

SCIENTIFIC Conference

e-Book



International Alliance for
Biological Standardization



World Organisation
for Animal Health
Founded as OIE

Vaccination and Surveillance for HPAI in Poultry : Current Situation and Perspectives

October 22 & 23, 2024

WOAH World Organisation for Animal Health

PARIS - FRANCE

www.iabs.org





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Sponsors

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Ceva Animal Health





About the Conference

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High Pathogenicity Avian Influenza (HPAI) in poultry, wild birds, wildlife mammals, and now even livestock, is a global challenge. The spread of the H5Nx 2.3.4.4b lineage of HPAI is now threatening to become truly global. Whilst the epidemiological situation differs across continents, veterinary authorities and the poultry industry all over the world must deal with a new situation where trade and production are constantly threatened by a virus that is entrenched in wild birds and parts of the poultry population, making a renewed approach necessary.

Wider use of avian influenza vaccination could increase chances for sustainable poultry production, improve animal welfare, reduce economic damage, limit human infections, contribute to the protection of wildlife and increase consumers and animal welfare acceptance of control programs. Although fully compatible with the World Organisation for Animal Health's (WOAH) standards, poultry vaccination creates new challenges in surveillance and trade.

In the wake of the World Organisation of Animal Health's Forum, held during WOA's General Session in May 2023, and the IABS October 2022 workshop on HPAI vaccination, WOA and IABS are announcing a follow-up meeting in October 2024: Vaccination and Surveillance for HPAI in poultry: Current situation and perspectives.

This workshop is intended to discuss how to implement surveillance in vaccinated populations to ensure safe and fair trade and will also touch upon further aspects of HPAI vaccination.

The workshop will be reviewing all the existing data with participation by a wide variety of stakeholders (WHO, OFFLU, FAO, WTO, governments, poultry breeding and biological companies, animal welfare organizations, human health, scientists, etc) and will be concluded by a panel establishing recommendations.



Scientific and Organizing Committee

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Scientific Committee

Arjan Stegeman, Utrecht University, Netherlands (Co-Chair)
Gounalan Pavade, WOAHA (Co-Chair), France
Olivier Espeisse, IABS Chair, France
Celia Abolnik, University of Pretoria, South Africa
Madhur Dingra, FAO, Italy
Timm Harder, FLI, Germany
Rick Hill, IABS President, USA
Khaled Hussein, Almarai, Saudi Arabia
Jeremy Ho, Agriculture, Fisheries and Conservation Department, Hong Kong
Carmen Jungbäck, IABS, France
Nicholas Lyons, FAO, Italy
Isabella Monne, EURL-IZSVE, Italy
Erica Spackman, USDA, USA
Barbara Storck, Moorgut Kartzfehn, Germany
David Suarez, USDA, USA
David Swayne, Birdflu Veterinarian LLC, USA
Sjaak de Wit, GD Deventer, Netherlands
Cristobal Zepeda, USDA, USA

Organizing Committee

Arjan Stegeman, Utrecht University, Netherlands (Co-Chair)
Gounalan Pavade, WOAHA (Co-Chair), France
Olivier Espeisse, IABS Chair, France
Madinina Cox, Events Manager, IABS/MC'Com, France
David Swayne, Birdflu Veterinarian LLC, USA



Scientific Program

Tuesday 22th of October, 2024

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09:00 – 09:10

Official welcomes from IABS & WOAHP - **Emmanuelle Soubeyran, WOAHP, France, Rick Hill, IABS, U.S.A.**

09:10 – 09:15

Welcome by FAO - **Amy Delgado, FAO, Italy**

SESSION 1 – Introduction to the meeting including objectives and expected outcomes

Moderator: Arjan Stegeman and Gounalan Pavade

09:15 – 09:30

Conclusions and recommendations from October 2022 IABS meeting
David Swayne, Birdflu Veterinarian LLC, U.S.A.

09:30 – 09:45

Progress in support, dialog and implementation of vaccination
Gounalan Pavade, WOAHP, Paris

09:45 – 10:15

Setting the scene; Global development of HPAI during the last two years
Ian Brown, The Pirbright Institute, United Kingdom

10:15 – 10:45

Meeting objectives and expected outcomes
Arjan Stegeman, Utrecht University, Netherlands

10:45 – 11:15

Morning tea / coffee

SESSION 2 – Tools for monitoring and surveillance in vaccinated poultry populations

Moderator: Timm Harder and Isabella Monne

11:15 – 11:30

Fit for purpose diagnostic tools for monitoring and surveillance in vaccinated populations - **David Suarez, USDA, U.S.A.**

11:30 – 11:45

Role of antibody detection (DIVA) in surveillance for freedom from HPAI and diagnostic tools to assess the effectiveness of vaccination
Timm Harder, FLI, Germany



Scientific Program

Tuesday 22th of October, 2024

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11:45 – 12:00

Optimizing surveillance for virus detection in vaccinated populations: dead bird, environmental or hybrid sampling systems

Jean-Luc Guérin, UMR IHAP, France

12:00 – 12:15

Surveillance for detection and assessment of virus evolution to inform vaccination programs including vaccine selection and updates

Isabella Monne, EURL-IZSVE, Italy

12:15 – 01:00

Lunch Break

01:00 – 02:00

Panel discussion with the audience

SESSION 3 – Field experiences on surveillance in vaccinated populations

Moderator: Sjaak de Wit and Jeremy Ho

02:00 – 02:15

France - **Béatrice Grasland, ANSES, France**

02:15 – 02:30

The Netherlands - **Sjaak de Wit, GD Deventer, Netherlands**

02:30 – 02:45

Uruguay - **Gonzalo Simone, Dirección General de Servicios Ganaderos, Ministerio de Ganadería Agricultura y Pesca, Uruguay**

02:45 – 03:00

Indonesia - **Teguh Yodiantara Prajitno, Jpafa Comfeed, Indonesia**

03:00 – 03:15

China - **Hualan Chen, Harbin Veterinary Research Institute (Virtual)**

03:15 – 03:30

Hong-Kong - **Jeremy Ho, Agriculture, Fisheries and Conservation Department**

03:30 – 04:00

Afternoon tea/coffee

04:00 – 05:00

Panel discussion with the audience on country experiences

05:00

End of the day



Scientific Program

Wednesday 23th of October, 2024

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SESSION 4 – Surveillance and Trade: Risk Assessment

Moderator: Barbara Storck and Khaled Hussein

08:30 – 08:50

Concepts of surveillance for early warning and demonstration of disease freedom in vaccinated populations - **Angus Cameron, EpiMundi, France**

08:50 – 09:20

Sensitivity of surveillance programs in vaccinated poultry populations
Jose Gonzales, WBVR, Netherlands & Oriana Beemer, USDA, U.S.A.

09:20 – 09:35

Vaccination of poultry against HPAI, Surveillance and Mitigation Measures
Francesca Baldinelli, EFSA, Italy

09:35 – 09:50

Cost benefit assessment of surveillance (affordable/sustainable, who pays)
Damian Tago Pacheco, F.A.O, Italy

09:50 – 10:05

What public health should gain from surveillance for HPAI in vaccinated poultry - **Ron Fouchier, Erasmus Medical Center, Netherlands (Virtual)**

10:05 – 10:35

Morning tea/coffee

10:35 – 11:35

Panel discussion with the audience

SESSION 5 – Surveillance and Trade: Risk Management

Moderator: Celia Abolnik and Nicholas Lyons

11:35 – 11:55

Assuring science-based measures against HPAI – The risk management perspective - **Katharina Stark, Federal Food Safety and Veterinary Office, Switzerland**



Scientific Program

Wednesday 23th of October, 2024

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11:55 – 12:10

Government consideration on compartmentalization
Christine Middlemiss, UK CVO, DEFRA
Gordon Hickman, DEFRA, UK

12:10 – 12:25

Practical issues around compartmentalization
Kate Hayes, Aviagen, U.S.A.

12:25 – 01:30

Lunch break

01:30 – 03:00

Surveillance in vaccinated populations and safe trade, different perspectives (exporting country perspective, importing country perspective, industry perspective)

Nadia Khaldoune, AVEC EU Poultry, Belgium
Nicolas Ponçon, Deputy Head of International Affairs, DGAL, France
Francisco Reviriego-Gorderjo, EU Commission
Kaltham Kayaf, Ministry of Climate Change and Environment, UAE (TBC)
Yukitake Okamura, MAFF, Japan
Tze Hoong Chua, National Parks Animal & Veterinary Service, Singapore

03:00 – 03:30

Afternoon tea/coffee

03:30 – 04:30

Panel discussion with the audience

SESSION 6 – Conclusions and recommendations

Moderator: Arjan Stegeman and David Swayne

04:30 – 05:00

Conclusions and recommendations

05:00

End of the day and closing by IABS & WOAH



Upcoming IABS Conferences and Workshops

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2024



**IABS 10th Annual Statistics Workshop
Science & Statistics – Elevating CMC through Partnership**

Washington DC, USA
November 12-14, 2024



Avoiding Antimicrobial Resistance: Veterinary use of Phages for Prevention, Therapy and Control of Bacterial Infections

Virtual Meeting
November 19-20, 2024



4th Conference on Next Generation Sequencing for Adventitious Virus Detection in Biologics for Humans and Animal

NGS Training Workshop
December 3, 2024
4th NGS Conference
December 4 & 5, 2024
Frankfurt, Germany

2025



Advances in Analytical Technologies for Biopharmaceutical Products

Rockville, MD, USA
March 19-21, 2025



Leveraging Analytical and Bioprocess Platforms for Biological Product Development and Commercialization

Brussels, Belgium
May 14-15, 2025



Celia Abolnik, PhD

Professor
Pretoria, 0110, South Africa
Faculty of Veterinary Science, University of Pretoria
Old Soutpan Road, Onderstepoort
Tel: +27 125298258
Fax: +27 125298306
E-mail: celia.abolnik@up.ac.za

Prof. Celia Abolnik holds the South African National Research Foundation's SARCHI research chair in Poultry Health and Production at the University of Pretoria's Faculty of Veterinary Science, which is the only veterinary school in the country. She is the author of almost 100 peer-reviewed scientific papers, mostly focusing on avian influenza.

Her skills and research interests encompass pathogen identification and genomics, the molecular epidemiological tracing of outbreak sources and spread, diagnostic test development, and the development and clinical testing of novel veterinary vaccines using a plant expression system. She is a member of the international WOAHA-FAO scientific OFFLU network, has served on national avian influenza task teams and is a member of the South African Veterinary Association's Poultry Group.



Francesca Baldinelli DVM, PhD

Scientific Officer
European Food Safety Authority
via Carlo Magno 1A, 43126 Parma, Italy
Tel: +390521036859
E-mail: Francesca.baldinelli@efsa.europa.eu

Francesca graduated as a veterinarian in 2005 from the Università degli Studi di Perugia, Italy. She completed a PhD in Epidemiology and Zoonoses Control and a postgraduate diploma in Veterinary Public Health. She then went on to work as an epidemiologist for several years before becoming a scientific officer at the European Food Safety Authority (EFSA) in 2015, where her work is focused on risk assessment in the animal health field, particularly on avian influenza.

Francesca Baldinelli

Vaccination of poultry against HPAI, Surveillance and Mitigation Measures

BACKGROUND : According to international standards, after vaccination against HPAI in poultry is implemented, enhanced surveillance of vaccinated poultry is required for early detection of any potential HPAI outbreaks in poultry, as well as to demonstrate that HPAI is not present in vaccinated areas.

METHODS : Mathematical models were used to investigate the effectiveness of different surveillance options for early detection and demonstration of freedom from HPAIV in vaccinated poultry. In the context of emergency and preventive vaccination, sample size, frequency of sampling, type of sample and diagnostic test sensitivity were the attributes explored to assess the effectiveness of the different strategies.

RESULTS : Upon emergency vaccination, molecular testing of all dead birds on a weekly basis and up to a number of 5, proved to be effective; longer sampling intervals may be considered if higher numbers of dead birds are sampled and tested. In ducks molecular and serological testing of live birds proved to be effective too (60 birds every 2 weeks). Regarding preventive vaccination and according to the poultry species considered, a number of equally effective surveillance options would lead to at least 99% confidence in disease freedom in the area and a probability of early detection from 74% to 93% when coupled with passive surveillance in unvaccinated establishments, such as molecular testing of all dead birds up to a number of 15 in 100%, 50% and 25% of the vaccinated establishments monthly, every 2 weeks and weekly, respectively.

CONCLUSIONS : Demonstration of freedom from HPAI in vaccinated poultry based on the effective surveillance options here proposed is recommended to enable safe movement of vaccinated poultry. Surveillance options should be selected according to the country's specific circumstances and resources.



Oriana Beemer, MS, DVM

Assistant Director, Poultry Health
United States Department of Agriculture
Address: 2150 Centre Ave, Building B, Fort Collins,
Colorado, USA 80526
Tel: +1-970-494-7426
E-mail: Oriana.m.beemer@usda.gov

Dr. Oriana Beemer is the Assistant Director of Poultry Health with the U.S. Department of Agriculture's Animal and Plant Health Inspection Service, Veterinary Services, Strategy and Policy. Prior to joining Poultry Health, she was an Assistant Director and veterinary epidemiologist with the Surveillance Design and Analysis Unit in the Center for Epidemiology and Animal Health. She also previously served as a live animal imports staff officer with the National Import Export Services. She obtained her Bachelor of Science in Animal Science and Doctor of Veterinary Medicine degrees at Colorado State University and her Master of Science in Epidemiology degree from George Washington University.

Oriana Beemer

Sensitivity of surveillance programs in vaccinated poultry populations

When considering an appropriate surveillance plan for vaccinated poultry populations, additional targeting and modification from baseline surveillance activities are needed. Both passive and active surveillance can be used in vaccinated and unvaccinated populations, though passive reporting may be more difficult in vaccinated flocks when the vaccine is a good match to the circulating virus. Because of this decrease in sensitivity of passive surveillance, active surveillance should be increased in the vaccinated population to detect disease circulating at a lower prevalence. This active surveillance would allow monitoring for infection, detection of emergent new field strain viruses, verifying appropriate vaccination and supporting flock level freedom from disease. Both passive and active surveillance would remain important in unvaccinated populations as they were before vaccination.

The type of vaccine used will inform the test methodology that is most appropriate for the vaccine type – serologic versus molecular (polymerase chain reaction [PCR]) methods. Killed vaccines are limited to molecular testing until a recognized system to differentiate infected from vaccinated animals (DIVA) is readily available. This outlines the importance of utilizing vaccines that are DIVA compatible or vaccines compatible with serologic monitoring to leverage existing surveillance programs. Production purpose of the birds and their type (gallinaceous vs. non-gallinaceous) may also impact vaccine type and therefore surveillance approach. Biosecurity principles should be regularly enforced to prevent disease introduction, decrease lateral spread, and reduce the potential for spillover between populations.

The United States Department of Agriculture, Animal and Plant Health Inspection Service, Veterinary Services, Center for Epidemiology and Animal Health developed a within-flock transmission model to predict potential HPAI spread in vaccinated flocks with partial immunity, in collaboration with University of Minnesota. The model includes 3 immunity classes spanning minimal immunity to full immunity against systemic shedding. The model simulates chickens vaccinated with rHVT H5 vaccine and focused on non-ideal vaccination condition scenarios. Preliminary results indicate slow spread and longer time to detect HPAI in vaccinated flocks. Additional transmission studies will be important to inform parameters and scenarios to explore and inform surveillance options based on the outputs.



Prof Ian Brown

Group Leader Avian Virology
The Pirbright Institute, Ash Road, Pirbright, Woking, Surrey GU24 0NF United Kingdom
Chair of OFFLU (WOAH/FAO network of expertise on animal influenza) steering committee
Tel: +44 1483 232448
E-mail: ian.brown@pirbright.ac.uk

Ian provides a broad range of disease consultancy at both international and national level to a wide range of stakeholders on all the aforementioned diseases, specialising in science evidence and laboratory application as directly relevant to disease control. Ian is a founder member of the OFFLU Laboratory Network. He is currently chairperson of the OFFLU steering committee. Ian has undertaken country specific missions to advise on the control of HPAI. His specific research interests include the epidemiology, vaccination, pathogenicity, transmission and infection dynamics in relation to the control of influenza in animal hosts including zoonotic threat. He led the implementation of the AIM (Avian Influenza Monitoring) programme through OFFLU to provide all stakeholders with science information to guide H5 vaccine strain selection. Ian holds a visiting Professorship position in Avian Virology at the University of Nottingham and Honorary Professorship in Pathobiology and Population Sciences with Royal Veterinary College, University of London.

Prof Ian Brown

Global developments with HPAI during the last two years: implications for disease control

During 2023 and 2024 there have been substantive changes in the epidemiology of H5 high pathogenicity avian influenza. The virus has continued to spread at global scale with Australasia the only unaffected continent following the detection of virus in avian and mammalian populations in Antarctica. Furthermore, due to high efficiency of infection and expansion of host range in birds (wild and domestic) there has been a continuous and high level maintenance of the virus in the environment. The epidemiology whilst not exclusively, has been dominated by H5N1 viruses belonging to clade 2.3.4.4b. The virus has extended its host range to wild avian populations not previously affected, such as seabirds due to heavy environmental contamination and exposure, but also has established continuous infections in key hosts groups such as Laridae which have further contributed to the changing epidemiology. Significantly the virus has spilled over and in some cases become established, in wild mammalian species. Initially these infections were primarily of species that scavenge or predate infected or dead wild birds and invariably resulted in fatal outcomes. More latterly following spread to sea mammals in South America evidence is emerging that the virus may be able to maintain independently in such populations. However of greatest significance is the spread of virus to dairy cattle in the USA where in excess of 230 cases have been reported to date since March this year. This is the first spillover into domestic livestock of non avian origin leading to ongoing maintenance of infection. All of these events have been accompanied by genetic changes in the virus some of which increase the risk to humans. As a result there have been several human infections due to exposure to infected birds and animals with most being unremarkable and not capable of onward transmission. The continued panzootic emphasizes the importance of the need for flexible and multiple options to prevent and control the spread of infection especially through effective use of vaccination.



Angus Cameron

Director General
EpiMundi Europe
3 rue Camille Jordan
69001 Lyon, France
Tel: +33 6 01 76 41 69
E-mail: angus@ausvet.eu

Angus Cameron is an experienced epidemiologist with special interests in the areas of surveillance, health information systems, epidemiological data analysis and spatial data analysis. He is the Director General of EpiMundi Europe, a private epidemiology consulting company based in Lyon, France.

Angus has worked across a range of species including livestock, aquatic, wildlife, plant and human health, and has designed, led and implemented projects in over 50 countries around the globe.



Hualan Chen

Director

Organization / Company: Animal Influenza Laboratory, Harbin Veterinary Research Institute, Chinese Academy of Agricultural Sciences

678 Haping Road, Harbin, P. R. China

Tel: +8645151997168

Fax: +8645151997166

E-mail: chenhualan@caas.cn

Dr. Hualan Chen is a professor in the Harbin Veterinary Research Institute of Chinese Academy of Agricultural Sciences. She is currently the director of the National Avian Influenza Reference Laboratory of China, the OIE Avian Influenza Reference Laboratory, and the FAO Animal Influenza Reference Center. Her research focus is the study of influenza virus and the development of vaccines against this virus. She performs extensive basic research to understand the evolution and the genetic basis of the virulence and host range of avian influenza viruses, and has published over 200 papers in international peer-reviewed journals, such as *Science*, *Cell Research*, *Cell Host & Microbe*, and *PNAS*. She established several platforms for avian influenza vaccine development, and nearly 300 billion doses of the vaccines developed by her have been used to control H5 and H7N9 influenza viruses in poultry in China and other countries.

She was selected as one of “the 10 people that mattered in 2013” by *Nature*, and was awarded the 2016 L’Oréal-UNESCO For Women in Science Awards. She was elected as a member of the Chinese Academy of Sciences in 2017 and a member of the World Academy of Sciences for developing countries in 2018.



Tze-Hoong Chua

Group Director
Veterinary Health Division
National Parks Board
1 Cluny Road, Singapore Botanical Gardens,
Singapore 259569
Tel: (65) 63347936
Fax: (65) 63341704
E-mail: chua_tze_hoong@nparks.gov.sg

Dr Tze-Hoong Chua is a veterinary officer who has served the Singapore Government in various policy, field surveillance and laboratory domains for more than 20 years. He graduated as a veterinarian from the University of Queensland and obtained his PhD at Murdoch University in veterinary epidemiology and virology. He has an interest in veterinary public health and zoonotic diseases, especially on avian influenza. Tze-Hoong is currently group director of veterinary health and oversees the biosecurity and biosurveillance programmes at the National Parks Board.

Tze-Hoong Chua

Biosecurity and Biosurveillance: the Singapore Perspective

Avian influenza A(H5N1) is a subtype of influenza A virus (IAV) that infects birds and is highly pathogenic to many species of wild and domestic birds. Sporadic infections of humans with A(H5N1) have been reported and most cases had prior occupational or domestic exposure to infected poultry. To date, no sustained human-to-human transmission has been reported. While wild waterfowl are the natural reservoir of avian influenza viruses, an A(H5N1) global epizootic is ongoing with widespread infections among wild birds, resulting in a high number of confirmed or suspected spillover transmissions to domestic poultry, urban resident birds, and a range of mammal species (e.g., cats, cattle, mink, marine mammals).

In Singapore, no animal or human cases of A(H5N1) infection have been detected. To minimise the importation risk of the virus in both humans and poultry, Singapore has implemented a multi-sectoral approach, with various agencies working together under the One Health framework. The Animal & Veterinary Service (AVS) of the National Parks Board works with other agencies on a multi-pronged approach to safeguard Singapore against the risk of disease incursion. This includes requiring overseas countries or territories exporting poultry, ornamental birds, poultry products and eggs to Singapore to be free from avian influenza and meeting veterinary conditions for import. AVS has an ongoing biosurveillance programme that monitors bird flu outbreaks worldwide and will take measures to temporarily restrict import sources where necessary. These biosurveillance programmes also monitor for the virus which could potentially be present in Singapore in populations e.g., local bird establishments or migratory bird roosting sites.

With the ongoing global HPAI outbreaks, due to the costly nature of culling policies and its negative impact on livelihoods, food security and prices; countries that have previously not permitted HPAI vaccination in poultry, have started looking at pre-emptive vaccination as an additional strategy to prevent and control HPAI outbreaks. Similarly, Singapore is looking at a need to develop a policy towards allowing vaccination - both when used in local bird populations and accepting trade in poultry and poultry products derived from vaccinated flocks, while addressing concerns associated with vaccine use. Vaccination of poultry flocks would help reduce viral shedding even should they be actively infected with HPAI. This would reduce the viral load in the environment, decrease house to house transmission within the same farm, and also reduce farm-to-farm transmission of the avian influenza virus. However, vaccination alone would not keep HPAI out of a premises, but robust biosecurity and good husbandry practices are also needed.



Sjaak de Wit, DVM, PhD

EVBS®

European Specialist in Poultry Veterinary Science

President of the World Veterinary Poultry Association

Sjaak gained his veterinary qualification at the University of Utrecht in 1989 and completed a PhD degree concerning diagnosis and transmission of infectious bronchitis virus, in 1997 at the University of Utrecht. He is senior researcher at Royal GD and professor integrated Poultry Health at the veterinary faculty of the University of Utrecht. In 2008 he was one of the founding officers of the European College of Poultry Veterinary Science. Since 2023, he is president of the World Veterinary Poultry Association.

He has been actively involved in applied and fundamental research related to the diagnosis and control of poultry diseases, especially viral diseases as infectious bronchitis virus, infectious bursal disease, Newcastle Disease, and Avian Influenza.



Amy Delgado, DVM PhD

Senior Veterinary Advisor
Organization / Company : Food and Agriculture
Organization of the United Nations
Address: Viale delle Terme di Caracalla
00153 Rome, Italy
Tel: +39 347-387-3266
E-mail: amy.delgado@fao.org

Dr Amy Delgado serves as a senior veterinary advisor within the Animal Health Prevention, Preparedness and Rapid Response Cluster in FAO. As a seconded officer from USDA APHIS, Dr. Delgado supports the unit's work in the prevention and control of high impact transboundary livestock and zoonotic diseases, as well as emerging pathogens. She serves as a technical expert in epidemiology, supporting a variety of initiatives within FAO focused on forecasting and early warning, surveillance, biosecurity, as well as supporting the strategic coordination of One Health-related work across FAO.

Prior to joining FAO, Dr. Delgado worked with the U.S. Department of Agriculture, Veterinary Services as the Director of the Center for Epidemiology and Animal Health where she focused on leading applied and innovative analyses to generate science-based solutions and information for decision-making around complex national animal health issues. She has over 10 years of experience in conducting large-scale epidemiologic investigations into outbreaks of HPAI on commercial poultry farms and coordinating the development and dissemination of data-driven solutions to support outbreak response.



Olivier Espeisse

Global Public Affairs Director
CEVA Sante Animale
10 Avenue de la Ballastière, 33500 Libourne
France
Tel: +33 6 78 23 42 68
E-mail: olivier.espeisse@ceva.com

Olivier Espeisse (DVM, Maisons-Alfort, and MBA, Bowling Green State University) practiced dairy veterinary medicine in Normandy before moving to the veterinary pharmaceutical industry, where he has been particularly involved in association work at global and European level. He is a member of the IABS VPC.



Ron A.M. Fouchier, PhD

Professor Molecular Virology
3015 GD Rotterdam, The Netherlands
Dept. Viroscience, Erasmus MC
Dr. Molewaterplein 40
Tel: +31 10 704 4067
Fax: +31 10 704 4760
E-mail: r.fouchier@erasmusmc.nl

Ron Fouchier is professor in Molecular Virology at Erasmus MC Rotterdam, where he is also the deputy head of the Viroscience department. He obtained a PhD in 1995 for HIV/AIDS research at the University of Amsterdam and continued HIV work at the University of Pennsylvania School of Medicine. Late 1998 he started a Molecular Virology research line on respiratory viruses, in particular influenza, at Erasmus MC. His team contributed substantially to the identification and characterization of various “new” viruses, such as human metapneumovirus, human coronavirus NL63, SARS coronavirus, MERS coronavirus, and influenza A virus subtype H16. Currently, his research is focused on respiratory viruses of humans and animals, antigenic drift, and influenza virus zoonoses, transmission and pandemics. Ron is elected member of the Royal Dutch Academy of Sciences (KNAW), the Royal Holland Society of Sciences and Humanities (KHMW) and Academia Europea. In 2006 he received the Heine-Medin award of the European Society for Clinical Virology, in 2013 the Huibregtsen award for top innovative science with societal impact and in 2023 the MW Beijerinck Virology Prize of the KNAW. Fouchier is a web-of-science Highly Cited author.

Ron A.M. Fouchier, PhD

What public health should gain from surveillance for HPAI in vaccinated poultry

Vaccination of poultry against highly pathogenic avian influenza A(H5) virus infection could be a welcome addition to the toolbox for the improvement of animal health and welfare and food security. Prevention of human exposures to HPAI A(H5) viruses and zoonoses may be an added indirect benefit of such poultry vaccinations. However, it is important to recognize that poultry vaccines may not be perfect and may not provide sterilizing immunity to all vaccinated animals and/or against all circulating H5 virus variants. Moreover, vaccination can result in natural selection of antigenically drifted variants of influenza virus, with possible reduced effectiveness of H5 vaccines in poultry. Therefore, there may be a risk of dormant infections and virus excretion in poultry, which may result in a (invisible) continuous risk of new zoonoses. We should remain vigilant about this possibility. Post-vaccination monitoring will be important, both for the detection of dormant infections and continued virus evolution and for monitoring antigenic drift. Given the expected absence of signs of infection in poultry, surveillance activities including systematic random sampling on vaccinated farms should be considered. At the same time, contact between infectious vaccinated poultry populations and other (unvaccinated) animals, both domestic and wild, should be prevented. Post-vaccination surveillance should ideally be linked to the WHO GISRS system, to facilitate updating of pre-pandemic vaccine candidates in case antigenic drift occurs in vaccinated poultry.



José L. Gonzales, DVM, MSc, PhD

Senior Researcher,
8221 RA Lelystad, the Netherlands
Wageningen Bioveterinary Research
Address: Houtribweg 39
Tel: +31 614323279
E-mail: jose.gonzales@wur.nl

José L. Gonzales graduated in Veterinary Medicine (2000) at Universidad Gabriel Rene Moreno (Bolivia), obtained his MSc in International Animal Health (2002) at the University of Edinburgh (UK), and his PhD (2012) at Utrecht University (the Netherlands). During his carrier, Jose has worked at the Animal Health Services in Bolivia (2000 – 2007), The Pirbright Institute in UK (2012 – 2015) and Wageningen Bioveterinary Research (WBVR) in the Netherlands. His primary research focus lies in the prevention and control of infectious diseases. Much of his research work has been on understanding transmission of infectious diseases to underpin the development of novel and efficient surveillance and control strategies.

Jose was part of the EFSA expert panel on animal health and welfare and is currently part of the EFSA expert group on Avian Influenza. Currently, Jose is the group leader of the Epidemiology and Risk Assessment expertise group at WBVR.



Béatrice Grasland

Head of the French national reference laboratory on avian influenza

22440, Ploufragan, France

ANSES, Laboratory of Ploufragan-Plouzané-Niort

Tel: +33 296010169

E-mail: beatrice.grasland@anses.fr

Béatrice Grasland is head of the avian and rabbit virology and parasitology unit at the Anses, the French Agency for Food, Environmental and Occupational Health & Safety laboratory, in Ploufragan-Plouzané-Niort and head of the national reference laboratory for avian influenza in France. Ph.D. in microbiology, she has been working at the Anses since 2003 in animal virology, first on emerging viruses in pigs such as circoviruses and coronaviruses, then in avian virology from 2018 onwards, particularly on avian influenza and Newcastle disease. Her research work focuses on the characterization of viruses in vitro and in vivo (virulence markers, transmission), diagnosis and the study of the viral genome evolution as well as inter-species transmission. She has been involved in the evaluation of vaccines used in ducks against highly pathogenic avian influenza in France. She participates as an expert in national (Haut Conseil de la santé publique, Anses) and international (EFSA, EMA) committees on these subjects. She has been involved in more than 30 research projects such as EU and national research projects as well as in 60 international peer-reviewed publications.

Béatrice Grasland

Highly pathogenic avian influenza vaccination campaign in ducks in France: review and outlook

Since 2016, highly pathogenic avian influenza (HPAI) viruses from the clade 2.3.4.4b of the A/goose/Guangdong/1/1996 lineage are causing serious problems worldwide and threaten the poultry sector. Since 2021, the A(H5N1) highly pathogenic avian influenza epizootic spread over almost all continents and has caused more than 200 million deaths in Europe and America in wild and domestic birds. France was particularly affected with more than 30 million of poultry culled, particularly in the duck production. France decided in 2023 to launch a preventive mandatory vaccination against HPAI virus in ducks since October 2023. This presentation shows the different steps reached to launch the vaccination: the selection of vaccine, the vaccine orders, the post-vaccination surveillance, the tools to support implementation, the communication, ... This presentation shows also the assessment of the first six months of the duck vaccination campaign against HPAI in France (01/10/23 - 31/03/24). Overall, positive results were recorded for France through this period with only 10 outbreaks reported in poultry and only two cases in vaccinated duck farms. Satisfactory vaccination compliance was observed with more than 95% of duck batches for which at least one vaccination operation was identified during the six-month period. None of the positive post-vaccination surveillance tests were linked to the presence of a highly pathogenic virus.



Jean-Luc Guérin, DVM, PhD

Dipl. ECPVS

Professor in poultry medicine and Director of the "host-pathogens interactions" UMR IHAP, INRAE-ENVT

Jean-Luc Guérin, DVM, PhD, Dipl. ECPVS, is full professor in poultry medicine at the National Veterinary College of Toulouse, France and Director of the "host-pathogens interactions" joint research unit (INRAE-ENVT), covering virology, prions, bacteriology, immunology and epidemiology of infectious diseases in animals, in a One Health perspective.

His own research is focused on viruses of poultry, and for some years, pathobiology of highly pathogenic avian influenza. A priority is the development of innovative approaches of viral detection, including from environmental samples and at the wild birds/poultry interface. Since 2016, his research has been very much directed toward the emergence of H5 HPAI and recently, to the scientific support of the National vaccination plan implemented in France.

Jean-Luc Guérin authored 100 original international papers, >200 communications and chapters of textbooks in the field of poultry virology and medicine.



Timm Harder, PhD

Head, National Reference Laboratory AIV
17493 Greifswald, Germany
Friedrich-Loeffler Institute
Tel: +49 38351 71546
Fax: +49 38351 71174
E-mail: timm.harder@fli.de

Timm Harder is a veterinarian and virologist with a broad interest in influenza viruses. His research areas range from diagnostic optimization, molecular epidemiology and viral pathogenicity to applied control measures. His work focuses on influenza viruses in animals, particularly poultry, wild birds and pigs. He is head of the National Reference Laboratory for Avian Influenza at the Federal Research Institute for Animal Health, Friedrich-Loeffler-Institute, Insel Riems, Germany. The laboratory is an active member of international networks of the World Health Organization for Animal Health (WOAH, OFFLU) and the Food and Agriculture Organization of the United Nations (FAO) for research, diagnosis and control of influenza in animals.



Kate Hayes, DVM, MAHM

Dipl ACPV
Senior Director of Veterinary Services
35806 Huntsville, Alabama, USA
Aviagen North America
Tel: +12567323574
E-mail: khayes@aviagen.com

Dr. Kate Hayes, is the Senior Director of Veterinary Services for Aviagen North America. With a vast repertoire of expertise that includes poultry, primary broiler breeders and biosecurity, Dr. Hayes has been a veterinarian for Aviagen®, the world's leading poultry breeding company, for the past sixteen years. She currently oversees the health and biosecurity of Aviagen North America's grandparent broiler breeder flocks. Kate leads a team of poultry veterinarians and microbiologists, as well as oversees one of Aviagen's internal laboratory's in Alabama.

During her tenure, Dr. Hayes was instrumental in supporting Aviagen in becoming the first primary broiler breeding company in the United States to achieve compartmentalization. She offers practical experience on achieving compartment status as well as the benefits of this program on continuity of trade.



Abstract

Kate Hayes

Practical Issues Around Compartmentalization

United States perspective on practical issues around compartmentalization will be reviewed by Dr. Kate Hayes, Senior Director of Veterinary Services for Aviagen. She will provide an overview of successes, weaknesses and challenges to date.



Gordon Hickman

Head of Exotic Disease Control

Defra

2nd floor, Seacole Block, 2 Marsham Street, SW1P 4DF

Tel: 020 8026 3190

Mobile: 07831 638738

E-mail: gordon.hickman@defra.gov.uk

Gordon has an honours degree in agriculture from Reading University. He spent 18 years as an agricultural adviser with ADAS in Southern England specialising in business management and waste & environmental management. In May 2001, he was seconded to the UK Ministry of Agriculture Fisheries and Food to assist with the disposal operations during the 2001 FMD outbreak, joining Defra on a permanent basis in 2004.

He was awarded an OBE in January 2024 for services to animal health.

Gordon is currently Head of exotic disease control in Defra, where he is responsible for policy and legislation for exotic notifiable diseases of animals, new and emerging animal disease threats and surveillance policy. This includes policy preparedness and response to disease outbreaks such as avian influenza.



Jeremy HP HO, DVM

Veterinary Officer (Animal Health)
Organization / Company: Agriculture, Fisheries and Conservation Department, Hong Kong SAR
Address: PB11, Farm Section, Tai Lung Experimental Station, Lin Tong Mei, Fan Kam Road, Sheung Shui, New Territories, Hong Kong
Tel: +852 2461 6411
Fax: +852 2461 4649
E-mail: jeremy_hp_ho@afcd.gov.hk

After graduating in Doctor of Veterinary Medicine from National Taiwan University in 2013, Dr. Jeremy Ho joined the Agriculture, Fisheries and Conservation Department (AFCD) in the Hong Kong Special Administrative Region Government as a Veterinary Officer in January 2014. Dr. Ho has worked in the Tai Lung Veterinary Laboratory since 2014 focusing on works related to molecular diagnostics and veterinary pathology, primarily handling cases related to avian influenza (AI). In 2018, Dr. Ho was seconded to work in the World Organisation for Animal Health (WOAH) Regional Representation for Asia Pacific in Tokyo for around 5 months to assist in various regional events. After his return to Hong Kong, he was subsequently posted to the Animal Health Division in AFCD in 2019 to oversee the local chicken farms and pig farms in Hong Kong, and has been responsible to monitor AI vaccination and biosecurity standards in chicken farms since then. From 2020 – 2022, Dr. Ho has also worked with the City University of Hong Kong as a consultancy team member and contributed in the development and the publication of a number of regional or international guidelines for WOA and the Food and Agriculture Organization (FAO) in relation to African swine fever.

In 2022, being the field veterinarian, Dr. Ho worked to update the H5/H7 AI vaccine being used in local chicken farms in Hong Kong with a view to better protect vaccinated flocks against the currently circulating strains of AI viruses in the region with a new HPAI surveillance programme implemented ceasing the use of sentinel chickens.

Jeremy HP HO

Field Experience on HPAI Surveillance in Vaccinated Populations in Hong Kong

Since the first outbreak of high pathogenicity avian influenza (HPAI) viruses reported in Hong Kong in 1997, the Agriculture, Fisheries and Conservation Department (AFCD) has implemented a series of preventive and control measures to reduce the risk of AI outbreaks at the farm, import, wholesale and retail levels of the live poultry supply chain, including a mandatory AI vaccination programme against H5 AI viruses launched in 2003 for chickens in all local farms destined for live poultry markets. Since January 2018, in view of the continuous threat of H7N9 AI viruses in the region, the compulsory AI vaccination campaign has also been expanded to cover both H5 and H7 subtypes till now.

Over the years, AFCD has been continuously monitoring both genetic and antigenic changes of the circulating HPAI viruses, and conducting regular reviews in consultation with relevant experts and the Mainland China counterparts on the AI vaccines used in local chicken farms to ensure that the most up-to-date vaccines against AI infections are being used.

HPAI surveillance in vaccinated chickens in Hong Kong has been conducted aiming to ensure that chickens are free of H5/H7 AI viruses prior to chicken sale for human consumption. Passive surveillance, such as regular farm inspections and mandatory reporting of abnormal death of chickens by farmers, are in place for monitoring health status of chickens on farms. Sentinel chickens were also used and placed in-between the vaccinated flocks for early detection of AI virus incursions. In addition, active surveillance with HPAI testing on samples collected from live chickens, farm environment and dead birds etc. were in place. Acceptable AI testing results were the pre-requisites for approval of market sale of the chickens.

While the HPAI surveillance programme in Hong Kong is extensive, it may not be feasibly applicable in other places. First of all, it requires frequent official farm visits which may not be acceptable in other places with a high number of farms over a large geographical area. In addition, the Hong Kong SAR Government fully covers the cost of the AI surveillance activities which may not be affordable in other places with a much larger poultry production scale. Furthermore, the chickens produced from chicken farms in Hong Kong are solely supplied for local consumption that international trade is not a concern for AI vaccination in Hong Kong compared to other countries.

Being a major component of the HPAI surveillance programme in Hong Kong, the use of sentinel chickens in local chicken farms has previously been used in Hong Kong for 20 years, which had been critically reviewed in recent years. Taking into consideration of the technology advancement for diagnostic testing over the years and drawbacks of the use of sentinel chickens on farm nowadays, the use of sentinel chickens had been eventually ceased starting from October 2022 onwards with other complementary measures implemented.

The need for H5/H7 AI vaccination in Hong Kong has been reviewed regularly over the years, and it is foreseen that H5/H7 AI vaccination would continue to be implemented in local chicken farms in the near future. The AFCD will continue to closely monitor the HPAI epidemiology in the region for timely update of the AI vaccines used on farm as appropriate with the ultimate goal to safeguard public health and food safety



Dr. Khaled Hussein, DVM, Ph.D, MRCVS

Veterinary Group Manager – Poultry
Almarai Company
P. O. Box 8524 | Riyadh 11492 | Saudi Arabia
T: +966 11 470 0005 Ext 6446
D: +966 11 528 6446
M: +966556805412
E-mail: khaled.hussein@almarai.com

I am a poultry veterinarian with more than 20 years of experience, with a passion for animal welfare and food safety with extensive experience within the technical and commercial sectors.

I obtained my DVM from University of Veterinary Medicine in Slovakia and after graduating I decided to work towards a Ph.D. in Veterinary Medicine Science completing my studies in 2004. I am a Member of the Royal College of Veterinary Surgeons in the United Kingdom.

Since 2019 I have been with Almarai, in Saudi Arabia, one of the largest fully integrated agricultural companies in the world as Group Veterinary Manager, in my role I bridge the gap between scientific and technological advancements and our day-to-day production, along with managing and developing a team of veterinarians whose primary goal is to tackle the day to day challenges, enhance animal health and welfare, and ensure the safety and quality of our products.



Carmen Jungbäck, Dr

Board Member Vice-Chair
IABS-EU
USA

Dr Carmen Jungbäck graduated from the Tierärztliche Hochschule, Hannover with a degree in Veterinary Medicine. In 1981, after a few years as an animal surgeon she joined the Paul-Ehrlich-Institut, (Federal Agency for Sera and Vaccines), Langen, Germany, where she was Head of the section Veterinary Virology 1 until retirement in 2016. The section's area of activities comprises vaccine licensing and testing, with special expertise in viral vaccines for poultry. In this context, the practical testing of vaccines during licensing and for official batch release is one of the major responsibilities.

She was also member of a number of advisory boards to the EDQM-OMCL Network, Ph.Eur Group 15V and CVMP-IWP and JEG3R at EMA dealing with IVMPs under various aspects.

At IABS she is member of the board and Chair of the Veterinary Biologicals Committee and Vice-President of IABS - EU. She is organizing IABS meetings focusing on the veterinary field. As member of IABS-EU she is involved in the IMI projects (ZAPI and Vac2Vac).



Nadia Khaldoune

Senior Policy Advisor
AVEC – European Poultry Meat Association
Rue du Luxembourg 47-51
1050 Brussels
E-mail: nk@avec-poultry.eu

Nadia Khaldoune, a dietician with a Master's Degree in Sciences Technologies and Health from Université de Bourgogne, has sixteen years of experience in the food, nutrition, and health industry. She currently serves as a Senior Policy Advisor at AVEC, the Voice of the European Poultry Meat Sector, focusing on EU policies related to Animal Health and Welfare, Food Safety, and Food Quality. Nadia collaborates closely with AVEC members on issues related to avian influenza, assessing its impact on the EU market and supporting mitigation measures, including vaccination.

Her previous roles include managing regulatory affairs at Godiva Chocolatier and Herbalife Europe, where she led product launches and regulatory compliance across multiple countries. Known for her leadership, analytical skills, and ability to translate complex information into clear business strategies, Nadia has been instrumental in advancing public health and regulatory affairs.

Nadia Khaldoune

Surveillance in vaccinated populations & safe trade – Industry perspective

The implementation of Highly Pathogenic Avian Influenza (HPAI) vaccination in poultry offers a significant opportunity to enhance biosecurity, animal welfare, and food security within the European poultry sector. While vaccination reduces viral excretion, bird sensitivity to infection, and mortality rates, it also poses challenges for international trade due to potential trade restrictions, surveillance costs, and resource limitations. Effective surveillance and rigorous monitoring are crucial to prevent the risk of silent contamination in vaccinated flocks, ensuring that vaccinated birds do not harbor the virus undetected.

Moreover, the acceptance of vaccination strategies by global trade partners remains a critical factor, as inconsistencies in recognition can lead to market access barriers and distortions. The presentation highlights the importance of comprehensive planning, resource allocation, and international cooperation to address these issues while emphasizing that HPAI vaccination should not act as a barrier to safe trade but rather as a tool for sustaining business continuity and public health.

The discussion also focuses on the trade-offs between prioritizing vaccination and addressing trade considerations, questioning whether the industry should lead this strategy or if it should be directed by broader regulatory frameworks. Achieving a balance between safeguarding public health, maintaining economic stability, and complying with international trade standards is essential for the future of global poultry production and trade.



Nick Lyons

Animal Health Officer (Global Surveillance Coordinator)
Rome, Italy
Food and Agriculture Organization of the United Nations
Tel: +39 065 705 0175
E-mail: Nicholas.lyons@fao.org

Originally from the UK, Nick qualified as a veterinarian in 2005. Following several years in farm animal practice in Ireland and the UK, including positions at University College Dublin and the Royal Veterinary College (RVC), he did a MSc in Veterinary Epidemiology at the RVC followed by a PhD at the London School of Hygiene and Tropical Medicine studying foot-and-mouth disease in Kenya. This led to a research fellowship at the Pirbright Institute undertaking field projects in numerous countries on the epidemiology and economics of transboundary animal diseases (TADs). He also spent several years working for the European Commission for the Control of Foot-and-Mouth Disease and as a consultant for large scale dairy farms on TAD control. Prior to the current position, he was leading a team of scientists and veterinarians at the Animal and Plant Health Agency advising the UK government on the control of bovine tuberculosis.

In November 2023, he joined FAO leading the global surveillance team, coordinating FAO's activities related to the surveillance and risk assessment of zoonotic and transboundary animal diseases.



Christine Middlemiss, CB, BVMS, MRCVS

UK Chief Veterinary Officer
Department for Environment Food & Rural Affairs
Seacole Building
2 Marsham Street London SW1P 4DF
Tel: 03459 335577
Tel: +44 (020) 7238 6495
E-mail: defra.helpline@defra.gov.uk

Christine Middlemiss is the UK's Chief Veterinary Officer. She was appointed on 1 March 2018 having been working as the CVO in New South Wales, Australia since July 2016 where she led major improvements to biosecurity across many farming sectors. This work included implementation of new outcome focused, risk based biosecurity legislation; online animal certification processes; improving evidence and risk based disease control approaches.

Prior to moving to Australia, Christine led Defra's Animal Traceability and Public Health policy team, and also previously surveillance including detection and response to new and emerging diseases such as Schmallenberg and Porcine Epidemic Diarrhoea. She is an experienced veterinarian. Before joining the UK government services in 2008, Christine worked in private practice with specific interest in research, meat processing and livestock genetics for a number of years in Scotland and the north of England prior to joining the Animal Health Agency (now part of Animal and Plant Health Agency) as a Divisional Veterinary Manager in Scotland.

Christine comes from a farming family in the Borders of Scotland, with a background in beef cattle and sheep.

Christine was appointed Visiting Professor of Practice by Harper Adams University in July 2019.

Christine was awarded the Companion of the Order Bath (CB), by His Majesty King Charles, in the New Year 2023 Honours for her services to the Veterinary and Farming Sectors.



Isabella Monne

Head of the Viral genomics laboratory
Organization / Company Istituto Zooprofilattico
Sperimentale delle Venezie
Address: Viale dell'Università 10, 35020 Legnaro (PD),
Italy
Tel: +390498084381
Fax: +390498084360
E-mail: imonne@izsvenezie.it

Isabella Monne is a senior veterinarian with 14 years of experience in the field of diagnosis and molecular epidemiology of major animal viral diseases. She is currently Head of the Viral genomics and transcriptomics laboratory at the Istituto Zooprofilattico Sperimentale delle Venezie (IZSve) which hosts the EU/FAO/WOAH Reference Laboratory for Avian Influenza (AI) and Newcastle Disease (ND). Her research focuses on the use of sequencing technologies and bioinformatics tools to investigate the evolution of RNA viruses, in particular the ones affecting avian species.

In 2016, she was appointed WOAH expert for the WOAH Reference Laboratory for AI and ND at the IZSve. She is a member of the OFFLU avian influenza network consisting of avian influenza experts who address priority influenza-related issues. Internationally, she is involved in assisting low-income countries to improve their veterinary diagnostic capacity in the field of animal influenza viruses and avian paramyxoviruses.

She is project leader and collaborator in several national and international research projects and has authored and co-authored 147 peer review articles published in international journals.

Isabella Monne

Surveillance for detection and assessment of virus evolution to inform vaccination programs including vaccine selection and updates

Avian influenza viruses (AIVs) evolve rapidly through antigenic drift and shift in both vaccinated and unvaccinated hosts. This is a natural ability of any influenza A virus, which constantly mutates to avoid extinction by genetically and antigenically distancing itself from the immune responses accumulating in host populations. This ongoing evolution challenges vaccine effectiveness as new strains can evade immune defenses. Genomic and antigenic surveillance is essential to track these changes, enabling timely updates to vaccine formulations and vaccination programs to maintain protection.

The importance of such surveillance is even more evident when considering the global spread and eco-epidemiological dynamics of viruses descended from the H5 A/Goose/Guangdong/1/1996 (Gs/GD) lineage. With their global reach and remarkable evolutionary capacity—amplified by an expanded host range and frequent interspecies transmission—it becomes essential to monitor their evolution across their multiple hosts in real time.

Adopting a comprehensive and coordinated approach to surveillance and vaccine updates is crucial. Initiatives such as OFFLU Avian Influenza Matching (OFFLU-AIM) exemplify this strategy, promoting international collaboration and data sharing to enhance genomic and antigenic monitoring. By integrating regional expertise, utilizing advanced surveillance technologies, and applying standardized methods for data collection and analysis, we can significantly improve our ability to control HPAI through vaccination and protect both animal and human populations globally.



Yukitake Okamura, DVM

Deputy Director, Animal Health Division
1-2-1, Chiyoda-ku, Tokyo, Japan
Ministry of Agriculture, Forestry and Fisheries
Tel: +81-3-3502-8292
Fax: +81-3-3502-3385
E-mail: yukitake_okamura340@maff.go.jp

Yukitake graduated as a veterinarian from Osaka Prefecture University in 2006 and was employed as Technical Official by the Ministry of Agriculture, Forestry and Fisheries (MAFF), Japan. In his work career, he was engaged in a range of tasks in animal health field such as:

- Border inspection of imported live cattle, live horse, live day-old chicks and animal products;
- Revising contingency plans for high pathogenicity avian influenza (HPAI) and foot and mouth disease;
- promoting good husbandry practices in livestock farmers;
- Epidemiological investigations of HPAI and classical swine fever (CSF) outbreaks; and
- Planning and implementing measures to address antimicrobial resistance (AMR) in livestock, aquaculture and companion animals based on national action plan on AMR.

Yukitake was employed from October 2020 to October 2023 as Scientific Officer for International Standards within the Standards Department of the World Organisation for Animal Health (WOAH), mainly as a member of the Secretariat for the Terrestrial Animal Health Standards Commission.

Yukitake Okamura, DVM

HPAI control: the Japan perspective (exporting and importing country perspectives)

The worldwide spread of High Pathogenicity Avian Influenza (HPAI) viruses has caused huge outbreaks and economic losses in poultry over the past few years. HPAI outbreaks in Japan occur mainly in autumn and winter as winter birds (geese, ducks, swans etc.) migrate from the north in autumn, harbouring the HPAI viruses. Most recently, Japan has experienced HPAI outbreaks in recent 4 winters in a row. The outbreak in the winter of 2022-2023 was the worst ever, with 84 cases in 26 prefectures, which resulted in culling of over 17 million poultry and a shortage of table eggs (and rising prices) in Japan.

Contrary to this large outbreak in 2022-2023 winter, only limited occurrence was observed in 2023-2024 winter. Japanese experts pointed out that high biosecurity and preparation before winter season might contribute to preventing larger outbreak. Together with the high biosecurity on farms, Japan has a well-developed Veterinary Services: There are 166 Livestock Hygiene Service Centres (LHSCs) with 2,064 official local veterinarians throughout Japan (as of April 2024). Once an HPAI case is confirmed, the poultry reared in the affected farm is depopulated mainly by the local government officers (and Japan Self-Defense Forces) and compensation for culling is paid to the affected farmers. This rigorous Veterinary Services enables immediate detection and quick response to contain the disease by stamping-out policy without secondary spread. In this situation, vaccination is not a viable option since vaccination without rigorous surveillance allows silent virus circulation.

Japan is both an importing country and an exporting country of chicken meat, egg and egg products. Therefore, in the presentation from Japan, the both perspectives will be shared.



Dr Gounalan Pavade, PhD

Senior Scientific Coordinator (Avian influenza)
World Organisation for Animal Health (WOAH)
12 Rue de Prony
75017 Paris - FRANCE
Tel: +33 1 44 15 18 88
Fax: +33 1 42 67 09 87
E-mail: g.pavade@woah.org

Dr Gounalan Pavade is a Veterinarian with specialisation in Veterinary pathology. He attended the Veterinary Universities in India to obtain his Bachelor, Master and Doctorate degree in Veterinary Sciences.

Currently he is working as Senior Scientific Coordinator (Avian influenza) at the World Organisation for Animal Health (WOAH) at its Headquarters, Paris since 2010. His main activities at WOAH involve administration of OFFLU network (WOAH-FAO network of expertise on animal influenza), establishment and coordination of scientific laboratory networks and providing technical support for animal and zoonotic diseases including animal influenza, African swine fever, PPR, rabies, MERS-CoV and camel diseases. In this role, he participates in international activities on animal influenza, organises technical meetings on avian, swine and equine influenza and interacts with WHO influenza network on issues related to the animal-human interface.

Gounalan has published over 20 articles in peer reviewed journals and represented WOAH in several international conferences and symposium.



Nicolas Ponçon

Deputy head of the division for Europe, International and Integrated Risk Management
Paris, France
General Directorate for Food
Ministry of agriculture
251 rue de Vaugirard, 75732 Paris cedex 15
Tel: +33 1 49 55 86 16
E-mail: nicolas.poncon@agriculture.gouv.fr

Nicolas Ponçon is Doctor in Veterinary Medicine and also holds a PhD in vector-borne diseases.

After a first experience as a project manager in the animal health office at the General Directorate for Food within the Ministry of agriculture from 2008 to 2011, Nicolas Ponçon joined the office of the European and multilateral negotiations as deputy head, where he was responsible for promoting French positions in the sanitary and phytosanitary field within multilateral organisations and within the EU.

In 2014, he was appointed Deputy Agricultural Counsellor at the French Embassy in Singapore, in charge of the Asean countries, to support French interests in this region within the framework of health diplomacy. In 2018, he joined the French Permanent Representation to the European Union in Brussels as Deputy Agricultural Delegate for sanitary and phytosanitary matters, where he was responsible for the French Presidency of the EU in 2022 (PFUE2022), among other things.

Nicolas Ponçon returned to France in 2023 where he joined the General Directorate for Food as deputy head of the division for Europe, international affairs and integrated risk management, where he helps to steer European issues, exports and imports, and risk analysis.

Nicolas Ponçon

French experience on HPAI vaccination from an exporting country perspective

France has experienced several large-scale outbreaks of highly pathogenic avian influenza in recent years, resulting in the slaughter of millions of birds to eradicate the disease. Considering the limits of conventional control methods, the need to make the transition to sustainable food systems and the pandemic risks associated with zoonoses, it has become necessary to consider the deployment of vaccination as a complementary control tool with the aim of eradicating this disease. Within this framework, France launched a vaccination program from the 1st of October 2023.

From an exporting country perspective, it was necessary to give reinsurance factors to importing countries in order to ensure that the exported products are not infected by HPAI virus. The vaccination strategy was defined, amongst other, to take into account those factors, and includes a clear objective, clear definition of vaccinated populations, precise traceability, robust surveillance and huge communication and diplomatic activity.

By the end of September 2024, around 60 million ducks were vaccinated. More than 850 000 samples were analysed within the framework of the exhaustive post vaccination surveillance : no positive HPAI virological results were identified. And regarding exports, only a few countries have stopped imports pending an in-depth risk analysis.

These figures underline the success of this plan in terms of its implementation, monitoring and acceptance on the international stage.



Dr Rer. Nat. Teguh Yodiantara Prajitno

Senior Vice President, Group Director of Animal Health

Jakarta, Indonesia

Japfa Ltd.

Tel: +62 815 8092638

E-mail: teguh.prajitno@japfa.com

Teguh Y. Prajitno has been assigned as Senior Vice President and group animal health director at Japfa, a leading integrated regional Agribusiness company, dedicated to feeding emerging Asia with animal proteins. With more than 20 years of experience, he has led the veterinary division, which monitors flock health and biosecurity, prevention programs, such as provision of vaccination and treatment options to prevent and cure diseases. Prevention, preparedness, control and eradication of transboundary animal diseases are critical for reducing livestock production failures and its negative impacts on productivity, sustainability and food security. To mitigate H5N1 HPAI Indonesia has adopted vaccination and biosecurity as the main control tool, where sustainable control strategies require innovation in science by transforming vaccine research from devising to implementing relevant solutions and sustainability for the use on farms. Beyond this, controlling Avian Influenza in an endemic situation requires harmonizing and conformity of government policies with regard in surveillance and monitoring with current farm practices. Japfa is on the forefront to contribute as key research collaborator in national and international Avian Influenza projects. With the largest network of diagnostic laboratories in Indonesia, Japfa is able to monitor disease development and to perform integrated molecular surveillance to detecting variation of avian influenza viruses circulating in Indonesia and neighboring countries.

Rer. Nat. Teguh Yodiantara Prajitno

Field experiences on Avian Influenza surveillance in vaccinated sector 1 poultry populations - Indonesia

Highly pathogenic avian influenza virus (HPAIV) of H5 A/Goose/Guangdong/1996 lineage (Gs/GD) has become endemic in poultry across several countries in the world. Vaccination has played an indispensable role in the control, prevention, and reduction of HPAIV infection, in places where HPAIV has been introduced annually by migratory wild-water fowls and has become endemic. In countries, such as Indonesia, where stamping out as intervention is unlikely and not sustainable, vaccination can be effective, if monitor and surveillance programs, involving public and private collaborations, are in place. Rapid detection of antigenic variants and accurate measuring the antigenic distance is detrimental to develop efficacious vaccines to reduce the likelihood of HPAIV infection, transmission and arising of HPAI escape variants, including variants with zoonotic potential. Indonesia has officially contemplated a mandatory vaccination campaign in sector 1-3 by monitoring of AIV dynamics and by using matching vaccines since 2010. The connectivity of live bird markets (LBMs; retail) and post harvest collector yards (CYs; wholesale) in the poultry marketing chain, as a key factor leading to endemicity of HPAIV cannot be denied. Biosecurity interventions alone are unlikely to counter the effect of a constant virus influx from and to poultry farms. Hence, a robust HPAI control program would require a strong public private surveillance component; Indonesia has established an enhanced surveillance program for sector 1-3 poultry, LBMs and CYs, improving biosecurity in sector 2 - 3 commercial egg-layer farms, proving the absence of HPAIV circulation in vaccinated flocks by real-time-PCR monitoring and certifying HPAI-free compartments to provide private sectors the opportunity to protect their investments by establishing segregation between livestock and wild species, and finally enabling export opportunities.

1. Use of Antigenic Cartography in Vaccine Seed Strain Selection.

Ron A. M. Fouchier and Derek J. Smith.

Avian Diseases Vol. 54, No. 1, Supplement: Proceedings of the Seventh International Symposium on Avian Influenza (March 2010), pp. 220-223

2. Epidemiology-driven approaches to surveillance in HPAI-vaccinated poultry flocks aiming to demonstrate freedom from circulating HPAIV (2023).

Timm Harder, Sjaak de Wit, Jose L Gonzales, Jeremy H P Ho, Paolo Mulatti, Teguh Y Prajitno, Arjan Stegeman. *Biologicals*.2023 Aug;83:101694. doi: 10.1016/j.biologicals.2023.101694.



Francisco Javier Reviriego Gordejo, PhD

Head of Unit
DG SANTE

Dr Francisco Javier REVIRIEGO GORDEJO obtained his PhD (1999) in Veterinary Epidemiology and his degree (1988) in Veterinary Science from the Universidad Complutense de Madrid. He holds a postgraduate diploma (2000) in Statistics and Design in Health Sciences from Universidad Autonoma de Barcelona.

He worked as Official vet for the Autonomous Region of Castilla y Leon (1990-2001) implementing eradication programmes, heading the Animal Health Laboratory of Avila and before worked as a veterinarian for pig farmers.

He joined the European Commission in 2001 as a Legislative Veterinary Officer. In 2005 was Head of Sector Epidemiology and Eradication, since 2008 to 2016 was as Head of the Sector Disease Control and Identification, later Adviser to the Director on Crisis management in Food, Animals and Plants and since 2021 is Head of Unit for Animal Health in DG SANTE.

In addition to his work at DG SANTE, Dr Reviriego Gordejo participated in a number of World Organisation for Animal Health (WOAH) ad hoc groups.



Dr. Gonzalo Simone

Advisor General Director DGSG MGAP
80000, (San Jose), URUGUAY
Ministry of Agriculture MGAP
Constituyente 1476
Tel: +598098985589
Fax: (+598) 2413 8030
E-mail: gsimone@mgap.gub.uy

Doctor in Veterinary Medicine, at University of the Republic of Uruguay, (UDELAR) since 2001. Private practice on dairy, cattle, equine reproduction, and pharmaceutical veterinary industry all over Latin America. Adviser and of the General Director of the Ministry of Agriculture, co responsible on Avian Influenza outbreak and vaccination strategy.

Dr. Gonzalo Simone

The uruguayan experience, on High Pathogenic Avian Influenza:

Un brote de influenza aviar altamente patógena (clado 2.3.4.4b H5N1) se produjo en Uruguay desde febrero del 2023 a marzo 2024, principalmente en aves de vida silvestre migratorias en lagunas del este del país, para luego interactuar en algunos focos, con aves de tras patio, siempre con relación epidemiológica con cursos de agua, donde co habitaron. Posteriormente se constató un brote en un eco parque, afectando a mamíferos (coaties-*Nasua nasua*) y una segunda ola de circulación viral, afectando principalmente a leones y lobos marinos y aves silvestres, durante la primavera de setiembre a diciembre del mismo año.

Los focos en total fueron 14 en la primera ola, todos rápidamente controlados por la autoridad sanitaria en el marco del Sistemas Nacionales de Emergencia, en la segunda ola en mamíferos marinos, los mismos se encontraban alejados geográficamente de zonas de avicultura por lo que no hubieron casos en aves de corral. Durante estos brotes, nunca se presentaron casos en establecimientos comerciales avícolas por lo que el estatus sanitario del país, no cambió.

Uruguay tiene una industria avícola hiperconcentrada en la periferia de su capital, donde conviven en un radio no mayor a 30 kilómetros granjas de ponedoras, granjas de parrilleros, reproductoras livianas y pesadas. En dicha zona, cohabitan escalas de producción familiar con esquemas integrados. Su destino principal es consumo nacional, sin una corriente exportadora significativa.

Dada esta situación, se conformó un comite técnico científico, integrado por especialistas públicos y privados, para evaluar la posibilidad de vacunar, ver cuales estaban disponibles, seleccionando las mismas según eficacia, momento de aplicación, que cumplieran DIVA. Se seleccionaron dos vacunas, una vectorizada con inserto para IAP con HVT, para ser aplicadas al día de nacidas y otra vacuna inactivada, a ser aplicada en sábana a toda la población tanto de ponedoras y reproductoras con un refuerzo a las 3era semana de la primo vacunación. Posteriormente, en agosto del 2024 a la fecha, se modificó el plan, cubriendo a todas las nacidas con vectorizada (se incorporó otra con viruela como vector) y realizando un refuerzo de la 8va a la 10ma semana con la inactivada, plan vigente a la fecha.

La distribución de las mismas fue gratuita para los productores a costo gubernamental, pero su aplicación debía ser supervisada por un profesional veterinario, previamente acreditado por el ministerio, quien retiraba las vacunas y reportaba mediante la plataforma de sanidad oficial, los establecimientos aplicados y elevaba un analisis de la bioseguridad del predio. Debido a la emergencia, también se permitió a granjas que a la fecha no se encontraban habilitadas de índole familiar, retirar vacuna bajo la misma modalidad, lo que permitió incorporar al sistema de vigilancia un 15% más de animales y un 20% mas de productores al sistema.

Se ejecutó un plan de monitoreo pos vacuna en más 120 granjas a la fecha (35% total), con toma de muestra de 60 aves vivas con hisopado oro-traqueal, hisopado cloacal hasta 10 aves muertas, para análisis por rTPCR para IAP y Newcastle, además de evaluar nivel de protección con extracción de 11 sueros para inhibición de la hemoaglutinacion, determinando buenos resultados en granjas donde la aplicación de la vacuna, la sanidad, nutrición, categoría eran adecuados, y menores niveles en otros de menor dedicación. Al momento ningún hisopado fue positivo para IAP ni NC, sin circulación viral al momento.

Al mismo tiempo, se elaboraron ensayos de eficacia del plan vacunal sugerido, en aves ponedoras y reproductoras pesadas desde la aplicación de la inactivada hasta comienzo de la postura, con una

media protección mayor de 1/32 durante todo el período. Al momento estamos evaluando lo mismo en reproductoras livianas y en ponedoras luego del replume, para sustentar aún mas, nuestro plan.

Según la información procesada, en ponedoras hay animales que no responden pero son muy pocos, es un porcentaje muy bajo (6-7%). La mayoría alcanzan niveles de anticuerpos compatibles con protección, con títulos muy altos a las 4 semanas de edad.

En reproductoras pesadas la cinética de la respuesta humoral es similar a la observada en ponedoras, pero se alcanzan títulos más bajos de anticuerpos. No se observan animales que no respondan a la vacunación, todos responden pero alcanzando títulos más bajos, aunque igualmente compatibles con protección hasta el tiempo medido.

Está claro que hay más variabilidad en reproductoras pesadas que en ponedoras, y que las reproductoras alcanzan niveles más bajos de anticuerpos, habrá que analizar si eso se debe a cómo se aplicó la vacuna o a los animales. Sería bueno que ambos gráficos tuviesen la misma escala y mostrarlos lado a lado.

Se ve claramente el efecto booster al aplicar Vaxigen en ambos grupos, aunque el valor promedio a las 2 semanas sería mayor y la distribución de los valores más homogénea en ponedoras (habría que ver la estadística).

Planes de vacunación

No es evidente que sea mejor utilizar la estrategia prime-boost (vectorizada/inactivada) que otra estrategia, pero está claro que las vacunas brindarían protección, según la medición de anticuerpos realizada. Por otro lado pareciera que dar dos dosis de vacuna es mejor que dar una sola dosis, aunque se necesitan más estudios ad hoc para poder sacar una conclusión al respecto.

Queda claro que pocos animales alcanzan títulos iguales o superiores a 1:128, la mayoría tiene títulos entre 1:16 y 1:32.

Creo que modificando un poco los gráficos y sacando los signos "mayor" es interesante mostrar la cinética general de respuesta al protocolo prime-boost, a todos los protocolos y yo agregué un gráfico general en el que muestra que independientemente del plan aplicado, y con todos los errores y complicaciones que no se pueden controlar, tomando todos los datos del último tiempo de muestreo, se observa que más del 50% de los animales alcanzan títulos de 1:32 que es el corte de protección de WOA.

Dependiendo de las condiciones epidemiológicas y los desafíos en esta primavera/verano, con la llegada de aves migratorias, se definirá tomando en cuenta los aportes de productores, veterinarios privados y oficiales, la academia y los laboratorios privados, el protocolo de salida de la vacuna para este 2025.

Dentro del éxito de este plan, está la utilización de un plan eficaz, que brinde tranquilidad, la protección de una industria abastecedora de alimentos primordial, la incorporación de establecimientos fuera del radar oficial, y especialmente, el trabajo en conjunto de los privados con los gubernamentales, incluso inter ministeriales, bajo el concepto de UNA SALUD.



Katharina D. C. Stärk, Prof. Dr. med. vet., Phd,

Head of Science Department
CH-3003 Bern, Switzerland
Federal Food Safety and Veterinary Office
Tel: +41 58 469 50 82
E-mail: katharina.staerk@blv.admin.ch

Katharina graduated as a veterinarian from Zurich Veterinary School and obtained her PhD from Massey University (New Zealand). Over the last 25 years, she conducted applied research on infectious diseases and zoonoses as well as risk analysis, surveillance and animal health decision making in relation to animal-derived food. She worked in diverse environments including private industry in Denmark and academia in Switzerland and the UK. Katharina has repeatedly served on international working groups and expert panels for organization such as the World Organisation for Animal Health (WOAH), the World Health Organisation (WHO) and the European Food Safety Agency (EFSA).

In 2019, Katharina joined the Federal Food Safety and Veterinary Office, Switzerland, as Head of Department of Animal Health. Since 2023, she is Head of the Science Department. Her unit leads research, training and risk assessment activities for animal health, animal welfare and food safety.

She is a honorary Professor of Veterinary Public Health Policy of the Royal Veterinary College, London UK. Her professional passion lies in translating science into practice with the aim to assure health for all.

Katharina D. C. Stärk

Assuring science-based measures against HPAI – The risk management perspective

BACKGROUND : Risk managers should take their decisions based on evidence which can be provided by the results of surveillance programmes and risk assessments. Members of the World Trade Organisation and signatories of the Sanitary and Phytosanitary (SPS) Agreement have formally committed to this approach as a basis for free trade with animals and animal-derived products. Industry structures can, however, vary between sectors and regions and should be taken into account, leading to variable solutions.

ISSUES AND CHALLENGES : Besides the evidence provided by surveillance and risk assessments, policy makers cannot ignore other relevant factors. These include the economic impact of policy options, the risk awareness and acceptance of measures by stakeholders such as farmers or consumers, societal values or political contexts within which the authorities operate. This can result in considerable differences between risk management measures, even in neighbouring countries that find themselves at very similar levels of risk. Such situations were abundant during the SARS-CoV-2 pandemic. Measures can lead to trade disruption and consequential economic losses if considered partial or technically unjustified.

PROPOSED SOLUTIONS : To be compliant, risk management strategies should be based on international standards. In order to tailor these to individual country or sector situations, the standards should not be overly prescriptive. The design of surveillance programmes, for example, should focus on their technical performance and the related equivalence in confidence. Flexibility should be allowed regarding how implementation is achieved in practice.

CONCLUSIONS : Vaccination and surveillance for HPAI in poultry should aim to achieve internationally agreed performance criteria with the necessary flexibility in design to – ultimately – assure compliance by farmers and acceptance by consumers.



Arjan Stegeman

Professor at Utrecht University
Yalelaan 7, Utrecht, The Netherland
Tel: +31 6 17477443
E-mail: J.A.Stegeman@uu.nl

Arjan Stegeman is professor of Farm Animal Health at Utrecht University, The Netherlands. He is a veterinarian by training, epidemiologist, and a specialist population health of the European College of Veterinary Public Health. His research is focused on the epidemiology of infectious diseases, including avian influenza, in farmed animals aiming to unravel the mechanisms that determine the transmission and spread of infections in animal populations and establish the effectiveness of intervention measures. For that goal his research group carries out controlled experiments, field studies and mathematical modelling.

In addition to research and teaching Arjan is engaged at the science-policy interface, e.g. as chair of the Dutch Expert Group on Animal Diseases, member of the Animal Health and Welfare panel of the European Food Safety Authority and member of the Scientific Commission for Animal Diseases of the World Organization for Animal Health.



Dr. Barbara Storck

Owner/Managing Director
D – 26219 Bösel
Moorgut Kartzfehn Turkey Breeder GmbH
Kartz-v.-Kameke-Allee 7, D – 26219 Bösel
Tel: +49 4494 88-0
Fax: +49 4494 88-113
E-mail: BST.Holding@kartzfehn.de

Dr. Barbara Storck is a veterinarian with more than 30 years of experience. Since 2001 with own office - mainly poultry and a DAKKS accredited laboratory.

Since Oct. 2020 Dr. Barbara Storck is the owner and Managing director of the largest turkey breeding business in Europe with over 500 employees. For more than 60 years the name Moorgut Kartzfehn is standing for best quality, innovative research and comprehensive service in rearing and multiplying turkeys. 300.000 parents are kept on own farms, annually generating around 34 million hatching eggs. Circa 20 million day-old poults each year are hatched exclusively at Kartzfehn hatcheries. The company delivers in the main to German turkey producers and also export - for example Poland, Czech Republic or Netherland. In addition to the poults, turkey hatching eggs are also sold to different continents. The export share is over 50 %.

As a breeding business operating on an international scale, animal welfare plays a crucial role in our daily operations.

One of the research topics Kartzfehn committed to is the development of animal-friendly rearing techniques and feed for turkeys that is suitable for the species.

As a member of the Association of German Turkey Producers and in partnership with the state ministries, various animal welfare organisations and the German Federal Ministry of Consumer Protection, Kartzfehn also drew up a voluntary agreement on rearing turkeys. Kartzfehn is always sure to set a good example when it comes to implementing these 'national benchmarks' in practice.

Dr. David Lee Suarez

Research Leader Exotic and Emerging Avian Viral
Disease Research Unit
Southeast Poultry Research Laboratory, U.S. National
Poultry Research Center,
934 College Station Rd.
Athens, GA 30605
E-mail: david.suarez@usda.gov

Dr. David Lee Suarez obtained a degree in Veterinary Medicine in 1988 from Auburn University and practiced small animal medicine for 3 years. He obtained his Ph.D. degree from Iowa State University in Veterinary Microbiology in 1995. Dr. Suarez is board certified in the American College of Veterinary Microbiology. He joined the Southeast Poultry Research Laboratory, Agriculture Research Service, USDA as a Veterinary Medical Officer in 1995. And has been the Research Leader of the Exotic and Emerging Avian Viral Disease Research Unit since 2005. His primary research interests are avian influenza virus (AIV) and Newcastle disease virus (NDV).



David E. Swayne

Private Poultry Veterinarian
Organization / Company: Birdflu Veterinarian
Address: Watkinsville, Georgia, USA
Tel: +1-706-207-4961
E-mail: birdfluvet@gmail.com

Dr. David E. Swayne is a veterinarian with specialization as a Veterinary Pathologist and Poultry Veterinarian. For the past 37 years, his personal research has focused on the pathobiology and control of poultry diseases, primarily avian influenza and Newcastle disease. He has published over 359 peer-reviewed papers and 117 book chapters, given 388 invited lectures and served as Editor or Associate Editor for 16 text and proceedings books, including Diseases of Poultry (11th-14th editions), and Associate Editor for five peer-reviewed journals, currently Emerging Infectious Diseases and Avian Diseases. He is currently editing the international textbook, Avian Influenza (3rd edition). He serves in leadership roles at the World Organization for Animal Health (WOAH) where he has led the updates to the Avian Influenza chapters in Terrestrial Animal Health Code and Manual of Diagnostic Tests and Vaccines for Terrestrial Animals and completed a 16-month sabbatical to study highly pathogenic avian influenza control programs. He currently serves as a member of the Steering Committee for OFFLU, the joint WOA/FAO Animal Influenza Network. Previously, he served as the Laboratory Director of the Southeast Poultry Research Laboratory, U.S. National Poultry Research Center, Agricultural Research Service, U.S. Department of Agriculture in Athens, Georgia, USA for 28 ½ years and as a tenured faculty member at The Ohio State University for 7 years. He is currently a private veterinarian consulting on avian influenza control and an Adjunct Professor in Department of Population Health, Poultry Diagnostic and Research Center, College of Veterinary Medicine at the University of Georgia.

David E. Swayne

Conclusions and recommendations from October 2022 IABS meeting

The International Alliance for Biological Standardization (IABS) organized an important and timely workshop on issues relevant to vaccination against high pathogenicity avian influenza (HPAI) in poultry. The meeting was held 25-26 October 2022 at the World Organization for Animal Health (WOAH) Headquarters in Paris, France. The H5Nx 2.3.4.b H5Nx goose/Guangdong (Gs/GD) HPAI virus emerged in the autumn of 2020 as the beginning of the largest transcontinental panzootic of HPAI in the past 100 years. This virus has an altered ecology and epidemiology from past emergent HPAI viruses by causing infections in over 400 new species of domestic and wild birds, many with high mortality, and affecting more than 9400 poultry premises resulting in death of over 27 million poultry and the culling of over 320 million poultry.

CONCLUSIONS from the workshop:

1. The virus has become endemic in many wild aquatic bird species with markedly increased risk of seasonal introductions and reintroductions into poultry in multiple geographic locations.
2. The continued use of stamping-out programs alone is not sustainable.
3. The global elimination of the virus is not realistic in the short and intermediate term, necessitating additional measures to reduce risks for poultry infections and to decrease the needed for stamping-out programs.
4. Vaccination of poultry can provide an extra layer of protection by increasing resistance of poultry to infection, leading to reduced quantities of circulating virus and its spread and fewer farms on which stamping out is required.
5. Barriers to wider use of vaccination include the threat of non-tariff trade barriers, poor understanding of appropriate surveillance programs in vaccinated populations and inadequate availability of suitable commercial vaccines, can be overcome.

RECOMMENDATIONS from the meeting included:

1. The formation of an international consultative group, involving a wide range of stakeholders, to identify and develop solutions to barriers that will facilitate increased uptake of vaccination.
2. Conduct additional vaccine trials on farms that could be used to assist in the development of appropriate surveillance systems in vaccinated poultry populations.
3. Support the WOAH/FAO Animal Influenza Network (OFFLU) AIM (Avian Influenza Matching) program through provision of sharing isolates, antigens, genetic material and sequence information from new isolates which will provide a global system to assist in analysis and matching vaccine antigens to evolving field viruses.
4. Continue monitoring for antigenic changes in field viruses and, when found, update vaccine seed strains in countries where HPAI virus infections are endemic.
5. Expand translational research to move advances in vaccine technologies from the developmental and basic vaccine research stage to commercial products, especially for mass application technologies and platform systems to facilitate rapid updating of hemagglutinin antigens or inserts in vaccines.
6. Develop templates for risk assessments of onward spread of HPAI for birds and their products from both vaccinated and unvaccinated flocks.
7. Progressively implement poultry production changes to reduce the likelihood of vaccinated flocks being infected including changes in structural and procedural biosecurity, and how poultry production is managed.



Damian Tago Pacheco

Biosecurity and Policy Coordinator

00198, Rome, Italy

FAO

Viale delle Terme di Caracalla 1, 00153, IT

Tel: +39 389 471 5853

E-mail: damian.tagopacheco@fao.org

Damian Tago works at the Food and Agriculture Organization of the United Nations (FAO), where he coordinates the implementation of biosecurity activities, in alignment with the Progressive Management Pathway for Terrestrial Animal Biosecurity (PMP-TAB). Originally from Mexico, Damian holds a PhD in Economics from the Toulouse School of Economics. Before starting his current assignment in FAO HQ, Damian led the work on Economics at FAO's Emergency Centre for Transboundary Animal Diseases (ECTAD) in Asia, including the evaluation of surveillance strategies using cost-effectiveness analysis.

Damian Tago Pacheco

Economic assessment to optimize surveillance systems

BACKGROUND : Economic analysis can be used to assess surveillance systems and optimize them, based on the objectives and resources available. By quantifying costs and benefits, Economics provides policy makers with the evidence required to assess trade-offs, identify inequities regarding the distribution of the costs and benefits, and ultimately make decisions about surveillance. Conducting economic assessments of surveillance systems is critical in low-income settings, where competition for resources is extreme both in the public and private sectors.

MATERIALS & METHODS : We present two economic analyses that were conducted to assess surveillance systems in two different settings. The first one analyses the cost-effectiveness of surveillance in live bird markets with the objective of early detection of a known pathogen in a free but high-risk area, using the case of H7N9 surveillance in Northern Vietnam during 2017. The second study looks at the trade-offs between costs and sensitivity of environmental sampling surveillance for H5 virus monitoring in an endemic country with limited resources, using the case of Bangladesh.

RESULTS : The first study shows that several hundreds of infected birds would be sold by the time the virus is expected to be detected in the live bird market when using a traditional surveillance strategy with 40 chicken samples collected twice a week. The adoption of innovative technologies that reduces the time between sampling and diagnostic test results, reduces the number of infected birds by 10-30% but increases the weekly surveillance costs by approximately 30%. In the second study, different strategies regarding number of samples and pooling, were compared. Given the high prevalence of avian influenza in the country, pooling pools leads to only small savings, even in a scenario where sensitivity is not affected by pooling. On the other hand, reducing the number of samples and focusing on areas in the market where the prevalence is higher, reduces the costs by 55% while affecting sensitivity by only 24%.

CONCLUSIONS : These studies show how economic analysis can generate useful information for decision makers. However, the lack of data regarding how surveillance information is used, hinders the capacity to monetize the benefits of surveillance and conduct cost-benefit analyses. If coupled with effective control measures, surveillance systems for early detection of avian influenza can be considered public goods, and the use of taxpayers' money can be justified.