

Avian Influenza and Bangladesh

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The 5th OIE Regional Meeting on Strengthening Animal Health
Information Networking for HPAI control and Prevention in Asia
Hanoi, Vietnam, 2-3 October 2012

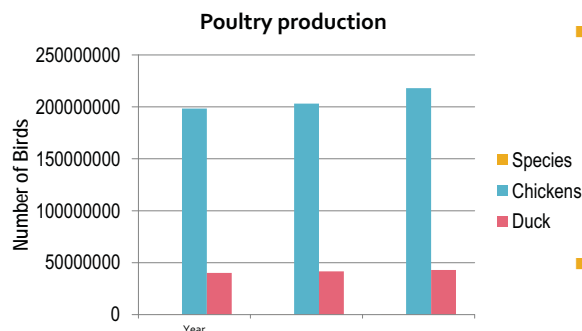
1.1 Farms by production sector

- Most poultry farms are classified as sector 3 or 4
- All commercial chicken farmers source chicks from breeding farms through agents. Some ducks are also hatched in breeding farms.
- Ducks are generally kept free range. There are also free range chicken.
- Free roaming migratory ducks are present in winter

Category	No. of farms	No. of poultry		
		Chicken	Ducks	Other
Sector – 1	348	4,716,100		
Sector – 2	6,950	26,890,470	100,000	
Sector – 3	41,353	33,117,987		unknown
Sector – 4		95,800,000	45,000,000	unknown
TOTAL				

* In government level, 10 duck breeding farms are there.

1.1 Poultry production



- Growth is slow due to many factors including avian influenza and feed costs
- Demand for poultry products remains high

Species	Year		
	2009	2010	2011
Chickens	198,417,000	203,184,000	218,072,000
Duck	40,171,000	41,537,000	42,949,000
TOTAL	238,588,000	244,721,000	261,021,000

1.2-3 Challenges and Good practices

1.2 MAIN PROBLEMS/CHALLENGES

- Biosecurity practices and status at the farm level
- Uncontrolled movement of birds
- Close proximity of backyard poultry to commercial farms
- High poultry density
- Large number of backyard poultry including mixing of species
- Insufficient disease reporting



1.3 GOOD PRACTICES & LESSONS LEARNT

- Community based active surveillance using SMS technology to improve disease reporting
- Ability to respond quickly to outbreaks (response time has decreased from 4.8 to 1.3 days in five years)
- Effective compensation of poultry farmers affected by H5N1

2.1 Live poultry markets in Bangladesh



- Vast majority of poultry are sold in live bird markets.
- Poultry move through several markets before being sold; from small rural markets to urban/regional collection centres, to regional markets and larger wholesale markets and then to retail markets and shops.
- Slaughtering, processing and disposal are performed on site in an open environment with low biosafety
- Live bird markets are located within the market place with no separation from other sections

2.1 Live poultry markets in Bangladesh

- All live bird markets in Dhaka City to have a weekly day off for cleaning and disinfection.
- Renovation of 28 markets and the construction of nine new LBM's to upgrade biosafety through a comprehensive package .
- Advocacy and capacity building activities including the distribution of posters and display of educational video
- The total number of poultry wholesale markets in the country is around 80.
- There are thousands of live bird markets.
- In each of 500 Sub-districts more than one, each of 64 Districts and seven Divisional cities including the capital city have a quite good number of live bird markets.

2.2 LMB improvements now and into the future

2.2 REDUCING RISKS AT LBMS INTO THE FUTURE

- Development of a poultry distribution and processing centre.
- Provision of separate markets for ducks and chickens.
- Continual improvement of LBMs following the models already developed by DLS.



2.3 GOOD PRACTICES IMPLEMENTED AT LBMS

- Weekly market closures
- Training in and implementation of decontamination practices
- Continuous advocacy and awareness raising

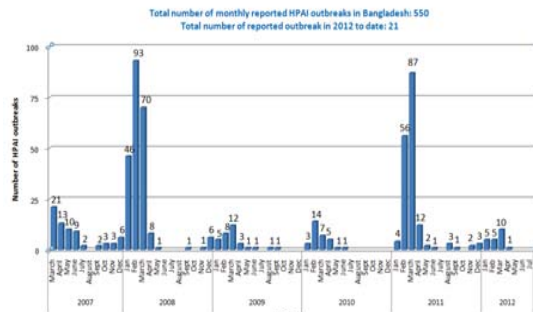


3.1 H5N1 outbreaks - summary

- 223 outbreaks from 2010 – 2012 in domestic poultry (chickens, ducks, quail).
- 550 outbreaks have occurred since the disease was first reported in 2007.
- During early 2011 there were three major mortality events in crows. H5N1 of clade 2.3.2.1 was identified

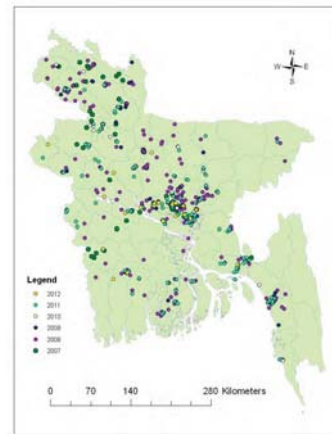


3.1 H5N1 outbreaks in domestic poultry



Year of Report date	Farming System				Total
	Commercial (broiler)	Commercial (layer)	Commercial*	Backyard	
2007			44	25	69
2008			208	18	226
2009			23	9	32
2010		29		2	31
2011	5	163		3	171
2012		21			21
Total	5	213	275	57	550

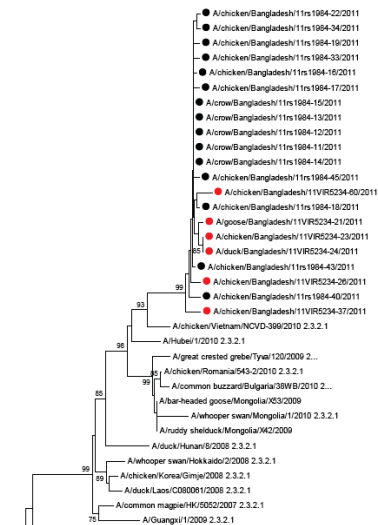
*production data not collected before 2010



3.1.4 Clades in Bangladesh

Three clades have been identified:

- 2.2
- 2.3.2.1
- 2.3.4



2.3.2.1

4.1 Active surveillance in domestic birds

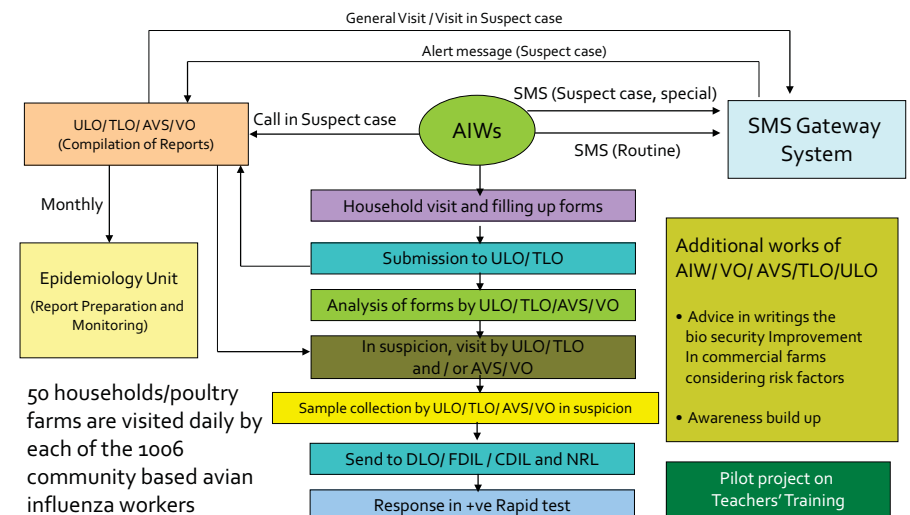
	SMS Gateway	Nomadic ducks
Aim	Early detection and response	Identify reservoir
Timing	Year round.	10/11 – 3/12
Target species	Chicken	Duck
Target premises	Backyard and commercial farms nationwide	Five districts free range ducks
Sample type	Tracheal and Cloacal swab	Tracheal and cloacal swab
Sample scale	Suspected birds only	13 500 samples
Target	H5N1	Influenza A
Testing method	Rapid antigen detection test kit PCR rRT PCR	rRT PCR
In case of positive	Sample sent to National reference laboratory for confirmation by rRT PCR. Control measures (culling, decontamination) applied.	



Duck Surveillance Area

4.1 SMS Gateway

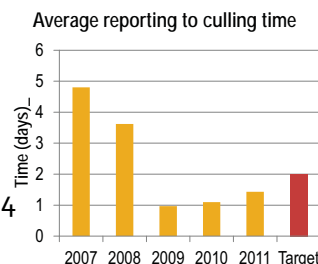
Modus Operandi of HPAI Surveillance



4.2 Results of surveillance programmes and control measures

■ Results of surveillance programmes

- Identified ducks as carriers/reservoirs
- Improved response times
- Clades identified recently: 2.3.2.1, 2.3.4



■ Control measures to be undertaken if H5N1 positive case is detected.

- Quarantine
- Culling and disposal
- Decontamination
- No restocking for three months
- Compensation

4.3 Control measures for positive cases

- Quarantine
- Culling and disposal
- Decontamination
- No restocking for three months
- Compensation



5 Influenza A virus prevalence studies

■ Prevalence studies have been completed in live bird markets.

- FAO and DLS
- BLRI
- Chittagong Agricultural University and
- Bangladesh Agricultural University

■ Research and studies done by:

- icddr,b (Humans, poultry, environment)
- FAO has collected samples
- IEDCR(humans)

6.1 Surveillance in wild birds

(1) Surveillance programme on wild birds

- Bangladesh Livestock Research Institute
- Chittagong Veterinary and Animal Science University
- icddr,b
- FAO (study completed two years ago)

(2) The main aim of conducting surveillance programme on wild birds

- To find out, if there is any new introduction

(3) Period for conducting surveillance on wild birds

- During winter season

(4) Timing of sampling: Winter season

(5) Target species: HPAI susceptible wild birds

(6) Sample category: Feces (7) Sample scale (8) Target serotype of influenza A virus

(9) Testing method (RNA detection by PCR)

(10) If a sample tests positive for H5N1 at the 1st stage of testing, what is the next step? Sequencing and comparing with circulating strain.

■ Steps undertaken:

- Disposal and decontamination
- Strengthening good disposal practices in nearby live bird markets with the assumption that dead poultry may be the source.



7.1-4 Control measures

- Vaccination
 - Vaccination is not currently in practice.
 - The Government of Bangladesh is planning to conduct a vaccination trial in two districts in 2012.
- Control measures for outbreaks:
 - Quarantine
 - Culling and disposal
 - Decontamination
 - No restocking for three months
- Stamping-out:
 - Stamping out is part of the response practices
 - Initially culling within a three kilometre radius of the infected property was practiced. Since 2009 the practice has been to cull only the infected farm (commercial farms) and within a 500 metre radius for backyard poultry.



8.1 Why H5N1 may be persistent in Bangladesh

- Low farm biosecurity
- Insufficient movement controls during outbreaks
- Preference for purchase of live birds
- Presence of asymptomatic carriers (ducks, wild birds)



8.2 Strategies to decrease virus circulation (next 5 yrs)

- Advocacy for and implementation of biosecurity and biosafety measures at both farm and market level
- Strengthening surveillance and diagnostic capacity.
- Detection of and control virus reservoirs with the aim to eliminate the virus.
- Vaccination is on trial.
- Closure of live bird market & supply processed chicken
- Zoning and movement control



Thank you

Avian Influenza Status BHUTAN

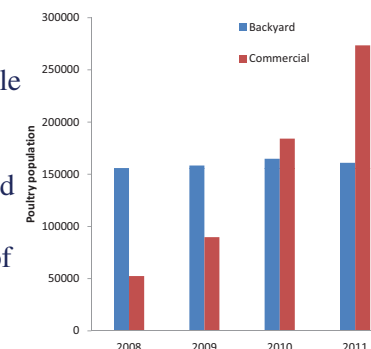


Lokey Thapa

The 5th OIE Regional Meeting on Strengthening Animal Health
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I. Poultry Production in Bhutan (General background)

- Mostly backyard reared on scavenging system
- over 66 percent of rural people depends on poultry farming
- Very recent shift from subsistence to market oriented production system
- 92% egg self sufficiency as of 2010
- Production shift attributed to Avian Influenza outbreak in neighboring countries



I. Poultry Production in Bhutan (Poultry population by species)

Districts	Backyard poultry	Commercial poultry
Bumthang	550	299
Chukha	11287	12434
Dagana	17235	16090
Gasa	173	976
Haa	2993	2958
Lhuentse	6158	2230
Mongar	13178	25880
Paro	1378	24558
Pemagatshel	5330	9820
Punakha	3628	4903
S/Jongkhar	9320	3138
Samtse	35448	10681
Sarpang	20666	63480
Thimphu	412	9793
Trashigang	8613	10102
Trashiyangtse	1238	11375
Trongsa	1622	991
Tsirang	10369	59009
Wangdue	5162	2251
Zhemgang	6259	2589
TOTAL	161019	273557

- Ducks - negligible population reared for local festival offering in southern part of Bhutan
- 13 numbers of Turkey introduced from Thailand for trial purpose

I. Poultry Production in Bhutan (Hatching system)

- Most backyard farms and in local breeds, hatching is by natural process
- In cross breeds, artificial breeding using incubator
- Pure breed chicks are supplied by the hatcheries (both Government and private)
- Government supplies on subsidized rates
- Some private entrepreneurs import day old chicks
- Government hatcheries import either day old pure bred chicks or hatching eggs from abroad



I. Poultry Production in Bhutan

(Free range/roaming ducks)

- Duck population estimate not available
- 2010 – approximate 30 ducks reared in southern border
- Apart from offering to local deities in some communities, duck meat is generally not preferred



I. Poultry Production in Bhutan

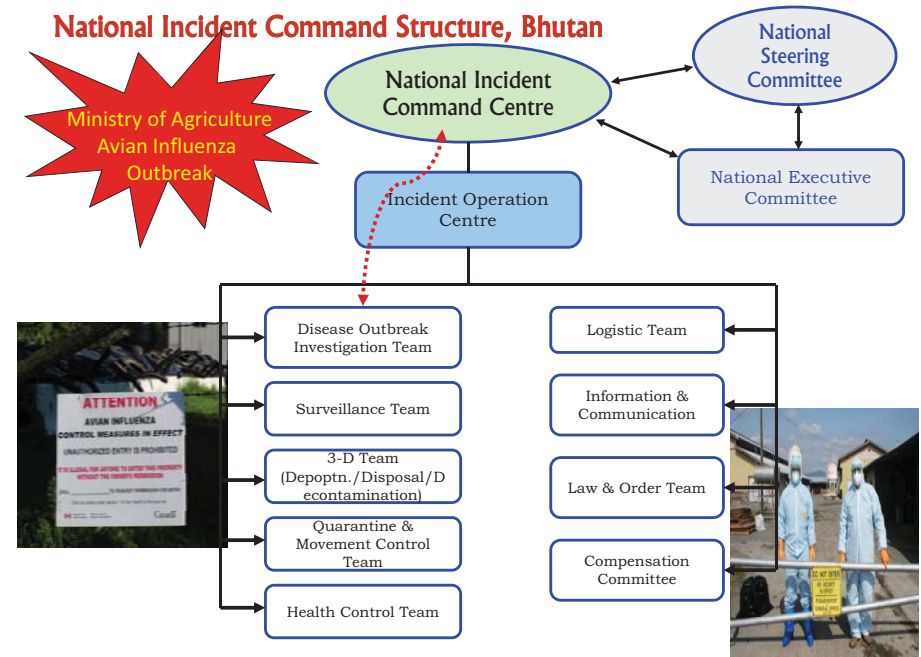
(Challenges to mitigate risk of H5N1)

- Remote and scattered setting of villages/household owning poultry population in the backyard system – problem in accessibility and reporting
- Poor farm bio-security; all backyard poultry farms are free ranging and are not considered main source of income resulting in negligence in all aspects
- Long porous border with neighboring state resulting in illegal imports

I. Poultry Production in Bhutan

(Good practices/lesson learnt from previous H5N1 outbreaks)

- Response plan and SOPs are based on the actual outbreak – the national plan was revised twice
- Very strong inter-sectoral cooperation (Livestock, Health, Disaster, local government etc)
- Surveillance & reporting system put in place (BVT, VVT, Weekly reporting system)
- Laboratory capacity strengthened
- Regular training of personnel in response procedures, awareness on national plan and simulation exercises conducted



II. Live poultry market

- There is no live poultry market in Bhutan
- Usually a few farmers buy live poultry but is directly from one household to another within the country.
- The live poultry import from other country is strictly regulated and quarantine procedures are vigorously enforced
- Ducks are purchased from near by Indian towns sometime



III. Recent H5N1 outbreaks (Number of outbreaks/cases)

First outbreak - February 2010

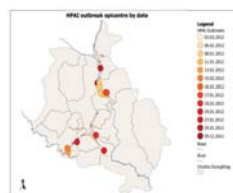
- One outbreak in two different locations
- A total of 5379 birds culled, 578 coop burned, Involved 517 poultry owners in 35 villages 44 disposal pits dug to dispose culled birds



III. Recent H5N1 outbreaks (Number of outbreaks/cases)

Second outbreak - January 2012

- Affected 10 different places in three districts
- A total of 3086 poultry birds culled, and 174 coops burned in 317 poultry owners.
- Local poultry birds from backyard and pure breeds from semi commercial were affected
- Affected species were poultry, Sparrow, wild birds and Pigeons

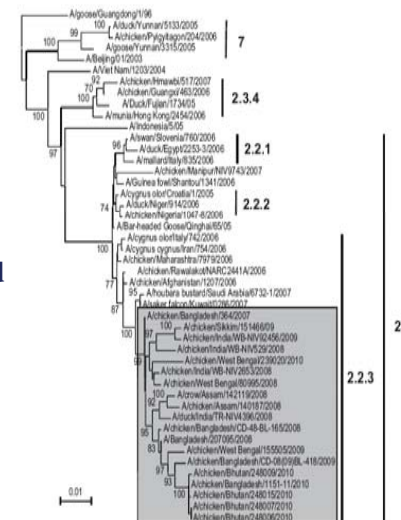


III. Recent H5N1 outbreaks (Virus clade)

2010 – Virus clade 2.2

2012 – Virus clade 2.3.2.1

The problem was resolved after three months.



IV: Active Surveillance in domestic birds

- Active surveillance in place
- Surveillance teams are
 - Border Vigilance Team - looks after the import of livestock products import
 - Veterinary Vigilance team - does the laboratory and clinical surveillance and all the unusual death will be screened
- Ecology of AI Virus project with USA
- The main aim of the active surveillance is to detect the disease in sub clinical form.
- We have surveillance through out the year in different month in different districts with more focus on southern border



IV: Active Surveillance in domestic birds

- Target species are chickens, ducks and wild birds (Pigeons, Black naked crane, other waster fowls)
- Target premises are commercial, semi commercial, backyard and free ranging poultry birds, ducks, wild birds.
- Targeted sample of around 3000 samples annually (cloacal, tracheal swabs and bloods)
- Regular surveillance of wild birds like water fowl, domestic poultry and pig population.
- Testing methods are Rapid test in the field and RNA detection by real time PCR.
- All positive samples referred to OIE designated laboratory in India (Bhopal) and St Jude CIERS, USA

IV: Active Surveillance in domestic birds

Response strategy

- National Influenza Pandemic Preparedness Plan (NIPPP) in place, Activation of National Incident Command Centre (NICC) and other committee as per the guidelines
- Mobilization of rapid response teams
- Identification of affected areas, Quarantine
- Depopulation, Monitoring, Prevention of transmission
- Awareness and education, Compensation

V: Influenza A Virus prevalence studies

- Ecology of AI Virus project
- Country wide study in collaboration with St Jude CEIRS – 2nd year running.
- Study focused in wild birds, pigs and poultry.
- All positive sample of Influenza virus sent to St Jude CEIRS for further testing and confirmation .

VI: Active/passive surveillance in wild birds

- Both active and passive surveillance in wild birds are in place
- Active collaboration with Wild Life Department – reports received instantly in case of death in wild life including birds.
- Active surveillance carried out periodically in collaboration with Wild Life Department
- Except for a pigeon and a sparrow testing positive in an outbreak location, no positive results from wild birds so far.

VI: Active/passive surveillance in wild birds

Frequency	Seven times a year	Sampling Size	30 birds per month
Timing	August, October, November, December, January, February, May	Target Premises	Along the rivers, wild bird roosting places
Target Species	Wild birds, Water fowl, Pigeon, pigs Sparrow	Target Serotype	H5N1 & H9N2
Survey Area	High risk area	Testing method	Rapid Field test & Real time PCR
Sampling category	Swabs (cloacal & Tracheal)	In case of positive	Control measure applied

VII: Control measures

- The National Influenza Pandemic Preparedness plan does not allow Influenza vaccination in poultry
- Humane culling, safe disposal of the poultry, poultry products, feeds litters and other infected materials.
- When there is outbreak in the locality, all the birds within radius of three kilometer are culled
- The country have very sound policy (NIPPP) in place and the documents have been revised based on the experienced gained while controlling the two HPAI outbreak in the country.

VIII: Action to be undertaken in the next 5 years

- Enhance active surveillance in all parts of country and include all wild birds in the regular program (current focus is in high risk areas).
- Strengthen diagnostic facilities (initiate establishment of BSL2 Laboratory)
- Streamline awareness to poultry farmers and general public
- Review NIPPP, SOPs based on outbreak experience



Critical areas of support needed for AI control

Training of personnel:

- Diagnostic skills – Virus isolation, molecular diagnosis
- Surveillance survey design, sampling methodology
- Laboratory diagnosis
 - Reagents & diagnostic kits supply
 - Sampling kits



Acknowledgement

- OIE/JSTF supplied real time PCR machine (rRT-PCR diagnosis extended to 12 diseases including cattle, pig and poultry)
- Other equipments such as animal incinerators, centrifuge, Gel doc system etc.
- Bhutan would like to sincerely appreciate & acknowledge the support and would further like to strengthen the collaboration in AI control



Thank You!

China Poster Presentation

5th OIE Regional Meeting on
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Control and Prevention

Poultry production in 2009

- Total poultry slaughtered: 10.6 billion
- Total poultry in-stock: 5.3 billion
- Duck slaughtered: 1.9 billion
- Geese slaughtered: 0.56 billion



Sections 3 & 4 are
shrinking rapidly in
China



Sections 1 & 2 are
blooming rapidly in
China

H5N1 control challenges

- Many free range duck flocks
- Big viral reservoir of wild-birds
- High rate of virus mutation



Viral HA1 gene mutates faster during mass vaccination periods

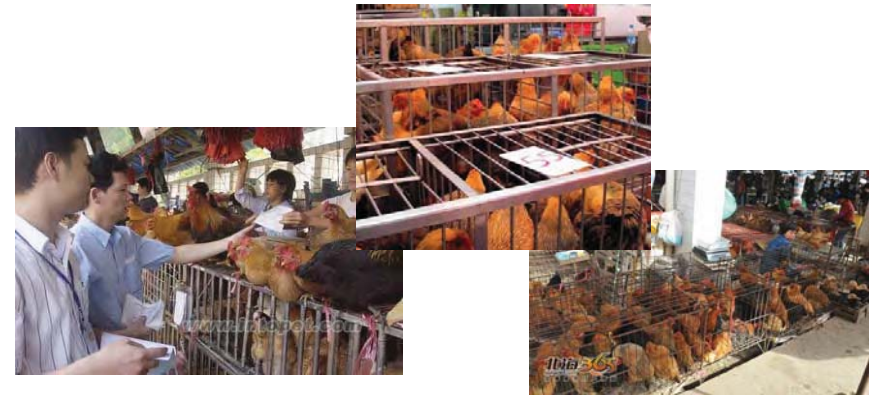
Table 1 Substitution rates (in 10^{-3} substitutions site $^{-1}$ year $^{-1}$) in the HA1 gene

Country	Period	Mass vaccination	HA1 nucleotide substitution rate		HA1 amino acid substitution rate	
			Mean	95% HPD	Mean	95% HPD
China	2005–2010	Yes	7.28	5.11–9.41	10.31	6.85–13.88
Indonesia	2003–2009	Yes	7.75	6.01–9.58	8.67	5.92–11.50
China	1996–2004	No	3.37	2.37–4.32	3.52	1.98–5.17
Thailand	2004–2008	No	2.69	1.78–3.62	3.65	1.95–5.60

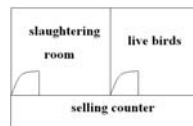
Increased substitution rate in H5N1 avian influenza viruses during mass vaccination of poultry, Chinese Science Bulletin, 2012, 57: 2419-2424

Live poultry markets in China

- LPMs are prevalent in South China



Many LPMs have been upgraded



More poultry products sold not via LPMs: approx. <10% in 1990, >60% in 2010

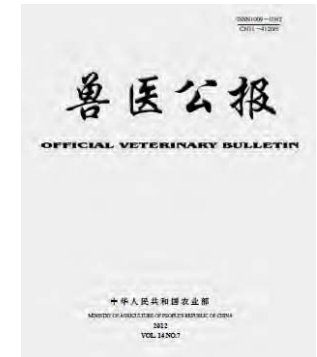


LPMs may play a limited role in H5N1 transmission

- Farm → LPMs → Consumers: One-way flow
- Evidence 1: Clade 7 H5N1 has been circulating almost exclusively in North China for years, even if millions of live poultry birds have been transported to the LPMs in South China annually
- Evidence 2: Most transboundary transmission events of H5N1 resulting in wide spread were done by wild bird migrations (Clades 2.2 and 2.3.2.1)

H5N1 surveillance in China

- Active surveillance: different level from town to national
- Passive surveillance: multiple approaches from farms to the central government
- Data published monthly in Chinese & English in *Official Veterinary Bulletin*



Example: surveillance in June, 2012

- Sampling sites: 1532 breeding farms, 13090 commercial farms, 34920 backyard flocks, 1203 LMPs, 2 slaughtering houses, 425 other poultry sites, 61 wild bird habitats
- 522583 sera samples, among which 485419 were vaccinated sera samples (91.29% with qualified HI titers)
- 55582 swab samples, among which 30 were H5N1 positives

Distribution of the 30 H5N1 positives

- 13 provinces: Jilin, Zheliang, Anhui, Fujian, Jiangxi, Hubei, Hunan, Guangxi, Sichuan, Chongqing, Guizhou, Ningxia, Xinjiang
- 3 host species: 15 from chickens, 14 from ducks and 1 from goose
- 3 kinds of sites: 21 from LMPs, 7 from farms, 2 from slaughtering houses
- All the infected sites have been treated according to relevant laws and regulations

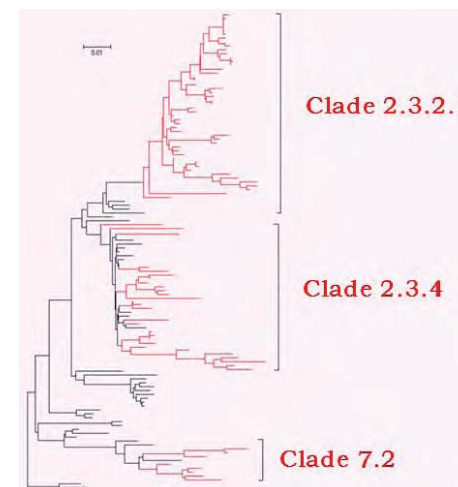
H5N1 outbreaks in China during 2010-2012



- Tibet, 2010/05/09, wild birds
- Tibet, 2011/12/02, resolved
- Yunnan, 2012/03/27, resolved
- Ningxia, 2012/04/13, resolved
- Nianing, 2012/04/18, resolved
- Gansu, 2012/06/01, resolved
- Xinjiang, 2012/07/02, resolved

Species	Susceptible	Cases	Deaths	Destroyed
Poultry	1367653	35587	12333	1355320
Wild birds		170	170	0

Phylogenetic distribution of H5N1 viruses in China in 2010-2012



China is to strengthen H5N1 control in coming years

- “National long-term animal disease prevention plan (2012-2020)” was issued by State of Council in May, 2012
- HPAI, FMD, HP-PRRS, CSF, ND were listed of highest priority in the plan
- Much more resources will be provided for intensive surveillance, poultry upgrading, bio-security improvement, etc.

Thank you!



Chinese Taipei poster presentation

Wen Yuan, Yang
BAPHIQ

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2012/10/2

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Outline

- Poultry production
- Live poultry market
- H5N2 outbreaks in domestic birds
- Active surveillance programme on domestic birds
- Active/passive surveillance programme on wild birds
- Control measures
- Actions to be taken in the next 5 years in Asia



2012/10/2

I. Poultry production

- 55% are small scale poultry farms, especially for layer and native broiler farms
- In sector 3, native broiler is predominant species and they are in the open shed
- Small scale farms purchase chicks and ducklings in commercial hatcheries



Table. Number of farm and poultry (chicken, ducks, others) by poultry production sector (Thousand heads)

Category	No. of Farms	% of total farms	Chicken	Duck	Others	Total	% of total number
Sector1	1,844	16.74%	20,977	2,676	0	23,654	21.84%
Sector2	2,873	26.10%	22,180	335	1,754	24,269	22.40%
Sector3	5,358	48.67%	47,430	5,485	141	53,056	48.98%
Sector4	935	8.49%	6,264	907	175	7,346	6.78%
Total	11,010	100.00%	96,851	9,403	2,071	108,325	100.00%

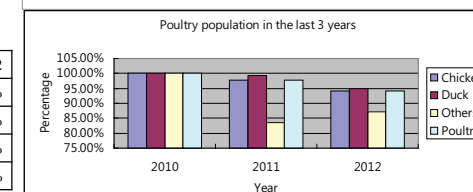
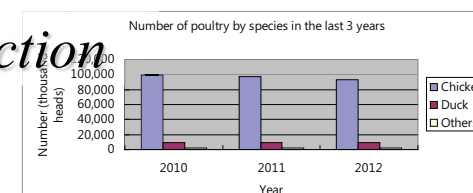
2012/10/2

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I. Poultry production

- Poultry population decreased year by year
- The decrease rate was 5.95% in 2012 compared with 2010

Category	2010	2011	2012
Chicken	100.00%	97.84%	94.12%
Duck	100.00%	99.25%	95.03%
Others	100.00%	83.52%	87.22%
Total	100.00%	97.67%	94.05%



(Thousand heads)						
Category	2010		2011		2012	
Chicken	98,988	(89.40%)	96,851	(89.55%)	93,163	(89.46%)
Duck	9,474	(8.56%)	9,403	(8.69%)	9,003	(8.64%)
Others	2,269	(2.05%)	1,895	(1.75%)	1,979	(1.5%)
Total	110,731		108,149		104,145	

2012/10/2

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I. Poultry production

- Problems/challenges reinforce the preventive measures against HPAI at a farmer's level:
 - Low biosecurity (open system, lack of entry control and sanitation)
 - Sharing egg boxes and transportation cages
 - Continuous raising system for layers (Not all in-all out)
- Good practices to prevent the introduction and occurrence of HPAI:
 - Improvement of biosecurity
 - Education and awareness programme
 - Intensified surveillance for precautions

2012/10/2

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II. Live poultry market

- Live poultry markets are still required for food culture and as sociocultural part in rural areas
- They sell and slaughter one species poultry (live ducks or native broilers) at one time
- Most live ducks were sent to abattoir for slaughter
- In some markets, they do not sell live chickens, only meat
- Most of live poultry markets, they handle native chicken only
- More than 90% of native broilers come in markets come from sector 3 farms
- There are much intervention from veterinary and competent authorities to control and regulate the markets

2012/10/2

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II. Live poultry market

- Actions taken to prevent any possible introduction/occurrence of HPAI virus
 - To improve biosecurity level
 - Selling single specie of poultry
 - Centralized management of stalls in the market
 - Cleaning and disinfection
 - Control the numbers of stall (stop the permission)
 - Surveillance for precaution and response
 - Education and awareness programme



2012/10/2

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II. Live poultry market

- Education and awareness
- Partition and sanitation



2012/10/2

III. H5N2 outbreaks in domestic birds

- Most HPAI cases were detected from native broiler farms
- Most LPAI cases were detected from caged layer farms with open system
- Cases detected from duck farms are all LPAI
- Only one LPAI case was detected at live poultry markets (1/20)
- The predominate strains of H5N2 HPAIV are RKKR*GLF and RRRK*GLF

Table. NAI cases from 2010 to 2012

	2010	2011	2012
Outbreaks	4	4	12
Chicken farm (75%)	4	2	9
Duck farms (25%)	0	2	3
	H5N2	H7N3	

2012/10/2

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III. Active surveillance programme on domestic birds

- Active surveillance programme started in 1998
- The aim is for early warning and detection of NAI viral activity among domestic poultry

Item	Description
Frequency	Four times a year
Timing	Each season
Target species	Chicken, Duck, Geese
Survey province	21 provinces
Sample category	Serum and Swab
Sample scale	20 /per farm
Target premise	Farms, markets
Target serotype	H5, H7
Testing method	ELISA, HI, RT-PCR, VI, Genetic analysis

2012/10/2

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III. Active surveillance programme on domestic birds

- NAI cases detected in 2010-2012 by active surveillance were all H5N2 subtype and low pathogenic.
 - All the HPAI cases in 2012 (6 cases) were detected by passive surveillance (reported cases)
 - LPAI cases in 2012 (6 cases) were detected by active or intensified surveillance
- Other NAI cases were found in the progress of intensified surveillance conducted on surrounding poultry farms of infected farms. (H5N2 and H7N3)

Table. Number of NAI positive farms and detection rate in domestic birds (Active surveillance)

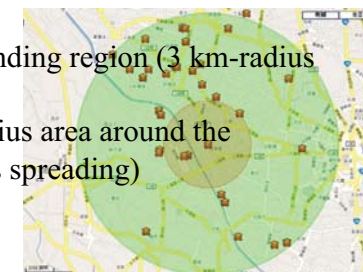
	2010	2011	2012 (Jan-Aug)
Chicken farm	776	658	506
Duck farm	331	283	183
Goose farm	82	79	65
NAI positive farm	2 (0.17%)	2 (0.2%)	4 (0.53%)

2012/10/2

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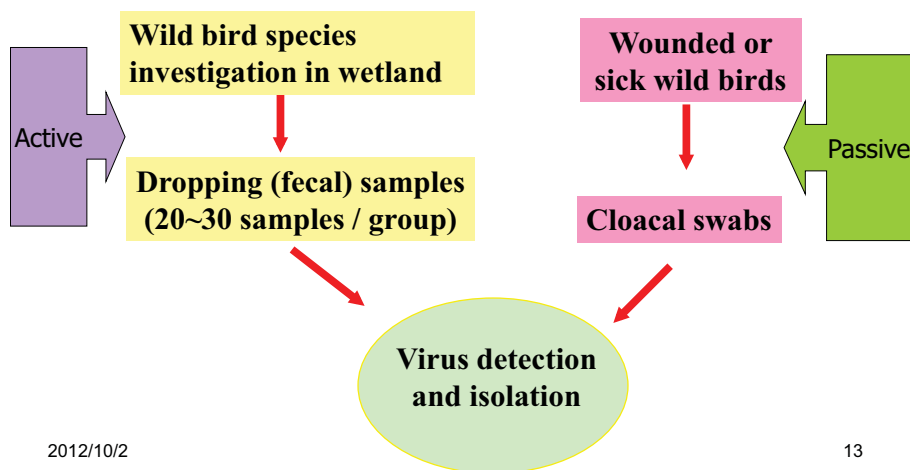
III. Active surveillance programme on domestic birds

- Control measures to be undertaken if HPAI case is detected:
 - Movement restriction
 - Stamping-out of infected farm
 - C&D
 - Empty for at least 21 days
 - Sentinel chicken test
 - Intensified surveillance of surrounding region (3 km-radius of infected farm) for 3 months
 - Ring vaccination within 1 km radius area around the infected farm (if the outbreak was spreading)



2012/10/2

IV. Active/passive surveillance programme on wild birds



2012/10/2

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IV. Active surveillance programme on WB

- Dropping samples collected from wetlands
- >3,000 samples were tested annually by RT-PCR and VI
- Samples were tested negative for HPAIV from 1998 to 2012

Item	Description
Frequency	Monthly
Timing of sampling	Each season, intensified surveillance on fall and winter
Target species	Ducks (Anatidae), Shorebirds or others
Sample category	Droppings (swab)
Sample scale	20-30 samples / group
Target serotype of influenza A	H5, H7
Testing method	RT-PCR, VI, Genetic analysis

2012/10/2



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IV. Active surveillance programme on WB

Year	Ducks	Shore birds	Gulls	Egrettas	Others	Total	Detected subtypes
1998	1,457	0	0	30	0	1,487	H1N1, H1N2, H1N3, H2N3, H2N7, H2N9, H3N2, H3N6, H3N7, H3N8, H3N9, H4N2, H4N3, H4N5, H4N6, H4N7, H4N8, H5N2, H5N6, H6N1, H6N2, H6N5, H6N9, H7N1, H7N2, H7N3, H7N5, H7N6, H7N7, H7N9, H8N3, H8N4, H9N6, H9N9, H10N1, H10N2, H10N3, H10N4, H10N6, H10N7, H10N8, H10N9, H11N3, H11N9, H12N2, H14N7
1999	1,418	75	0	0	0	1,493	
2000	1,825	44	0	0	0	1,869	
2001	2,516	45	3	0	0	2,564	
2002	2,060	652	72	0	98	2,882	
2003	1,831	553	59	0	0	2,443	
2004	1,902	1,149	190	4	106	3,351	
2005	2,806	1,357	112	38	194	4,507	
2006	2,352	1,413	161	436	179	4,541	
2007	2,645	1,147	20	317	21	4,150	
2008	2,768	920	80	389	108	4,265	
2009	2,755	835	57	417	91	4,155	
2010	2,791	754	79	504	18	4,246	
Sum	29,126	8,966	833	2,135	815	41,953	
isolates	315	14	2	4	1	336	
Prevalence (%)	1.08	0.16	0.24	0.19	0.12	0.80	

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IV. Active surveillance programme on WB

Year	Samples examined	Isolation rate (%)	subtypes	AIV subtypes identified
1998/2-1998/4	906	13 (1.4)	1	H1N3
1998/9-1999/4	2,134	163 (7.6)	10	H1N1, H1N3, H2N3, H3N8, H4N2, H4N6, H4N7, H4N8, H7N1, H10N7
1999/8-2000/7	1,831	36 (2.0)	8	H1N1, H4N6, H6N1, H7N1, H8N4, H10N4, H11N9, H14N7
2000/8-2001/3	1,427	3 (0.2)	1	H7N1
2001/10-2002/5	2,781	9 (0.3)	3	H4N6, H4N8, H10N4
2002/9-2003/6	2,888	8 (0.3)	5	H4N6, H3N8, H6N2, H3N6, H6N1
2003/7-2004/7	3,488	7 (0.2)	2	H11N9, H10N3
2004/8-2005/5	3,611	28 (0.8)	11	H1N1, H2N7, H4N2, H4N6, H4N8, H5N2, H5N6, H6N5, H7N3, H10N8, H11N9
2005/8-2006/7	5,201	44 (0.8)	14	H1N3, H3N8, H3N6, H3N9, H4N3, H4N6, H4N2, H5N2, H6N1, H7N3, H10N4, H10N6, H11N9, H12N2
2006/8-2007/7	4,027	38 (0.9)	9	H1N3, H3N8, H4N6, H4N7, H7N6, H9N6, H9N9, H10N3, H10N7
2007/8-2007/12	1,889	18 (0.9)	6	H1N1, H1N2, H3N8, H4N6, H7N7, H8N4
2008/1-2008/12	4,265	25 (0.6)	11	H2N9, H3N6, H3N8, H4N2, H4N6, H7N3, H7N7, H10N1, H10N7, H10N9, H11N3
2009/1-2009/12	5,834	35 (0.6)	15	H1N1, H3N2, H3N8, H4N5, H4N6, H4N8, H6N9, H7N2, H7N3, H7N5, H7N7, H7N9, H10N3, H10N7, H11N3
2010/1-2010/12	4,849	38 (0.8)	7	H1N1, H2N3, H4N6, H7N2, H10N3, H10N7, H10N9
2011/1-2011/12	3,935	27 (0.7)	8	H3N6, H3N8, H4N6, H5N2, H7N3, H7N6, H7N9, H10N7
Total 2012/10/2	49,066	492 (1.0)	46	

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IV. Passive surveillance programme on WB

Table. Results of passive surveillance in WB

Year	Waterfowls (AIV isolates)	Land birds (AIV isolates)	Total (AIV isolates)
1998-2007	70 (0)	7 (1*)	77 (1)
2008	15 (0)	75 (0)	90 (0)
2009	267 (0)	625 (0)	892 (0)
2010	58 (0)	555 (0)	613 (0)
2011	2 (0)	108 (0)	110 (0)
Total	412 (0)	1,370 (1)	1,782 (1)

1. Samples were from dead, wounded or sick wild birds

2. * Crested serpent-eagle/Hualien/A423/05(H12N2)



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V. Control measures of HPAI

- Vaccination is prohibited
- All HPAI infected poultry farms shall be stamped out in accordance with the law
 - Movement restriction
 - Stamping-out of infected farm
 - C&D
 - Empty for at least 21 days
 - Sentinel chicken test (21 days)
- Intensified surveillance of surrounding region (3 km-radius of infected farm) for 3 months
- Ring vaccination within 1 km radius area around the infected farm (if the outbreak was spreading)
- Smuggling birds are tested and destroyed

2012/10/2

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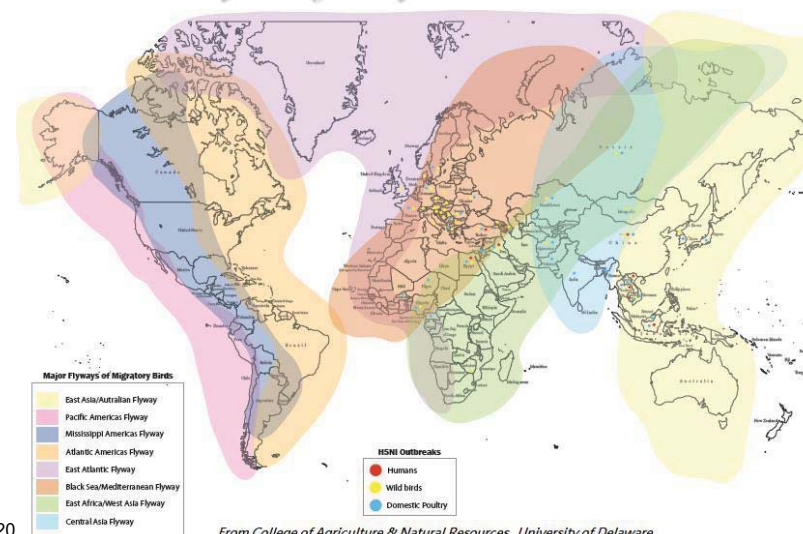
VI. Actions to be taken in the next 5 years in Asia

- To assist countries in the region to build up and maintain the routine active/passive surveillance system
- Sharing the disease and its control information in the region for early preparedness and response
- Vaccination on endemic region/countries and monitoring the vaccine efficacy to the field strains periodically

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Thank you for your attention!



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The 5th OIE Regional Meeting on Strengthening
Animal Health Information Networking for HPAI
Control and Prevention in Asia
Hanoi, Vietnam, 2-3 October 2012



Hong Kong SAR

Dr. Thomas SIT
Chief Veterinary Officer

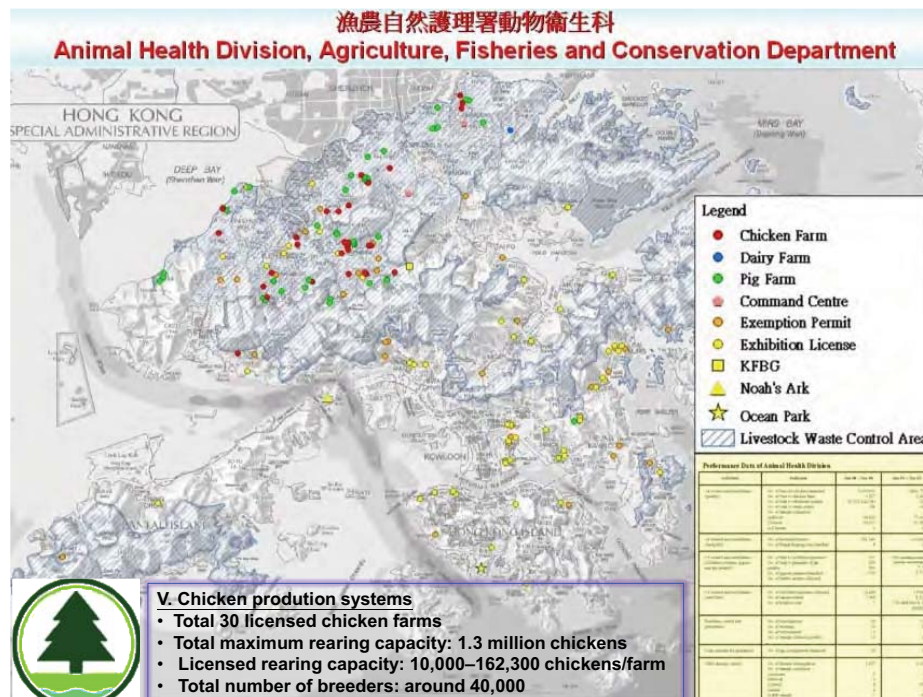
1



I. Poultry production in Hong Kong

➤ In 2011, the local chicken industry produced
HK\$218 million of poultry production

- There are total 30 licensed chicken farms (**Sector 2**) with a maximum rearing capacity of 1.3 million chickens
- The licensed rearing capacity ranged from 10,000–162,300 chickens/farm
- Number of breeders: around 40,000 birds



II. Live Poultry Market in Hong Kong

- The average daily local supply of live chickens from local farms are 10,300 birds
- The average daily imported live chickens from the Mainland are 7000 birds
- There are 1 wholesale market and 132 retail shops in Hong Kong
- All trucks and cages are disinfected with certificate before going to local chicken farms
- One truck from one farm enters wholesale market once a day
- In 2008, no overnight keeping of live poultry was implemented at the retail markets



V. Active/Passive surveillance program on wild birds in Hong Kong

➤ Active surveillance

- AI Monitoring and surveillance of wild bird droppings from wetland areas
- Since the end of 2002, the surveillance programme has been extended to cover wild birds, captive wild birds in recreational parks and pet birds in retail bird markets.

➤ Passive surveillance

- Passive surveillance is more sensitive than active surveillance in wild birds in detecting HPAI.
- Twenty-four hours sick and dead birds collection service for AI testing starting from 27 October 2005.



V. Active/Passive surveillance program on wild birds in Hong Kong

- In 2009, **13,933** wild bird carcasses were collected. **6,977** samples were screened & tested for AI and **6** samples were confirmed to be infected with H5 HPAI viruses.
- In 2010, **8,467** wild bird carcasses were collected. **6,940** samples were screened and tested for AI and only **1** samples were confirmed to be infected with H5 HPAI viruses.
- In 2011, **9,804** wild bird carcasses were collected. **6,503** samples were screened and tested for AI and only **5** samples were confirmed to be infected with H5 HPAI viruses.
- In 2012 (up to August 31th), **11,720** wild bird carcasses were collected. **6819** samples were screened and tested for AI and only **21** samples were confirmed to be infected with H5 HPAI viruses.



V. Active/Passive surveillance program on wild birds in Hong Kong

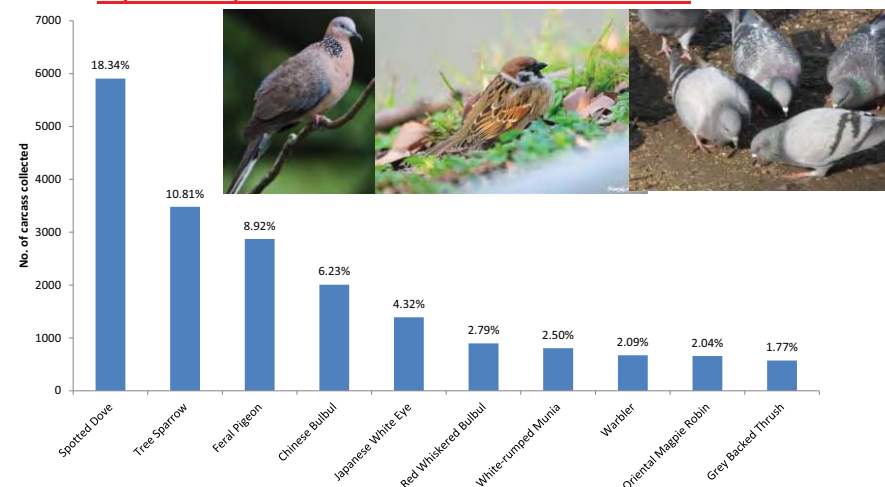


Number of samples (bird carcasses / debilitated birds)	Calendar Year		
	2010	2011	2012 (up to Aug)
Collected	8,467	9,804	11,720
Tested for Avian Influenza	6,940	6,503	6,819
Infected with HPAI virus	1	5	21

V. Active/Passive surveillance program on wild birds in Hong Kong



Top 10 Bird species collected from Jan 2009 to Dec 2011



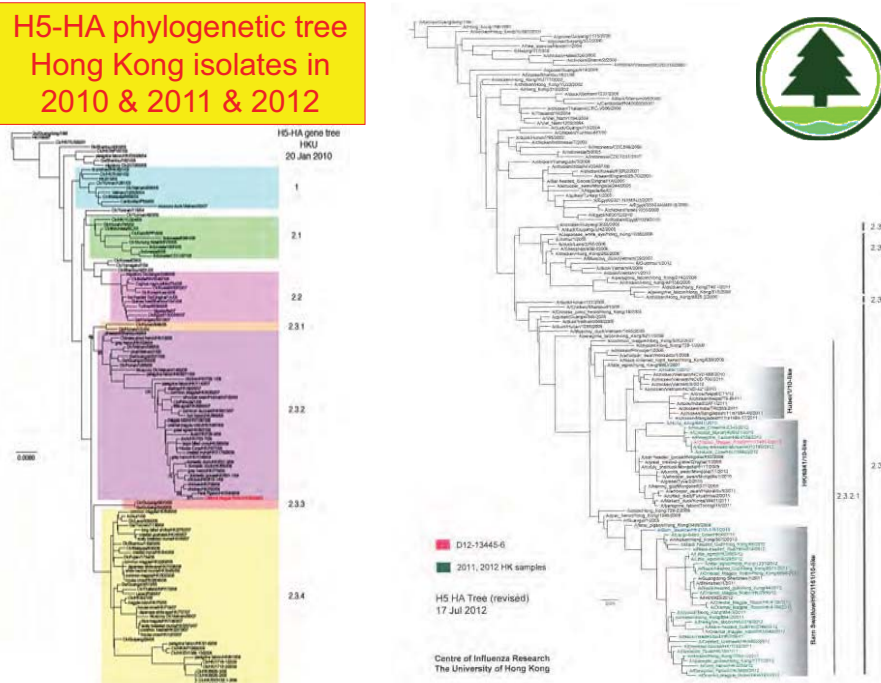
V. Active/Passive surveillance program in Hong Kong

AI Testing Statistics 2010-2012						
	2010		2011		2012 (up to 31 Aug)	
	Number of samples	Percentage	Number of samples	Percentage	Number of samples	Percentage
Local Poultry Farms	8068	18.71%	10807	23.89%	4747	14.53%
Import Poultry	12039	27.93%	10849	23.98%	7089	21.70%
Poultry Markets	4060	9.42%	3692	8.16%	2013	6.16%
Other locations	740	1.72%	1101	2.43%	644	1.97%
Pet birds	3810	8.84%	4043	8.94%	3164	9.69%
Park birds	2579	5.98%	2993	6.62%	2369	7.25%
Wild birds	11815	27.41%	11760	25.99%	12641	38.70%
Total	43111	100.00%	45245	100.00%	32667	100.00%

V. Active/Passive surveillance program in Hong Kong

AI Antibody Testing Statistics 2010-2012 (Aug)						
	2010		2011		2012 (up to 31 Aug)	
	Number of blood samples for Ab testing	Percentage	Number of blood samples for Ab testing	Percentage	Number of blood samples for Ab testing	Percentage
Local Poultry Farm	85140	62.53%	74558	61.31%	55559	64.56%
Import Poultry	46370	34.06%	42680	35.09%	27512	31.97%
Poultry Market	4446	3.27%	4202	3.46%	2907	3.38%
Park bird	195	0.14%	178	0.15%	82	0.10%
Total	136151	100.00%	121618	100.00%	86060	100.00%

H5-HA phylogenetic tree Hong Kong isolates in 2010 & 2011 & 2012



VI. HPAI Control and Prevention Measures in Hong Kong

1. Legislation support

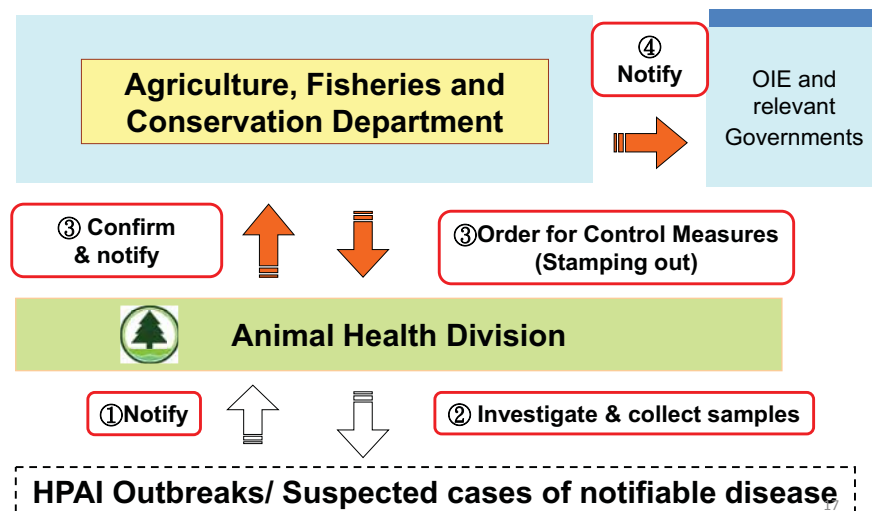
- 1.1 Public Health (Animal and Birds) Ordinance (Cap. 139)
- 1.2 Subsidiary Legislation
 - Cap. 139 sub. Leg. A
Public Health (Animal and Birds) Regulations
 - Cap. 139 sub. Leg. F
Public Health (Animal and Birds) (Exhibitions) Regulations
 - Cap. 139 sub. Leg. L
Public Health (Animal and Birds) (Licensing of Livestock Keeping) Regulations
- 1.3 License Conditions (granted under Cap. 139 and Regulations made pursuant to it)
- 1.4 Biosecurity Requirements for Individual Chicken Farms (part of License Conditions)
- 1.5 Biosecurity Plans for Individual Chicken Farms (part of License Conditions)
- 1.6 Compensation for the order of emergency slaughter of chickens
- 1.7 Ban on keeping backyard poultry in 2006
- 1.8 Chicken farm Voluntary Surrender Scheme and Buy-out plan (completed)

2. Policy on HPAI Control and Prevention

- 2.1 Measures to enhance biosecurity in local farms, wholesale and retail markets
- 2.2 Universal AI vaccination program
- 2.3 Culling operation for infected farms and farms within designated distance
- 2.4 Emergency legislation - Potential ban of all commercial chicken production



Information & work flow on HPAI notification when a H5N1 outbreak is detected



VI. HPAI control and Prevention Measures in Hong Kong

3. Principal HPAI Control and Prevention Measures:

(1) Categories of measures:

1) Biosecurity requirements and License conditions (Penalty as in point 11)

2) Vaccination: License Condition #11,12, 18, Biosecurity Plan #4.5, 4.10

3) Active surveillance: License Condition #11,12,17

- 1) Chicken
- 2) Pet / exhibit birds
- 3) Wild birds dropping collection in wetland areas

4) Passive surveillance:

- 1) Round the clock sick and dead wild bird collection service for AI surveillance
- 2) Sample collection on seized poultry from enforcement of banning backyard poultry or stray poultry found during patrol

5) Notification: Cap. 139 A reg.23

6) Border control: Cap. 139 s.4 (Penalty: HK\$5000)

7) Movement control inside infected areas: Cap.139 s.5(Penalty:HK\$5000),Cap.139A reg.31-32

8) Zoning: Cap.139 s.5 (Penalty: HK\$5000), Cap.139A reg.29-30

9) Stamping out: Cap.139A reg.35

10) Compensation: Max. HK\$30 per bird if slaughter by order; Cap. 139 s.6



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VI. HPAI control and Prevention Measures in Hong Kong

3. Principal HPAI Control and Prevention Measures:

(1) Categories of measures:

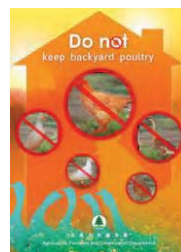
11) Penalty

11.1) under Cap. 139L reg. 3 (2) :

- (a) for a first offence to a fine of HK\$50000
- (b) for a second offence to a fine of HK\$100,000
- (c) and where livestock has been kept continuously, to a fine of HK\$1000 for each day on which it is proved to the satisfaction of the court

11.2) under Cap. 139 s.10: License may be cancelled

11.3) under Cap. 139 s.8: Any animal, bird or thing deal with in contravention of this ordinance may be seized.



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VI. HPAI control and Prevention Measures in Hong Kong

3. Principal HPAI Control and Prevention Measures:

(2) **Implementing/responsible organizations**

- 1) Farm inspection and biosecurity monitoring: AHD of AFCD
- 2) Monitor the implementation of vaccination: AHD of AFCD
- 3) Active surveillance: AHD & TLVL of AFCD
- 4) Passive surveillance: AHD & TLVL of AFCD
- 5) Notification: AHD & TLVL of AFCD, CHP
- 6) Border control: IED of AFCD
- 7) Movement control inside the country: AHD of AFCD, Police
- 8) Zoning: AHD of AFCD
- 9) Stamping out: AHD of AFCD
- 10) Compensation: AFCD and FSTB
- 11) Penalty: AHD of AFCD, DOJ, Police

AFCD : Agriculture, Fisheries and Conservation Department
 AHD: Animal Health Division
 CHP: Centre for Health Protection
 DOJ: Department of Justice
 FSTB: Financial Services and the Treasury Bureau
 IED: Import and Export Division
 TLVL: Tai Lung Vet Lab



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VII. Actions to be undertaken in Asia in the next 5 years

1. Increase AI surveillance and monitoring and sharing the information

- *To understand, assess and monitor the HPAI situation and its spread*

2. Analyze the most recent circulating viruses in the regional and vaccine matching results and sharing the information

- *To assess and monitor the effectiveness of AI vaccination and vaccines used*

3. Enhance the implementation of control measures such as AI vaccination and stamping out policy

- *To prevent and/or reduce the spread of HPAI to other areas/countries in the region*



Country Presentation -India

Dr. Hans Raj Khanna

Department of Animal Husbandry, Dairying and Fisheries,
Ministry of Agriculture
Government of India



5th OIE Regional Meeting on Strengthening Animal Health Information Networking for HPAI
Control and Prevention in Asia

Hanoi, Vietnam, 2-3 October, 2012

Poultry Industry in India

Type	Species	No. in Millions
Backyard	Chicken	265.44
	Ducks	26.17
	Turkey	0.32
	Quails	0.26
	Other Poultry	1.85
	Total Backyard	294.04
In Farms	Layers	153.75
	Broilers	197.11
	Ducks	1.45
	Others	1.73
	Total in Farms	354.04
Total Fowls		616.3
Total Ducks		27.62
Others		4.16
Grand Total		648.08

About 45% poultry are with smallholders or backyard, falling under sector 3-4 with low biosecurity, about 10 % in sector 1 and rest in sector 2.

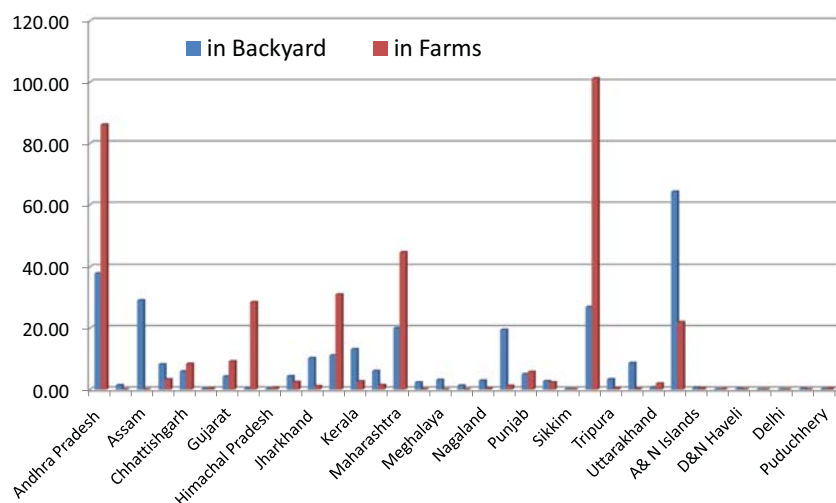
Annual Growth Rate= 7.3% in 2007 over 2003 Census

Fowls: +7.8%

Ducks: -1.99%

Other spp.: +20%

Distribution of Total Poultry (in Millions) (As per 18th Livestock Census-2007)



Backyard chicken-Sector 4



Backyard chicken-Sector 4



Small scale farm-Sector-3



Organized farm-Sector-2

Challenges faced and Good practices to improve H5N1 risk mitigation at Farmers' level

Challenges:

- Huge poultry population. More poultry in sector-3 & 4 with inadequate biosecurity
- Large chicken population in North-east/ eastern region intermingling with free range ducks
- Bird-human interface (Many times both share the same room)
- Possible delayed reporting of sickness or mortality by backyard farmers to authorities (Low awareness level)
- Poor sanitation in wet markets (About 3900 in NER only)
- Porous international borders



Good Practices for Improvement:

- Awareness programme on enhancement of biosecurity/ quick reporting/rearing of separate species
- Vaccination against other viral diseases resulting in enhancement of bird immunity
- Training of vets/ para-vets (92 %) / RRTs and village level workers to sensitize people to maintain alertness against the disease. About 44395 community workers have been trained. As a result, the recent outbreaks were contained in 4-7 days.
- Better understanding of outbreaks-Epidemiology Cell established in the DADF.
- Co-ordinated efforts of various agencies
- Nip the evil in the bud- "control at source "

Hatching System

Fowls:

- Government Hatcheries/ Private Hatcheries
- Custom Hatching
- M.S- Mini Satellite Hatcheries

Ducks:

- 95% in unorganized sector....
- Hatching eggs sourced mainly from Households in villages in Backyard (BY) setting
- 1.45 million out of 27.62 million are free range/ roaming ducks



Live Poultry Markets (LPMs)

- Live poultry markets -the backbone of poultry meat supply (95 %) in the country
- No data available on number of live poultry markets for most places. However, in the Capital, New Delhi, about 3200 licensed (in 2009) retail shops present.
- Overview of supply chain/distribution of live poultry to markets:
 - Commercial producers → Wholesaler → Retail Shops → Consumer
(The slaughtering is done at **Retail Meat Shops** but the birds are procured from commercial farms/ wholesale markets)
 - Backyard producers → sometimes middlemen → Consumers
(The **Rural markets** where auction/ selling/ slaughtering of live birds take place)
- Advisories Issued by the Central/local government to improve hygiene situation/biosecurity at markets , but no direct control of veterinary authorities, against overnight stay of poultry.
- Bio-security level
 - Retail Meat Shops** -Low to Medium
 - Rural markets** - Very Low

Live Poultry Markets



Improving situation in LPMs

- **Key Points :**
 - Mixing with potential carrier birds (Ducks)
 - Birds do not go back from market carrying infection
 - Situation of hygiene & cleanliness ?
 - Offal disposal
 - Porous borders
- **Possible actions for Improvement:**
 - Identify markets and improve biosecurity, awareness and cleanliness & Hygiene (Disinfection of market areas regularly) of shops ; Disposal of poultry offal
 - Advisories to States on 'No-returning back' of birds from Market
 - Border strengthening
 - Surveillance Plan with emphasis on LPMs
 - Allotting specific market places

Good practices and lessons learnt

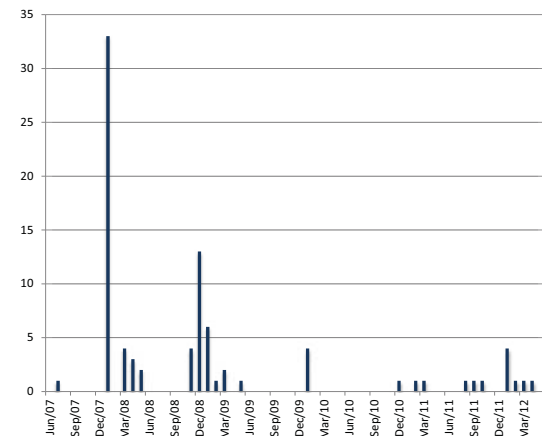
- Scenarios contemplated
 - Ban LPMs (not feasible)
 - Organizing roadside wet market- (who and how?)
- Lessons learnt
 - Not feasible to regulate without Identification of such markets
 - Awareness is utmost important
 - Legal back-up or even better self-regulation- key to success



Recent HPAI outbreaks in poultry

Sr. No.	Period	State affected	*No. of cases(in millions)	Affected poultry (type)	Antigenic clade
1	Dec,2008 – May, 2009	West Bengal	2.01	BYP	2.2
2	Jan, 2009	Sikkim	0.04	BYP	2.2
3	Jan, 2010	West Bengal	1.56	BYP	2.2
4	Feb-Mar, 2011	Tripura	0.021	Farm	2.3.2.1
5	Sept, 2011	Assam	0.15	BYP	2.3.2.1
6	Sept, 2011	West Bengal	0.49	BYP	2.3.2.1
7	January, 2012	Odisha	0.32	BYP	2.3.2.1
8	January, 2012	Meghalaya	0.07	Farm	2.3.2.1
9	January, 2012	Odisha	0.11	BYP	2.3.2.1
10	January, 2012	Tripura	0.06	Farm	2.3.2.1
11	February, 2012	Odisha	0.38	Farm	2.3.2.1
12	March, 2012	Tripura	0.05	Farm	2.3.2.1
13	April, 2012	Tripura	0.02	Farm	2.3.2.1

Magnitude of the problem



Active surveillance programme on domestic birds

- **Aim:** Immediate response to unusual sickness/ mortality in poultry and wild birds
- Carried out periodically in the event of unusual sickness, mortality or the rumours those of, Vigil by forest department, Awareness campaigns.
- **Target species:** chicken, duck, turkeys, goose, etc. in the farms, live bird markets, backyard poultry, slaughter points; Sampling any time when need arises, mostly during winter months
- **Sample category:** Serum, cloacal swab, tracheal swab, feces, dead birds and morbid materials
- **Sample scale:** As per surveillance plan of each state
- **Target serotype:** All subtypes of Influenza A virus
- **Testing method:**
 - **Serological tests:** AGID and HI
 - **RNA detection:**
 - Real time RT-PCR for matrix, H5 HA and N1 NA gene.
 - RT-PCR for NP/matrix gene, H1 to H15 and N1 to N9 subtypes
 - **Virus isolation:** In SPF embryonated chicken eggs
 - If a sample tests positive for H5N1 at the 1st stage of testing, the laboratory intimates the results to DADF, MOA, GOI who takes action as per Action Plan.
 - Since 2004, more than poultry 700,000 samples have been tested for Influenza

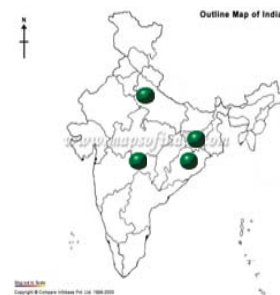
Control measures when H5N1 outbreak is detected

- Notification of the disease, Co-ordination with other agencies
- Strict movement control of men and material in and out of infected area
- Strengthening of surveillance; ; IEC campaign
- Stamping out of entire poultry population in a radius of 1 km with help of trained Rapid Response Teams
- “Spot Payment” of compensation to farmers for forced culling of birds/ destruction of eggs/ feed
- Advisories are issued to improve the bio-security in the premises, clean-up, disinfection, disposal etc.
- Post Operation Surveillance Plan for a period of three months

Active/ passive surveillance programme on wild birds in India

- Surveillance programme on wild birds is conducted periodically.
- Main aim of conducting surveillance programme on wild birds is to ascertain the prevalence of Influenza A Viruses in wild birds
- Surveillance is conducted during the migratory bird season or in case of abnormal mortality in wild birds.
- Target species are wild birds / migratory birds
- **Sample category and Testing Method :** Same as for Domestic Poultry
- There is no targeted sample scale.
- All subtypes of Influenza A viruses are targeted

Confirmed H5N1-HPAI in crows (2011-12)



In 2011-2012, some samples from crows were found positive for H5N1 virus.

The clade of the virus was found to be 2.3.2.1.

If H5N1 detected in wild birds?

- Declaration of the disease by the GOI so as to take suitable measures to stop the spread of disease to other birds, animals or human-beings
- Disposal of dead birds, disinfection of the areas
- Intensification of awareness campaign
- Intensify active surveillance in poultry



- Co-ordination with other agencies like Public Health, Environment & Forests, Wetlands etc.
- Advisories issued to all States to keep a strict vigil

National Policy – Vaccination/ Stamping Out

- **Vaccination Policy**

The country is open for vaccination against H5N1, depending upon the situation at that time.

However, no vaccination done till date because the outbreaks were:

- localized within extensive poultry population mainly backyard.
- Did not involve any precious stocks like parents/grand parents/pure lines.
- Stamping out policy to control the disease at source, worked well.
- The experts felt that using vaccine would be more troublesome in the given scenario.
- Support of Public health authorities for stamping out policy

- **Stamping Out Policy**

Stamping out of entire poultry in 1 km radius by decapitation/dislocation of the neck of the bird . As per revised Action Plan -2012, the culling zone has been reduced to 1 km from 3 km.

Actions to be undertaken in next 5 years: Virus circulation-Culprits

- Barring 2006 outbreak, the disease has been reported in NER/ ER states (different States/ Territories most of the times), more sporadic in nature and contained at source, hence it is not likely to be persistent in India.
- However, the main culprits allowing circulation of AI virus could be:
 - Intermingling of free range ducks with fowl
 - Inadequate biosecurity
 - Possible under-reporting
 - Porous borders



Measures to reduce the risks in next 5 years

- Awareness programme on prompt reporting, strengthening biosecurity/ personnel hygiene
- Regulation of live poultry markets
- Border controls; collaboration with neighboring countries
- Upgrading backyard poultry to a more bio-secure model (night shelter)
- Epidemiological study to better understand outbreaks for preventing future outbreaks
- Risk communication
- Integrated Surveillance: **One Health** approach for animal, human and wild life sectors

Indonesia

Poster Presentation

Dr Muhammad Azhar

Coordinator, HPAI Campaign Management Unit
Directorate of Animal Health
Directorate General of Livestock
and Animal Health Services

Poultry Production System (Layer and Broiler)

- DGLAHS poultry population data
- 3 Main Challenges to mitigate the risk of H5N1 virus at farmer's level
 - Limited regulation of poultry production throughout the country
 - General low standard of biosecurity on most farms
 - High density of sector 4 and high contract rate between sectors 3 and 4, both of which may contribute to H5N1 endemism in Indonesia
- Lessons learned in control to control/improve the risk of H5N1
 - Improved vaccination practices by farmers appears to have significantly reduced level of H5N1 virus in Indonesia
 - Use of local vaccine strains matched to circulating field virus
 - Farmers vaccinating during egg production rather than just during grow phase (pre-production)
 - Most occurrences of HN1 outbreaks in sector 4 (both poultry and ducks). Sector 4 may serve as the primary reservoir of the virus In Indonesia.
 - Passive surveillance by PDSR has been key in discovering the high level of circulation taking place in sector 4

Indonesia poultry production 2005-2011

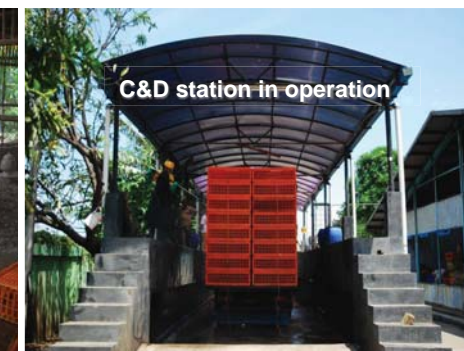
POULTRY TYPE	2005	2006	2007	2008	2009	2010	2011*
NATIVE CHICKENS (Sector 4)	278,954,000	291,085,000	272,251,000	243,423,000	249,963,000	257,544,000	274,893,000
LAYER (Sectors 2 and 3)	84,790,000	100,202,000	111,489,000	107,955,000	111,418,000	105,210,000	110,300,000
BROILER (Sectors 2 and 3)	811,189,000	797,527,000	891,659,000	902,052,000	1,026,379,000	986,872,000	1,041,968,000
DUCK (Sectors 3 and 4)	32,405,000	32,481,000	35,867,000	39,840,000	40,680,000	44,302,000	49,392,000
QUAIL (Sectors 3 and 4)	n/a	n/a	6,640,000	6,683,000	14,429,000	7,054,000	7,056,000
PIGEON (Sector 4)	n/a	n/a	163,000	1,499,000	5,149,000	490,000	420,000

* 2011 figures are preliminary

Live Bird Markets

- Characteristics and main roles of Live bird markets are the primary means of retail sale of poultry throughout Indonesia
 - Sale of chilled or frozen poultry meat becoming more common in urban areas such as Jakarta.
- Over 10,000 live bird markets estimated in Indonesia
- Supply chain/distribution : Most live bird markets source poultry from wholesale "collector yards" which serve as an intermediate trading point between farm and market

- Government's intervention: Cleaning and disinfection programme implemented in live bird markets and collector yards in the greater Jakarta area since 2009.
 - Market cleaning days
 - Rehabilitation of sub-standard live bird markets
 - Truck cleaning stations at collector yards
 - Construction of consolidated collector yard/slaughterhouses with regulated SOPs for poultry slaughtering
 - Branding of safely-slaughtered whole poultry carcasses (Ayam ASUH) as means of increasing consumer awareness and demand for safer chilled carcasses rather than freshly slaughtered live birds.



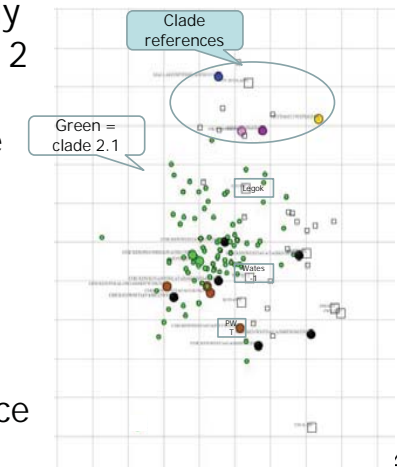
- Due to the separation between farm and live bird markets, as well as the accumulation of virus contamination into downstream urban markets with limited contact with poultry farms, live bird markets do not appear to be the primary means of spread of the H5N1 virus to poultry, however live bird markets may be a primary means of spreading virus to human populations. There is no apparent relationship between endemic areas and locations with highly contaminated markets.
- Live poultry markets along with duck population play a key role in spreading, maintaining H5N1 virus circulation in ecosystems. What are the key points/factors to reduce such risk of H5N1 at a live bird market level? Please describe at least 3 realistic and feasible actions to be undertaken to improve the situation in your country.

Recent H5N1 Outbreaks in Domestic and Wild Birds

- **PDSR/SMS data**
- **DIC surveillance data**
- **All viruses within clade 2.1.3. Most within 2.1.3.2 subclade.**
- **No significant evolution within past 2 years.**
- Please describe recent H5N1 outbreaks in the last 3 years covering the following points.
 - (1) Number of outbreaks/cases
 - (2) Affected premises (backyard, small scale farm, live bird markets, etc.)
 - (3) Species of affected birds
 - (4) Clade of virus, genetic evolution of viruses, etc.

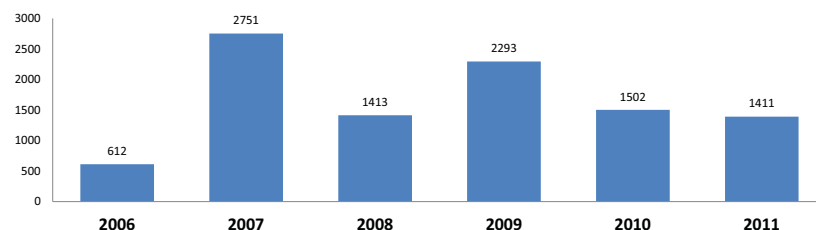
Accomplished

- Identified 4 new antigenically relevant vaccine strains and 2 challenge strains for use by GOI and Indonesian vaccine manufacturers. New strain vaccines being produced.
- Pioneered application of antigenic cartography, a technique to characterize human influenza viruses since 2002, using avian sera.

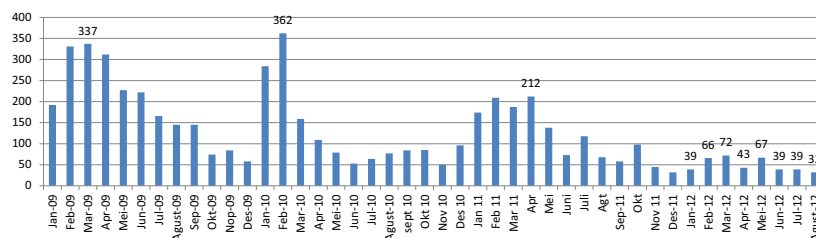


4

Cases of HPAI in Backyard Poultry (mostly) by PDSR Data

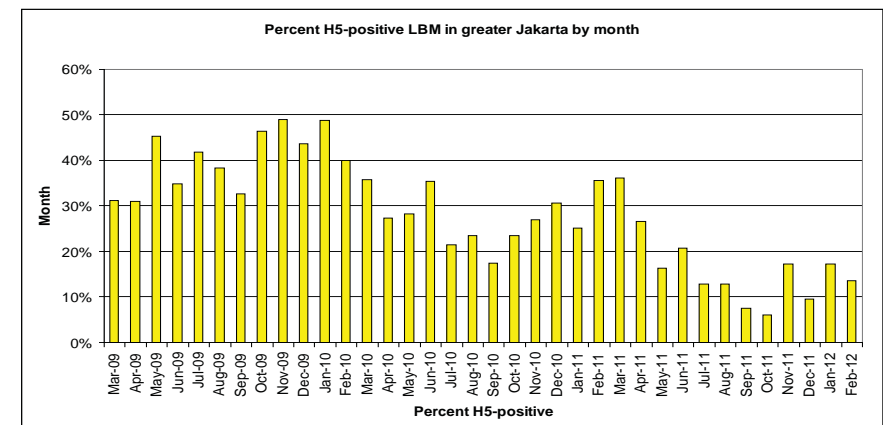


Number of Positive Cases per Month 2009-2012



Live Poultry Market

1. Surveillance of prevalence in collector yard and traditional markets in Greater Jakarta. Declining trend of prevalence in commercial poultry farm since 2009-2012.



Active Surveillance Programme in Domestic Birds

- In general, active surveillance is not a cost-effective means of detecting H5N1 virus in poultry
- In Indonesia, a specially designed live bird market surveillance programme is used to periodically determine the prevalence of H5-contaminated markets
 - The LBM environmental surveillance system is used to assess progress in controlling H5N1 in commercial poultry
- Active surveillance by local government is no longer supported because passive surveillance much more effective at detecting H5N1 outbreaks.

Influenza A Virus Prevalence Studies in Indonesia

- LBM Influenza A (matrix PCR) data
- Limited government financial and laboratory resources to study other influenza A viruses
- Apart from the above mentioned surveillance programme, If your country or international organizations in your country conducted influenza A virus prevalence studies on small scale farms, please describe it and show results/findings of recent studies.
- Apart from the above mentioned surveillance programme, If your country or international organizations in your country conducted influenza A virus prevalence studies on live poultry markets , please describe it and show the results/findings of recent studies.

Accomplishments of LBM surveillance

Goal: determine prevalence of H5-contaminated live bird markets over time.

Started in March 2009, 261 live bird markets included in the study. Environmental swabs from 5 sites pooled into one VTM sample. PCR testing for both matrix and H5

Overall LBM surveillance results

From 5,862 environmental samples collected
47.2% influenza A virus positive
26.2% H5 subtype positive results

The data showed a progressively decreasing prevalence in both matrix and H5-positive samples each year:

2009: 68.2% matrix-positive and 40.1% H5-positive
2010: 50.3% matrix-positive and 28.8% H5-positive
2011: 35.6% matrix-positive and 18.9% H5-positive

Seasonal pattern increasingly evident in 2010 and 2011

Active/passive surveillance on wild birds, if any

- Due to the endemic nature of H5N1 in domestic poultry and limited control programme resources, active surveillance in wild birds is not a priority and not implemented.

Control Measures

- Vaccination policy
 - Government mandates challenge strains by which vaccines must be measured against.
 - Private sector responsibility to vaccinate
 - All breeder/parent stock and layers should be vaccinated throughout life cycle (at least 3 times before lay and 2 times during lay)
- In H5N1-endemic areas of Indonesia, geographic stamping out is not supported. Stamping out policy is implemented to province which still remain free from H5N1 when occur first outbreak
- Focal culling of infected flocks is carried out by local government PDSR-trained officers in sector 4 poultry.

- Most breeder and layer producers vaccinate against H5N1, however there is still significant variation in vaccine strain selection and schedule.
- Due to the endemic nature of the disease, in commercial poultry (sectors 1-3), the primary control measure is disease prevention via vaccination and improved biosecurity, rather than reactive outbreak control measures.
- In sector 4, the control measures are focal culling of the infected flock, cleaning and disinfection of the affected premise, and confinement of healthy poultry. The prevention strategy is improving poultry health via improved village biosecurity and reducing contact rate by increasing fencing or caging of village poultry.

Actions to be undertaken in the next 5 years

- Endemism appears to be driven by ongoing circulation in sector 4 (chickens and ducks) or combination of sectors 4 and 3.
- Greater effort is necessary to determine how to control virus in sector 4
- Lack of effective compensation is still an obstacle which decreases commercial farmer incentive for reporting and limits government's ability to contain large outbreak events
- Live bird markets in mega-urban areas appear a significant risk to spreading virus to humans, but not to poultry farms.
- Duck populations alone do not appear to be the significant reservoir for endemicity or source of virus spread. (Indonesian H5N1 strains generally not pathogenic in ducks).
- In your country, H5N1 virus is persistent and has been circulating in ecosystems and causing economic losses and public health concerns. Why do you think that the disease is persistent in your territory? What would be the main culprits that allow the virus to maintain its circulation in ecosystems? Please describe your observations in this regard.

Actions to be undertaken in the next 5 years

- Improve vaccination practices by poultry farmers and continue to closely regulation approved vaccine strains based on ongoing antigenic analysis of circulating field strains.
- Develop private sector-funded culling compensation programme for broiler farmers for use in H5N1 outbreaks (based on small premium added to DOC price)
- Evaluate alternative strategies to reduce transmission of H5N1 virus in sector 4, such as by reducing contact rate via increased fencing or caging of poultry.
- Identify and promote cost-effective biosecurity practices for commercial poultry farms
- In this context, what should be undertaken to reduce the risk/level of H5N1 virus in ecosystems in your country in the next 5 years, so that you could change and improve the H5N1 situation step by step. Please describe at least 3 realistic, feasible and effective actions and/or measures to be undertaken to decrease the virus (circulation) level in your country.

How/Why has HPAI H5N1 virus been able to maintain its circulation in ecosystems in our region?

- Discuss later together

What would be the main culprits for allowing the virus to maintain its circulation in the environment in our region?

- Discuss later together

How could we break the virus circulation in our ecosystems to gradually reduce the level of H5N1 virus?

- Discuss together

What kind of actions should be undertaken in the next 5 years to gradually reduce H5N1 virus in the environment?

- Discuss together

Country poster presentation

JAPAN

Noriyoshi OJIMA, DVM
Animal Health Division
Ministry of Agriculture, Forestry and Fisheries
The 5th OIE Regional Meeting on Strengthening Animal Health
Information Networking for HPAI control and prevention in Asia
Hanoi, Vietnam, 2-3 October 2012

Poultry production system

1. Populations of poultry and others (As of 1 Oct, 2011)

Broiler	Layer	Breeder	Ostrich	Duck	Turkey	Japanese quail	Guinea fowl	Pheasant
144mil	187mil	18.4mil	3,230	264,000	3,230	5.26mil	11,600	87,900

(unit: birds)

2. Slaughtered birds for meat in 2011

Slaughtered birds
for meat

714 millions

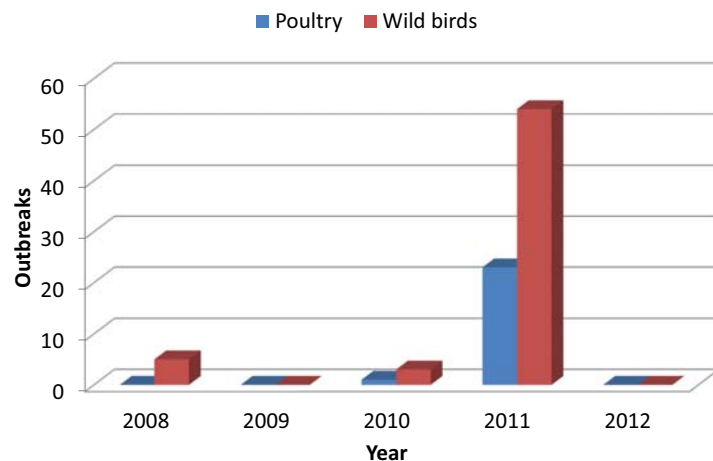
• There are **no live bird markets** and **few holdings of backyard production** in Japan

3. The number of chickens by farm size (As of 1 Oct, 2011)

(unit: birds)

Farm size	< 100	100 - 99,999	100,000≤
Broiler	22,600	103mil	40,6mil
Layer	300,000	70.3mil	116mil

H5N1 outbreaks in domestic and wild birds in the last 5 years



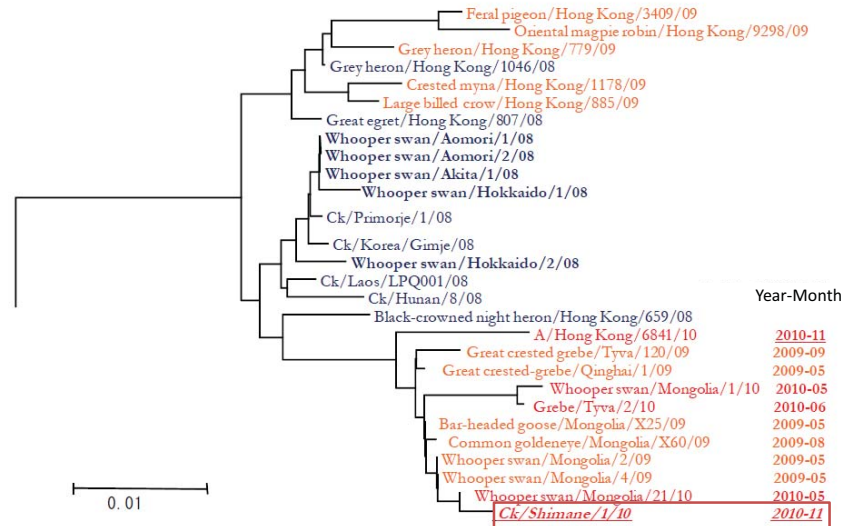
Overview of the recent HPAI outbreaks in poultry in Japan (2010-2011)

- There were 24 outbreaks of HPAI in 9 prefectures between November 2010 and March 2011.
- A total of 1,850 thousand poultry were affected and all destroyed.
- Thirteen out of 24 outbreaks were in Miyazaki prefecture; 1 or 2 outbreaks in other prefectures.
- Japan declared itself free from notifiable avian influenza with effect from 25 June 2011.

【Epidemiology】

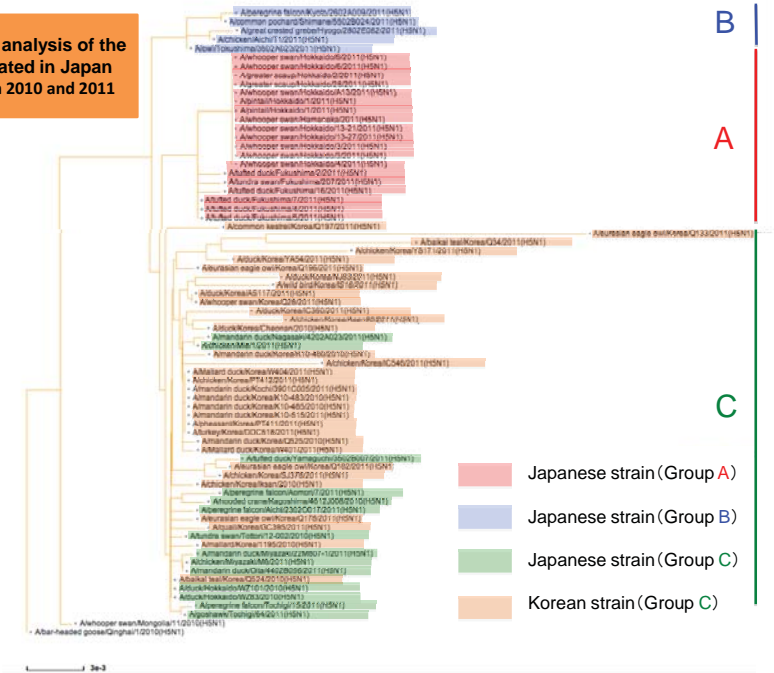
- In October 2010, HPAI virus was isolated from feces of wild ducks in Hokkaido.
- The isolates from the cases are classified into clade 2.3.2 and closely-related strains with the viruses isolated in Hokkaido.
- Seven out of 24 outbreaks were located near lakes, rivers and/or ponds inhabited by wild waterbirds.
- For 5 outbreaks, untreated surface water was used.

Phylogenetic analysis of the virus isolated in Shimane



5

Phylogenetic analysis of the viruses isolated in Japan and Korea in 2010 and 2011

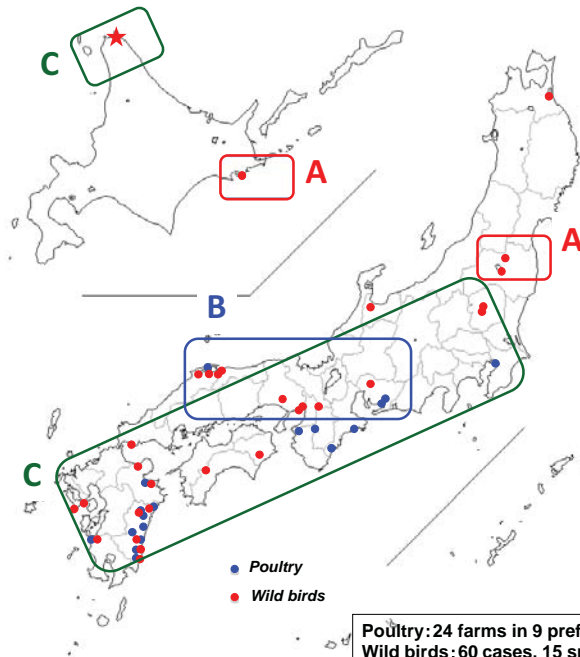


B

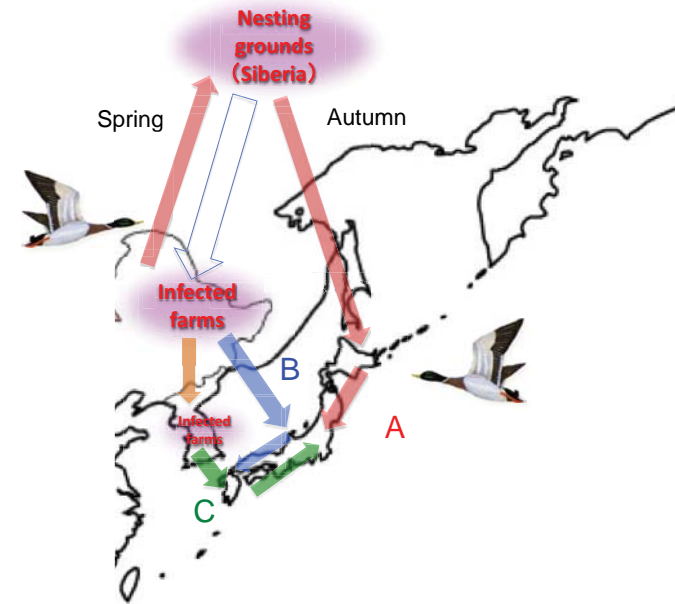
A

C

Japanese strain (Group A)
Japanese strain (Group B)
Japanese strain (Group C)
Korean strain (Group C)



Poultry: 24 farms in 9 prefectures
Wild birds: 60 cases, 15 species in 16 prefectures



Flying routs of migratory birds and virus spreading (hypothesis)

Why so many outbreaks occurred in 2010-11 ?

- Its answer is still inconclusive.
- It was presumed that migratory birds from the north such as Siberia were infected in China or Korea *en route* to Japan.
- But for the recent outbreaks, it is considered that migratory birds infected with the viruses in the north such as Siberia came flying directly to Japan. Nesting grounds in the north may have been contaminated with the viruses.

Active surveillance on domestic birds

- Each prefectural veterinary authority has local veterinary service centers, which put control measures in the front line and give producers guidance. As of 1 July 2012, a total of 171 local veterinary service centers are established in Japan.
- Each local veterinary service center has been doing both **fixed point monitoring** and **intensive monitoring** as surveillance for early detection of poultry diseases such as Avian influenza.
- For **the fixed point monitoring**, at least 3 farms are selected by each center among high risk farms such as those located around places where wild birds come flying, and at least 10 samples are collected for antigen and antibody tests from each farm every month.
- For **the intensive monitoring**, target farms are selected randomly at a level sufficient to detect 10% prevalence with at least 95% level of confidence, and at least 10 samples are collected for antibody tests from each farm.
- In addition, Avian influenza is notifiable in Japan by law. Owners or private veterinarians must report it if they find suspicious cases or confirm that the number of dead poultry per day increase more than twice than the average number of those during 21 days before the day.

Active surveillance on domestic birds

Fixed point monitoring

1. Frequency: once a month
2. Timing: all the year round
3. Target species: poultry
4. Target premises: at least 3 farms are selected by each local veterinary service center among high risk farms
5. Sample scale: at least 10 birds/farm
6. Sample category: cloacal and tracheal Swab, blood and viscera of dead poultry
7. Target serotype of influenza A virus: H5, H7 and others
8. Testing method: virus isolation and serological test
9. Next step in case of positive: clinical inspection, genetic analysis, virus isolation (retest), serological test (retest)

Intensive monitoring

1. Frequency: schedule designed, taking coming flying of migratory birds into account
2. Timing: from October to May in principle
3. Target species: poultry
4. Target premises: selected randomly at a level sufficient to detect 10% prevalence with at least 95% level of confidence, among those which has no less than 100 poultry or no less than 10 ostrich
5. Sample scale: at least 10 birds/farm
6. Sample category: blood
7. Target serotype of influenza A virus: H5, H7 and others
8. Testing method: serological test
9. Next step in case of positive: clinical inspection, genetic analysis, virus isolation, serological test (retest)

Active surveillance on domestic birds

Results of the surveillance

(July 2011-June 2012)

Month/Year	Fixed Point Monitoring			Intensive Monitoring		
	Farms	Poultry	Result	Farms	Poultry	Result
7/2011	525	5,270	Negative	352	4,203	Negative
8/2011	522	5,240	Negative	266	2,700	Negative
9/2011	521	5,230	Negative	296	3,234	Negative
10/2011	511	5,129	Negative	337	3,940	Negative
11/2011	527	5,279	Negative	364	4,070	Negative
12/2011	508	5,095	Negative	274	2,940	Negative
1/2012	526	5,278	Negative	208	2,130	Negative
2/2012	523	5,249	Negative	187	1,945	Negative
3/2012	524	5,258	Negative	107	1,005	Negative
4/2012	520	5,224	Negative	134	1,335	Negative
5/2012	517	5,181	Negative	207	2,070	Negative
6/2012	516	5,177	Negative	108	1,060	Negative

Active/passive surveillance on wild birds

- Each prefectural wildlife conservation authority has been conducting inhabitation research, dead bird inspections, Feces investigations and environmental research to early detect avian influenza and to comprehend the infection range.

	Inhabitation research	Dead bird inspections	Feces investigations	Environmental research
Frequency	Routine	Routine	4 times a year 8 times a year only in Hokkaido	When necessary
Timing	All the year around	All the year around	From October to April	In case of HPAI outbreaks
Target species	Wild birds with high risk	Wild birds with high risk	Anseriformes	
Sample scale		All dead wild birds notified	53 places in Japan 100 feces/place	The surroundings of HPAI outbreaks
Sample category		Cloacal and tracheal Swab	Feces	Water, feces, captured wild birds and others
Target serotype		H5, H7 and others	H5, H7 and others	H5, H7 and others
Testing method	Information collecting	Rapid antigen detection test	Genetic analysis	Virus isolation and identification
Next step in case of positive		Genetic analysis Virus isolation and identification	Virus isolation and identification	

Active/passive surveillance on wild birds

Results of the surveillance

Year	Dead bird inspections			Feces investigations		
	Samples	HPAIV	LPAIV	Samples	HPAIV	LPAIV
2008-2009 (Oct-May)	517	0	0	13,628	0	19
2009-2010 (Oct-May)	185	0	0	14,009	0	14
2010-2011 (Oct-May)	5,649	60	0	24,191	0	38
2011-2012 (Oct-May)	404	0	2	13,536	0	30

Basic policies against Avian Influenza

1. Prevention of the outbreak

- Provision of information
- Biosecurity standards
- Animal quarantine
- On-the-spot inspection
- Training course
- Wildlife surveillance

2. Early detection and notification

- Mandatory notification of abnormalities
- Active surveillance (fixed point monitoring and intensive monitoring)
- Full compensation

3. Rapid and appropriate initial responses

- Dispatch of veterinary officers
- Rapid analysis
- Self-imposed movement restriction



- Stamping-out
- Mandatory movement and shipment restriction
- Disinfection
- Block of the traffic
- Surveillance

Preparedness

- Improvement of capacities
- Coordination and cooperation
- A list of experts
- Comprehension of information of farms
- Securing vaccines for emergency

Policy on vaccination against Avian Influenza

1. Prohibition of preventive vaccination

Japanese government will not permit to ordinarily use the vaccine to prevent the outbreak because of the following reasons:

- Recent AI vaccines have an effect on control AI outbreaks but cannot perfectly protect poultry against AI infection;
- Unplanned and disordered vaccination could produce the risk of missing outbreak or prevalence of AI as well as interfere with antibody tests to confirm the freedom and be in danger of incurring long and large economic load and confusion; and
- For broiler, the vaccination may cause problems of food safety due to drug residue.

2. Emergency vaccination

Japanese government will decide to conduct emergency vaccination only when it is considered that it would be difficult to prevent AI from spreading only by stamping out and movement restrictions, taking into account the following factors:

- Progress of control measures including destroying poultry by burying;
- Spread of the infection (the number of epidemiologically related farms)
- Environmental factors (the number of surrounding farms, density of poultry, existence of mountains and rivers)

Policy on stamping out against Avian Influenza

1. Confirmed and suspicious cases of Highly Pathogenic Avian Influenza (HPAI)

Japanese government recognize poultry as confirmed cases or suspicious cases of HPAI according to the following criteria.

① Confirmed cases of HPAI

- Poultry from which virus isolated are diagnosed as highly pathogenic; or
- Poultry from which H5 or H7 serotype specific genes are detected and which gene sequences of virus isolated are considered highly pathogenic by gene analysis.

② Suspicious cases of HPAI

- Poultry which are kept in farms where the confirmed cases are detected;
- Poultry which are kept in farms where poultry showing HPAI specific clinical signs are detected and which:
 - Are kept in epidemiologically related farms and from which antigens of influenza A are detected;
 - H5 or H7 serotype specific genes are detected from;
 - Viruses isolated from have H5 or H7 serotype specific genes or are confirmed as H5 or H7 serotype by HI test; or
 - Antibody against H5 or H7 serotype are detected from.
- Poultry which are kept in farms where suspicious cases are detected;
- Poultry which are kept in farms where persons who are directly involved in keeping poultry at affected farms directly contact with poultry for treatment;
- Poultry which are confirmed to be contacted with confirmed or suspicious cases within 7 days before the recognition of them; or
- Poultry which are confirmed to be contacted with confirmed or suspicious cases more than 7 days before the recognition of them as well as are recognized to have probability to become confirmed cases by prefectural veterinary officers.

Policy on stamping out against Avian Influenza

2. Slaughter

- Confirmed and suspicious cases of HPAI should be slaughtered in principle within 24 hours after the diagnosis.
- The slaughter should be conducted in principle in the poultry houses.
- The slaughter should be conducted by killing with carbon dioxide gas, fire fighting foam and the like.

3. Management of dead poultry

- Dead poultry of confirmed and suspicious cases should be destroyed in principle within 72 hours after the diagnosis by fire, or by burying in the farms or the surroundings which are not close to human habitations, the source of water supply, rivers or roads as well as which people and poultry do not usually come near.
- If the dead poultry unavoidably have to be transferred from the farms to other places for destroying by fire or burying, prefectural veterinary authorities should adopt prescribed measures including disinfection of vehicles.
- If it is difficult to destroy the dead poultry by fire or burying, they should be destroyed by rendering.

Other principal control measures to be taken when HPAI is detected

1. Movement and shipment restriction

- Movement and Carrying-out of poultry and others are prohibited in movement restriction zones and shipment restriction zones, respectively, which are established promptly after the diagnosis.
- Movement restriction zones: in principle within 3 km around affected farms
- Shipment restriction zones: in principle within 7 km from the periphery of the movement restriction zones
- Target: live poultry, poultry eggs, dead poultry, bedding, feed, excretions and the like, and equipments for poultry
- In the movement restriction zones, it is suspended to operate slaughterhouses (except meat processing facilities), GP centers and hatchery and to hold poultry gathering events such as exhibitions.
- Lifting: 21 days after completion of control measures at all affected farms in the movement restriction zones

2. Establishment of disinfection stations

- Prefectural veterinary authorities should establish disinfection stations around affected farms and at borders of movement and shipment restriction zones and other places promptly after the diagnosis.

3. Control and block of the traffic

- Prefectural veterinary authorities or municipalities should control or block the traffic around affected farms for no more than 72 hours immediately after the diagnosis.

What should be undertaken in the next 5 years to reduce the risk/level of H5N1 virus in Asia?

- ◆ Surveillance of wild birds and poultry in Vietnam and Mongolia
- ◆ Development of vaccine exit strategies of countries which are ordinarily using AI vaccines
- ◆ Capacity building of veterinary services

Country Poster Presentation

Republic of Korea



I. Poultry production in the Republic of Korea

- More than 90% of poultry producers are large-scale (sector-1,2) with moderate to high biosecurity.
 - Categorized farms by herd size (Sector-1 : more than 50,000, Sector-2 : 50,000~10,000, Sector-3 : under 10,000 in chicken)

Category	Chicken		Duck		Total	
	No. of farm	No. of poultry	No. of farm	No. of poultry	No. of farm	No. of poultry
Sector-1 (more than 50,000)	1,104	102,007,410	8	480,300	1,112	102,487,710
Sector-2 (50,000~10,000)	1,994	55,676,650	605	9,606,297	2,599	65,282,947
Sector-3 (Under 10,000)	339	2,018,915	366	2,516,569	705	4,535,484
Total	3,437	159,702,975	979	12,603,166	4,416	172,306,141



I. Poultry production in the Republic of Korea

Chicken - 3,791 farms 170 million heads

As of Jun 2012

- Breeder : 354 farms 10.3 million heads
- Layer : 1,379 farms 61.9 million heads
- Broiler : 2,058 farms 97.8 million heads

Duck - 979 farms 12.6 million heads

As of Jun 2012

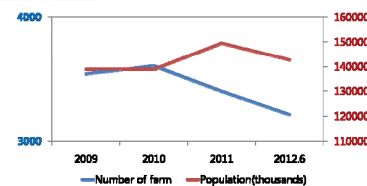
- Breeder : 111 farms 1.1 million heads
- Broiler : 868 farms 11.4 million heads

Other species - 2,481 farms 14 million heads

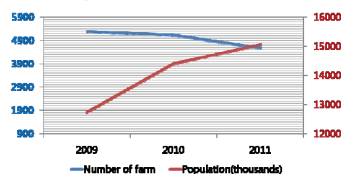
As of Dec 2011

- Turkey : 487 farms 7.4 thousand heads
- Goose : 971 farms 9.3 thousand heads
- Quail : 127 farms 13,460 thousand heads
- Ornamental birds : 529 farms 83.5 thousand heads
- Ostrich : 136 farms 1.8 thousand heads
- Pheasant : 231 farms 325.3 thousand heads

Chicken

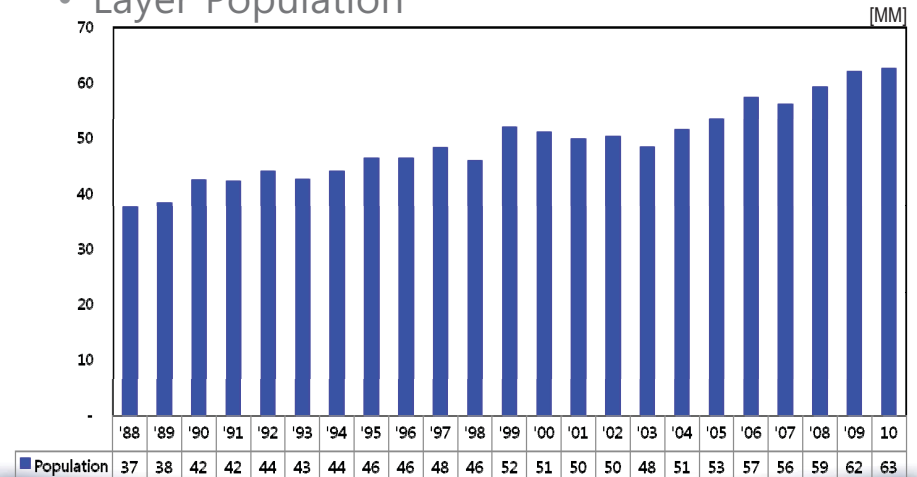


Duck



Poultry Industry of Korea

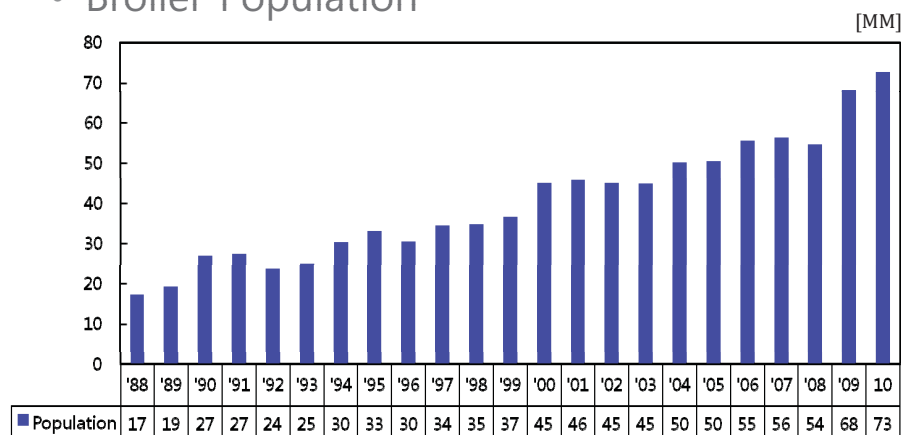
Layer Population



CHALLENGE & EDMAHO Toward Sustainable Growth

Poultry Industry of Korea

• Broiler Population



I. Poultry production in the Republic of Korea

■ Number of poultry by species in the last 3 years

Category	2009	2010	2011
Chicken	138,768,000	149,200,000	149,511,000
Duck	12,733,275	14,397,301	15,053,352
Others	12,305,798	13,888,085	13,816,042
Total	163,807,073	177,485,386	178,380,394

Main problems/ challenges for H5N1 control at farmer's level in ROK

- Migratory birds
- Transmitting factors
 - Visit by people or cars
 - Supplying residual feed
 - Direct contact
- Small scale farmers are not inclined to report sick birds to the local VS.

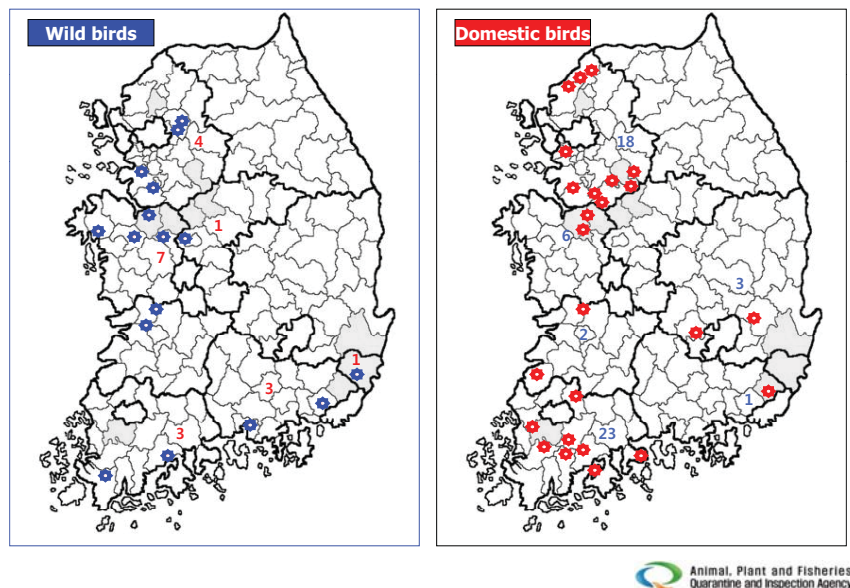
Good practices to control the risk of H5N1

- Designating and operating transporting vehicles only for chickens, ducks, eggs.
- Strengthening preventive measures for slaughter houses
 - Location of government officials
- Inspection of live poultry markets and restriction on selling

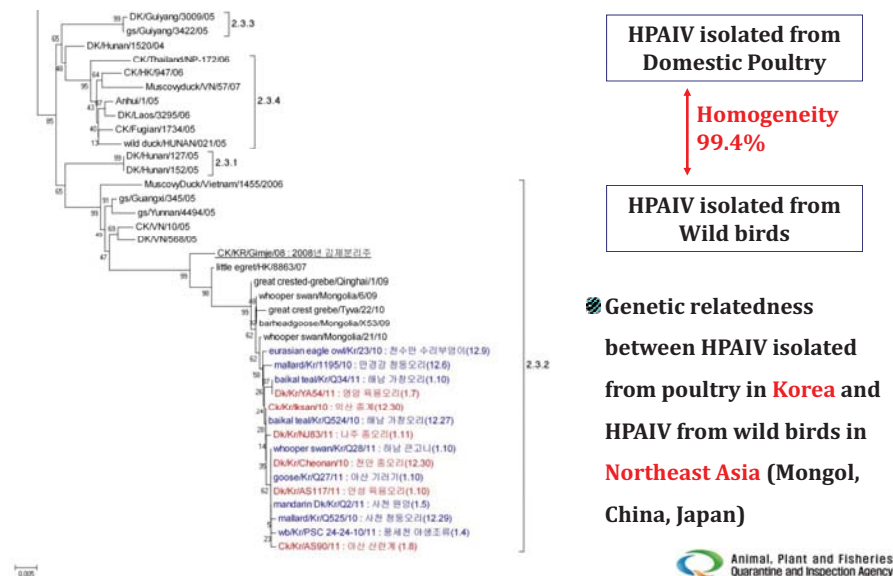
III. Recent H5N1 outbreaks in the Republic of Korea

Classification	2003 / 2004	2006 / 2007	2008	2010/2011
Duration	2003.12.10 ~ 2004. 3.20 (102days)	2006.11.22 ~ 2007. 3. 6 (104 days)	2008. 4. 1 ~ 2008. 5.12 (42 days)	2010.12.29 ~2011.5.16 (139 days)
Administrative areas	7 Provinces (10 Si/Gun)	3 Provinces (5 Si/Gun)	11 Metro cities/ Provinces (19 Si/Gun/Gu)	6 Provinces (25 Si/Gun)
Outbreaks	19	7	33	53
Affected poultry farms	Chicken 10, Duck 9	Chicken 4, Duck 2, Quail 1	Chicken 24, Duck 8, Others 1	Chicken 18, Duck 33, Quail 1, Pheasant 1
No. of poultry culled	392 farms 5,285 thousands	460 farms 2,800 thousands	670 farms 10,204 thousands	283 farms 6,427 thousands
Antigenic clade	HA 2.5	HA 2.2	HA 2.3.2	HA 2.3.2
Genetic analysis	Similar to isolates from migratory birds	Similar to isolates from migratory birds	Similar to isolates from migratory birds	Similar to isolates from migratory birds (99.4%)
Indemnity	\$ 153 million	\$ 58 million	\$ 307 million	\$ 82.2 million
Declaration of HPAI Free	2004.9.21	2007.6.18	2008.8.15	2011.9.5

III. Recent H5N1 outbreaks in the Republic of Korea



III. Recent H5N1 outbreaks in the Republic of Korea



III. Recent H5N1 outbreaks in the Republic of Korea

■ Epidemiological investigation

Migratory birds are suspected to be introducing factor

- **H5N1** was isolated from wild birds (including feces)
- **HPAIVs** isolated from wild birds and domestic **HPAI** outbreak farms were identified to belong in **the same genetic group (HA 2.3.2.)**
- **HPAIVs** isolated from domestic wild birds are similar to the virus from **great-crested grebe in Chinghai, 2009 and whooper swan in Mongolia, 2009 & 2010.**

Transmitting factors

- **Visit by people or cars** contaminated with feces of infected wild birds inhabiting the area nearby farm (Highest possibility)
- **Supplying residual feed** contaminated with feces of infected wild birds
- **Direct contact** with infected wild birds (in case of pasturage)
- **Farmer's visit** to contaminated farm (or meeting)

III. Recent H5N1 outbreaks in the Republic of Korea

■ Emergency response against HPAI outbreaks

Outbreak area

- Management of the AI Central-Preventive Headquarters
- Setting-up & maintenance of the Control Area (10km radius)
- Serological test of duck farms (Control Area)
- Disinfection & Emergency observation
- Installation of the mesh of domestic farms
- Movement control for 14 days

Free area

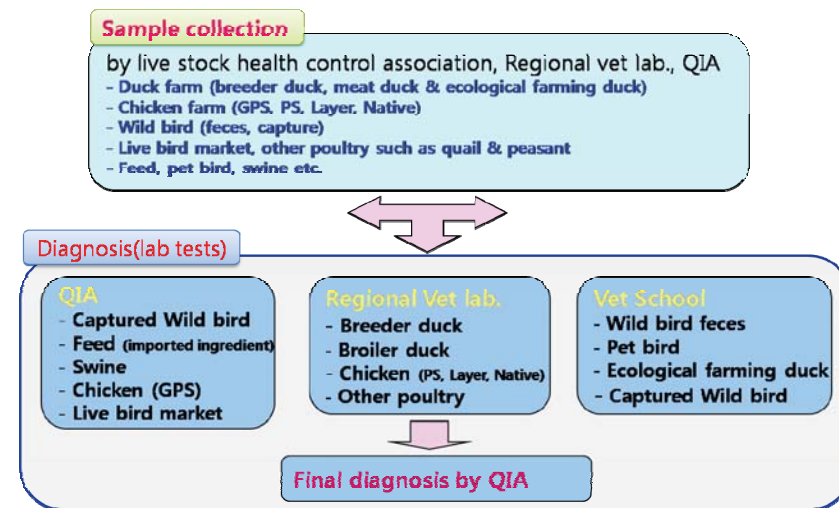
- Restrictions on visitor access (Vehicles, people, etc)
- Strengthening of the observation of fowl farms
- Promotion of AI preventive methods (sending SMS text messages)

IV~ V. Surveillance program on domestic/wild birds

Classification		Testing period	The frequency of testing	Testing item	Institute in charge
Breeding duck		Mar~Apr, Jun~Jul, Sep~Oct, Dec	4 times	Ag, Ab	(Primary test) Regional(Si・Do) Lab. (Confirmative test) QIA
Meat duck				Ag	
Poultry being sold in the regional market		Feb~Apr, Sep~Dec	2 times	Ag	(Primary test) Vet. Univ., etc (Confirmative test) QIA
Natural agricultural method for raising ducks		May~Jul	1 time	Ag, Ab	
Capturing wild birds		Ordinary times	-	Ag, Ab	
Feces from wild birds		Jan~May, Oct~Dec	8 months	Ag	
Fowls for viewing or exhibition		Jan~Feb, Sep~Oct	2 times	Ag	QIA
Pigs being raised in the hazardous area of AI		Jan~May, Sep~Dec	1 time	Ag	
Imported materials for livestock feed		Jan~Dec	1 time	Ag	
LPAI (H5/H7) Ab test	GPS	120 days ~ Before laying	2 time (per group)	Ab	(Primary test) Regional(Si・Do) Lab. (Confirmative test) QIA
	PS	Jan~May, Sep~Dec	2 time		
	Layer				
	KNC				

IV~ V. Surveillance program on domestic/wild birds

National Plan for AI monitoring system



IV~ V. Surveillance program on domestic/wild birds

Result of AI surveillance in 2011

Classification			Tests		Positive	Serotypes
			Farms (spots)	Tests		
Duck	Breeder	Ag	526	6,079	14 farms	H3(4),H4(5),H3-H4(2),H3-H12(1), H3-H4-H12(1), H6-H11(1)
		Ab	483	52,638	1 farms	H5(1)
	Broiler	Ag	3,544	21,028	11 farms	H1(1), H3(6), H6(2), H11(2)
		Ab	25	50	-	-
	Eco-farming	Ag	25	250	-	-
Wild bird	Feces	Ag	1,276	5,148	34 cases	H1(3),H3(3), H4(3), H6(7), H7(12), H9(2), H10(2), H12(2)
		Ab	67	2,008	2 birds	H1(1), H7(1)
	Captured	Ag	67	1,956	70 birds	H5(69), H7(1)
		Ab	67	1,956	70 birds	H5(69), H7(1)
Chicken		Ab	1,675	76,913	-	-
Live bird market		Ag	228	2,675	8 cases	H6(3), H9(5)
Other poultry (quail, turkey, peasant, etc)		Ag	322	3,800	2 farms*	H7(1)*, H9(1)
		Ab	290	4,959	1 farms	H7(1)
Pet (ornamental) bird		Ag	235	470	-	-
Pig in AI hazardous area		Ag	1,135	20,363	-	-
Imported feed material		Ag	12	318	-	-
Total			9,910	198,655	※ All Ag serotypes were LPAI	

VI. Control Measures

Principle of control policy

- Prompt stamping out of affected flocks (500m or 3km)

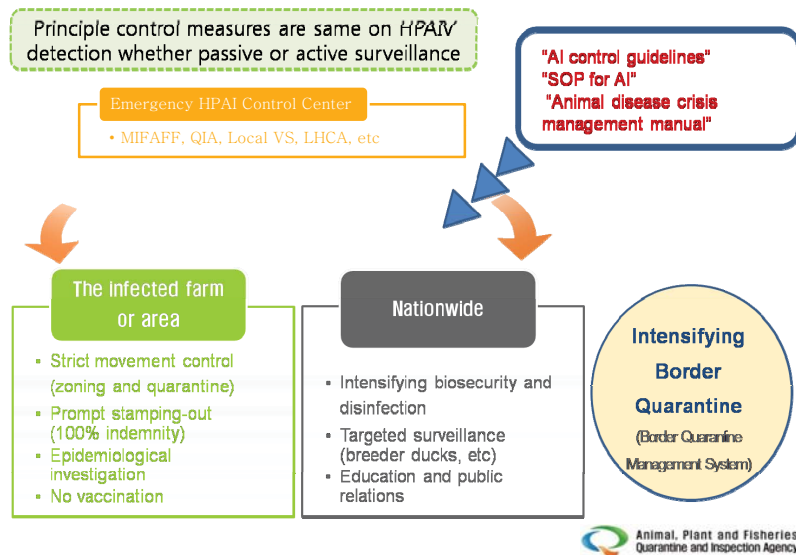
Vaccination policy – prohibited

- Capable of manufacturing inactivated virus vaccine
- But, vaccination will be applied only if HPAI outbreak is uncontrollable (like FMD vaccination case of Nov 2010)
- The decision will be made by the 'Council for Animal Disease Control'

Risk assessment to prevent virus introduction

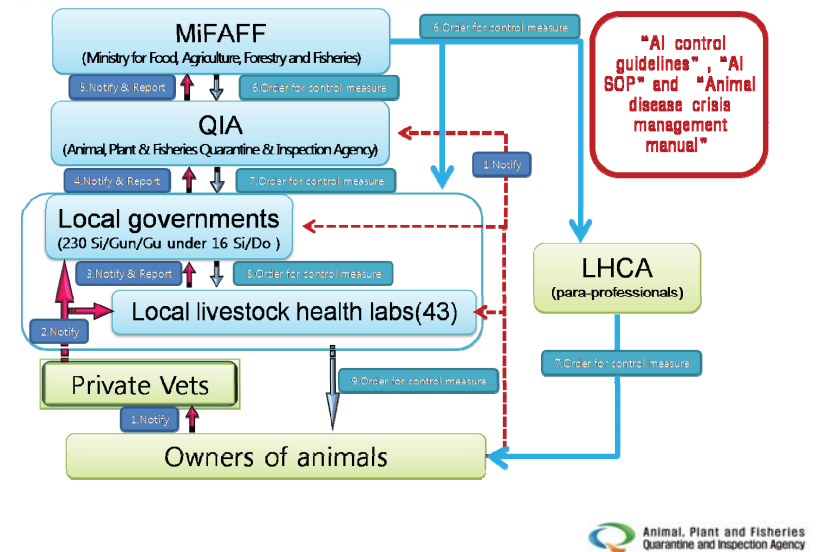
- Early warning system based on routine surveillance
- Strong border quarantine (Poultry import prohibition from HPAI infected country)

VI. Control Measures (Without Vaccine)



VI. Control Measures (Principal control measures)

ANIMAL DISEASE CONTROL SYSTEM IN KOREA



V. Actions to be undertaken

- Improving AI preventing system
 - Gradually increasing monitoring inspection
 - * The number of capturing inspection for wild birds
[2010 (1600) → 2011(2000) → 2012(2000)]
 - Strengthening active surveillance during the arrival of migratory birds
- Enhancing AI preventing ability through the improvement of AI diagnostic capacity, etc.
- Promoting cooperation between central and local veterinary service
- Increasing public relations to prevent the spread of AI
- Improving AI-related regulations and guidelines
 - AI control guidelines
 - Standard Operating Procedure (SOP) for AI

Thank you !