Swine Disease Global Surveillance Report

Worldwide pork production is highly interconnected by trade between countries and markets which could increase the risk of introduction of foreign pathogens into the US.

PROJECT

The aim of these reports is to have a system for near real- time identification of hazards that will contribute to the mission of assessing risks to the industry and ultimately, facilitate early detection and identification, or prevent occurrence of events, in partnership with official agencies, and with our international network of collaborators.

Monthly reports are created based on the systematically screening of multiple official data sources, such as government and international organization websites, and soft data sources like blogs, newspapers, and unstructured electronic information from around the world, that then are curated to build a raw repository. Afterward, a group of experts uses a multi-criteria rubric to score each event, based on novelty, potential direct and indirect financial impacts on the US market, credibility, scale and speed of the outbreak, connectedness, and local capacity to respond average is calculated. The output of the rubric is a final single score for each event which then it is published including an epidemiological interpretation of the context of the event.

These communications and the information contained therein are for general informational and educational purposes only and are not to be construed as recommending or advocating a specific course of action.

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Current and previous reports:

www.swinehealth.org/global-disease-surveillance-reports/

Spontaneous reporting TOOL

Swine Disease Global Surveillance Report

Tuesday, January 4, 2021 – Monday, February 1, 2021

Report Highlights

- **Situation in Germany keeps evolving:** New cases outside of the core zones in Brandenburg and seized pork products infected with the ASF
- **New ASF strain in China:** A new form of ASF most likely caused by illicit vaccines
- **"*Focus on*"section:** Asia: Part 2

OCTOBER OUTBREAKS BRIEF

R	Location	Date	Disease	Impact
1	Manipur state, **India**	1/6	ASF	Suspected source: illegally imported pigs from neighboring states (Assam, Arunachal Pradesh)
1	Free State, **South Africa**	1/12	ASF	Outbreak outside South Africa's control zone
1	Shinyanga Region (Northwest), **Tanzania**	1/12	ASF	Over 1,155 killed pigs.Kahama district was the most heavily affected.
1	Märkisch-Oderland district, **Germany**	1/20	ASF	Two dead wild boars discovered outside the previous core zone, but within the endangered area
1	Southern province of Guangdong, **China**	1/21	ASF	First report since last October at country level; first case in Guangdong since 6/2019 - 1015 pig death/culled.
1	Tandjouaré prefecture (Savannah region, north of the country), **Togo**	12/28	ASF	Mortality among pigs has recently risen sharply in five districts.
1	Hessen state, **Germany**	1/28	ASF	Customs officers confiscated around 500 kg of meat products
1	Hazafon, **Israel**	1/5	FMD (Pan/ Asia-2)	9 outbreaks. Over 400 cases from a total of 4,583 susceptible animals.
2	Oshana and Ohangwena regions, **Namibia**	1/13	FMD	6 outbreaks moving westwards in the north region, above the cordon fence
1	International port, **Bahrain**	1/30	FMD	Seized shipment from Somalia containing 196 heads of cows and 1,544 heads of sheep

The outbreaks described in the table above are colored according to an assigned significance score. The score is based on the identified hazard and potential it has to the US swine industry. Rank(R) Blue: 1 - no change in status; Red: 2 - needs extra attention as the situation is dynamic; Black: 3 - requires consideration or change in practices to reduce exposure to the US swine industry. Map with the location of the events reported is available at the end of this report.

African Swine Fever

EUROPE

In January, nine European countries reported ASF cases in wild boars: Estonia, Lithuania, Latvia, Poland, Romania, Bulgaria, Hungary, Slovakia and Germany. Only, Ukraine (1), and **Romania (100)**, have reported cases in domestic pigs.

Germany

Current status - 236 ASF cases in wild boar reported in Germany in January 2021

Since the first detection in a wild boar in September 2020, the number of reports has risen to over 600. The epidemic continues to focus on Brandenburg, where there were more than three dozen proven new cases the last week of January. In Saxony, 19 ASF wild boars have been found so far, within the defined epidemic area (Restriction zone - consisting of core area, endangered area and buffer zone). So far there have been three core areas in the districts of Spree-Neisse, Oder-Spree, and Märkisch-Oderland.

Two of the new reported cases were found about 2 kms (1.2 miles) outside the core area where other cases were found. Still, within the White Zone and therefore in the Endangered Area, the Brandenburg ministry communicated.

The core area is now being expanded and temporarily enclosed with an electric fence. In the next step, the expanded core area must be closed off with a solid fence, and the systematic search for fallen game with the help of cadaver dogs, drones and a helicopter begins around the site.

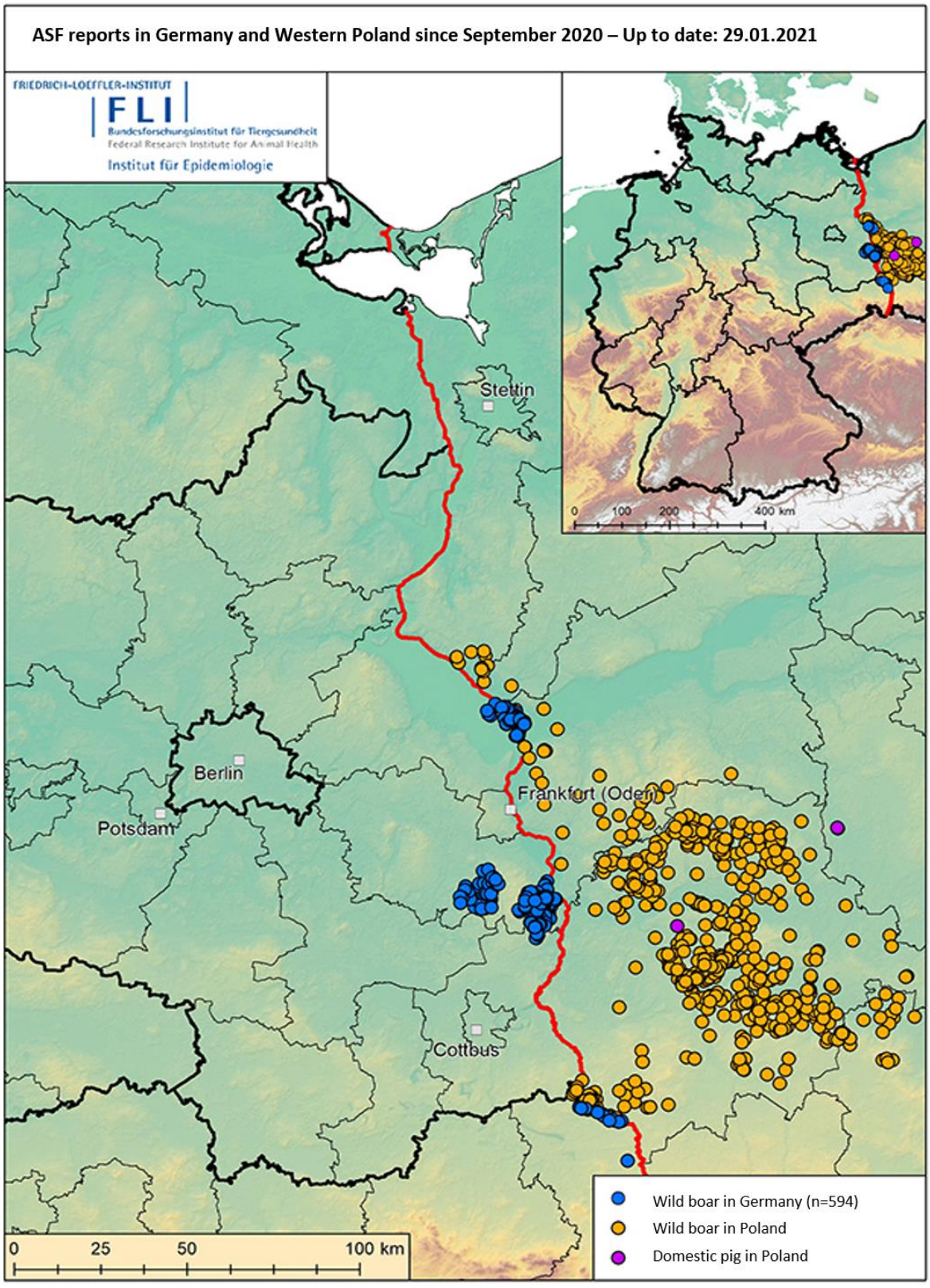
Pork infected with the ASF virus was confiscated on a motorway in Hessen

A few days ago it became known that customs had found meat products infected with ASF during an inspection on the Hessian highway, in mid December.

On December 19th, the customs officers discovered and confiscated around 500 kg of meat products from a van with Romanian registration. These included **raw sausages, raw minced meat, liver sausage and raw pork parts**.

The suspicion was confirmed in three samples after multiple samples were tested in the Friedrich-Loeffler-Institut. This case makes it clear how dangerous is the role of human behavior in the spread of ASF across large distances. That is how a second Polish cluster came into existence in western Poland in 2019, more than five years after it was introduced in Eastern Poland. And human behavior most likely caused the emergence of hotspots in Belgium and in the Czech Republic.

Link to the current ASF European Regionalization map



Map 1. Current distribution of ASF cases in Germany and Western Poland (source: Friedrich-Loeffler-Institute)

ASIA
China

New ASF variants

In mid January, the first reports on two new strains of ASF in China came to light. What are the facts:

- On January 21, Reuters reported that variant ASF viruses had been detected in China, in farms owned by New Hope Liuhe (China's fourth-largest producer). The origin of this strain is attributed to the use of illegal ASF vaccines. The same report mentioned that another private practitioner working in China has confirmed finding a similar variant in farms.

- The two new strains of ASFv described so far are gene-deleted viruses. One misses the MGF360 gene, while the one reported by New Hope, is missing two components, the MGF360 genes and the CD2v genes.

According to field reports, these two strains produce a milder form of the disease, PRRS-like viral reproductive syndrome in vaccinated sows, with stillbirths, mummifications, embryonic deaths, infertility, and abortion. Vaccine-induced mortality is rather low.

Veterinarians managing these cases suspect that "*Pigs that survive into the grow-finish period appear to shed the vaccine virus and pass it to other pigs.*" A chronic atypical ASF presentation is the result of such infections.

Throughout 2020, several reports mentioned that Chinese farmers turned to unapproved products to help protect their animals. The fears of Chinese experts regarding these illicit vaccines would create accidental infections have come true, and had started to spread.

China's Ministry of Agriculture and Rural Affairs did not respond to two requests for comment, Reuters published. Still, MARA has issued at least three warnings against use of unauthorized ASF vaccines, since October 2019, cautioning that they could have severe impact and that producers could be charged with a criminal offense. In August 2020, the ministry started a strict crackdown on the production and use of illegal ASF vaccines, including testing pigs for different virus strains as part of a nationwide investigation. No findings have been published so far.

Raising challenges

The accurate detection of the spread of these new viruses in the national herd will be rather difficult, given the detection by PCR from oral swabs, which is not reliable for ASF, is even less sensitive to the vaccine virus. The double-gene-deleted vaccine virus also may not be present in the blood, but it is often possible to find it in lymph nodes and other tissues even when the blood is negative, based on available reports.

Current diagnostic tools based on the detection of the P72 gene by PCR would detect the new strains. Still, a second test for either CD2v, MGF360, or both will need to be conducted to know if it is the field (wild type) virus or the vaccine virus. Wild type ASF virus should be positive for all three genes (P72, MGF360, and CD2v).

Chinese legitimate research

Scientists at Harbin Veterinary Research Institute have openly published about their progress during 2020. International experts expressed moderate optimism about their vaccine. The Harbin live-attenuated virus has a deletion of seven genes - following the approach taken by the Plum Island Animal Disease Center (ARS-USDA).

Thailand

False alarm

Last month, mortalities in domestic pigs caused by an undiagnosed disease were reported in Thailand's Nakhon Ratchasima province, resurfacing rumors of ASF.

In January, the Regional FAO's office contacted Thailand authorities enquiring about the confirmatory diagnosis. Dr. Thaneto, Director General of the Department of Livestock Development (DLD), confirmed that there was concern about the unusual death rate, and that further disease investigation, sample collections, and preventive culling of those suspected animals were conducted. **Laboratory results confirmed that all suspected animals (16 head of pigs) were positive with PRRS**, but negative with ASF using the RT-PCR technique.

Still, in high alert

A Multi-Criteria Decision Analysis (MCDA) approach and social network analysis was applied to analyze the risk of introduction of ASF to the country, resulting in the identification of 13 provinces at a higher risk, which informed the current surveillance efforts.

The DLD routinely conducts active surveillance by collecting samples from live animals in farms and slaughterhouses, animal carcasses, and pork products. Passive surveillance was also strengthened through a public awareness campaign and motivating farmers/stakeholders to report ASF suspected cases via mobile application.

While there has not been ASF positive from the surveillance activities. **the DLD has found ASF positives (by PCR/RT-PCR) in pork products illegally carried by tourists at the international airport and the border of Thailand.**

Last May, results of the surveillance efforts at points of entry were published. From a total of 4,010 pork products confiscated from travelers, 8.5% result positive to ASF. Most of ASF tainted products came from passengers flying from different provinces of China and Vietnam.

Point of entry	No of Samples	No. of Positives
International airports	646	86 (13.3%)
Border checkpoints	3,364	257 (7.6%)
Total	**4,010**	**343 (8.5%)**

Table 1. The number of prohibited pork products confiscated at international ports and quarantine checkpoints brought into Thailand during 2018-2019 (Source: Thai J Vet Med. 2020. 50(Suppl.): 257-259.)

Foot and Mouth Disease

ASIA

Israel

Nine FMD outbreaks have been reported in Israel since early January. Two in commercial operations, housed dairy cattle and dairy goats, in the western Galilee, six in beef cattle in pasture and fattening calves, and another one, along the Lebanese border, involving a fallow deer (found dead).

The causative agent is, most probably, circulating in southern Lebanon. Wild boars are abundant on both sides of the international fencing structure and may have served as an intermediate transmitter (**pigs are notoriously known as prolific emitters of airborne FMD virus**).

Vietnam

On January 7, a report of a *Novel Recombinant Foot-and-Mouth Disease Virus Circulating in Vietnam* was published in the Journal of the American Society of Microbiology.

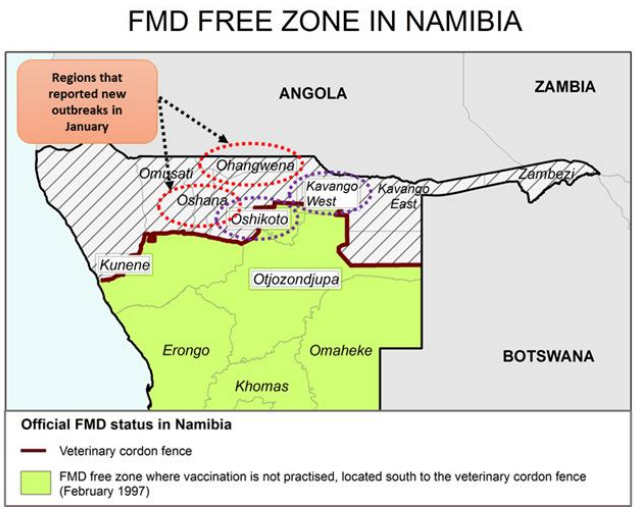
In this article, the authors reported the genome sequences of 12 recombinant FMD virus isolates from Vietnam. The recombinant strain has a capsid region from an A/Sea-97 strain and a nonstructural segment from an O/ME-SA/PanAsia strain. The isolates were obtained from two outbreak samples collected in June 2017 and 10 subclinical samples collected between 2017 and 2019.

These recombinant genome sequences highlight the need for continued surveillance combined with full-genome sequencing to identify emerging novel FMDV strains in regions of endemicity. Because routine sequencing of FMDV typically includes only the VP1 coding segment, related viruses likely have been reported as simply A/SEA-97 without awareness of the chimeric nature of the viruses.

AFRICA

Namibia

FMD keeps spreading across the north region of Namibia. Six new outbreaks in Kavango West, Oshikoto, and two new regions, Ohangwena and Oshana, were reported in January (Map).



Map 2. FMD free zone in Namibia

Eight of the country's 14 regions have now been affected by the restrictions on movement.

Since last September, the disease has spread westwards from the northern region of Kavango East.

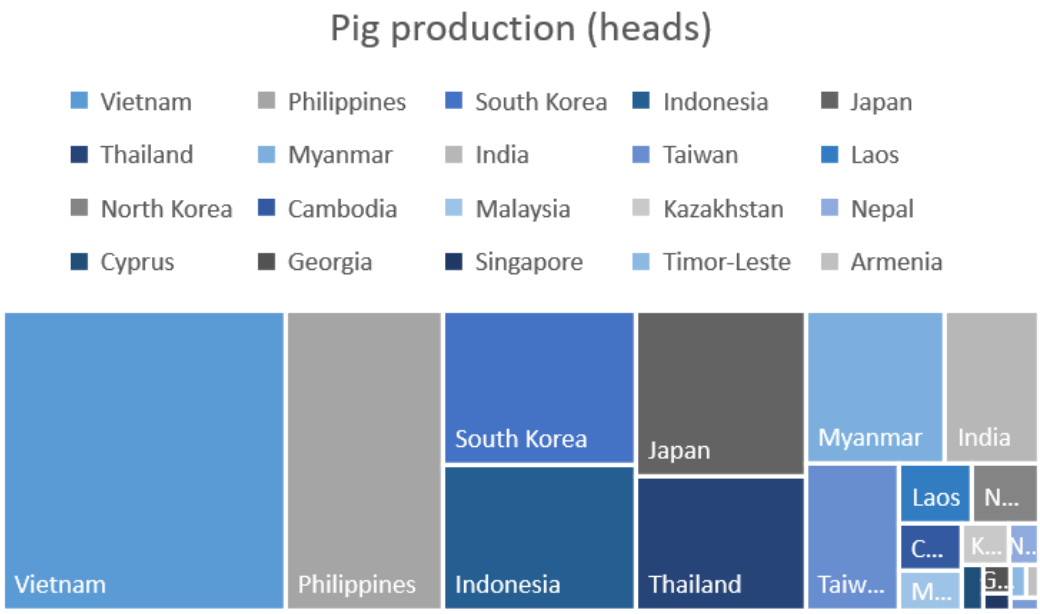
In December, the Ministry of Agriculture announced that an FMD outbreak was detected in the Oshikoto Region. This region is part of the “protection zone” between the free zone (in green below the Red Line) and the infected zone (eastern states bordering Botswana and Zambia).

FOCUS ON

ASIA

Key facts:

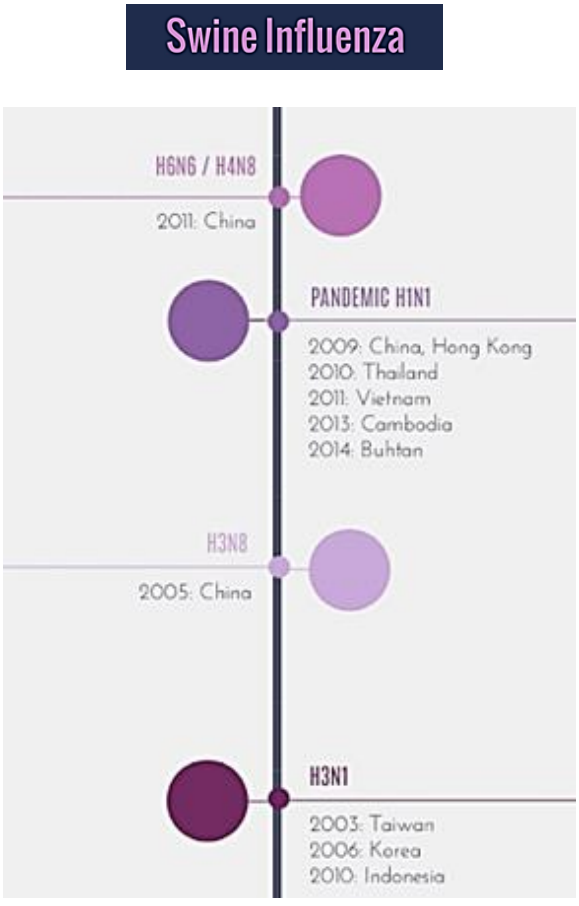
- Total pig population of more than 850 million pigs—China represents approximately 75% of it.
- Four of the top 10 pork producing countries in the world (China, Vietnam, Philippines, and South Korea)—which surpassed the 60,000 metric tons production in 2018
- Various pig production systems—while the ASF epidemic has accelerated the shift and significant efforts have been made across the region towards the modernization of hog production from backyard pigpens to large-scale, standardized farms with better biosecurity measures and environmental treatment facilities. Still, small-scale, back-yard production represents a large proportion of the production - between 50-80% depending on the country.
- Several countries in the region are also top pork importers (only imports by China, Japan, South Korea, Philippines represent more than the 60% of global imports)
- For the last three decades, Asia has acted as a hub for emerging and re-emerging swine viruses. Molecular epidemiology has demonstrated the introduction of local and foreign viral strains, which have co-mingled, mutated, and then spread to other regions.



Comparative pig production across countries in Far East and Southeast Asia, excluding China

KEY ENDEMIC AND EMERGENT VIRAL PATHOGENS SNAPSHOT

Distribution of the disease in the region



Swine Influenza

STATUS	Endemic in most of the region *China, Japan, Korea, India, Indonesia, Malaysia, Singapore, Thailand, Taiwan, Vietnam, Sri Lanka, Kazakhstan, Cambodia, Lebanon, Laos, Bhutan*
	Influenza in swine is not an OIE listed disease and thus does not require reporting to the OIE by the veterinary authorities

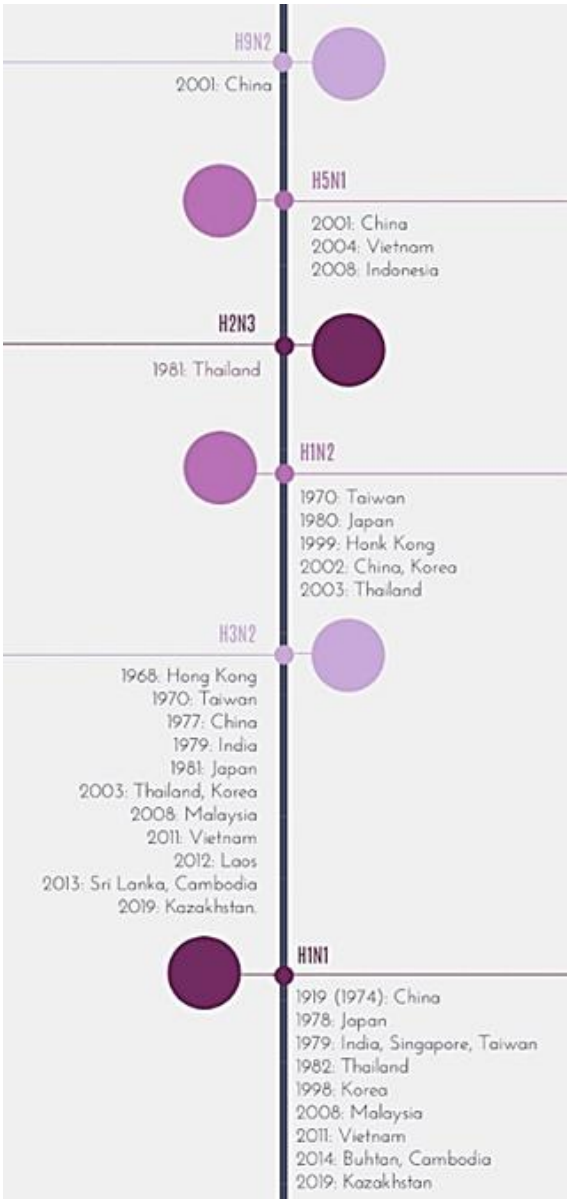
Swine influenza is an important respiratory disease of pigs caused by type A influenza viruses that regularly cause outbreaks of influenza in pigs.

Key facts

- Swine influenza strains generally cause a high morbidity with low mortality, but important economic losses.
- Pigs are natural hosts of avian, swine, and human influenza viruses. Infected swine with different influenza viruses can generate a novel virus by reassortment with the possibility to generate a novel virus with pandemic and zoonotic potential.
- Constant imports of live swine for breeding into Asia from the US and Europe have been related to the introduction of new variants creating preconditions for a reassortment event to occur.

Control strategies

- Good biosecurity and hygiene measures need to be executed (People should wash hands, wear gloves, wear masks, and wear eye protection to reduce transmission of IAV to and from pigs).
- It is important that new and updated swine influenza surveillance data collected by countries are rapidly analyzed and risk-



assessed: For early warning and preparedness.

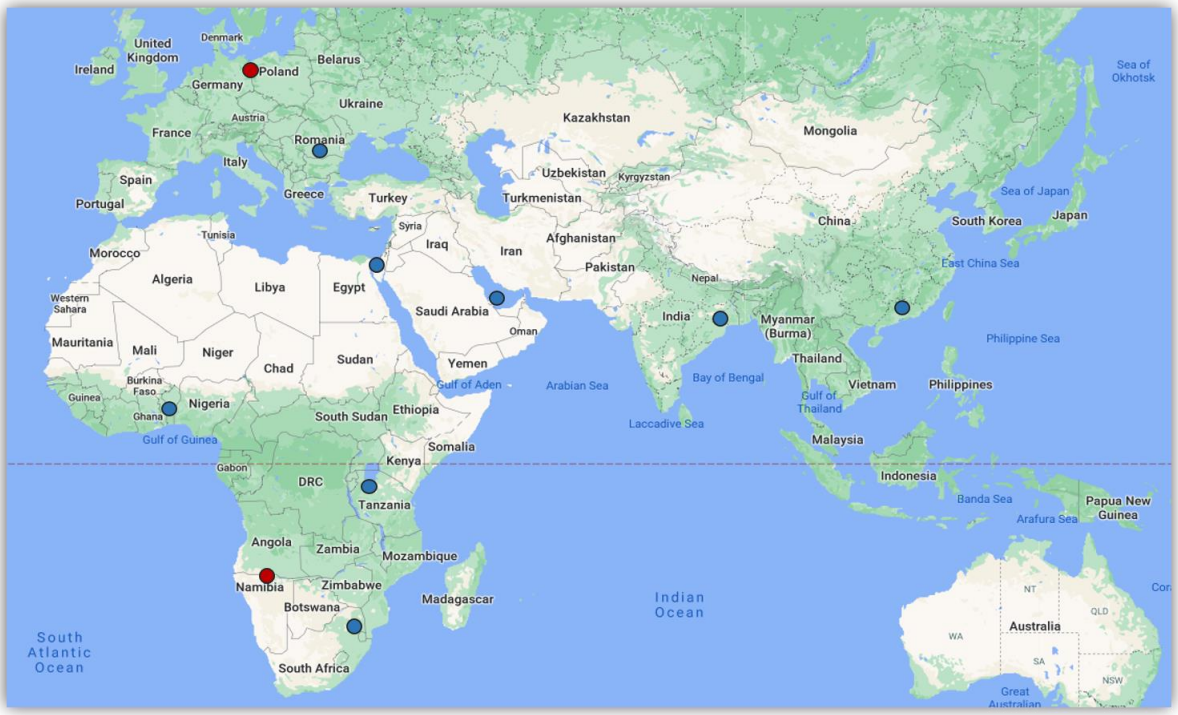
- OFFLU (OIE-FAO Network of Expertise on Animal Influenza) advocates timely sharing of swine surveillance data.
- Awareness and vigilance are strongly advised to avoid spread of the virus from pigs to people and from people to pigs.
- It is recommended that laboratories continue to conduct tests for swine influenza according to OIE International Standards.
- Vaccination of pigs remains an essential component of the control strategy.
- Good understanding of the complexity and diversity of human-animal interfaces in different countries/regions.

In countries with limited resources, as a minimum, surveillance systems could be developed by targeting swine with influenza-like illness and by setting up risk-based surveillance systems targeting specific swine age groups and farming systems to improve IAV detection sensitivity at reasonable costs

Vaccines

Information regarding availability of influenza vaccines in Asia is scarce and reports vary from country to country.

- In **China**, at least four inactivated adjuvanted licensed vaccines are available. Those vaccines are manufactured by local companies and are either H1N1 monovalent or H1N1, H3N2 bivalent products.
- Inactivated vaccines based on local strains are also mainly used in **Japan** and **South Korea**.
- In Japan, the main commercialized bivalent vaccine contains H1N1 and H3N2 strains isolated in the late 1960s and 1970s. In South Korea, there are three inactivated vaccines available, two of which are trivalent containing strains from 2004 to 2005. In both Asian countries, SIV vaccines contain mainly non-oil-based adjuvants.



Map 3. Location of the outbreaks reported throughout December. Blue: 1 - no change in status; Red: 2 - needs extra attention as the situation is dynamic; Black: 3 - requires consideration or change in practices to reduce exposure to the US swine industry

References:

Recurrent reports reviewed and included
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