	0.94			
20/1/21	41	0	11.12	451	4559.2	451	0.94			
21/1/21	42	0	11.12	462	4670.4	462	0.94			
22/1/21	43	0	11.12	473	4781.6	473	0.94			
23/1/21	44	0	11.12	484	4892.8	484	0.94			
24/1/21	45	0	11.12	495	5004.0	495	0.94			
25/1/21	46	0	11.12	506	5115.2	506	0.94			
26/1/21	47	0	11.12	517	5226.4	517	0.94			
27/1/21	48	0	11.12	528	5337.6	528	0.94			
28/1/21	49	0	11.12	539	5448.8	539	0.94			
29/1/21	50	0	11.12	550	5560.0	550	0.94			
30/1/21	51	0	11.12	561	5671.2	561	0.94			
31/1/21	52	0	11.12	572	5782.4	572	0.94			
1/2/21	53	0	11.12	583	5893.6	583	0.94			
2/2/21	54	0	11.12	594	6004.8	594	0.94			
3/2/21	55	0	11.12	605	6116.0	605	0.94			
4/2/21	56	0	11.12	616	6227.2	616	0.94			
5/2/21	57	0	11.12	627	6338.4	627	0.94			
6/2/21	58	0	11.12	638	6449.6	638	0.94			
7/2/21	59	0	11.12	649	6560.8	649	0.94			
8/2/21	60	0	11.12	660	6672.0	660	0.94			
9/2/21	61	0	11.12	671	6783.2	671	0.94			
10/2/21	62	0	11.12	682	6894.4	682	0.94			
11/2/21	63	0	11.12	693	7005.6	693	0.94			
12/2/21	64	0	11.12	704	7116.8	704	0.94			
13/2/21	65	0	11.12	715	7228.0	715	0.94			
14/2/21	66	0	11.12	726	7339.2	726	0.94			
15/2/21	67	0	11.12	737	7450.4	737	0.94			
16/2/21	68	0	11.12	748	7561.6	748	0.94			
17/2/21	69	0	11.12	759	7672.8	759	0.94			
18/2/21	70	0	11.12	770	7784.0	770	0.94			
19/2/21	71	0	11.12	781	7895.2	781	0.94			
20/2/21	72	0	11.12	792	8006.4	792	0.94			
21/2/21	73	0	11.12	803	8117.6	803	0.94			
22/2/21	74	0	11.12	814	8228.8	814	0.94			
23/2/21	75	0	11.12	825	8340.0	825	0.94			
24/2/21	76	0	11.12	836	8451.2	836	0.94			
25/2/21	77	0	11.12	847	8562.4	847	0.94			
26/2/21	78	0	11.12	858	8673.6	858	0.94			
27/2/21	79	0	11.12	869	8784.8	869	0.94			
28/2/21	80	0	11.12	880	8896.0	880	0.94			
29/2/21	81	0	11.12	891	9007.2	891	0.94			
30/2/21	82	0	11.12	902	9118.4	902	0.94			
31/2/21	83	0	11.12	913	9229.6	913	0.94			
1/3/21	84	0	11.12	924	9340.8	924	0.94			
2/3/21	85	0	11.12	935	9452.0	935	0.94			
3/3/21	86	0	11.12	946	9563.2	946	0.94			
4/3/21	87	0	11.12	957	9674.4	957	0.94			
5/3/21	88	0	11.12	968	9785.6	968	0.94			
6/3/21	89	0	11.12	979	9896.8	979	0.94			
7/3/21	90	0	11.12	990	10008.0	990	0.94			
8/3/21	91	0	11.12	1001	10119.2	1001	0.94			
9/3/21	92	0	11.12	1012	10230.4	1012	0.94			
10/3/21	93	0	11.12	1023	10341.6	1023	0.94			
11/3/21	94	0	11.12	1034	10452.8	1034	0.94			
12/3/21	95	0	11.12	1045	10564.0	1045	0.94			
13/3/21	96	0	11.12	1056	10675.2	1056	0.94			
14/3/21	97	0	11.12	1067	10786.4	1067	0.94			
15/3/21	98	0	11.12	1078	10897.6	1078	0.94			
16/3/21	99	0	11.12	1089	11008.8	1089	0.94			
17/3/21	100	0	11.12	1100	11120.0	1100	0.94			

**Mortality Pattern**

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**HIGH PATHOGENIC AVIAN INFLUENZA IN CHICKEN**

18/12/20 Sukumar Chakraborty

Date	Age	Mortality	Feed Intake		Cum Feed		Body Wt (gm)	FCR	Medicine / Vaccine	Feed Reg.
			Std	Actual	Std	Actual				
18/12/20	1	0	11.12	11	111.2	11	0.94			
19/12/20	2	0	11.12	22	222.4	22	0.94			
20/12/20	3	0	11.12	33	333.6	33	0.94			
21/12/20	4	0	11.12	44	444.8	44	0.94			
22/12/20	5	0	11.12	55	556.0	55	0.94			
23/12/20	6	0	11.12	66	667.2	66	0.94			
24/12/20	7	0	11.12	77	778.4	77	0.94			
25/12/20	8	0	11.12	88	889.6	88	0.94			
26/12/20	9	0	11.12	99	1000.8	99	0.94			
27/12/20	10	0	11.12	110	1112.0	110	0.94			
28/12/20	11	0	11.12	121	1223.2	121	0.94			
29/12/20	12	0	11.12	132	1334.4	132	0.94			
30/12/20	13	0	11.12	143	1445.6	143	0.94			
31/12/20	14	0	11.12	154	1556.8	154	0.94			
1/1/21	15	0	11.12	165	1668.0	165	0.94			
2/1/21	16	0	11.12	176	1779.2	176	0.94			
3/1/21	17	0	11.12	187	1890.4	187	0.94			
4/1/21	18	0	11.12	198	2001.6	198	0.94			
5/1/21	19	0	1							

## TREATMENT OF AVIAN INFLUENZA

- There is no satisfactory treatment
- Antiviral VIRKON S @ 2gm/lit water with Electrolytes help reduces loss in LP AI
- In HP AI if Virkon S started early, it may be help reducing mortality
- VIRKON S spray daily prevents horizontal spread of the disease
- Supportive therapy with Vit AD3EC, Iron Tonic & Immunostimulant like  $\beta$  Glucan may be helpful

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## CONTROL OF AVIAN INFLUENZA

- Very Difficult
  - No country done it so far
  - No Short-cut Answer
  - But we can Minimize the Loss
  - The Govt needs to make regulations (already there as per WHO)
  - Need is Implementation by Administration with specific objective of controlling AI
  - The Govt Veterinarians shall implement the regulations & create Awareness in respective areas
  - The Poultry Veterinarians need to take lead by creating Task Forces which shall deal all incidents by visiting the site war footedly
  - The poultry industry need to extend full cooperation with Veterinarians and sacrifice some short term gain
- Because there is
- No successful vaccines so far
  - Biosecurity is the only Way-Out

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## WHAT WE NEED TO DO TO CONTROL AVIAN INFLUENZA?

- REDUCE Existing Viral Load of the area through Year round Program involving all concern
- PREVENT ENTRY of Virus in Poultry Production area
- PREVENT SPREAD of Virus through Scientific DISPOSAL of Dead & Live Infected Birds
- Strict VIGILANCE on outbreak of AI in the respective area and Surveillance /Isolation /Culling /Disposal /Sanitation as per norms of WHO/FAO
- Create Awareness among rural small farmer and poultry fraternity about the disease and their possible control

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## WHAT WE NEED TO DO TO CONTROL AVIAN INFLUENZA?

### VIGILANCE on AI outbreak in the area and Surveillance /Isolation /Culling /Disposal per WHO

- Be Alert & informed about any abnormal mortality of any bird in your area
- Visit the area immediately, inform the people concern inside & outside of your office



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**WHAT WE NEED TO DO TO CONTROL AVIAN INFLUENZA?**

- Collect and Send Organ & Blood samples to concerned Laboratory
- Immediate Surveillance, Isolation of the area, Restriction of Bird movement, Culling of birds as advised by WHO
- Need Ownership & Professional Action from Veterinarian concerned, not the wait for Administrative and/or Political decision

The VIRUS is very Smart  
Will not allow us to Control themselves  
**unless we start doing Honest Job**

# THANK YOU

<https://sites.google.com/view/drbaichandradutta/home>