OIE Regional Expert Group Meeting for the Control of Avian Influenza in Asia

Sapporo, Japan, 3-5 October, 2017

Summary Report

OIE Regional Representation for Asia and the Pacific

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Acronyms and abbreviations

AAHL	Australian Animal Health Laboratory
AI	Avian influenza
ASEAN	Association of South-East Asian Nations
CDC	Centre for Disease Control
EID	Emerging infectious diseases
FAO	Food and Agriculture Organisation of the United Nations
GLP	Good Laboratory Practice
GMP	Good Manufacturing Practice
GPS	Global Positioning System
HA	Hemagglutinin
HPAI	Highly pathogenic avian influenza
IHR	International Health Regulations
ISO	International Organization for Standardization
JRA	Joint risk assessment
LIMS	Laboratory information management system
LPAI	Low pathogenic avian influenza
MAFF	Ministry of Agriculture, Forestry and Fisheries
NGO	Non-governmental organisation
NIHSAD	National Institute of High Security Animal Diseases
OFFLU	OIE/FAO global network of expertise on animal influenza
OH	One Health
OIE	World Organisation of Animal Health
PCR	Polymerase chain reaction
PIP-FW	Pandemic Influenza Preparedness Framework
PT	Proficiency testing
PVS	Performance of Veterinary Services
RAP	Regional Office for Asia and the Pacific
SAARC	South Asia Association for Regional Cooperation
WAHID	World Animal Health Information Database
WAHIS	World Animal Health Information System
WHO	World Health Organisation

Executive Summary

Outbreaks of avian influenza (AI) have been continuing over the years in many Asian countries. The most recent common subtype was highly pathogenic avian influenza (HPAI) H5N8 virus in poultry and wild birds. Low pathogenic AI H7N9 in China has become HPAI H7N9 in the beginning of 2017. Animal health, public health and the economy have been affected by these situations. The OIE Regional Expert Group Meeting for the Control of Avian Influenza in Asia focused on sharing epidemiological and scientific information on the current situation of the disease, control measures, use of vaccines, proficiency testing and laboratory twinning activities in the region.

Situation analysis and updates

- AI continues to be a global public health and animal health concern. The number of AI subtypes and countries affected by HPAI continues to increase and has cause significant poultry destruction and human deaths. WHO, OIE and FAO have be working together to tackle the problem. Member countries have the obligation to report HPAI to OIE through World Animal Health Information System (WAHIS).
- The idea of a risk-based, comprehensive and cost-effective regional approach for active surveillance was raised. A novel portable PCR diagnostic technique has been developed and used in some places. A tool prepared by the tripartite initiative for joint risk assessment involving animal and human health sectors is underway.
- The process of candidate vaccine viruses selection, the Pandemic Influenza Preparedness Framework (PIP-FW) of WHO and a novel viral detection system were presented.
- Articles 10.4.27 to 10.4.33 of the OIE Terrestrial Animal Health Code provides principles and guidance on surveillance and the Manual provides standards for diagnostic tests. Updated standards and measures will be provided soon. The OIE/FAO global network of expertise on animal influenza is another source of information and assistance to countries.
- Outbreaks of avian influenza in domestic and wild birds are linked with major flyways of migratory birds in Serbia, Russia. Active monitoring has to be done on healthy birds during the period of mass migration.
- H5N1 and H9N2 viruses are continuously evolving in the SAARC region. Biosecurity awareness together with targeted and coordinated active surveillance in poultry, wild birds and other species are essential.
- HPAI H7N9 has been detected in birds and humans in China. Bivalent vaccines (H5 and H7) for farmed poultry have been developed and used in many provinces in China since mid-late 2017. Country members should aim to either eradicate AI or contain AI in endemic areas.
- Each member provided updates on the AI situation of their respective countries/territories in a 3-minute flash talk and poster session (Appendix IV).

Vaccination

- Chapter 10.4 of the OIE Terrestrial Code has provided information on determination of AI status, surveillance strategies and documentation for freedom from AI.
- A pre-meeting questionnaire survey revealed that most countries prohibit the use of vaccines on poultry, while some have targeted vaccination and/or vaccine stockpiling for emergency. Some countries use mass vaccination a part of AI prevention and/or control strategy.

- Representatives of countries that prohibit vaccination argued that use of vaccines does not provide complete protective immunity. They use strategies such as movement control, pre-movement testing, public-private partnership, biosecurity, and compartmentalization to prevent and control AI.
- Representatives of countries that practice vaccination argued that where the virus is entrenched, vaccination is the only viable strategy as stamping out is impossible. It was also pointed out that one major challenge is to keep vaccines up-to-date as clades are changing frequently.
- It was concluded that all countries want to eradicate HPAI. Appropriate surveillance based on relevant chapter of the OIE Terrestrial Code is essential. Stamping-out should be applied when circulation of HPAI virus is confirmed regardless whether or not vaccination is applied.

Influenza surveillance

- Pigs play an important role in influenza A transmission. It is important to monitor and control influenza A virus in pig population in order to reduce economic burden on pig industry and risk of emerging a novel swine influenza virus with pandemic potential.
- Passive and/or active surveillance on poultry are practiced in many countries in Asia. Challenges specific to local communities or individual countries are still present.
- Reporting of suspicious cases at local or village level to the authority and training for animal health workers are important in rapid detention and response to outbreaks.
- Surveillance of wild birds contributes significantly to early detection of HPAI. Information collected help to implement rapid preventative measures to minimize risk of infections to poultry.

Laboratory networking and capacity building

- The OIE laboratory twinning programme provides sustainable enhancement of capacity and expertise by supporting a link between an OIE reference laboratory and a national laboratory. It has contributed to improve global disease control capacity and balanced the geographical distribution of OIE reference laboratories.
- The examples of laboratory twinning between Australian Animal Health Laboratory and the laboratories in ASEAN countries such as Thailand and Malaysia, and the programme between Hokkaido University of Japan and Mongolia were shared.
- International collaboration with neighbouring countries is needed to monitor the spread of AI in the region.
- Diagnostic capacities through laboratory networking and proficiency testing support have been established by FAO.
- In the group exercise session, participants discussed the ideal laboratory networking and capacity building requirements and limitations in achieving the ideals. Options and proposals for building a good laboratory network for the region and laboratory capacity were suggested.

Acknowledgements

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1. Introduction and opening session

Outbreaks of avian influenza in many Asian countries, including highly pathogenic avian influenza (HPAI) subtypes such as H5N1, H5N2, H5N6, H5N8, have been continuing over the years as well as detection of the highly pathogenic H7N9 subtype in birds in 2017 in China for the first time. These situations impact animal and public health, trade and economy in affected countries and pose threats to other neighbouring countries.

Influenza viruses transmissible to humans evolve from time to time and viruses circulating in both domestic and wild birds pose continuous threats not only to animal health but also to human health. This regional expert group meeting brought together experts from the OIE's Reference Laboratories for Influenza from the Asia-Pacific region to focus on aspects of avian influenza. It provided a regional platform for discussion on current issues, challenges and progress for the future in tackling influenza in birds.

Thanks to the funding received from the People of Japan, this meeting which updated the country participants on the latest developments on avian influenza situation and shared the experiences and way forward with the experts could be organised. The same was organised in collaboration with experts from Hokkaido University, one of the OIE's leading Reference Laboratories in Influenza along with participation of experts from other OIE's Reference Laboratories such as Australian Animal Health Laboratory (AAHL), Australia, National Institute of High Security Animal Diseases (NIHSAD), India and other experts from Japan.

The objectives of the workshop were to share Member Country's/Territory's updates, including experiences and lessons learned regarding surveillance, prevention and control of avian influenza in Asia. The specific objectives of the workshop were:

i. To share epidemiological and scientific information regarding the new highly pathogenic form of serotype H7N9, which has emerged in 2017.
ii. To discuss control measures including enhancement of laboratory capacity and vaccination policy, both current and future use, in the region.
iii. To provide an update on the current situation of avian influenza in domestic and wild birds; and
iv. To provide an update on proficiency testing and laboratory twinning activities in the region.

Apart from the updates on disease situation and response activities, the participants learned more about vaccinations in birds along with its pros and cons on the use of vaccines. A collaborative activity on laboratory networking and capacity building was also conducted in the group exercise sessions.

The meeting programme can be found in Annex I.

Opening remarks

Professor Hiroshi Kida from Hokkaido University started the opening remarks by welcoming the participants. Dr Filip Claes from Food and Agriculture Organisation of the United Nations (FAO) for Asia Pacific Region (RAP) stressed the importance to control and eradicate highly pathogenic avian influenza (HPAI) through information sharing and collaboration. Dr Hirofumi Kugita, OIE Regional Representative for Asia and the Pacific briefed on the objectives of the meeting and emphasized the critical role of national veterinary services in controlling HPAI at its source. Dr Kazuo Ito, the national

OIE delegate of Japan and member of the OIE Regional Commission for Asia Pacific also welcomed the participants and supported the concept of One Health and the global and regional work on strengthening the control on transboundary animal diseases. Dr Pasang Tshering then explained the outline and format of the meeting and introduced the participants.

2. Technical sessions

2.1. Situation analysis and updates

2.1.1. Global and regional situation of avian influenza

Avian influenza (AI) continues to be a global public health and animal health concern. The number of AI subtypes and countries affected by HPAI continues to increase. The number of human infections have risen to 2,458 and 80 countries have already been affected. Coordination and cooperation with WHO and FAO are being conducted to face the challenges due to the virus. The most recent common subtype was HPAI H5N8 virus in poultry and wild birds, followed by subtypes H5N1, H5N5, H5N6, H5N2, H5N3, H5N9, H7N1, H7N3, H7N7, H7N8 and H7N9. Asian lineage H5N1 continues to be reported in Asia and Africa. Low pathogenic avian influenza H7N9 in China has become HPAI H7N9 this year (2017). Members were reminded of their obligation to report HPAI to OIE and World Animal Health Information System (WAHIS) which is the official OIE disease reporting platform. Timely and accurate information helps members to adopt better biosecurity measures to prevent spread of the disease. In January 2016-March 2017, 38% of the 154 countries/territories have reported the disease as present and it was the highest number of countries/territories affected since the 2006 crisis. The global impact of the disease included destruction of 18,000,000 poultry and 118 registered human deaths during the period. As a result, OIE encourages members to improve surveillance and monitor AI in both domestic and wild birds.

2.1.2. Recent surveillance of influenza in animals and joint risk assessments

Much effort of surveillance has been focussed on H5Nx and H7N9 recently. Many parts of China are at-risk of H7N9. While most H7N9 cases are low pathogenic, sparse cases of highly pathogenic incidences have occurred. Because of cross-border poultry value chains, China's neighbouring countries such as Laos, Myanmar and Vietnam are also at-risk. The regional approach for an active surveillance on AI is suggested to be risk-based, comprehensive and cost-effective. The objectives of a comprehensive AI surveillance include 1) early detection of incursion of non-endemic viruses (e.g. H7N9); 2) monitoring of the circulation and evolution of AI viruses (e.g. H5Nx) in poultry value chains; 3) monitoring the effectiveness of control programmes and 4) raising awareness among different stakeholders of poultry value-chain. When designing a surveillance programme, key area selection criteria include high poultry density, movement of poultry from a known infected area, geographical proximity to a known infected area, history of AI outbreaks, results of previous active surveillance studies and vicinity to wild bird congregation sites or major flyways. Sampling site should include farms, villages, poultry gathering sites, slaughterhouses and live bird markets. Surveillance with the above-mentioned criteria has been conducted in Laos, Myanmar and Vietnam. To rapidly detect AI in the field, a novel portable PCR diagnostic technique (pen-side PCR) has been introduced.

In the sub-regional consultation on H7N9 with the tripartite initiative, it has been agreed that there is a need for joint risk assessment (JRA) by animal and human health sectors. JRA may also be applied to other national priority zoonotic diseases at the human-animal interface. The conceptual basis for JRA includes 1) qualitative assessment; 2) systematic approach to evaluating currently available knowledge;

3) regular and iterative updates; 4) evidence-based approach; 5) multiple stakeholder involvement; and 6) separate uni-sectoral risk assessments performed by animal health sector and human health sectors respectively in preparation to JRA. The tool prepared by the tripartite initiative will be tested, finalized and disseminated widely in the near future.

2.1.3. **Global and regional situation of zoonotic influenza in humans and pandemic preparedness**

All influenza A virus subtypes are detected in aquatic birds (H1-16 and N1-9). The pandemic potential routes include poultry, humans and pigs. Most human cases of H5Nx viruses comprise of H5N1 and H5N6. Since 2003, different subtypes of H5Nx have been observed all over the world and clade 2.3.4.4 is the most common. Many human cases of H5N1 were reported to WHO till 2015 and then the number of cases decreased. Recent human cases of H5Nx viruses have been reported in China, Egypt and Indonesia.

The majority of H7N9 viruses detected in poultry and humans are low pathogenic, but since 2016 highly pathogenic H7N9 viruses have been detected in humans and in poultry in 2017. Case fatality rate in humans was 39%. Most cases in 2017 were reported in eastern China and the pandemic potential with this viruses is not low. Sixty-eight percent of the human cases were due to direct exposure to live poultry or contaminated environment and so far sustained human to human transmission is limited. Imported cases have also been reported in Canada, Malaysia and Chinese Taipei.

Candidate vaccine viruses (CVVs) for zoonotic influenza are selected and updated twice a year. Recently five CVVs are in preparation to be listed for H5Nx, while two new CVVs are listed for H7N9 (low-path and high-path). The Pandemic Influenza Preparedness framework (PIP-FW) of WHO has the objectives to strengthen virus sharing and to increase access to vaccines and other benefit for developing countries. Under the standard material transfer agreements 2 (SMTA2) with WHO, members and stakeholders can obtain CVVs and reference viruses and they are required to respond to partnership contribution. A novel virus detection system for pandemic preparedness at alert phase is setup by the Japanese government (National Institute of Infectious Diseases and Ministry of Health, Labour and Welfare). A library with a systematic collection of zoonotic influenza viruses and a PCR-detection system are in place.

2.1.4. **OIE standards on the surveillance for avian influenza viruses**

AI is an OIE listed notifiable disease, therefore OIE member countries must report infection with any HPAI viruses in poultry and wild birds, low pathogenic avian influenza (LPAI) viruses of subtypes of H5 and H7 detected in poultry and any unusual mortality of wild birds. The epidemiological information can be found at World Animal Health Information Database (WAHID). Articles 10.4.27 to 10.4.33 of Chapter 10.4 of the Terrestrial Animal Health Code provide the principles and guidance on surveillance (including clinical, virological and serological surveillance) and the Terrestrial Manual provides standards for diagnostic tests. Good veterinary services are essential for an effective surveillance. Given the fact that the AI chapter has been in force for a long time, but as member countries continue to face challenges an ad hoc group will be formed to revise and update standards and measures in the chapter. The updates could be adopted in May 2018.

OIE reference laboratories support member countries by providing scientific and technical assistance along with expert advice. The OIE/FAO global network of expertise on animal influenza (OFFLU) network facilitate information exchange between public health and animal health sectors at the international level. It also has an agreement with WHO for collaboration for pandemic preparedness and its information is analysed and shared twice a year.

2.1.5. **Surveillance of avian influenza in Siberia: monitoring migratory wild birds; potential risks to/from neighbouring countries**

In Russia, surveillance is coordinated by Ministry of Agriculture and Ministry of Health. These two sectors exchange information and work together on AI research and control. A national surveillance plan for commercial and backyard poultry and wildlife is in place for active monitoring.

HPAI H5N1 outbreaks in domestic and wild birds with an Asian lineage were first reported in 2005 and the spread of different subtypes of AI has begun since. Most outbreaks were reported in Siberia which is a place for migration and nesting of wild birds. In 2014, the first case of H5N8 were reported in a Eurasian wigeon and in 2015, HPAI H5N1 clade 2.3.2.1 was reported in several wild birds. In 2016, HPAI H5N8 (clade 2.3.4.4) was initially detected in wild birds, then in domestic birds (chickens, geese and guinea fowl) in Siberia. These outbreaks were well linked with major flyways of migratory birds. As migratory birds are clinically healthy, active monitoring has to be conducted on healthy birds especially during the period of mass migration (spring and autumn), in addition to surveying free-ranging poultry. The results of wild bird population monitoring in Siberia should be taken as reference in other regions for disease control.

2.1.6. **Epidemiological and molecular information on avian influenza from Indian and the SAARC sub-region**

H5 and H7 AI viruses have been reported in a number of countries in the SAARC region. The H5N1 were first detected in 2006 in Afghanistan, India and Pakistan then later in other countries of the region. The phylogenetic evolution of these viruses were clade 2.2 before 2010 and clades 2.3.2.1 and 2.3.4 replaced the dominant subtype. Antigenicity of the two recently emerged H5N1 clades 2.3.2.1a and 2.3.2.1c showed divergence and difference from earlier clades 2.2 (2.2.2.1). H5N8 outbreaks were reported in the zoological parks, wetlands, lakes and domestic poultry in India and in layers in Nepal in 2016-2017. It was related to the H5N8 viruses isolated from wild birds in the same year in Russia and China. H9N2 viruses has been isolated in India, Bangladesh and Pakistan and are continuously evolving in the region. There is evidence to show that wild birds play a role in dispersing viruses during the winter migration and thus there is a higher risk of AI during the winter season in Northern Hemisphere. In conclusion, H5N1 and H9N2 viruses are continuously evolving in the SAARC region. Due to cultural and economic factors, there is close interaction between human and poultry. Biosecurity awareness along with targeted and coordinated active surveillance in poultry, wild birds and other species are needed.

2.1.7. **H7N9 avian influenza viruses in China**

On behalf of China participants, Dr Sakoda presented an update on the situation of H7N9 in China. All information shared during the presentation was based on published data. In Asia there are 4 reference laboratories that study H7N9. The Yangtze River and Pearl River in China are the main areas where H7N9 human infection were reported. Phylogenetic tree of the HA gene H7N9 was discussed. China CDC is responsible to gather and analyse information on AI and provide update. Vaccination against H7N9 for farmed poultries has already been started in Guangdong and Guangxi provinces in June 2017. The programme has also started in other provinces last month and bivalent vaccines (H5 and H7) are used.

In Japan, H5N6, H7N9 LPAI and H7N9 HPAI viruses have been isolated and they are closely related to the ones from China. A document on its phylogenetic analysis will be ready in the near future. In summary, H7Nx from wild birds has spread to domestic birds in China. The H7N9 LPAI circulated in

poultry later became highly pathogenic. As a result, both human cases of H7N9 LPAI and HPAI have been reported. Countries in the region should prepare for any accidental spill over of the virus from birds to humans. Our aim should be to eradicate HPAI or contain it in already endemic areas.

2.1.8. Swine influenza scenario in the region: risks and threats to other animal species and people

Pigs play a very important role in influenza A transmission. The receptor binding of influenza virus is different between humans (alpha 2, 6) and birds (alpha 2, 3) but swine has both types of receptors. Genetic reassortment of AI virus and human influenza virus might occur in swine and the reassorted viruses have potential to cause pandemic in humans due to the lack of antibody in human population. Examples are the Spanish flu in 1918, the Asian flu in 1957 and the Hong Kong flu in 1968. Transmission of influenza A from birds to pigs have been reported in at least 9 countries in North America, Central Asia, Korea and North Africa etc. In addition, swine to human transmission has occurred in at least 11 countries in several parts of the world due to human exposure to pig population. However, in our region there is not much studies on swine influenza. It is important to monitor and control influenza A virus in pig population in order to reduce economic burden on pig industry and risk of emerging a novel swine influenza virus with pandemic potential.

2.1.9. Biological diversity of avian influenza viruses in wild birds in the Asian part of Russia

The Research Institute of the Experimental and Clinical Medicine of Novosibirsk State University has been conducting research on AI in wild birds in Russia. There are 4 major migratory routes of wild birds that cover Siberia, the Asian part of Russia. More than 700 species of birds including 615 distant migrants nest in the area. Samples from wild birds are taken the region during the hunting seasons (spring and autumn) and mostly from Anseriformes. H3 and H4 are the first and second most common subtypes isolated. Some unique subtypes such as H15N4, H13N8, H5N1 (LPAI) and H6N8 have been isolated as well. Three strains of H5N8 were isolated in wild birds in 2016 and the key areas for early detection of H5Nx is the Russian-Mongolian border. It is predicted that there will be further spread of H5 to Russia in 2018. International collaboration with China, Italy, USA, Mongolia and Japan is currently in place.

2.2. Panel discussion on vaccination

OIE has provided standards and guidelines on vaccination in the Chapter 10.4 of the OIE Terrestrial Code, which include information on determination of AI status, surveillance strategies and documentation of freedom from AI. Recommendations for countries have also been made during the 26th conference of the OIE Regional Commission for Asia, the Far East and Oceania in Shanghai, China, 2009, and the OFFLU meeting on vaccination as a control tool against HPAI in Beijing, China, 2013.

For this expert group meeting, a questionnaire survey was conducted in advance of the meeting comprising information on surveillance of AI and vaccination against AI. The preliminary summary of the survey from 25 countries/territories was presented. Vaccination on poultry was prohibited in most countries/territories. Four countries/territories revealed that they had vaccine stockpiling for emergency use, six had policy on targeted vaccination and two used mass vaccination as part of the AI prevention and/or control strategy. The details of the questionnaire survey are listed in appendices II & III.

Five countries then presented an update on the science and administrative decisions behind vaccination policies and strategies.

a) Japan

Live bird markets play a significant role in the transmission of LPAI viruses from water birds to poultry in which HPAI viruses are selected. Professor Kida expressed that stamping-out is the most effective measure and should be the primary measure to control AI. Vaccination is an additional option if stamping-out alone cannot control the disease. The use of vaccines does not provide complete protective immunity and leads to silent spread of the virus. As a result, vaccines should not be misused alone and sentinel birds should be used as part of the surveillance. Furthermore, surveillance on swine influenza is essential in countries where AI has not been controlled. To control HPAI, early detection, containment, culling of infected flock, movement restriction and biosecurity are essential. International collaboration and cooperation are needed.

b) Thailand

AI vaccination in birds is not allowed in Thailand due to several reasons such as the use of sentinel birds is not practical for the country and vaccine implementation may lead to export ban on poultry products. In contrast, strong public-private partnership has been developed to support biosecurity on farms. For example, stakeholders involved contribute in good farming management practice. There is one public health volunteer in every 10 households to report suspected cases to the AI monitoring system. Compartmentalisation has been introduced. GPS tracing and pre-movement testing of poultry is on-going.

c) Republic of Korea

The country suffered a huge loss from the AI outbreak in 2016 and billions of poultry were culled. As a result, an AI emergency vaccination system is under consideration as stamping out alone seems not to be effective enough to control the disease. Two of the H5 types have been selected for consideration. It is understood that there are difficulties in eradicating AI with the use of vaccines and the implementation of vaccination comes with other challenges such as distinguishing vaccinated and non-vaccinated birds during surveillance, increased risk of human infection and handling concerns from the public on consuming vaccinated poultry meat. Other measures such as movement control are important in preventing and controlling outbreaks. Consultation with veterinary and medical personnel on the use of vaccines is in progress.

d) China

Mass vaccination is practiced in the country. Socio-economic challenges arises when stamping-out is used. In regards to exit strategies, breeding poultry farms have good surveillance system and thus can exit first. Some other areas could be evaluated and selected for terminating the use of vaccines. For example, if there is an area without any recent outbreaks, vaccination can be terminated in that area. However, vaccination cannot be terminated in the whole country at the moment.

e) Vietnam

The use of vaccines has been started in 2005 along with intensive stamping out policy when Re-1 vaccine was introduced from China. In 2010, the use of Re-5 vaccine has begun and the use of Re-1 vaccines

was terminated. Between 2011 and 2014 another new Re-6 vaccine and local vaccines were utilized, and now Re-6 + Re-8 vaccine are being used. HPAI H5 virus in Vietnam has been changing and shifting through introduction from northern border with China. The strategy of using stamping-out as the main method with the support of vaccination has been effective in reducing AI outbreaks recently. Keeping vaccines up-to-date as clades are changing frequently is a challenge. The country has to face a high risk of introduction of new virus clade and emergence of new strains. H7N9 virus has not been detected in the country but preparation of vaccines for the said virus is under consideration.

Conclusion

Representatives from Bangladesh, Laos, Mongolia, Russia, Singapore and Hong Kong etc. also shared their view on vaccination. It was concluded that 1) all countries/territories want to eradicate HPAI, and to do so, 2) appropriate surveillance based on the relevant Chapter of the OIE Code, particularly post-vaccination monitoring for those applying vaccination, is essential and 3) stamping-out should be applied when circulation of HPAI virus is confirmed regardless whether or not vaccination is applied.

2.3. Panel discussion on surveillance from affected and unaffected countries/territories

Seven members - Chinese Taipei, Cambodia, Nepal, Malaysia, India, Japan, and the Philippines were invited to share the successes and limitations of the surveillance programme in their respective countries.

a) Cambodia

Passive surveillance is conducted at the village level and rapid detection and response to outbreaks are being enhanced. Leaders of local communities have the responsibility to report incidents of high mortality in animal populations to national authority. Active surveillance is done in live bird markets and wild birds. Epidemiology teams are sent out to investigate suspicious cases. Training, materials and equipment for animal workers are provided at the village level to control outbreaks. Sustainability of village animal workers and lack of standardization on reporting are some of the challenges to overcome.

b) Chinese Taipei

AI outbreaks were sporadic in poultry population before 2014 and the subtypes involved were low-pathogenic H5N2 and H6N1. Novel H5N2, H5N3 and H5N8 (clade 2.3.4.4) were isolated in 2015 and highly pathogenic H5N6 in 2017 which was later eliminated. Active surveillance is done yearly on poultry farms and the risk factors identified are migratory birds and low biosecurity in poultry farms. Farmers are encouraged to report unusual circumstances to the authority and culling compensation is provided during outbreaks. Surveillance around infected holdings and in wetland is also in place.

c) India

The first outbreak of HPAI was in 2006 and all outbreaks were caused by H5N1 till 2016 when H5N8 was reported. All outbreaks were contained successfully and India was free of HPAI at the time of this meeting. India has the National Action Plan on AI, laboratory infrastructure, surveillance programme, veterinary-related professional training and the web-based National Animal Disease Reporting System in place together with legislative support as preparedness for AI prevention and control. Most of the veterinary personnel are trained to handle control and containment operations. Education has been provided to communities to report suspicious cases. Cultural practices, viral mutation and surveillance in wild birds continue to be the challenges the country is facing.

d) Japan

The Ministry of Environment of Japan has a surveillance framework for AI in wild birds, which provides effective infection control and minimizes damage caused by HPAI. Migratory birds' flyways are studied by using satellite tracking of migratory birds and bird banding. Information collected are shared with other countries on the official website. Active surveillance is performed on waterfowls and samples are collected from dead birds for passive surveillance. Samples are collected all-year-round based on risk analysis. In conclusion, surveillance of wild birds contributes significantly to early detection of HPAI. Information is collected to help implement rapid preventative measures to minimize risk of infections to poultry and be part of the conservation of endangered and threatened species.

e) Malaysia

HPAI H5N1 was first detected in free-range chickens in Malaysia in 2004 and the most recent case was in February 2017 in backyard chickens (clade 2.3.3.1). Stamping-out, disinfection of infected premises, active surveillance, movement restriction and compensation were done to control the outbreak. The current national prevention and control plan on AI incorporates the One Health approach and appears to be cost effective with early notification and immediate disease management. Limitations include ineffective border control, insufficient laboratory capabilities and geographic constraints on sample delivery, etc. Further improvement has to be done on village chicken rearing registration, poultry movement control and public awareness campaigns, to name a few.

f) Nepal

Passive and active surveillance are conducted and various stakeholders such as poultry producers, wildlife personnel, NGO participatory groups and private practitioners in addition to government authorities are involved. Live markets, backyard poultry farms, commercial farms and wild bird interface are sites for sample collection. Data are managed and analysed by the Veterinary Epidemiology Centre and reports are published every 6 to 12 months. Predominance of small holders of poultry farm, low veterinary service coverage, long porous border, illegal/informal trade, inadequate legislation and low compensation rate are some of the difficulties that the country is facing.

g) Philippines

Surveillance programme is in place in poultry critical areas (during the migratory bird seasons), live bird markets (with high poultry population density) and wild/migratory birds (dead bird submission to laboratories). AI testing are also conducted on other occasions such as during farm accreditation, export and local shipment. All samples were negative in 2016. The authority faces various challenges which include resistance and lack of incentives from farmers to cooperate with surveillance and issues in handling samples. However, solutions are underway to tackle these problems such as providing education forum and supporting laboratories.

2.4. Laboratory networking

After Dr Kugita presenting a list of previous and future regional activities for the control of AI in regards to laboratory networking organised by OIE or with OIE's involvement presentations were done on laboratory twinning initiatives and experiences.

2.4.1. Overview of the OIE laboratory twinning programme

In order to improve veterinary services and establish partnership between laboratories in developing and in-transition countries, the OIE laboratory twinning programme has been established. It provides sustainable enhancement of capacity and expertise by supporting a link between an OIE reference laboratory or collaboration centre (parent) and a national laboratory (candidate). The objectives of the programme are to strengthen global disease surveillance networks and scientific networks, to improve OIE members' access to rapidly and accurately detect and characterise pathogens, to improve biosafety, biosecurity and bioethics and to create collaborative research opportunities. So far the laboratory twinning programme has made important contributions to improve global disease control capacity and address current bias in the geographical distribution of OIE reference laboratories.

2.4.2. Example 1: OIE laboratory twinning project with Australia

Australian Animal Health Laboratory is one of the world's six biocontainment laboratories. It is an OIE collaborating centre for emerging infectious diseases (EID), FAO referencing centre and a reference laboratory for eight diseases. OIE laboratory twinning programme with Thailand has been set up to enhance EID preparedness, response delivery, technology transfer and test development. Another twinning programme is ongoing with Malaysia. The goal is to help them to become an AI reference laboratory in the future and overcome challenges such as staff continuity, issues on importing samples and reference materials. Further improvement on the projects include improving transparency between the two laboratories in the twinning programmes, increasing flexibility in contracting and funding, better facilitation and engagement with partners and encouraging multi-level engagement with stakeholders in public health and animal health sectors.

2.4.3. Example 2: OIE laboratory twinning project with Japan

Hokkaido University of Japan has been cooperating with Mongolia under the OIE laboratory twinning project since 2016. Activities under the project include joint-surveillance in Mongolia, molecular techniques training and staff exchange programmes. More training on the techniques in diagnosing emergency cases and collaborative researches will be conducted in the future.

2.5. Laboratory capacity building

2.5.1. Global and regional proficiency testing for the diagnosis of avian influenza and laboratory networking in SE Asia supported by AAHL, Australia

The technical scope for the ASEAN regional network includes strengthening diagnosis capacity (workshop, training and providing reference material), facilitating laboratory networking at national and regional level (laboratory network meeting and partnership), assuring quality of laboratory services (laboratory assessment and proficiency testing programme which provide external quality assessment for the laboratory) and improving laboratory biosafety (biosafety risk assessment, biosafety cabinet testing and calibration). The network also helps laboratories to meet ISO standards.

A FAO programme has been established to strengthen diagnostic capacities via laboratory networks with animal and human sectors and support proficiency testing (PT). Influenza PT has been running in the region since 2009, which includes molecular and serological testing for AI subtypes. PT involves laboratories performing the same tests on the same quality controlled samples and comparing results of the tests. It helps to develop inter-laboratories comparability to standardization and harmonization of diagnostic testing and improve diagnostic capability, credibility and compliance.

2.5.2. **Discussion: Conducting proficiency test in Asia**

PT has been done in several countries. Funding for PT, however, has been a challenge. Variability is still present between laboratories. Consultation with experts should be sort to identify problems and come with solutions. Further work such as providing laboratories with new viruses and clades that have not been worked on before can be conducted. OIE invited countries in the Far East who has interest in performing PT for follow-up as these countries can be supported if official requests are submitted and activity facilitated.

2.6. Country situational updates and practices (25 countries/territories)

Each member provided updates on the AI situation of their respective countries/territories in a 3-minute flash talk and poster session. For details, please refer to Appendix IV.

2.7. Group exercise session

Laboratory networking and capacity building

The objectives of the group exercise session on laboratory networking and capacity building were:

(1) To make participants realize their ideal laboratory networking and capacity building requirements and issues limiting to fulfill achieving the ideals
(2) To suggest options and proposals for building a good laboratory network for the region and laboratory capacity in the countries

Participants were divided into 5 groups for group discussion. Three groups worked on the topic "Laboratory networking" and two groups worked on "Capacity building." Suggested questions were provided to the respective groups for discussion. The key elements identified by the groups are summarized as follow:

2.7.1. Laboratory networking (Group A, B and C)

The most important thing to build laboratory network
• Geographic responsibilities and official responsibilities • Laboratory twinning programme / laboratory capacity (e.g. trained personnel, facilities and infrastructure) • Establishment of good communication, reporting and data collection systems for information sharing between laboratories nationally and internationally and between laboratories and epidemiology units • Availability of reference materials • Participation in inter-laboratory proficiency programmes • Collaborative work and research • Harmonization with standardized methods and procedures • Fund support

The most effective method to build network in a country or in emergency
• Policy support and committed funding for rapid response • Establishment of different levels of reporting system and action plan • Coordination committee at every level • Communication between different levels of laboratories • Accreditation of the laboratory facilities including mobile laboratory to handle emergency samples • Collaboration with public health laboratory for facility sharing • Regular meetings, workshops, trainings and simulation exercises • Information technology (e.g. mobile app system) to support rapid reporting and information sharing • Contingency fund

Important / effective methods to build regional networks
• Time when the region is facing the concerned diseases • Establishment of regional coordination agency with adequate financial support

- Regular regional scientific meetings, workshops and training programmes
- Opportunity for info exchange and joint research project between laboratories in the region
- Participation in proficiency testing programme
- Expert assistant from neighbouring countries, twinning programmes
- Trust relationship building between laboratories of countries in the region

Limitations or issues
• Different priorities between countries in the region in regard to the disease • Lack of capacities or expertise • Lack of institution mechanism for direct communication, information sharing and coordination • No sharing of information between laboratory and epidemiology sections • Logistics difficulties due to geographical and language barrier • Competition between laboratories • Political barrier and administrative duplicity • Insufficient budget for animal health • Staff movement and lack of manpower

Proposed solutions to address the above limitations and issues
• Advocacy by internationally response organizations to increase cooperation, transparency between countries, peer pressure to regional committees • Long term commitment establishment and clear detective in combating AI • Increase in collaboration and joint research between laboratories in the region • Development of SOPs for information sharing • Use of information technology for networking and awareness • Trainings and formal meetings with interpretation service to reduce language barrier • Lead funding taken by countries with resources provided by international organization • Clear explanation to decision makers on the severity of economic loss due to animal disease and minimizing administrative duplicity • Enhancement on linkages between epidemiology unit and laboratory unit • Staff training

2.7.2. Capacity building (Group D and E)

Important things needed to build laboratory capacity
• International collaboration, joint research and network • Laboratory policy plan that includes laboratory business plan and resources • Laboratory Diagnosis and Quality Assurance • LIMS (laboratory information management system) • Training programmes with international agencies and other laboratories (domestic or foreign) • Funds for operational cost of the laboratory • Resource mobilization • Proper equipment and supplies • Continuously and regularly updated protocols/ techniques

Effective methods to build laboratory capacity in your country and to support building laboratory capacity in the other country
• Clear roadmap • Commitment system in the region • PVS laboratory analysis, FAO Laboratory Mapping Tool, GMP/GLP workshop • Use of LIMS • Proficiency testing programme • OIE twinning programme • Emergency plan • Stimulation exercise • Technical meetings, webinars, expert consultations, exchange programmes • Joint research and surveillance activities • Higher degree training for personnel

Limitations or issues
• Funding/budget allocation • Political will • Human resource capacity, recruitment, skills and training • Cooperation and data-sharing due to competition between laboratories • Lack of coordination between ministries and between laboratories and universities • Sample shipment and access to reagents • Lack of good infrastructure • Language barrier

Proposed solutions to address the above limitations
• Staff recruitment and development • Good policy in laboratory to reduce turnover • Higher education • Sharing of knowledge internationally • Advocacy/awareness meeting on getting funding and political support • Infrastructure development • Links between private sectors and universities • Building and strengthening networks • Projects with other countries

3. Recommendations and conclusion

Considering that:

1. Avian Influenza (AI) viruses of different subtypes continue to threaten both animal and public health worldwide.
    a. Outbreaks caused by Asian lineage H5Nx highly pathogenic avian influenza (HPAI)

viruses continue to be reported from multiple countries in Asia and Africa. It caused significant loss through both mortality and destruction of poultry.

b. During 2016 - 2017, a significant number of epidemics of HPAI H5N8 virus in poultry and wild birds have been reported in Europe, Africa, Asia and the Middle East.
c. In 2017, H7N9 low pathogenic avian influenza (LPAI) virus acquired pathogenicity to become HPAI H7N9 virus, and has been reported from multiple provinces of China.

2. Members in Asia Pacific have different capacities to conduct effective AI surveillance and control.
3. Control of HPAI at the source through stamping out is recognised as the most effective measure to effectively control or eradicate an epidemic.
4. Vaccination continues to be applied as a measure for the control of HPAI in some countries, but outbreaks are still occurring in these countries. Thus, a need to re-evaluate the use of vaccine as a control measure is felt essential.
5. The One Health (OH) approach is increasingly recognized at international and country levels for avian and pandemic influenza preparedness and response. Several Asian countries have demonstrated good practices for institutionalization of One Health.
6. With changing epidemiology of AI viruses, expansion of cooperation on surveillance and control beyond the region of Asia Pacific is becoming more important.
7. Novel portable diagnostic techniques are becoming available.
8. Implementation of biosecurity measures remains a continuing challenge.
9. Role of pigs as possible mixing vessel for the generation of a possible pandemic Influenza virus strain remains relevant.

Recommendations

For Members

1. Further improve and enhance surveillance of avian influenza for early detection, rapid response and control.
2. Explore the application of risk-based targeted surveillance in domestic and wild bird populations to provide early warning for disease incursion, and also to monitor circulation of different subtypes.
3. Encourage virological surveillance of swine influenza.
4. Enhance linkages and collaboration between epidemiology units and laboratory units. Particularly with regard to planning surveillance, sampling strategies and analysis and interpretation of laboratory test data.
5. Evaluate and pilot potential novel diagnostics for the rapid on-site detection of AI viruses (e.g. pen-side PCR).
6. Strengthen national coordination to control HPAI and other influenza A viruses. If not already existing, a national multi-sectoral coordination unit may be established linked with the existing One Health coordination mechanism.
7. Promote prompt sharing of information on disease status, actions undertaken, and control measures implemented with national stakeholders, the OIE and regional organizations.
8. Implement stamping out as the primary measure to control and eradicate HPAI viruses especially at the early stage of an outbreak in a non-endemic situation.
9. Vaccination may be considered as an additional option in support of stamping out. Ensure that post-vaccination surveillance (such as the use of sentinel birds) and an exit strategy are in place whenever vaccination is practiced in line with existing international standards and guidelines

(e.g. OIE Standards and Guidelines, and OFFLU vaccination guidelines).

10. Continue to improve biosecurity guidelines and protocols applications, taking into consideration different production systems.
11. Apply the OIE international standards for safe cross-border trade in poultry and poultry products.

For partners and international organizations

1. Support Members to strengthen capacity to monitor and control Influenza A virus circulation, particularly building surveillance capacity of laboratories such as through laboratory twinning and proficiency testing.
2. Strengthen regional coordination and expand networks particularly with members sharing common geographical epidemiological bloc (epi-zones) to control HPAI and other influenza A viruses. Members of the networks are encouraged to conduct joint research and surveillance activities. A Virtual? Coordination Unit may be established to provide secretariat to the network.
3. Promote sharing of information on disease status, actions undertaken, and control measures implemented at global and regional levels.
4. Continue to support strengthening of the One Health mechanism in the control of HPAI.
5. Support requests for national IHR-PVS bridging workshops and use the outputs and recommendations for strengthening capacity to control HPAI.
6. Continue to facilitate dialogue in bilateral cross-border safe trade in poultry and poultry products among the bordering countries.

Annex I: Meeting programme

OIE Regional Expert Group Meeting for the Control of Avian Influenza in Asia

Sapporo, Japan, 3-5 October 2017

Provisional Programme

DAY 1		
Time	**Theme**	**Speaker**
08:30 – 09:00	Registration of participants	OIE RR
09:00 – 09:30	Welcome address Opening remarks Opening remarks Opening remarks	Prof Hiroshi Kida Hokkaido University (HU) FAO RAP OIE RRAP Dr Kazuo Ito, OIE Delegate, Japan
	Group photo	MC Dr Pasang Tshering
	Introduction of participants and the workshop	Dr Pasang Tshering , OIE RRAP
	Technical session I: Situational analysis and updates	**Chair: Prof Hiroshi Kida**
09:30 – 09:50	Global and regional situation of avian influenza	Dr Gounalan Pavade, OIE HQ
09:50 – 10:10	Recent surveillance of influenza in animals and joint risk assessments	Dr Filip Claes, ECTAD FAORAP
10:10-10:30	Global and regional situation of zoonotic influenza in humans	Dr Takato Odagiri, NIID, MHLW, Japan
10:30 – 10:45	Q&A time for session	Speakers in session
10:45 – 11:15	***Tea/coffee break***	
11:15 – 11:35	OIE Standards on the surveillance for avian influenza viruses	Dr G Pavade
11:35 – 11:55	Surveillance of avian influenza in Siberia: monitoring migratory wild birds; potential risks to/from neighbouring countries.	Dr Nikita Lebedev
11:55 – 12:15	Epidemiological and molecular information on avian influenza from India and the SAARC sub-region	Dr Nagarajan S Sundaram, NIHSAD, ICAR, Bhopal, India
12:15 – 12:35	H7N9 and other avian influenza subtypes in China, including genetic , epidemiological, experimental and vaccine implementation information	Prof Yoshihiro Sakoda
12:35 – 13:00	Q&A time for session	Speakers in session
13:00 – 14:00	***Lunch***	
	Technical session II: Country situational updates and practices	**Chair: Dr H Kugita**
14:00 – 15:30	**Flash talk and poster gallery session** Member Country/territory updates I: recent outbreaks and response activities undertaken (endemic countries) or preparedness (influenza-	Member Country representatives (12 countries)

	free countries); 3 min "flash talk" of highlights, followed by poster viewing session time for Q&A	
15:30 – 16:00	***Tea/coffee break***	
16:00 – 16:50	**Presentations on vaccination** Vaccination against avian influenza in poultry: an update on science and administrative decisions behind vaccination policy and strategy – 10 minutes presentations by each panelist; - Japan, Thailand, Korea, China, Vietnam	Professor H Kida, Dr Thanawat Tiensen, Dr Heechul Lee, Dr Chuanbin Wang, and Dr Chu Duc
16:50 – 17:20	Q&A session	
18:00 – 20:00	***Dinner hosted by the OIE***	

DAY 2		
Time	**Theme**	**Speaker**
09:00 – 09:15	Summary from Day 1 (including housekeeping)	Prof Yoshihiro Sakoda, HU, Sapporo, Japan
	Technical session III: Country/territory situational updates including surveillance activities	**Chair: Dr Nagarajan S Sundaram**
09:15 – 11:00	**Flash talk and poster gallery session Contd…** Member Country updates II: as above	Member Country representatives (12 countries)
11:00 – 11:30	***Tea/coffee break***	
11:30 – 11:50	Swine influenza scenario in the region: risks and threats to other animal species and people	Dr Takehiko Saito, Director, Div. of Transboundary Animal Disease, NIAH Japan
11:50 – 12:40	**Panel discussion on surveillance from affected and unaffected countries** Surveillance: practicalities and overcoming difficulties - 7 minutes presentation from selected Member Country/territory representatives, including both epidemic and free countries (Cambodia, Nepal, Chinese Taipei, Malaysia, India, Japan, Philippines)	**Moderator: Dr Nagarajan** Dr. T. Ren; Dr MR Bista; Dr Ming-Hsing Peng; Dr SB Abdul Ree; Dr Aruna Sharma; Dr T Yomane; Dr AA Vytiaco
12:40 – 13:00	Q&A session	
13:00 – 14:00	***Lunch***	
	Technical session IV: Laboratory networking and capacity building	**Chair: Dr T Saito**
14:00 – 14:50	**Laboratory networking** Regional activities for the control of avian influenza (5 min) Overview of the OIE twinning programme (5 min) Example 1: OIE twinning programme by Australia (10 min) Example 2: OIE twinning programme by Japan (10 min)	- Dr H Kugita - Dr G Pavade - Dr F Wong - Dr M Okamatsu

	Networking between Siberia and Asia (15 min) Q&A session (5 min)	- Dr A Shestopalov
14:50 – 15:20	**<u>Capacity building</u>** Global and regional Proficiency Testing for the diagnosis of avian influenza (15 min) Q&A and discussion: How to conduct the Proficiency Test in Asia? (15 min)	- Dr F Wong - Drs Wong, Filip and Kugita
15:20 – 15:50	***Tea/coffee break***	
15:50 – 17:15	**<u>Group exercise on laboratory networking and capacity building</u>** Group exercise 1: Laboratory Networking – Groups A, B and C Group exercise 2: Laboratory Capacity Building – Groups D, and E	**Lead Facilitator: Dr Keita Matsuno,** HU, Sapporo, Japan **Other facilitators:** - Okamatsu/Lesa - Pasang/Karina - Pavde - Filip - Ronnel

DAY 3		
Time	**Theme**	**Speaker**
09:00 – 09:20	***Summary** of country updates (from Days 1 and 2)	Prof Y Sakoda
09:20 – 09:40	***Summary** on how to move forward with laboratory networking and capacity building in the region (from Day 2 Technical Session IV)	Dr F Wong
09:40 - 10:05	*** Summary** of Group work outputs (A, B, C, D, E)	Rapporteurs
10:05 – 10:20	***Summary** plan to strengthen laboratory networking and capacity building (from Day 2 Group Exercises)	Dr K Matsuno
10:20 – 10:40	***Tea/coffee break***	
10:40 – 12:15	<u>Laboratory tour:</u> Research Centre for Zoonosis Control	Hokkaido University researchers
	Technical session V: Summary and conclusions	**Chair: Dr H Kugita**
12:15 – 12:45	Conclusions and recommendations	Ronello Abila/Y Sakoda
	Official close of meeting	
12:45- 13:15	**Closing remarks**	Prof Y Sakoda (HU) Dr G Pavade (OIE HQ) Dr H Kugita (OIE RRAP)
13:15	**Lunch and departure**	

Annex II: Vaccination questionnaire form

Regional Expert Group Meeting for the Control of Avian Influenza in Asia

Sapporo, Japan, 3-5 October 2017

This information is being requested by OIE Regional Representation for the Asia and Pacific in Tokyo a supporting data for the captioned meeting.

Country:

Reporting officer:

1. Surveillance of avian influenza

1) National Control Strategy for controlling influenza A viruses in poultry.

Does it exist?	☐ Yes	☐ No		
If "Yes" please check what exists				
Quarantine ☐	Enhanced biosecurity ☐	Rapid diagnosis ☐	Surveillance ☐	
Monitoring ☐	Vaccination ☐	Compensation ☐	Education ☐	
Contingency Plan ☐	Others ☐ (*Please specify*			

2) Is a surveillance programme in place for influenza A in animal during 2014 to-2017?

☐ Yes ☐ No

If yes, specify the target species –

☐ Poultry	☐ Wild birds	☐ Swine
☐ Equine	☐ Other species (	

3) Type of surveillance programme followed for each species-

Active/ Targeted	☐ poultry	☐ wild birds	☐ swine	☐ equine	☐ others
Event-based	☐ poultry	☐ wild birds	☐ swine	☐ equine	☐ others
Passive	☐ poultry	☐ wild birds	☐ swine	☐ equine	☐ others

4) Please check the capacity of your laboratory diagnosis for influenza A viruses in avian

☐	Detect	☐	Sub-typing	☐	Sequencing
Test methods					
☐	Ager-gel immunodiffusion	☐	Haemeagglutination	☐	Haemeagglutinatio inhibition
☐	RT-PCR	☐	ELISA		

5) Name of National Laboratory(ies) for the diagnosis of influenza viruses in animals

2. Vaccination against avian influenza

1) Vaccination Policy

☐ Prohibited ☐ Emergency vaccine stockpiling

☐ Mass vaccination ☐ Targeted vaccination ☐ Field trial

Others _____

☐ _____

2) Vaccine

☐ Imported ☐ Locally produced ☐ Provided by donors

☐ Vector vaccine ☐ Inactivated ☐ Other _____

(The following questions are not applicable to non-vaccination countries/territories)

3) **Vaccination practice**

Implementation agency _____

	For disease control		For disease prevention		For vaccine trial	Others
	Mass vaccination	Targeted vaccination	Mass vaccination	Targeted vaccination		
Chicken/ Commercial farms	☐	☐	☐	☐	☐	☐
Chicken/ Backyard farms	☐	☐	☐	☐	☐	☐
Duck	☐	☐	☐	☐	☐	☐
Others	☐	☐	☐	☐	☐	☐

4) Post vaccination monitoring

Implementation agency _____

_____

☐ Clinical ☐ Virological ☐ Serological

☐ Vaccinated flocks ☐ Vaccinated flocks & others

☐ Commercial farms ☐ Backyard farms ☐ Live bird markets

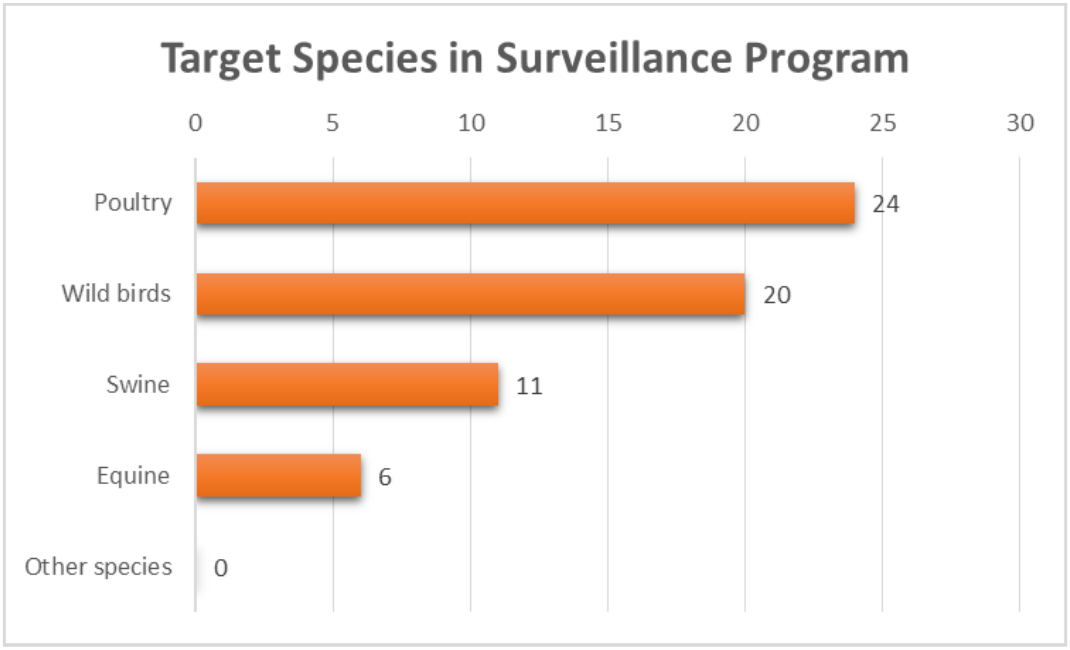
☐ Gallinaceous poultry ☐ Ducks ☐ Others _____

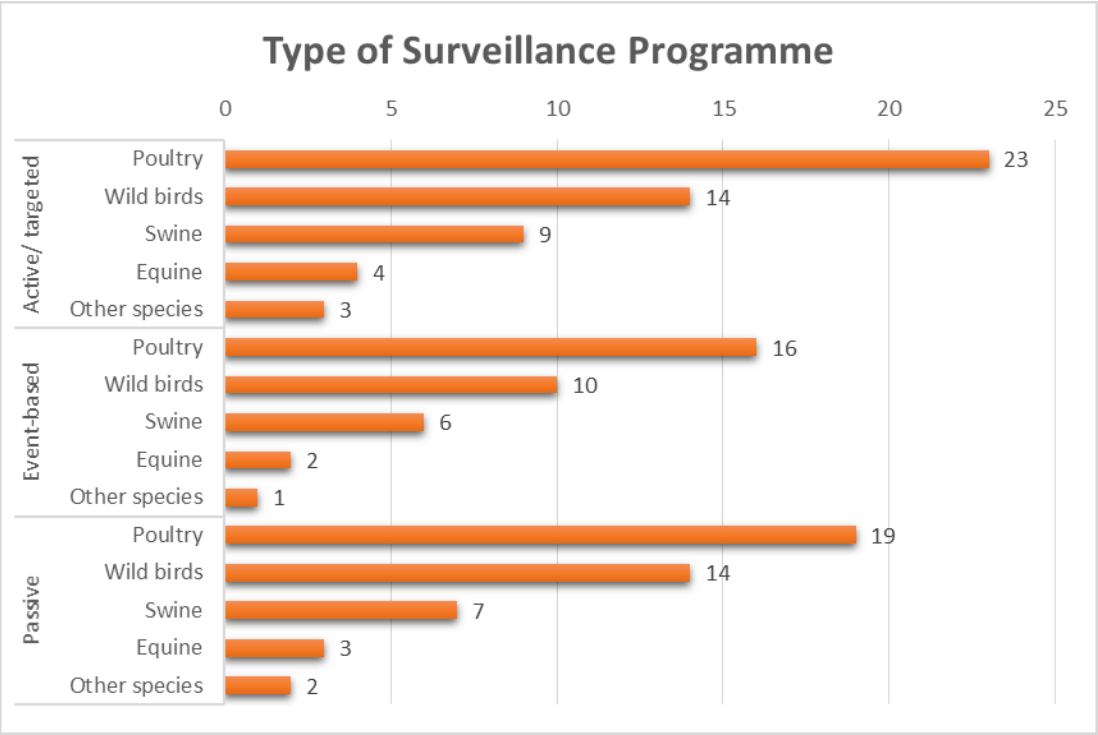
5) Constraints/lessons learned

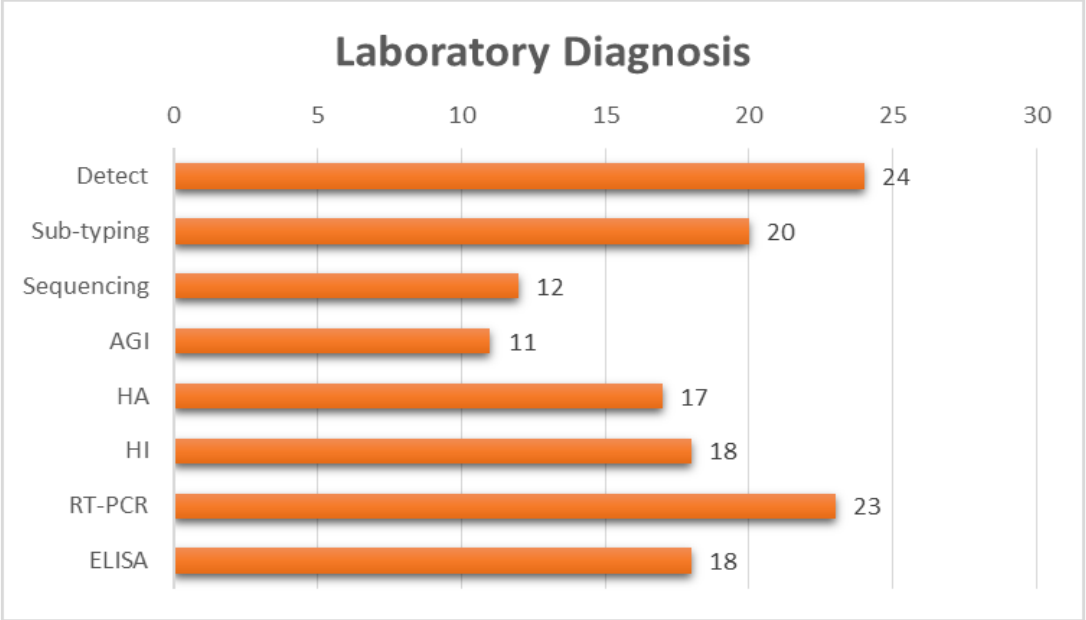
6) Plan for next 5 years (including criteria to stop AI vaccination (exit strategy, if applicable)

Annex III:
Summary review of the vaccination questionnaire survey

The questionnaire survey comprises of surveillance of AI and vaccination against AI (Appendix I). Twenty-five countries/territories replied to the questionnaire. The following is a preliminary summary of the survey. Figures in the graphs indicate the number of countries/territories. *Please note that further studies are needed to reflect the actual regional situation.*

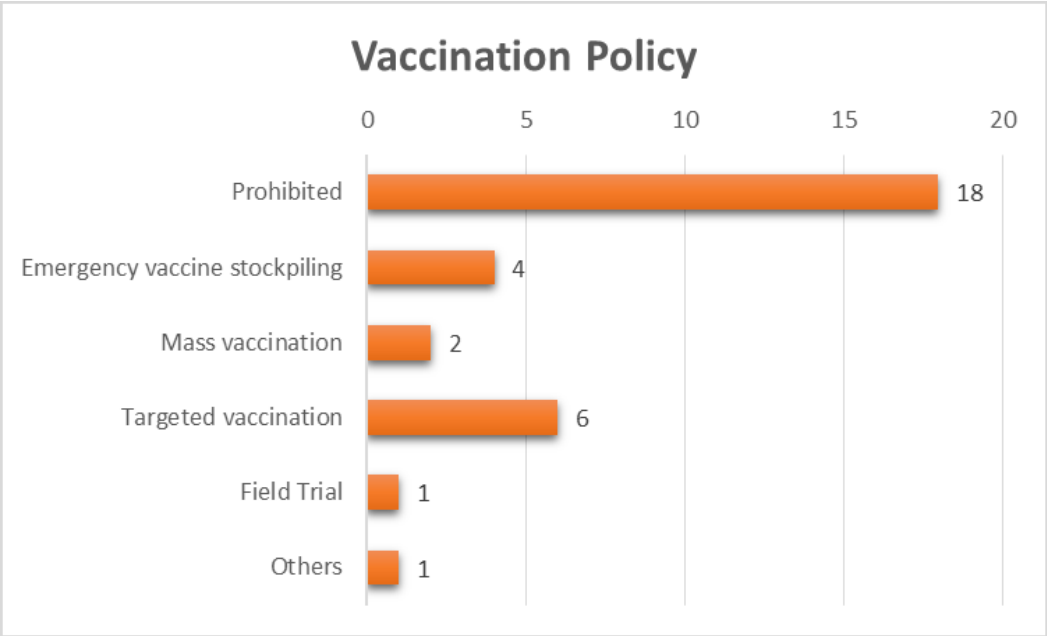


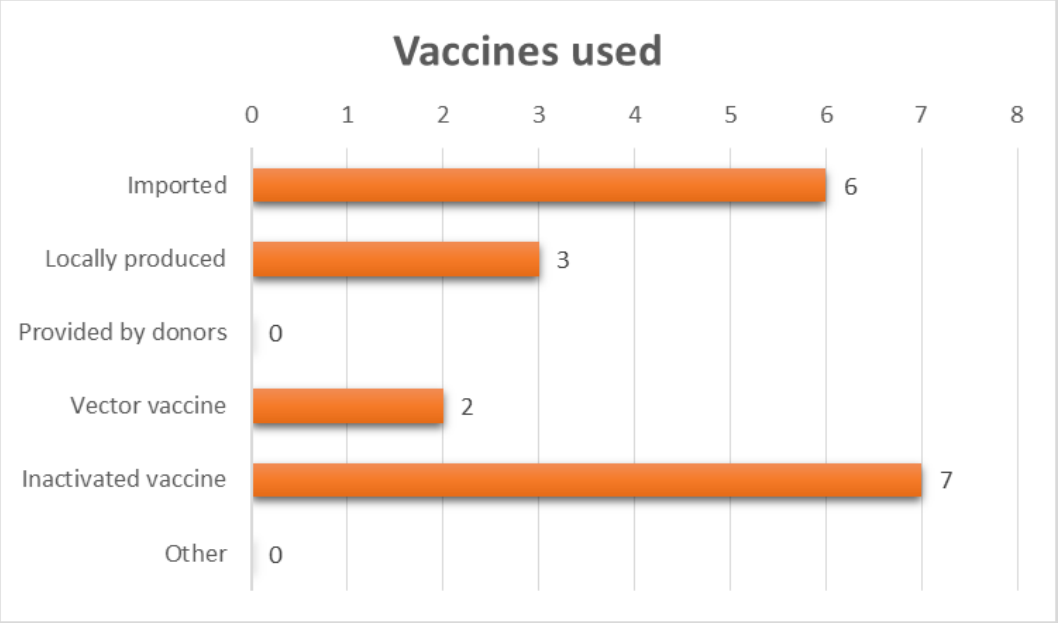

Type of Surveillance Programme
0
5
10
15
20
25
Active/ targeted
Poultry
Wild birds
Swine
Equine
Other species
23
14
9
4
3
Event-based
Poultry
Wild birds
Swine
Equine
Other species
16
10
6
2
1
Passive
Poultry
Wild birds
Swine
Equine
Other species
19
14
7
3
2

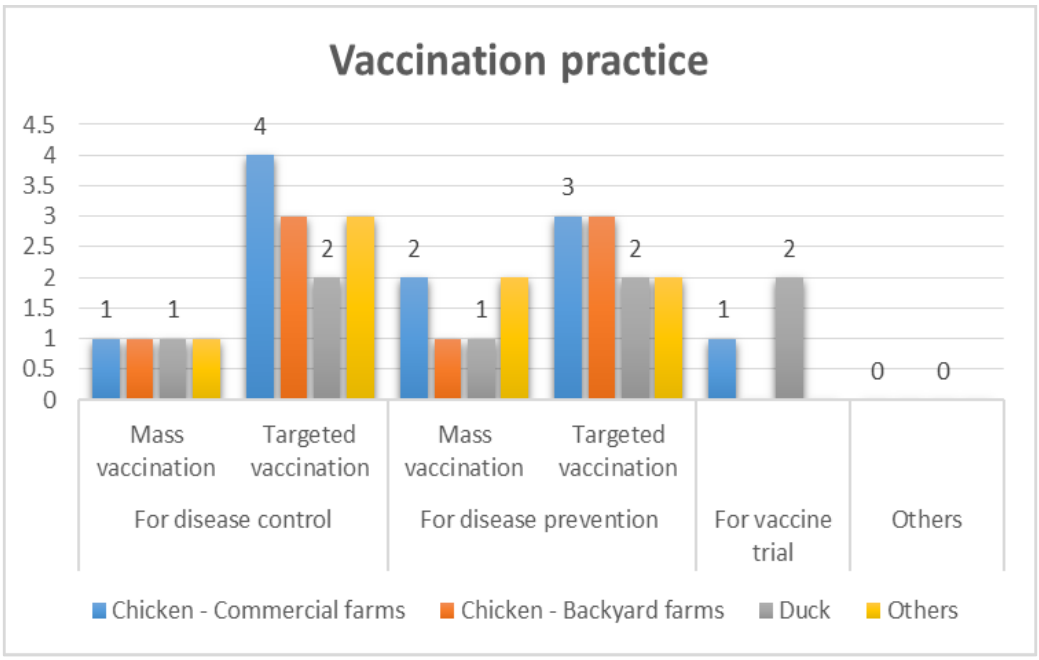

Laboratory Diagnosis
0
5
10
15
20
25
30
Detect
24
Sub-typing
20
Sequencing
12
AGI
11
HA
17
HI
18
RT-PCR
23
ELISA
18

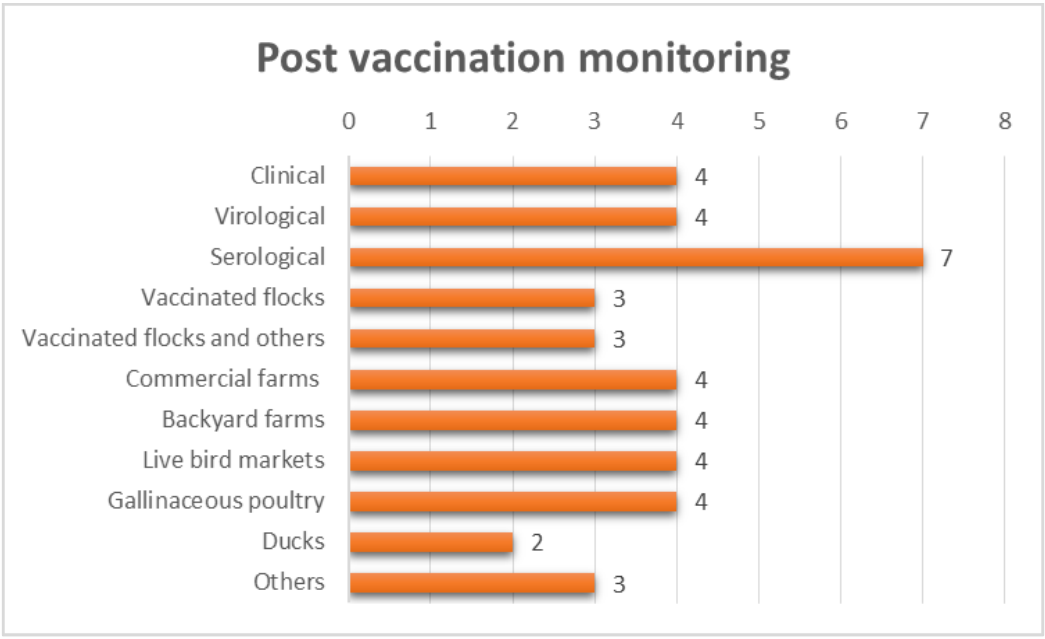
National Laboratory for the Diagnosis of Influenza Viruses in Animals

Australia	Australian Animal Health Laboratory
Bangladesh	NRL-AL, Bangladesh Livestock Research Institute, Savar, Dhaka, Central Disease Investigation Lab
Bhutan	Natinoal Centre for Animal Health, Department of Livestock, Serbithang, Thimphu
Brunei	Veterinary Laboratory Services Unit, Division of Livestock and Veterinary Services, Department of Agriculture and Agrifood
Cambodia	National of Animal Health and Production Research Institute, General Directorate of Animal Health and Production
China	National Reference Laboratory for Avian Influenza, Harbin Veterinary Research Institute of Chinese Academy of Agricultural Sciences
Chinese Taipei	Animal Health Research Institute
Fiji	Fiji Veterinary Pathology Laboratory
Hong Kong	Tai Lung Veterinary Laboratory, Agriculture, Fisheries & Conservation Department
India	ICAR - National Institute of High Security Animal Diseases, Anand Nagar, Bhopal - 462022 Madhya Pradesh, India
Japan	National Institute of Animal Health, Animal Quarantine Service
Republic of Korea	Screening test: Animal and Plant Quarantine Agency (APQA), Provincial labs; Confirmation test: APQA
Laos	National Animal Health Laboratory
Malaysia	Veterinary Research Institute
Mongolia	Central Veterinary Laboratory of Mongolia
Myanmar	Yangon Veterinary Diagnostic Laboratory (lower Myanmar), Mandalay Veterinary Diagnostic Laboratory (Upper Myanmar)
Nepal	Central Veterinary Laboratory, Kathmandu, Nepal; National Avian Laboratory, Chitwan, Nepal; Regional Veterinary Laboratory(5), Nepal
New Caledonia	Service des laboratoires officiels veterinaires, agoralimentaires et phytosanitaires de la Nouvelle-Caledonie
Papua New Guinea	National Veterinary and Food Testing Laboratory
Philippines	Bureau of Animal Industry - Animal Disease Diagnostic Reference Laboratory
Russia	FGBI Federal Center for Animal Health (FGBI ARRIAH), Vladimir
Singapore	Animal & Plant Health Centre, Agri-Food & Veterinary Authority of Singapore
Sri Lanka	Veterinary Research Institute
Thailand	National Institute of Animal Health (NIAH), Thailand, Regional Veterinary Research and Development Centers
Vietnam	National Centre for Veterinary Diagnosis, Regional Animal Health Officer I-VII


Vaccination Policy
0
5
10
15
20
Prohibited
18
Emergency vaccine stockpiling
4
Mass vaccination
2
Targeted vaccination
6
Field Trial
1
Others
1


Vaccines used
0
1
2
3
4
5
6
7
8
Imported
6
Locally produced
3
Provided by donors
0
Vector vaccine
2
Inactivated vaccine
7
Other
0


Vaccination practice
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
1
1
4
2
2
1
3
2
1
2
0
0
Mass vaccination
Targeted vaccination
Mass vaccination
Targeted vaccination
For disease control
For disease prevention
For vaccine trial
Others
Chicken - Commercial farms
Chicken - Backyard farms
Duck
Others


Post vaccination monitoring
0
1
2
3
4
5
6
7
8
Clinical
4
Virological
4
Serological
7
Vaccinated flocks
3
Vaccinated flocks and others
3
Commercial farms
4
Backyard farms
4
Live bird markets
4
Gallinaceous poultry
4
Ducks
2
Others
3

Constraints / lessons learned:

- Diversified poultry industry are not equally addressed in all sectors
- Application of vaccines in backyard poultry is not always effective
- Transportation, slaughter and poultry trading activities have not been strictly controlled
- Wild birds and live bird markets are still a difficulty of the plan and vaccination cannot solve the programme completely
- Waterfowls breeding in the bordering area in complicated to facilitate virus entry
- Providing laboratories with reference kits and methods is still relevant
- Lack of activities, lack of capacity and lack of reagents are the constraints
- It is necessary to develop common recommendations on the use of vaccines in poultry farming

Plan for the next 5 years

- Develop a strategy for backyard poultry
- Ensure the allocation of finance for the facilitation of AI surveillance and monitoring programme
- Develop national programme for the prevention and control of HPAI 2016-2020
- Introduce H7N9 vaccines
- Increase surveillance in wild bird population
- Provide education and training of veterinary specialists in far and veterinary services
- Strengthen cooperation with international organisations to conduct active surveillance on the circulation and evolution of AI viruses

Annex IV: Presentations on countries' situations (annexed separately)

Annex V: Useful links

1. OIE Situation Report for Avian Influenza 2017
   http://www.oie.int/.../OIE...situation_report/OIE_SituationReport_AI_9_11July2017.pdf
2. 6th Asia-Pacific Workshop on Multi-sectoral Collaboration for the Prevention and Control of Zoonoses
   http://www.rr-asia.oie.int/uploads/tx_oiefiles/Sapporo_meeting_report_FINAL.pdf
3. Terrestrial Animal Health Code Chapter 1.4: Animal Health Surveillance
   http://www.oie.int/index.php?id=169&L=0&htmfile=chapitre_surveillance_general.htm
4. Terrestrial Animal Health Code Chapter 10.4: Infection with Avian Influenza Virus
   http://www.oie.int/index.php?id=169&L=0&htmfile=chapitre_avian_influenza_viruses.htm
5. Manual of Diagnostic Tests and Vaccines for Terrestrial Animals Chapter 2.3.4: Avian Influenza
   http://www.oie.int/fileadmin/Home/eng/Health_standards/tahm/2.03.04_AI.pdf
6. OIE Reference Laboratories for HPAI and LPAI in poultry http://www.oie.int/en/our-scientific-expertise/reference-laboratories/list-of-laboratories/
7. OFFLU http://www.offlu.net/
8. OFFLU Annual Report 2016
   http://www.offlu.net/fileadmin/home/en/publications/pdf/OFFLU_Annual_Report_2016.pdf
9. Novel Reassortant Highly Pathogenic Avian Influenza (H5N8) Virus in Zoos, India
   https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5367432/pdf/16-1886.pdf
10. USDA: Environmental spread, multiple entries likely fueled US H7N9 outbreaks
    http://www.cidrap.umn.edu/news-perspective/2017/06/usda-environmental-spread-multiple-entries-likely-fueled-us-h7n9-outbreaks
11. Biological characterization of the emerged highly pathogenic avian influenza (HPAI) A(H7N9) viruses in humans, in mainland China, 2016 to 2017
    https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5476987/
12. Hokkaido University Influenza Virus Database System http://virusdb.czc.hokudai.ac.jp/
13. Avian influenza - Scientific Opinion https://www.efsa.europa.eu/en/efsajournal/pub/4991
14. Avian influenza overview October 2016–August 2017
    https://www.efsa.europa.eu/en/efsajournal/pub/5018
15. Risk factors of primary introduction of highly pathogenic and low pathogenic avian influenza virus into European poultry holdings, considering at least material contaminated by wild birds and contact with wild birds https://www.efsa.europa.eu/en/supporting/pub/1282e
16. Narrative overview on wild bird migration in the context of highly pathogenic avian influenza incursion into the European Union https://www.efsa.europa.eu/en/supporting/pub/1283e
17. Report about HPAI introduction into Europe, HPAI detection in wild birds and HPAI spread between European holdings in the period 2005-2015
    https://www.efsa.europa.eu/en/supporting/pub/1284e
18. Data analysis and predictive modelling of HPAI H5 and H7 outbreaks in the EU 2005-2015
    https://www.efsa.europa.eu/en/supporting/pub/1285e
19. LPAI detection in wild birds and LPAI spread between European holdings in the period 2005-2015
    https://www.efsa.europa.eu/en/supporting/pub/1286e
20. Mechanisms and risk factors for mutation from low to highly pathogenic avian influenza virus:
    https://www.efsa.europa.eu/en/supporting/pub/1287e

Notes

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