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Avian Influenza Disease Update, Control Strategy, and Poultry Vaccination in Indonesia

KEMENTERIAN PERTANIAN
REPUBLIK INDONESIA

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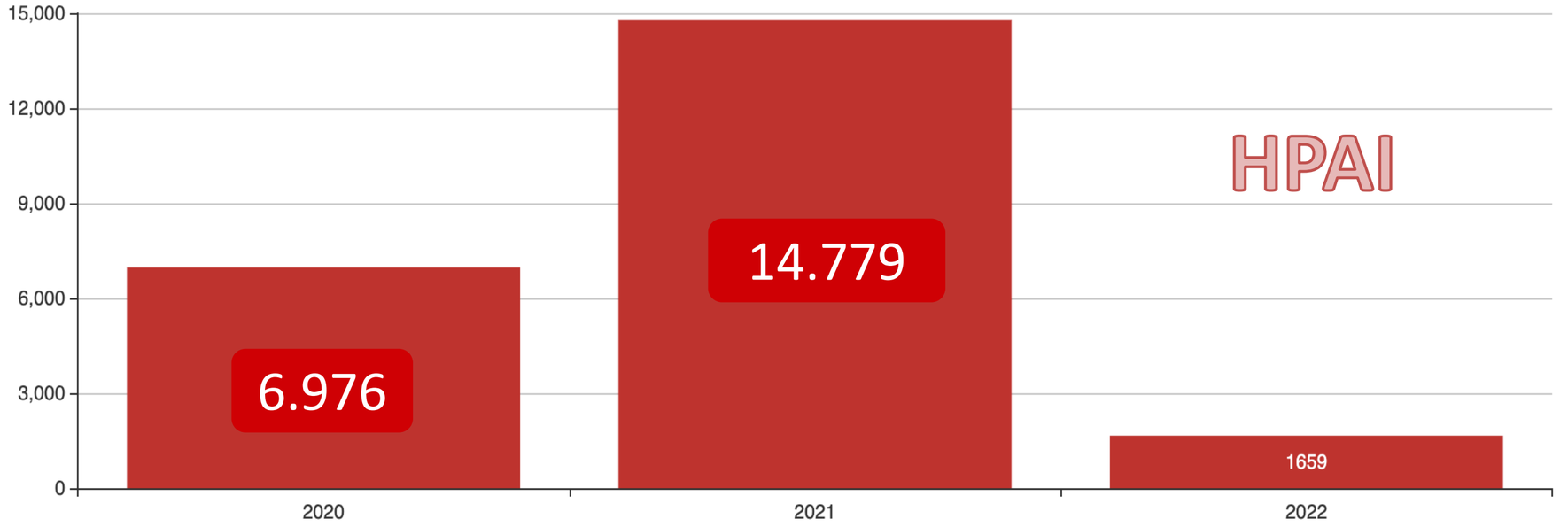
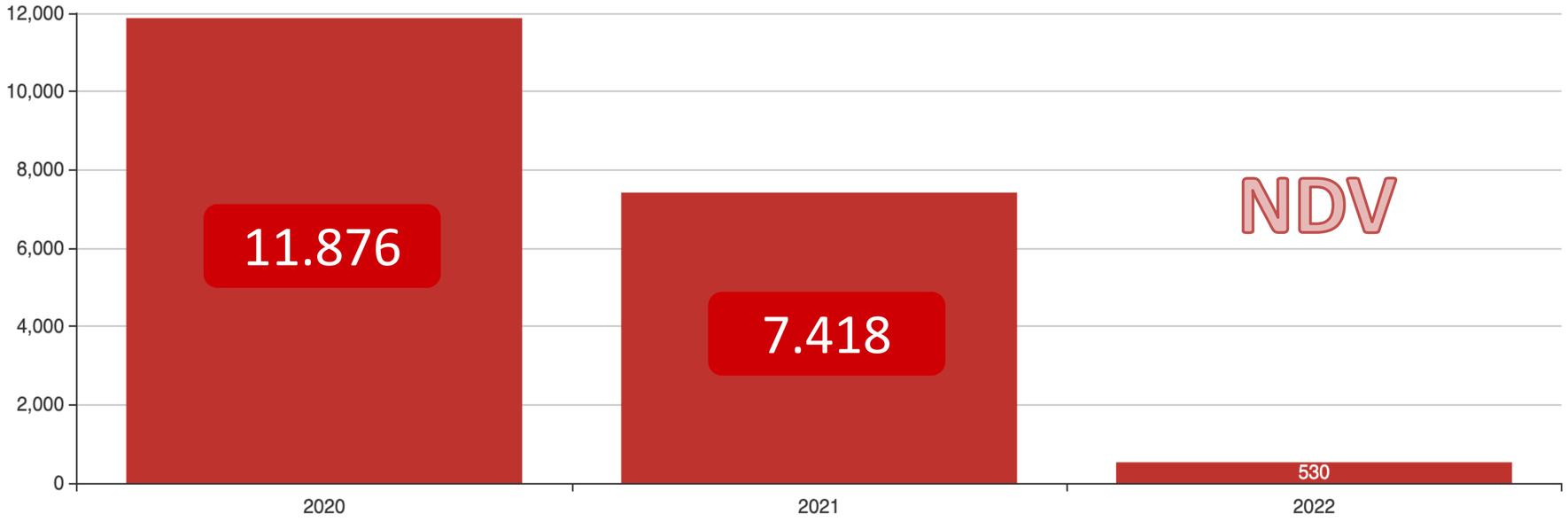
Avian Disease and Diagnostics Update

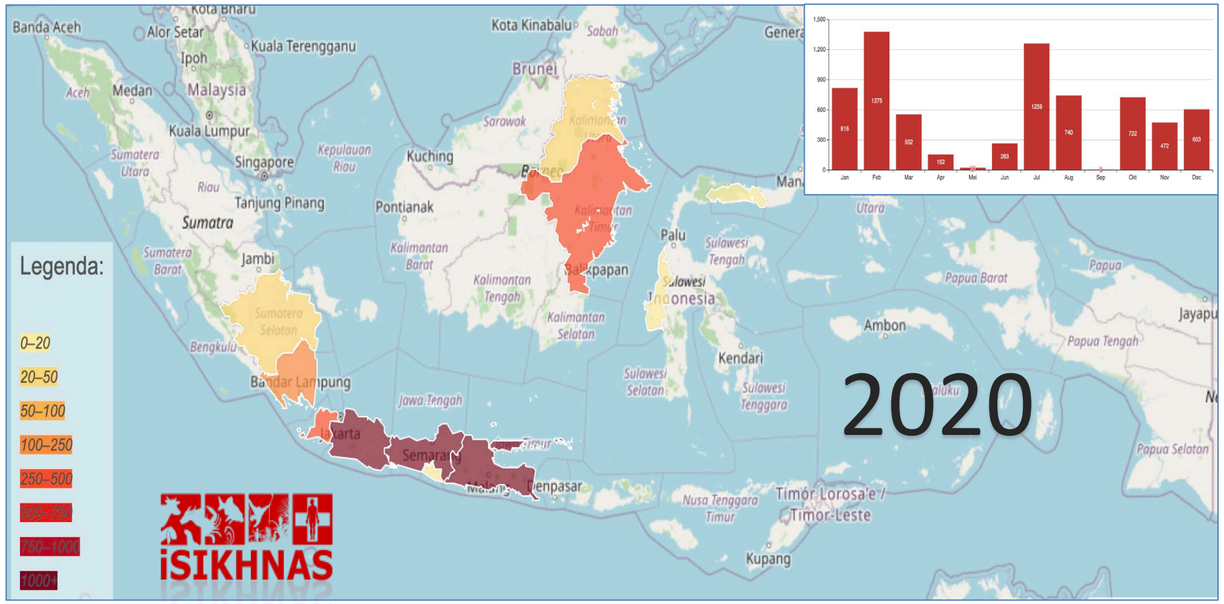
From Jan-2021 to Mid-2022 there have been several avian diseases reported from poultry through the National Information System for Animal Health (iSIKHNAS), particularly:

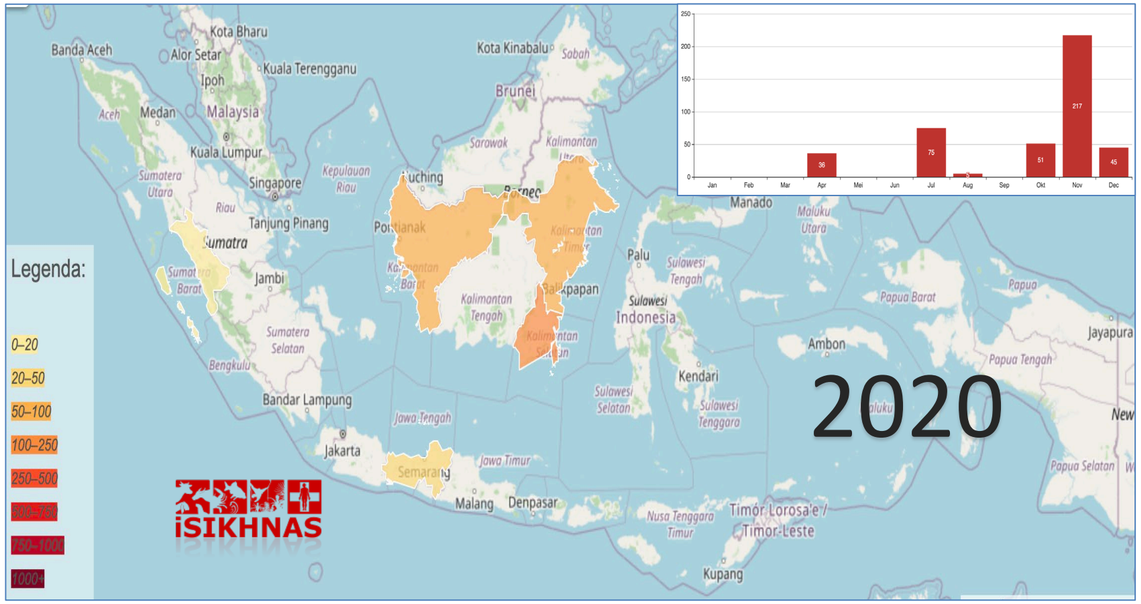
- Avian Influenza (HPAI H5N1) and Newcastle Disease (NDV)
- Animals affected particularly chickens and ducks
- Risk factors : low biosecurity measures in traditional and commercial farms
- Laboratory diagnosis used for detection and charatecrisation :
  - Realtime and/or conventional RT-PCR (All DICs),
  - Virus isolation following by HI test (All DICs),
  - Pre-screen Antigenic (All DICs) and Full Panel Cartography (DIC Wates)
  - HA Sequencing (Pusvetma, BBPMSOH, DIC Bukittingi) and Whole Genome Sequencing (DIC Wates)

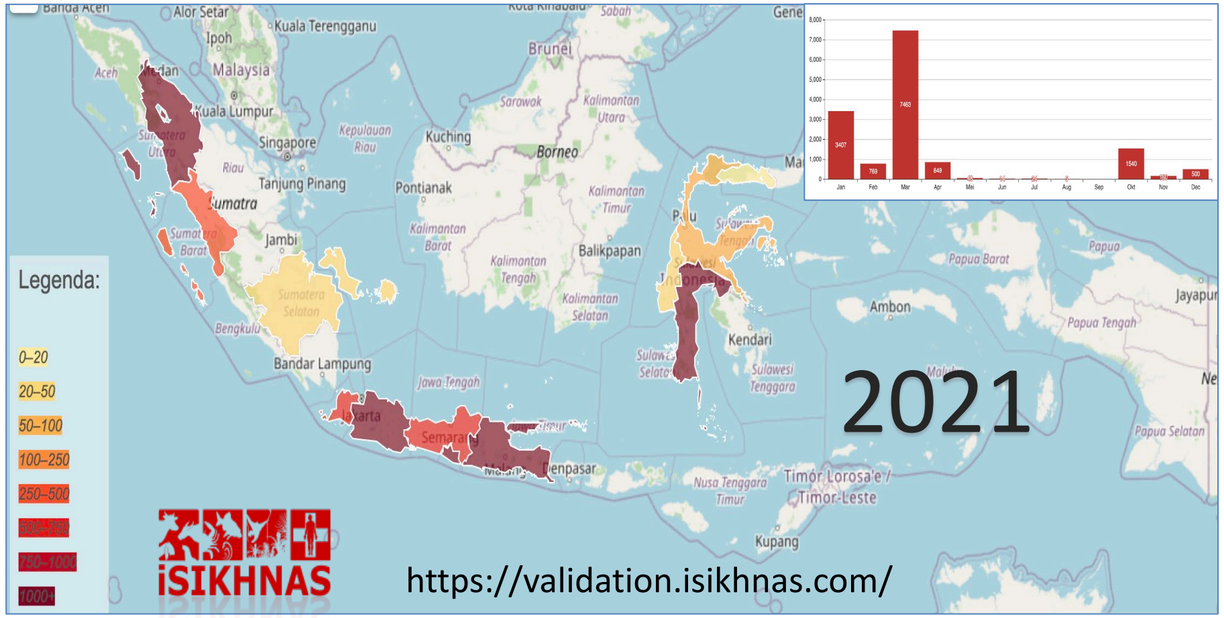
HPAI & NDV Situation in Poultry
Jan 2020 - Mid 2022

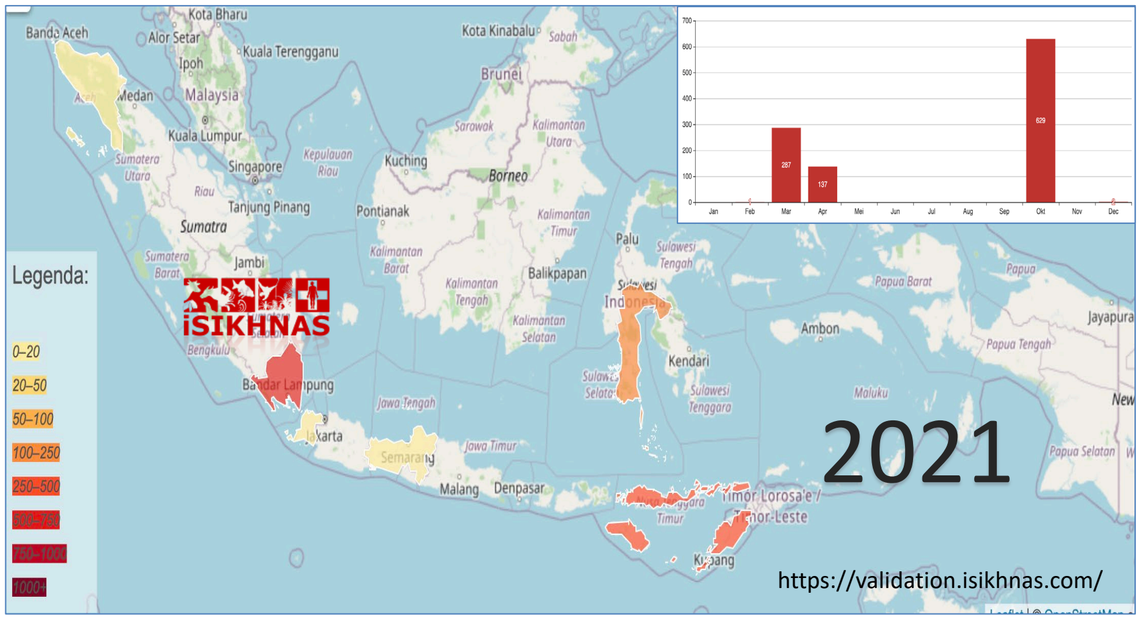








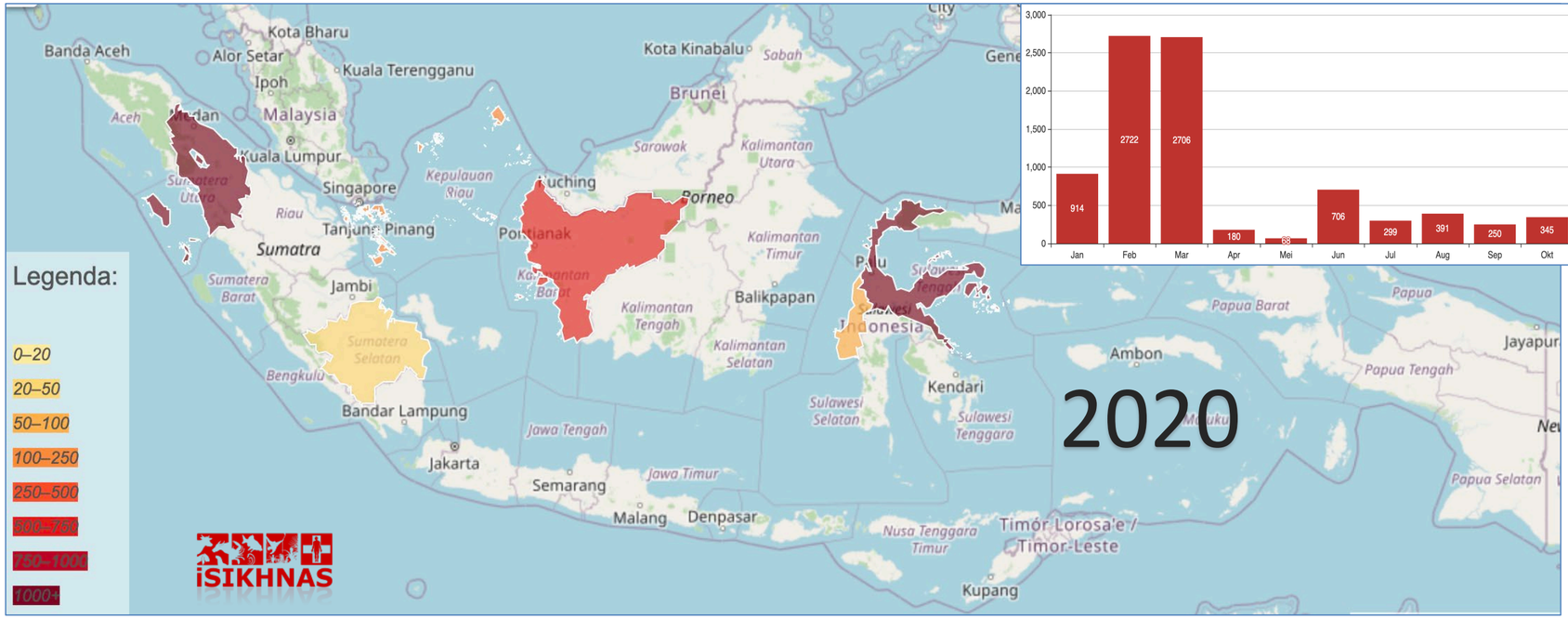


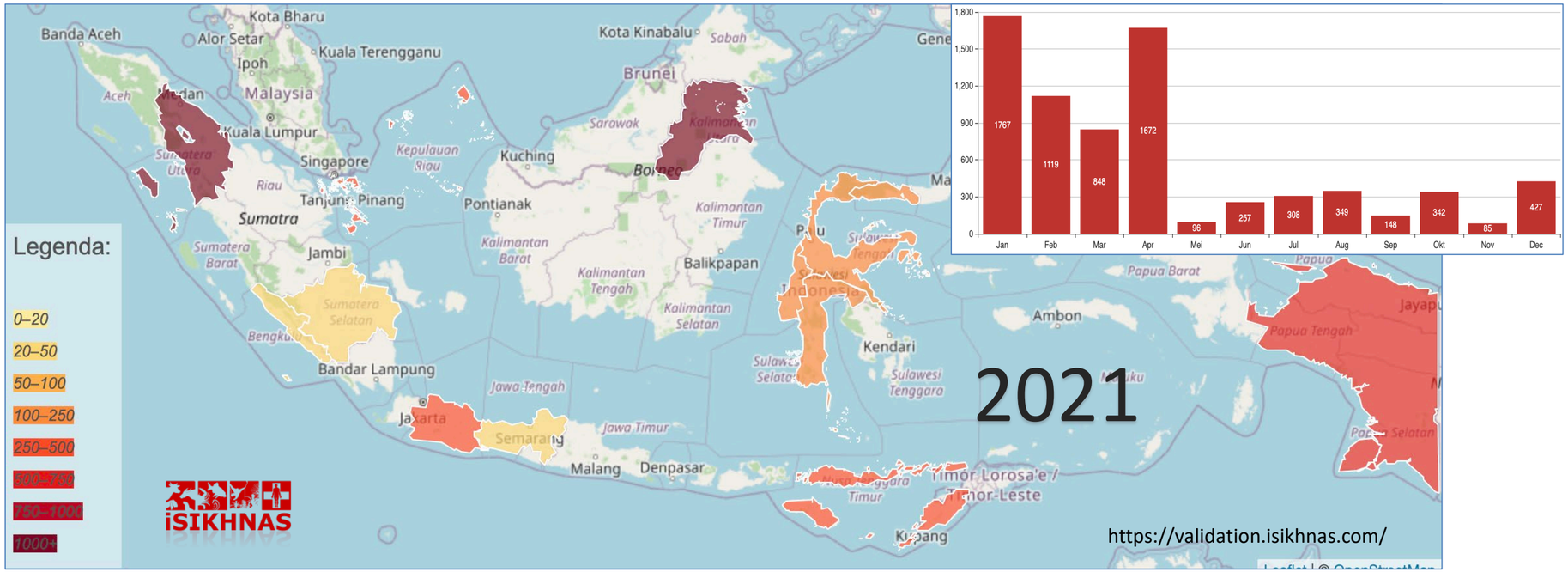


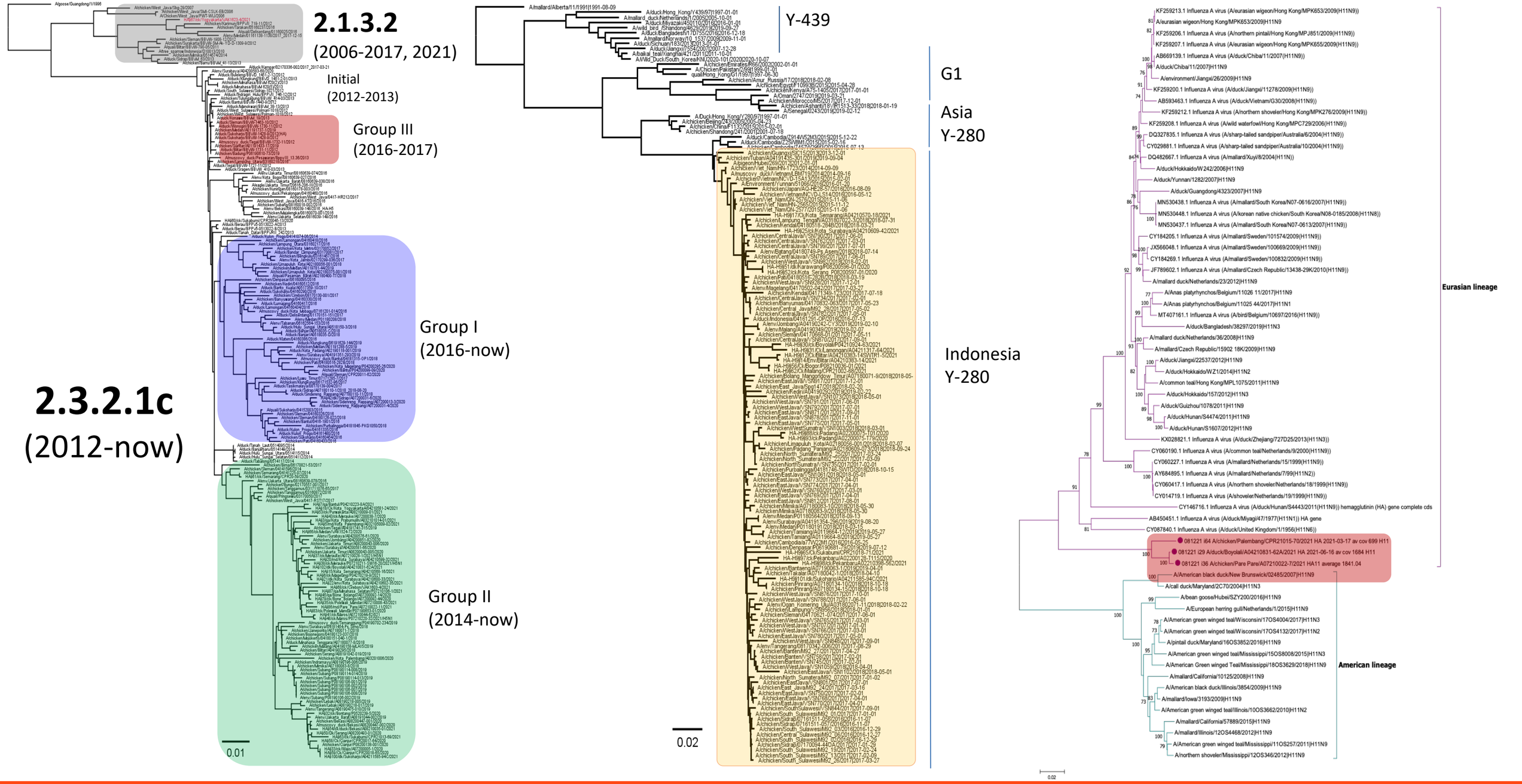
HPAI-H5N1

LPAI-H9N2

NDV Situation in Poultry



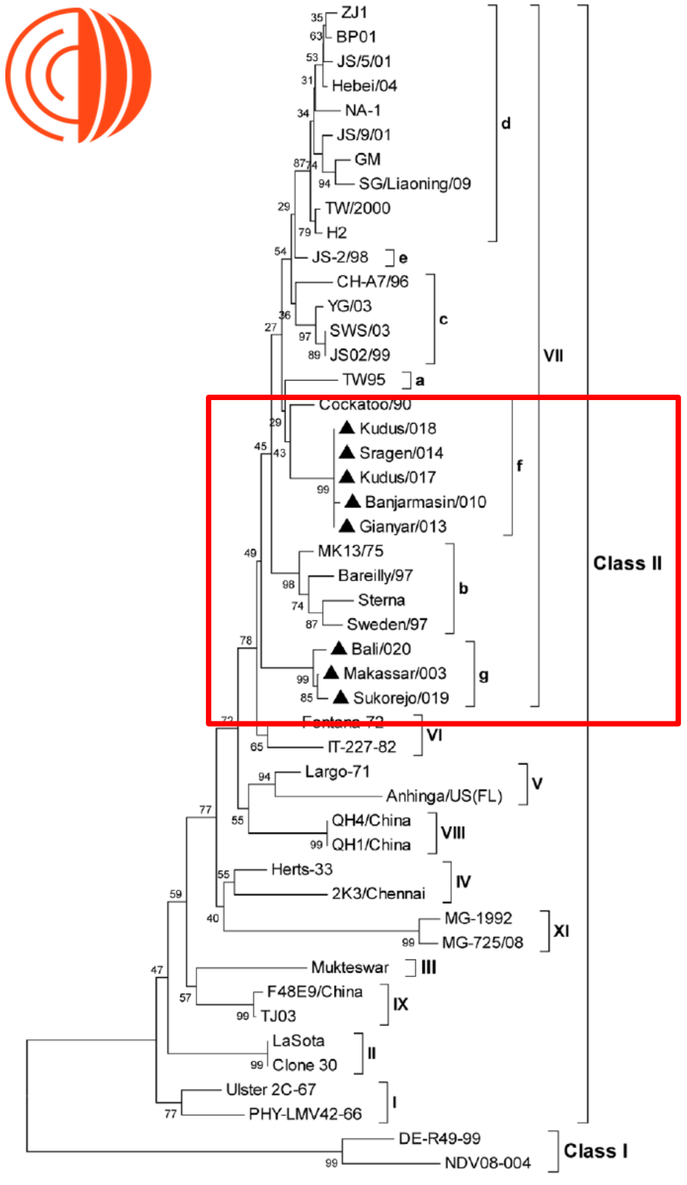




HPAI H5N1

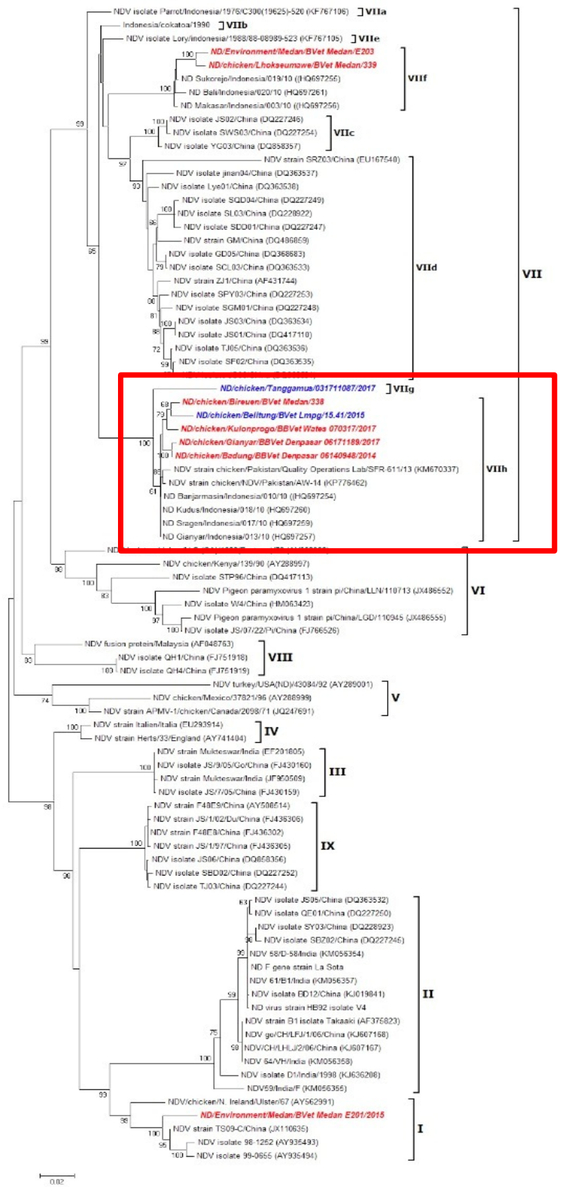
LPAI-H9N2

LPAI-H11N9



2009-2010 isolates
(Xiao et al, 2012)

2011-2014 isolates
(Dharmayanti et al, 2012)



2015-2017 isolates
(Srihanto et al, 2018)

2019 isolates
(Saputri et al, 2019)

NDV – The dominant circulation of Genotipe VII

AIV Control Strategy

- AI control in Indonesia is focused on enhancing **surveillance** (in poultry and live bird markets), improving **biosecurity** in livestock, **vaccination** in poultry supported by **monitoring of AI virus dynamics**, and **certifying AI free compartments**,
- It is very difficult for countries with endemic status, including Indonesia, to obtain and maintain AI free status for all regions of the country.
- A more feasible concept is to obtain and maintain different animal health status for a poultry compartments within the country. **HPAI-free compartments** provide private sectors with an opportunity to protect their investments by establishing segregation between livestock and wild species.
- MoA Indonesia has implemented of HPAI-free compartments through the Minister of Agriculture Decree Number 28/Permentan/OT.140/ 5/2008 since 2008 in accordance with the Terrestrial Animal Health Code (2021): Chapter 1.4. Animal Health Surveillance; Chapter 4.4. Zoning and Compartmentalisation; Chapter 4.5. Application of Compartmentalisation; and Chapter 10.4. on Infection with High Pathogenicity Avian Influenza Viruses

AIV Surveillance

AI surveillance is carried out through the daily observation of the appearance of clinical signs of AI in sick birds by animal health services in the field (general surveillance) and targeted surveillance to monitor AI viruses

Passive Surveillance

- Directorate of Animal Health (DAH) receives a regular and constant flow of reports of suspect cases, and they are all subject to official investigation (these include reports of disease, which are investigated under standard official instructions and procedures) performed by Poultry market surveillance and intervention (PSP) and National Veterinary Services (NVS).
- Avian influenza suspect cases can be reported directly from farmer to veterinary field officer through Integrated National Animal Health Information System (iSIKHNAS) followed by outbreak investigation by Disease Investigation Centers (DICs).

Active Surveillance

- Representative - targeted surveillance to demonstrate absence of AIV infection in Sector I-IV poultries. Surveillance in Sector I-II is requirement for HPAI-free compartments. A minimum sample size of 14 samples was taken from each flock according to the sample size calculation to detect disease at a 95% confidence level. Birds in will be randomly tested using molecular, serology, and virology methods.
- Risk-based surveillance in live bird markets (LBMs) and wild birds (goose) which aims to detect the presence of AI in the environment, and of wild birds (grouse).

Molecular Surveillance

- The dynamic and evolution of AIV virus in poultry continue to monitori through nfluenza Virus Monitoring Network an integrated and coordinated HPAI surveillance at the molecular level conducted by veterinary laboratory network in Indonesia.
- Disease Investigation Centers (DICs), private sectors, and universities work together on monitoring, collection of isolates, and reporting to IVM Online to provide an updated map of circulating HPAI virus in Indonesia to recommend the most appropriate AI vaccine.

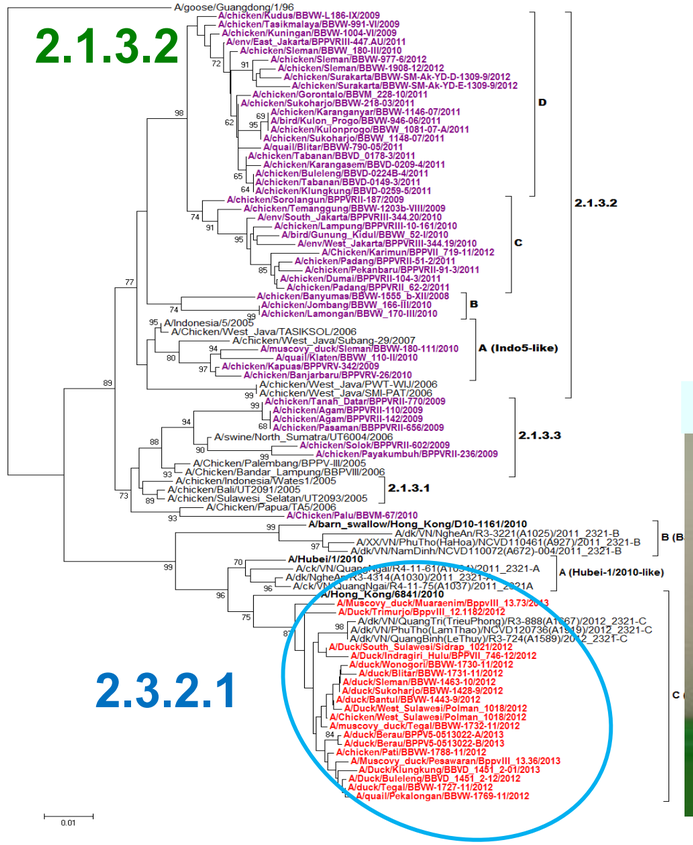
The Benefits of IVM Network for AI Surveillance & Vaccination

Vaccination Use and Research

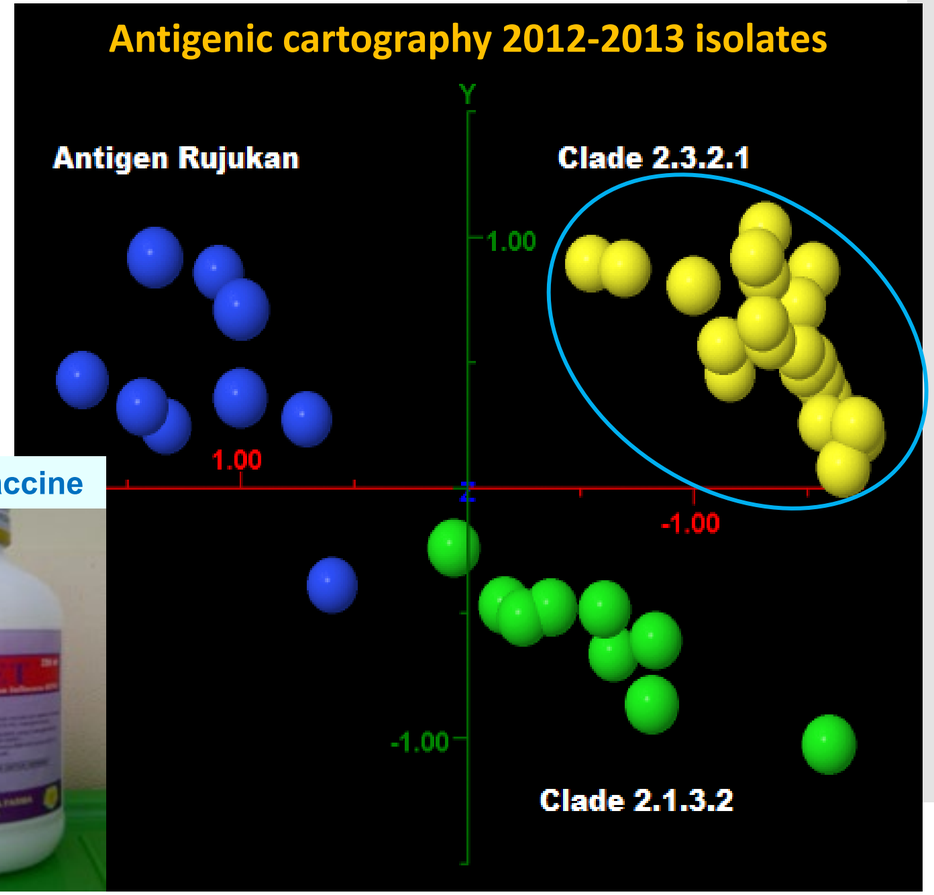
Output and Outcome IVM (2012-2013):

Identification of a new clade (2.3.2.1) H5N1 virus incursion into Indonesia through bioinformatics analyses (phylogenetics and antigenic cartography) lead to the successful and timely development H5N1 clade 2.3.2.1 vaccine that produced locally

Phylogenetic analysis 2012-2013



Antigenic cartography 2012-2013 isolates



2.3.2.1. vaccine

The Benefits of IVM Network for AI Surveillance & Vaccination

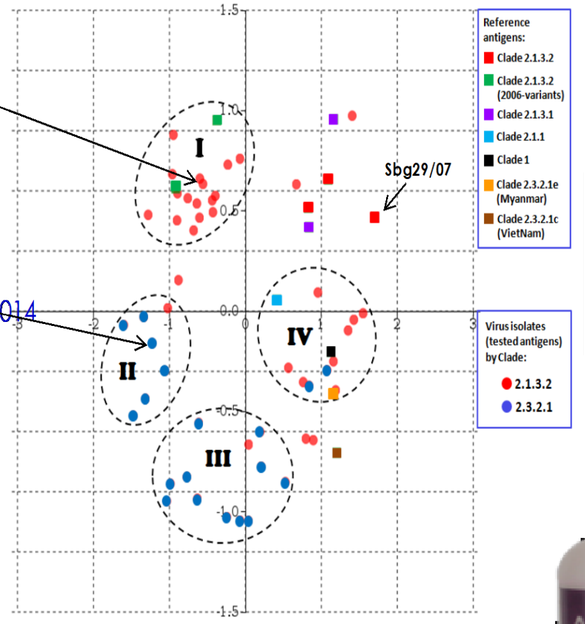
Vaccination Use and Research

Output and Outcome IVM (2014-2017):

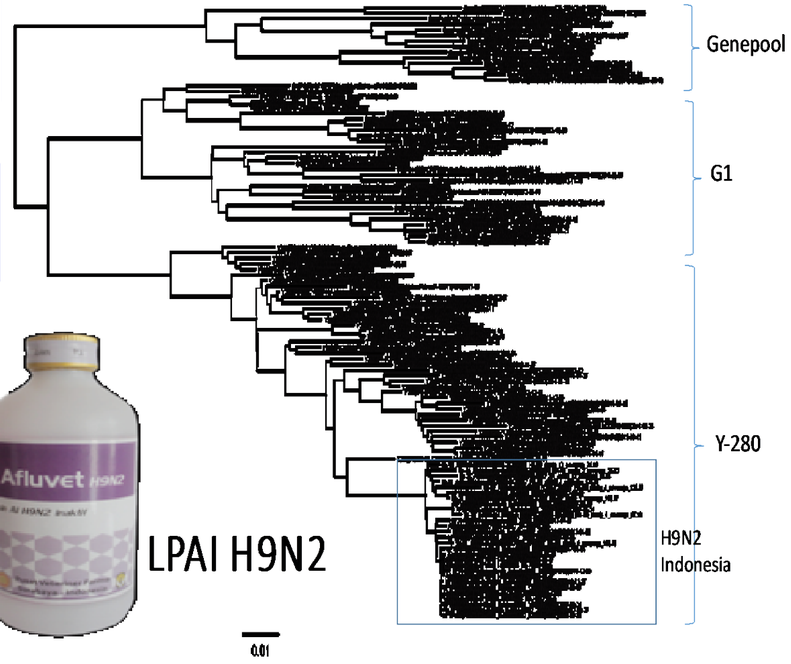
Updated challenge strains for vaccine efficacy due to mutation of HPAI H5N1 clade 2.3.2.1c and clade 2.1.3.2 and provided recommendation for master seed vaccine following the identification of LPAI H9N2

2.1.3.2 challenge strain candidate:
A/chicken/Barru/BBVM 41-13/2013

2.3.2.1 challenge strain candidates:
A/chicken/Semarang/0401225-07/2014



LPAI H9N2

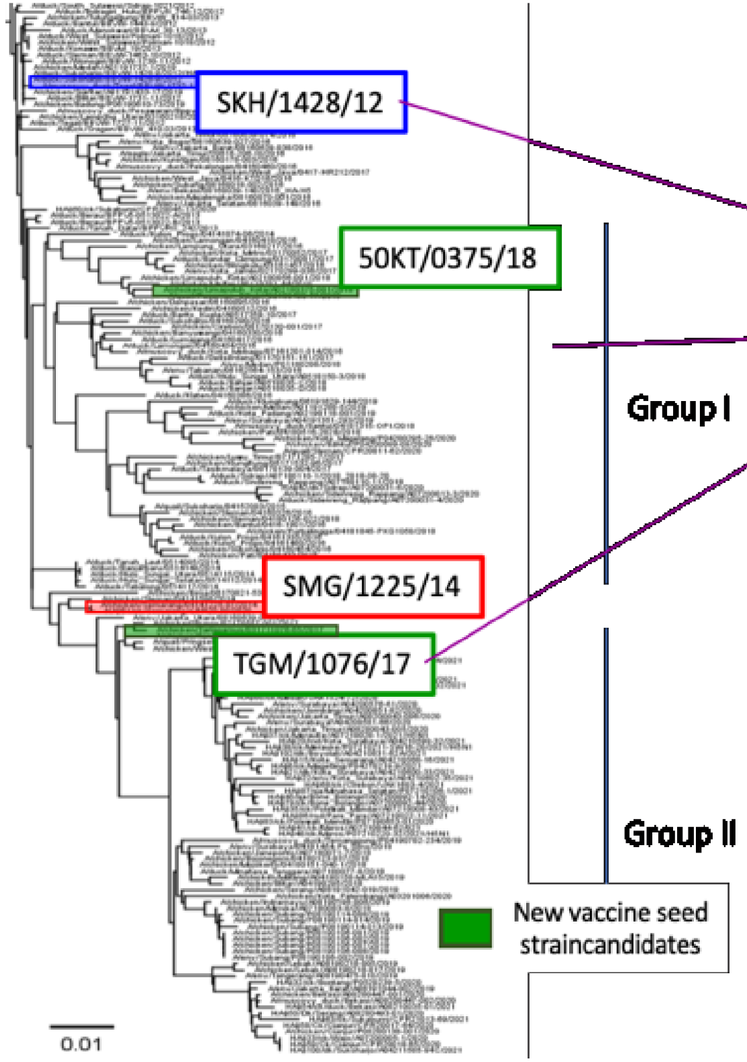


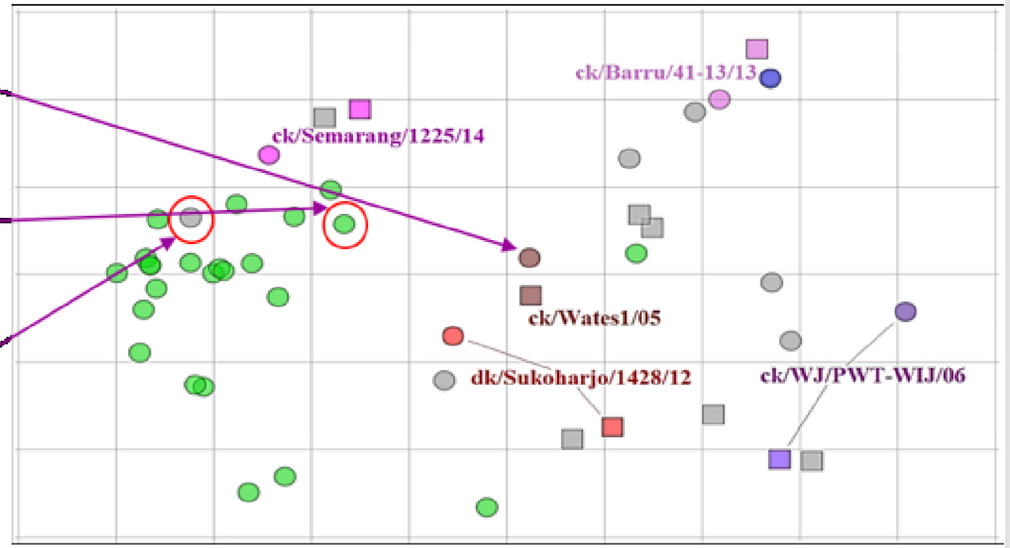
The Benefits of IVM Network for AI Surveillance & Vaccination

Vaccination Use and Research

Output and Outcome IVM (2018-2021):

- **Provided recommendation to update master seed vaccine due to significant mutations (genetically and antigenically) of HPAI H5N1 clade 2.3.2.1c**





Tested Antigen	HA Titer	HI Titer			Antigenic Distance (AD) to SKH/1428/12		AD pattern to SKH/1428/12
		SMG/1225/14 (2.3.2.1)	TGM/1076/17 (2.3.2.1)	SKH/1428/12 (2.3.2.1)	Antigen	Antisera	
ck/Limapuluh Kota/A02180375-001/201	2048	512	512	32	1.7	3.6	Moderate AD
ck/Tanggamus/031711076-65/2017	256*	256	256	16	3	4.9	Strong AD
dk/Sukoharjo/BBVW1428-9/2012	256*	512	128	512			

* HA dari inactivated antigen. Titer HI dengan warna merah adalah dari homologous antigen-antisera

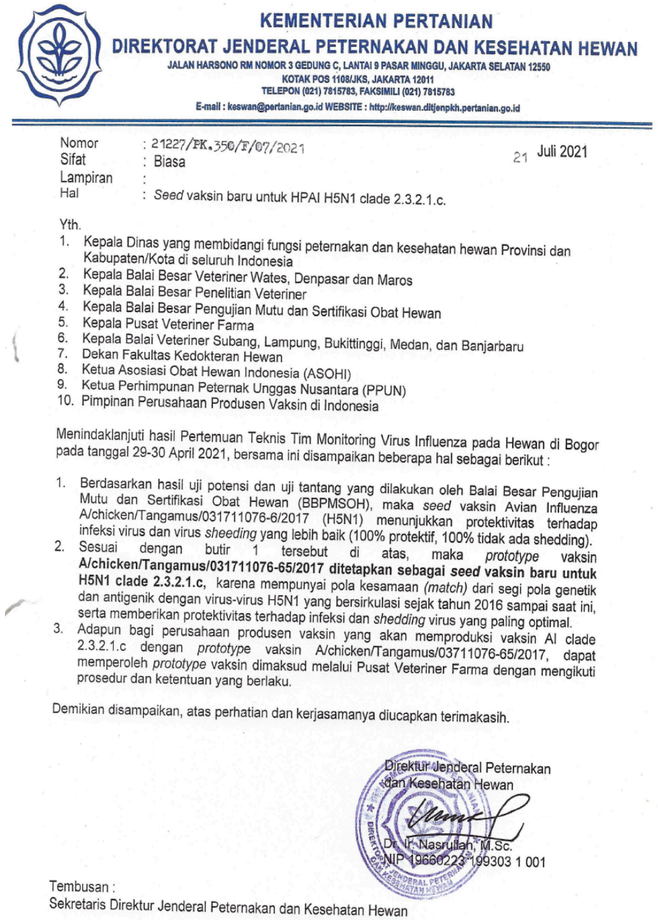
The Benefits of IVM Network for AI Surveillance & Vaccination

Vaccination Use and Research

Results of Challenge Study of HPAI H5N1 Clade 2.3.2.1c (Source: NVDAL - IVM Network)

Vaccine Seed Strain (Clade 2.3.2.1c)	Challenge Strain(Clade 2.3.2.1c)					
	TGM/1076/2017		50-KT/0376/2018		SMG/1225/2014	
	Dead/ Survive	Shedding	Dead/ Survive	Shedding	Dead/ Survive	Shedding
SKH/1428/ 2012	0/10	Yes (Day 3-6)	0/10	Yes (Day 3-6)	**1/9**	Yes (Day 3-6)
50-KT/0376/2018	0/10	No	0/10	No	**1/9**	Yes (Day 3-6)
TGM/1076 /2017	**0/10**	**No**	**0/10**	**No**	**0/10**	**No**

From the process of virus characterization through IVM Network, IVM Team recommended to MoA to update vaccine seed strain for H5N1 clade 2.3.2.1c : A/chicken/Tanggamus/031711076-65/2017 (TGM/1076/2017)



KEMENTERIAN PERTANIAN
DIREKTORAT JENDERAL PETERNAKAN DAN KESEHATAN HEWAN
JALAN HARSONO RM NOMOR 3 GEDUNG C, LANTAI 9 PASAR MINGGU, JAKARTA SELATAN 12550
KOTAK POS 1108/JKS, JAKARTA 12011
TELEPON (021) 7815783, FAKSIMILI (021) 7815783
E-mail : keswan@pertanian.go.id WEBSITE : http://keswan.ditjenpkh.pertanian.go.id

Nomor : 21227/PK.350/F/07/2021
Sifat : Biasa
Lampiran :
Hal : *Seed* vaksin baru untuk HPAI H5N1 clade 2.3.2.1.c.

21 Juli 2021

Yth.
1. Kepala Dinas yang membidangi fungsi peternakan dan kesehatan hewan Provinsi dan Kabupaten/Kota di seluruh Indonesia
2. Kepala Balai Besar Veteriner Wates, Denpasar dan Maros
3. Kepala Balai Besar Penelitian Veteriner
4. Kepala Balai Besar Pengujian Mutu dan Sertifikasi Obat Hewan
5. Kepala Pusat Veteriner Farma
6. Kepala Balai Veteriner Subang, Lampung, Bukittinggi, Medan, dan Banjarbaru
7. Dekan Fakultas Kedokteran Hewan
8. Ketua Asosiasi Obat Hewan Indonesia (ASOHI)
9. Ketua Perhimpunan Peternak Unggas Nusantara (PPUN)
10. Pimpinan Perusahaan Produsen Vaksin di Indonesia

Menindaklanjuti hasil Pertemuan Teknis Tim Monitoring Virus Influenza pada Hewan di Bogor pada tanggal 29-30 April 2021, bersama ini disampaikan beberapa hal sebagai berikut :

1. Berdasarkan hasil uji potensi dan uji tantang yang dilakukan oleh Balai Besar Pengujian Mutu dan Sertifikasi Obat Hewan (BBPMSOH), maka *seed* vaksin Avian Influenza A/chicken/Tangamus/031711076-6/2017 (H5N1) menunjukkan protektivitas terhadap infeksi virus dan virus *sheeding* yang lebih baik (100% protektif, 100% tidak ada shedding).
2. Sesuai dengan butir 1 tersebut di atas, maka *prototype* vaksin **A/chicken/Tangamus/031711076-65/2017 ditetapkan sebagai *seed* vaksin baru untuk H5N1 clade 2.3.2.1.c,** karena mempunyai pola kesamaan *(match)* dari segi pola genetik dan antigenik dengan virus-virus H5N1 yang bersirkulasi sejak tahun 2016 sampai saat ini, serta memberikan protektivitas terhadap infeksi dan *shedding* virus yang paling optimal.
3. Adapun bagi perusahaan produsen vaksin yang akan memproduksi vaksin AI clade 2.3.2.1.c dengan *prototype* vaksin A/chicken/Tangamus/03711076-65/2017, dapat memperoleh *prototype* vaksin dimaksud melalui Pusat Veteriner Farma dengan mengikuti prosedur dan ketentuan yang berlaku.

Demikian disampaikan, atas perhatian dan kerjasamanya diucapkan terimakasih.

Direktur Jenderal Peternakan dan Kesehatan Hewan

Dr. Ir. Nasrullah, M.Sc.
NIP 19660223 199303 1 001

Tembusan :
Sekretaris Direktur Jenderal Peternakan dan Kesehatan Hewan

THANK YOU

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