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AVIAN INFLUENZA

Avian Influenza or Fowl Plaque, commonly known as Bird Flu, since 1st incident in Italy, 1878

AI 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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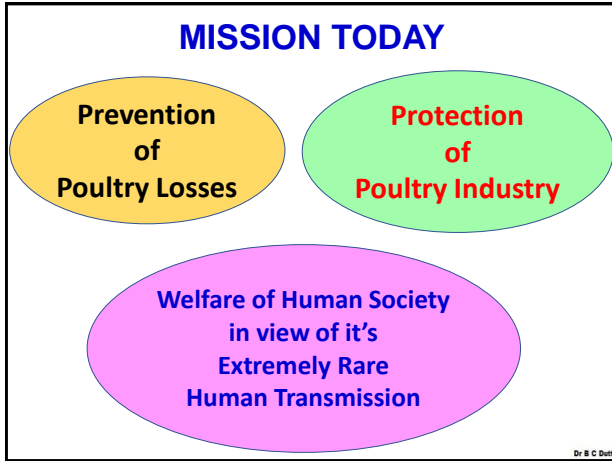
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Cost of AI epidemics in Poultry Industry

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(Rs 240 Crore)

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Cumulative number of confirmed human cases for avian influenza A(H5N1) reported to WHO, 2003-2019

Country	2003-2009		2010-2014*		2015		2016		2017		2018		2019		Total	
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
Azerbaijan	8	5	0	0	0	0	0	0	0	0	0	0	0	0	8	5
Bangladesh	1	0	6	1	1	0	0	0	0	0	0	0	0	0	8	1
Cambodia	9	7	47	30	0	0	0	0	0	0	0	0	0	0	56	37
Canada	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	1
China	38	25	9	5	6	1	0	0	0	0	0	0	0	0	53	31
Djibouti	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Egypt	90	27	120	50	136	39	90	3	3	1	0	0	0	0	359	120
Indonesia	162	134	35	31	2	2	0	0	1	1	0	0	0	0	200	168
Iran	3	2	0	0	0	0	0	0	0	0	0	0	0	0	3	2
Lao People's Democratic Republic	2	2	0	0	0	0	0	0	0	0	0	0	0	0	2	2
Myanmar	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Nepal	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
Nigeria	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Pakistan	3	1	0	0	0	0	0	0	0	0	0	0	0	0	3	1
Thailand	25	17	0	0	0	0	0	0	0	0	0	0	0	0	25	17
Turkey	12	4	0	0	0	0	0	0	0	0	0	0	0	0	12	4
Viet Nam	112	57	15	7	0	0	0	0	0	0	0	0	0	0	127	64
Total	468	282	233	125	145	42	10	3	4	2	0	0	1	1	861	455

* 2003-2009 total figures. Breakdowns by year available on subsequent slides.
 ** 2010-2014 total figures. Breakdowns by year available on subsequent slides.
 Total number of cases includes number of deaths.
 WHO reports only laboratory cases.
 All data here is final or final.
 Source: WHO GIP, data in WHO as of 23 November 2019.

World Health Organization

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A I is a fatal viral disease of wild & domestic birds including chickens characterized by extremely high mortality

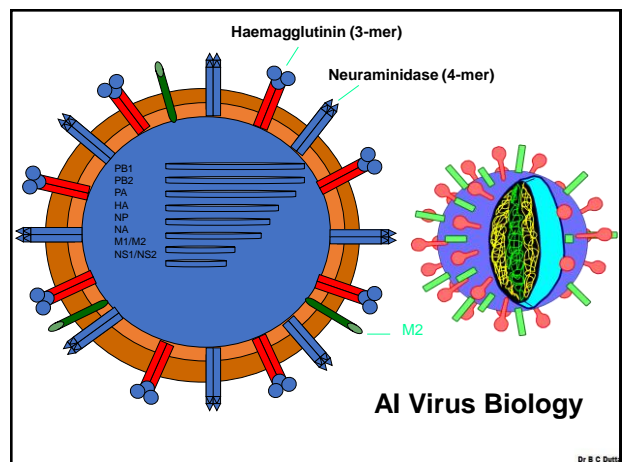
AI virus have been found from more than 90 species of birds

Migratory birds, particularly ducks store more virus than others

Most infections do not produce clinical disease

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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

There are all 144 subtypes which are identified in birds

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

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Influenza Virus Surface Antigen Subtype

Haemagglutinin:

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

Neuraminidase:

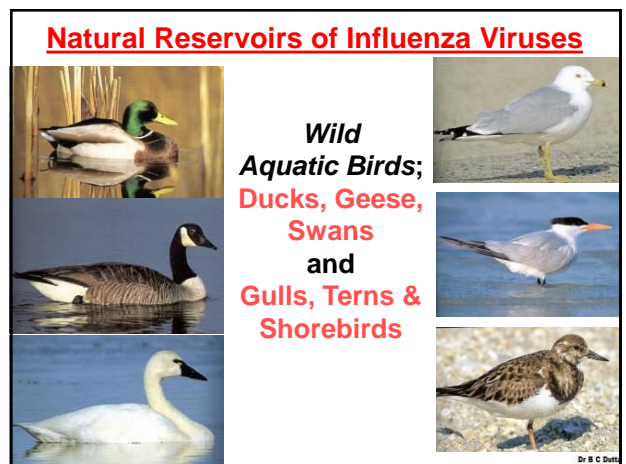
	1	2	3	4	5	6	7	8	9
Human	•	•							
Equine							•	•	
Swine	•	•							
Avian	•	•	•	•	•	•	•	•	•

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TRANSMISSION

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

1. **Faeco-oral route is most common after shedding of virus through faeces, saliva, nasal and lachrymal discharge**
2. **Contaminated Eggs of infected Parents to chicks**
3. **Transfer of infected birds from one shed to another & one farm to another**
4. **Contaminated Shoes**
5. **Transfer of contaminated equipment**
6. **Broiler chicken vehicle carry infections if not disinfected properly after carrying infected birds**

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NATURE OF THE DISEASE

Two pathotypes of AI viruses are demonstrated:
LPAI or Low Pathogenic Avian Influenza
 &
HPAI or High Pathogenic Avian Influenza.

But 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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Mild Harmful form by Low Pathogenic Virus up to 5% mortality, typically in older birds.



Asymptomatic form without any symptoms & mortality, common in wild birds

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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

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

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

1. Presence of Host /Reserver Species
2. **Virulency of Virus**
3. Immune Status of the Chicken
4. **Environment (Stress)**
5. Species of Birds
6. **Age of Birds**
7. Dose of Virus

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Let's discuss

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 24 Parg N & S (like Jagatdhatri Puja of Chandanagar and Gangasagar Mela of Sagar Island?)

No, AI is not seasonal as noticed during last 13 years

I see the virus 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

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In WB 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.

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?

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AI does not appears every year. The virus is very much present round the year in all poultry areas, not only WB but all parts of India. No country is free from AI, even developed nations like EU, Japan, China, USA, Korea, etc.

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**

II) 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 AI is annual Winter Fear in 24 Parg N & S?

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

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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 hrs under 30 – 37°C & less than a week under 15 – 20°C temperatures (Lu et al. 2003)

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SYMPTOMS

The symptoms of AI are extremely variable and depends on species, sex, age, immunity status, associated secondary infections, environmental factors, etc

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LP AI in Chickens

Respiratory signs of coughing, sneezing, abnormal **respiratory sounds (rales)**, & ocular discharges

- × Layers & Breeders show increased broodiness & reduced egg production
- × **Huddling**
- × **Ruffled feathers**
- × **Depression**
- × **Decreased activity**
- × **Reduced feed & water intake**
- × **Occasional diarrhea**

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Symptoms of H P A I

In wild birds & ducks, HPAI virus grows poorly and produces no symptoms

In chickens, symptoms depends on damage to specific organs/tissues

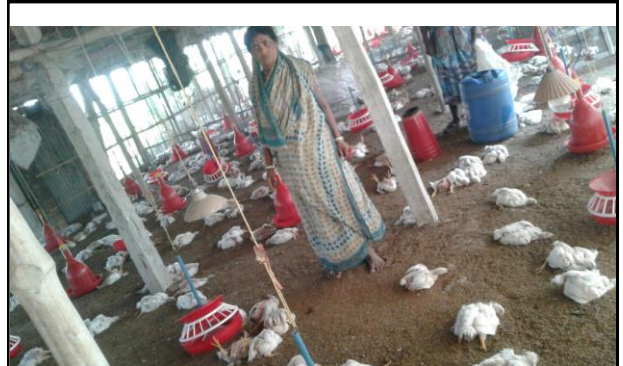
NOT ALL SYMPTOMS ARE PRESENT IN EVERY BIRD

Some birds found dead without showing any signs

In severe cases 100% birds die in 72 hours

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100% Mortality in 48 hours

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100% Mortality in 48 hours

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HUDDLING

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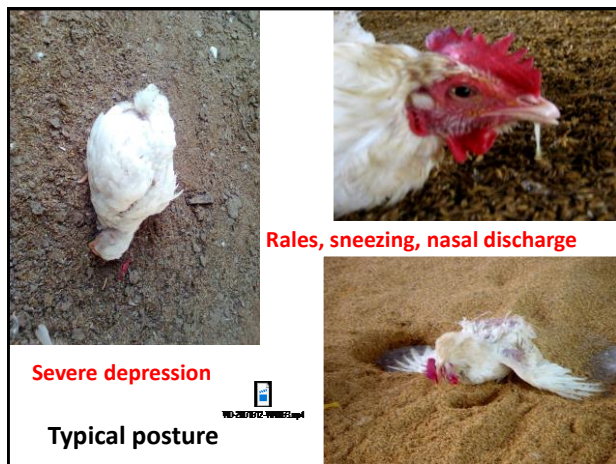
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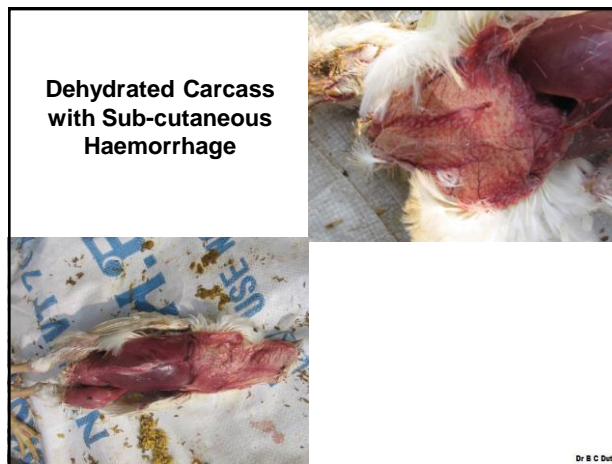
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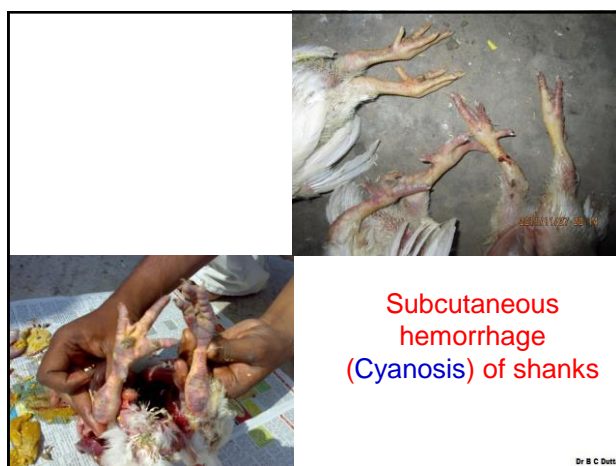
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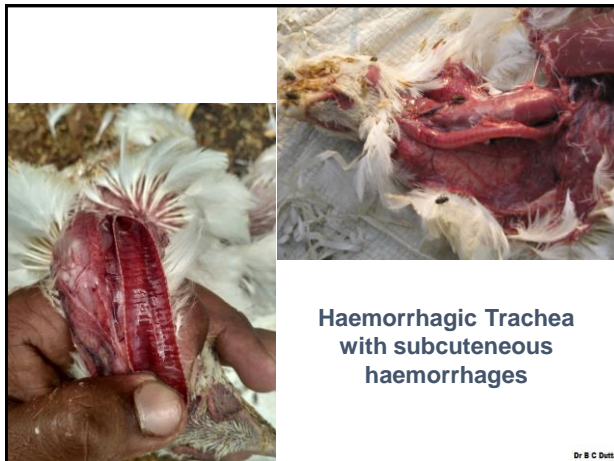
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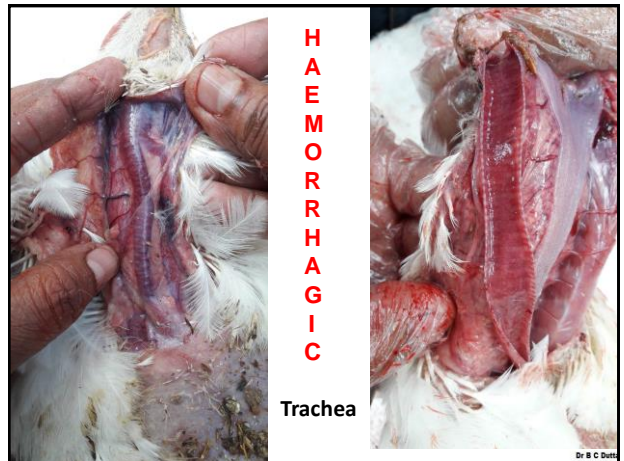
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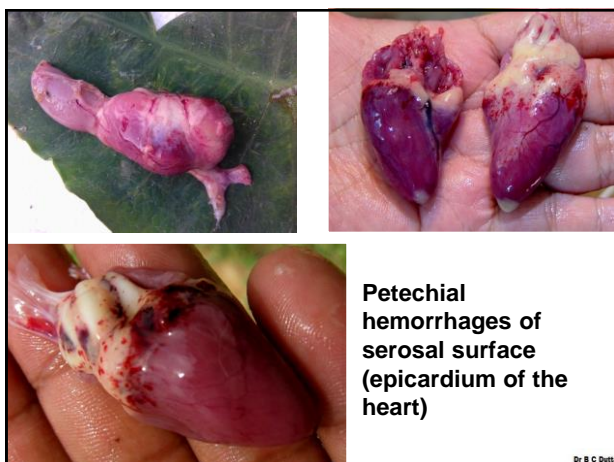
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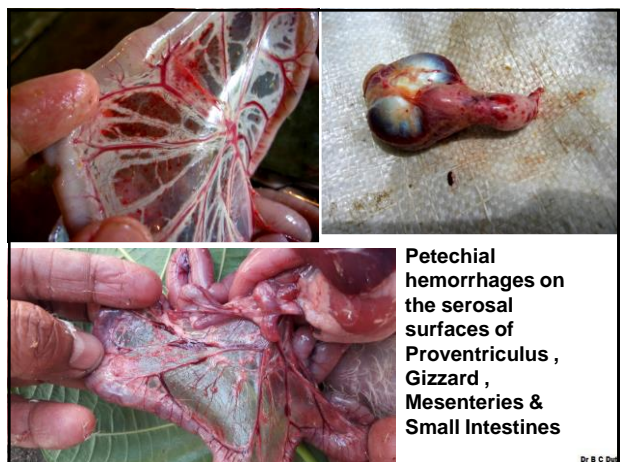
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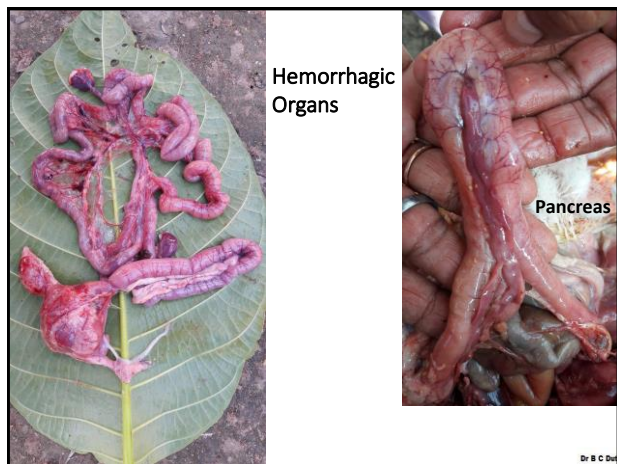
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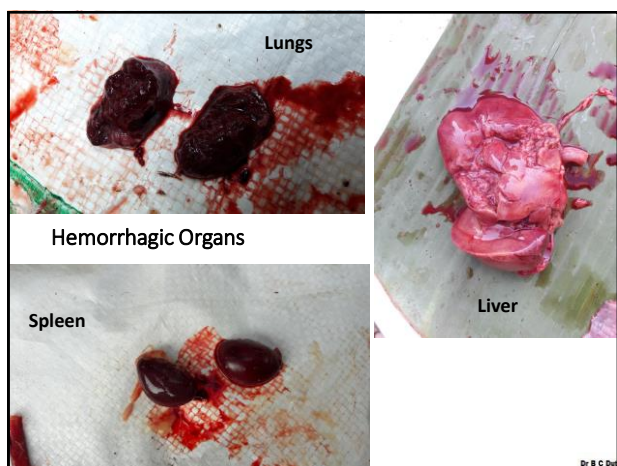
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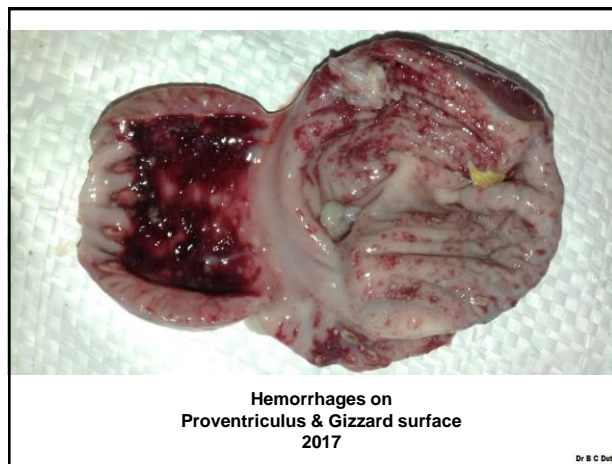
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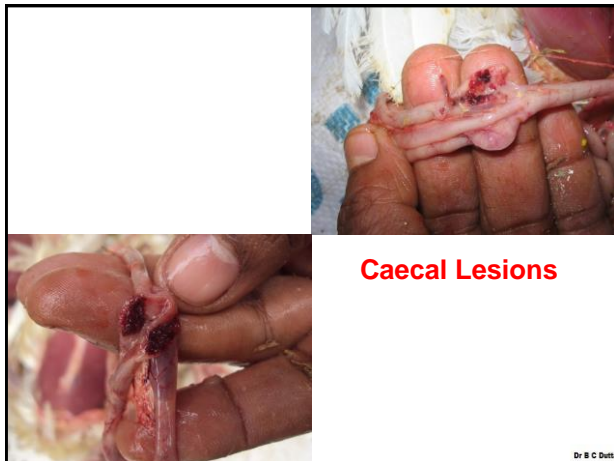
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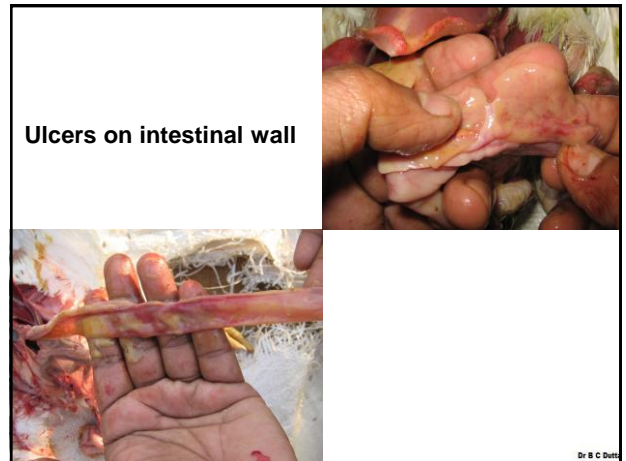
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	ND	IBD	IB	AI	CRD	Pox	Coryza	Aspergilosis
Coughing	+			+	+	+		
Sneezing	+			+	+	+	+	
Head shaking	+			+	+	+	+	
Rales	+	+	+	+	+	+	+	
Gasping	+	+	+	+	+	+		+
Eye discharge	+	+	+	+	+	+	+	
Nasal discharge	+	+	+	+	+		+	
Head Swelling	+			+	+		+	
Blue discoloration	+			+	+			+
Reduced growth	+	+		+	+	+	+	
General Diarrhoea	+	+		+	+		+	
Green Diarrhoea	+			+				
Paralysis								+
Head/Neck Twisting	+							+
Conjunctivitis	+			+			+	
Prostration	+	+		+	+			

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1196 rd Sukumar shakla DAILY CARD

Date	Age	Mortality		Feed Intake		Cum Feed		Body Wt (gm)		FCR	Medicine / Vaccine	Feed Kg					
		Daily	Total	Std	Actual	Std	Actual	Min	Actual			Std	Actual	Recd	Cons	Stock	
0	0																
1/12	1	2	2	12	12	11	55	50	0.24		1120-120-V	200	20	230			
1/12	2	2	4	13	14	27	108	83	0.43		1120-V	200	20	230			
1/12	3	1	5	19	19	48	167	80	0.58		1120-V	200	20	230			
2/12	4	1	6	23	23	69	236	108	0.64		1120-V	200	20	230			
2/12	5	6	11	27	27	96	332	130	0.74		1120-V	200	20	230			
2/12	6	7	18	34	34	126	458	158	0.81		1120-V	200	20	230			
2/12	7	9	27	43	43	160	618	182	0.88		1120-V	200	20	230			
				160													
24-2	8	2	29	37	37	197	815	212	0.93		1120-V	200	20	230			
24-2	9	1	30	41	41	238	1053	248	0.97		1120-V	200	20	230			
24-2	10	1	31	46	46	280	1333	281	1.01		1120-V	200	20	230			
24-2	11	1	32	50	50	333	1766	320	1.04		1120-V	200	20	230			
24-2	12	1	33	55	55	388	2154	360	1.07		1120-V	200	20	230			
24-2	13	1	34	60	60	446	2599	407	1.10		1120-V	200	20	230			
24-2	14	2	36	65	67	513	3112	456	1.13		1120-V	200	20	230			
				353													
24-2	15	2	38	70	72	583	3695	505	1.15		1120-V	200	20	230			
24-2	16	3	41	75	78	658	4353	558	1.18		1120-V	200	20	230			
24-2	17	4	45	80	84	738	5091	613	1.20		1120-V	200	20	230			
24-2	18	2	47	85	87	823	5914	670	1.23		1120-V	200	20	230			
24-2	19	3	50	91	94	914	6828	731	1.25		1120-V	200	20	230			
24-2	20	2	52	97	99	1011	7839	793	1.27		1120-V	200	20	230			
24-2	21	1	53	100	101	1114	8953	867	1.30		1120-V	200	20	230			

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1875 Yesuddin Mandal

2872 Samkar mal

DAILY CARD									
Date	Age	Daily Mortality	Feed Intake		Cum Feed		Body Weight		Mortality
			Star	Actual	Star	Actual	Star	Actual	
1872	1	0	12	11	12	11	11	11	0.94
1873	2	0	15	15	27	26	15	15	1.00
1874	3	0	18	18	45	45	18	18	1.00
1875	4	0	23	23	68	68	23	23	1.00
1876	5	0	27	27	95	95	27	27	1.00
1877	6	0	30	30	125	125	30	30	1.00
1878	7	0	34	34	160	160	34	34	1.00
1879	8	0	37	37	197	197	37	37	1.00
1880	9	0	41	41	238	238	41	41	1.00
1881	10	0	45	45	283	283	45	45	1.00
1882	11	0	50	50	333	333	50	50	1.00
1883	12	0	55	55	388	388	55	55	1.00
1884	13	0	60	60	448	448	60	60	1.00
1885	14	0	65	65	513	513	65	65	1.00
1886	15	0	70	70	583	583	70	70	1.00
1887	16	0	75	75	658	658	75	75	1.00
1888	17	0	80	80	738	738	80	80	1.00
1889	18	0	85	85	823	823	85	85	1.00
1890	19	0	90	90	913	913	90	90	1.00
1891	20	0	95	95	1008	1008	95	95	1.00
1892	21	0	100	100	1108	1108	100	100	1.00
1893	22	0	105	105	1213	1213	105	105	1.00
1894	23	0	110	110	1323	1323	110	110	1.00
1895	24	0	115	115	1438	1438	115	115	1.00
1896	25	0	120	120	1558	1558	120	120	1.00
1897	26	0	125	125	1683	1683	125	125	1.00
1898	27	0	130	130	1813	1813	130	130	1.00
1899	28	0	135	135	1948	1948	135	135	1.00
1900	29	0	140	140	2088	2088	140	140	1.00
1901	30	0	145	145	2233	2233	145	145	1.00

Mortality Pattern

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TREATMENT

There is no satisfactory treatment

Antiviral VIRKON S @ 2gm/lit water with Electrolytes if started early may be helpful

VIRKON S spray daily prevents horizontal spread of the disease

Supportive therapy with Vit AD₃EC
Immunostimulant like β 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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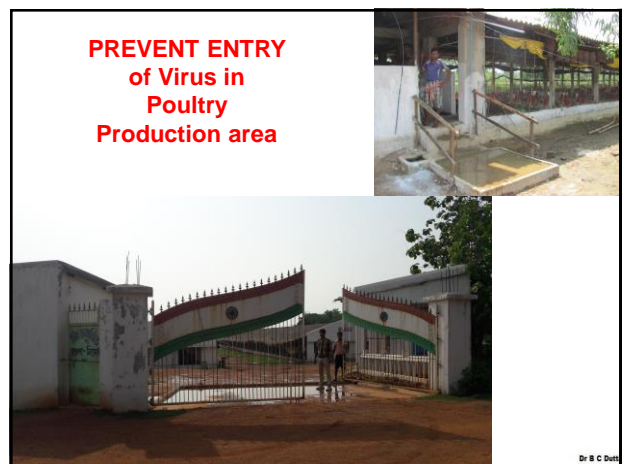
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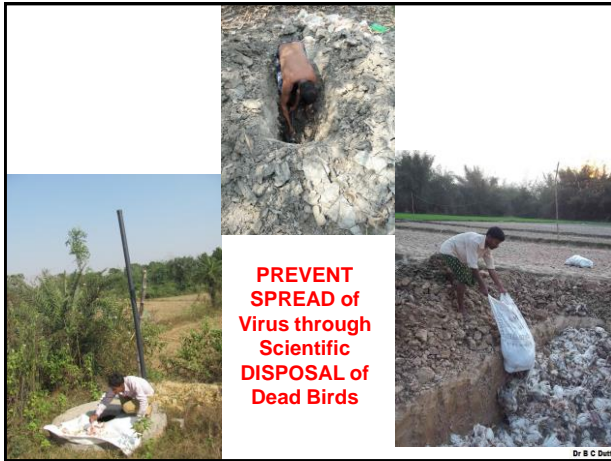
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VIGILANCE on AI outbreak in the area and Surveillance /Isolation /Culling /Disposal per WHO

- **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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- **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**

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