



AGENCE FRANÇAISE
DE SÉCURITÉ SANITAIRE
DES ALIMENTS

Maisons-Alfort, 30 September 2009

Opinion

**of the French Food Safety Agency
on the public health risk associated with the 2009 A (H1N1) influenza virus, on
the objectives of the surveillance and control measures for the virus in pigs
according to European Community guidelines and on the specific biosecurity
measures to be implemented on pig farms**

THE DIRECTOR-GENERAL

Review of the request

On 13 August 2009, the Directorate General for Food (DGAL) and the Directorate General for Health (DGS) submitted a joint request to the French Food Safety Agency (AFSSA) to evaluate various measures that could be implemented on pig farms to counter the epidemic of human influenza caused by the 2009 A (H1N1) influenza virus and also the risk of consuming meat and meat-based products from infected swine.

This Opinion deals with questions concerning the risk of infection by the Influenza A (H1N1), 2009 virus for humans, surveillance and control measures in pig populations according to European Community guidelines and specific biosecurity measures for preventing possible outbreaks on pig farms.

Opinion of the 'Swine Flu' emergency collective expert assessment group

The available members of the 'Swine Flu' emergency collective expert assessment group (GECU 'IP'), appointed on 22 May 2009, met at AFSSA and communicated by electronic conference and e-mail on 7 September 2009 and drew up this report and its conclusions:

"Context

- On 2 May 2009, the Canadian Food Inspection Agency (CFIA) announced that a pig farm in the province of Alberta (Clearwater County) had been infected by the Influenza A (H1N1) virus, 2009. This took place shortly after the return from Mexico of a person working on the farm.

Analysis of the samples taken on the farm by the CFIA on 28 April 2009 showed high homology between genome sequences of the virus isolated in pigs from this farm and the A (H1N1) virus, 2009 responsible for the influenza epidemic in several countries, including Mexico.

On 5 May 2009, the Canadian Food Inspection Agency officially notified the World Organisation for Animal Health (OIE) of this contamination. Out of 2,020 animals, 450 had mild respiratory symptoms. The farm was quarantined and almost all the pigs affected recovered from the disease.
- Following on from this outbreak, AFSSA considered in its Opinion no. 2009-SA-0126, of 15 May 2009, concerning the zoonotic risk associated with the H1N1 A/California/04/2009 virus in the context of French farming, that the risk of human infection by this virus through contact with pigs in the European Union and continental France was close to zero.
- Since the Canadian event, infection of pigs by the 2009 A (H1N1) influenza virus has been observed in other countries and notified officially to the OIE, particularly:

27-31, avenue
du Général Leclerc
94701

Maisons-Alfort cedex
Tel 01 49 77 13 50
Fax 01 49 77 26 13
www.afssa.fr

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- on two pig farms in Argentina (on 25 June and 1 July 2009);
- on a pig farm in Australia (on 31 July 2009);
- on a pig farm in Northern Ireland (on 18 September 2009).

Epidemiological studies did not formally establish that the farms were infected through human contact or followed on from infection of members of the personnel with the Influenza A (H1N1) virus, 2009.

Non-official sources (ProMED – Project for Monitoring Emerging Diseases) have signalled the existence of other pig farms infected by the Influenza A (H1N1) virus, 2009, notably in Canada (Manitoba), Singapore (in pigs bred in Indonesia) and in Australia.

- *In the light of this situation, the European Commission has issued a document intended for the Member States, suggesting surveillance and control measures to be applied voluntarily on pig farms.*
- *In France, the recommended biosecurity measures for preventing any introduction of pathogenic agents to pig farms have been reinforced in order to avoid introduction of the Influenza A (H1N1) virus, 2009, particularly with respect to recommendations to pig farmers and those working in the pig sector showing clinical symptoms corresponding to the definition of possible cases of 'H1N1nv' as described by the French Institute for Public Health Surveillance (Institut de veille sanitaire).*

Questions asked

The DGAL has requested AFSSA's opinion on:

- *the risks to humans of infection by the Influenza A (H1N1) virus, 2009, concerning in particular:*
 - *AFSSA's opinion dated 15 May: "Does it need to be re-assessed in the light of the current state of the human epidemic?"*
 - *"What are the risks to humans and what routes for infection by the new H1N1nv virus from pigs would there be in the event of pig farms becoming infected?"*
 - *"What is the danger that this new virus might evolve (recombination, antigenic drift) in the pig population? More specifically, what is the risk of the new H1N1nv virus recombining with other influenza viruses, especially avian influenza (bird flu)?"*
- *"More generally, with regard to the swine influenza virus:*
 - *What is the epidemiological frequency and extent of exchange of influenza viruses from pigs?*
 - *What routes of infection could lead to infection of people with influenza viruses from pigs?"*
- *the objectives of the European Community guidelines for surveillance and control of the Influenza A (H1N1) virus, 2009:*
 - *"Are the objectives justified, particularly regarding the characteristics of the new H1N1nv virus, compared to other influenza viruses? Or should it also be applied to all emerging influenza viruses?"*
 - *"Are the objectives realistic and can they be achieved?"*
- *the biosecurity measures implemented on a national level in France:*
 - *"Are there any other biosecurity measures that should be recommended for use on pig farms?"*
 - *"Should biosecurity measures also be applied on poultry farms to avoid possible recombinations?"*
 - *"Should vaccination against the new virus of people coming into contact with pigs (farmers, veterinary surgeons, farm workers) be a priority as soon as vaccines are available in France?"*

Assessment method

Following on from the 'IP' Gecu meeting at AFSSA and by telephone on 7 September 2009, the scientific coordination committee of the 'Animal Health' Scientific Panel jointly drafted an Opinion that was studied by the members of the 'IP' Gecu communicating by e-mail and validated on 22 September 2009.

The assessment was carried out on the basis of:

- documents supplied by the requesting bodies:
 - the letter of request, dated 13 August 2009;
 - the annexe "Influenza A H1N1 – biosecurity measures on pig farms";
 - the "Working document on surveillance and control measures for the pandemic (H1N1) 2009 influenza virus in pigs" issued by the European Commission;
- a working document written by G. Kuntz-Simon;
- the document concerning biosecurity on pig farms in the United States of America that can be consulted at the following URL:
<http://www.pork.org/NewsAndInformation/WebFeaturePage2.aspx?Id=472> ;
- AFSSA's Opinion no. 2009-SA-0126 concerning the zoonotic risk associated with the H1N1 A/California/04/2009 virus in the context of French pig farming, dated 15 May 2009, available at the following URL:
<http://www.afssa.fr/Documents/SANT2009sa0126.pdf> ;
- various scientific articles listed in Annex 3 of this Opinion;
- discussions between the experts of the 'IP' Gecu.

Discussion and recommendations

As a preamble, it should be remembered that swine influenza viruses (SIVs) infect only the respiratory tract, with viral multiplication limited to the epithelial cells of the nasal mucous membrane, the tonsils, the trachea, the lungs and the tracheobronchial lymph nodes (Brown et al., 1993; Heinen et al., 2000; Lanza et al., 1992). Attempts during experimental infections to detect the virus in tissues not belonging to the respiratory system, were unsuccessful (Choi et al., 2004).

SIVs thus differ from avian influenza viruses, which multiply in the digestive and respiratory systems for weakly pathogenic viruses, and in a wider range of organs, or all organs, for highly pathogenic viruses, depending on the species concerned and the age of the infected birds (AFSSA, 2008).

1/ Zoonotic risks to humans of the Influenza A (H1N1) virus, 2009

1.1 "Does AFSSA's Opinion dated 15 May need to be re-assessed in the light of the current state of the human epidemic?"

- In Opinion no. 2009-SA-0126 concerning the zoonotic risk associated with the H1N1 A/California/04/2009 virus in the context of French pig farming, dated 15 May 2009, AFSSA argued that the risk to humans, in the context of the epidemic at that date, was from respiratory infection by other infected humans. Considering that no outbreaks had been reported in French or European pig farms, as of 15 May 2009, the risk of human infection by the H1N1 A/California/04/2009 virus associated with contacts with pigs in the European Union and continental France was considered to be close to zero.
- The receptivity and susceptibility of pigs to the 2009 A (H1N1) influenza virus has been demonstrated both by experimental studies, in which infected pigs presented only mild influenza symptoms and multiplied the virus, shed it and transmitted it to contact pigs (Brookes et al., 2009; Lange et al., 2009) and by a limited number of

field observations (see the infections on pig farms in Canada, Argentina and Australia).

Furthermore, Itoh et al. (2009) infected miniature specific-pathogen-free (SPF) pigs with the Influenza A (H1N1) virus, 2009. The pigs did not develop symptoms but the virus replicated in their respiratory system and pulmonary lesions were observed. The authors concluded that it was possible for the virus to replicate in pigs asymptotically.

The experimental studies tend to confirm that this human virus, which has all the genome segments found in the influenza virus previously adapted to swine (see Annexe 1), ought to be capable of adapting easily to pig populations, without, however, necessarily inducing marked influenza symptoms under farming conditions or different from those generally observed during infections by enzootic SIVs.

- It may be assumed that, as the number of human cases of 2009 A (H1N1) influenza virus increases, pig farms will face a corresponding increase in exposure to and risk of infection from infected persons. However, as of 22 September 2009, no infection of pigs by this virus has been reported in France.
- It should nonetheless be emphasised that surveillance of SIVs around the world is limited. Although research teams have set up surveillance schemes in certain countries in the last few years, especially in Europe and in France in the framework of programmes supported by the European Commission, surveillance is currently not sufficiently encouraged or systematic enough to detect and isolate all strains of SIV circulating on pig farms. A French laboratory has recently been nominated as National Reference Laboratory for SIVs, which should enable surveillance to be reinforced and consolidated on French territory.
Due to the fact that there may not be sufficiently unequivocal influenza symptoms in pigs herds to justify and enable a search for viruses, it is therefore not possible to ascertain that no 2009 A (H1N1) influenza virus is circulating on pig farms.
- Since no outbreak has been identified on pig farms in continental France as of 22 September 2009, the 'IP' Gecu considers that the risk of human infection by the 2009 A (H1N1) influenza virus associated with contact with pigs, in continental France, remains close to zero.
However, considering the receptivity of pigs to the 2009 A (H1N1) influenza virus and the increased risk for farms of exposure to this virus due to the rapidly developing situation of the human epidemic, the 'IP' Gecu considers that the risk of infection of pigs by humans, and subsequently of humans by pigs, will increase in the coming months. The level of risk should therefore be re-assessed periodically depending on the extension of infection by the 2009 A (H1N1) influenza virus in humans or the detection of cases on pig farms in France or in neighbouring countries.

1.2 "What would be the risks to humans and what paths for infection by the new H1N1nv virus would there be in the event of farms becoming infected?"

As indicated in AFSSA's Opinion no. 2009-SA-0126, the possibility of humans becoming infected by SIVs has been reported many times. Virus transmission from pigs to humans occurs by **the respiratory route**, with the virus being transported by air (aerosols) or through contact with infected oronasal secretions. No other route of infection has been described so far.

Myers et al. (2007) reported 50 cases of human influenza which could be attributed to infections from pigs with the sub-types H1N1 and H3N2, between 1958 and 2005, in the United States of America, Europe and Asia. Most of these human cases, which were limited and most often sub-clinical, were found in people who had either direct or indirect contact with pigs. Shinde et al. (2009) also reported 11 cases of humans becoming infected by triple-reassortant H1N1 viruses in the United States of America between 2005 and 2009, nine of which were cases involving persons for whom it was confirmed that they had had contact with pigs. Sporadic cases of zoonotic infections

due to SIVs have also been reported in Europe (Kuntz-Simon and Madec, 2009). Serological studies in the United States of America and Europe have also shown that exposure to SIVs is greater among people with activities related to pig farming (Kluska et al., 1961; Nowotny et al., 1997; Schnurrenberger et al, 1970; Woods et al., 1968 and 1981). An American study also showed that the risk of being seropositive for SIVs was statistically greater for pig farmers and members of their families, or for people working on pig farms for four or more days a week, than for the population as a whole (Olsen et al., 2002).

- The two experimental studies in pigs infected by the A (H1N1) virus that were carried out in Europe showed that this virus, like other SIVs, is found in oronasal and ocular secretions (Brookes et al., submitted for publication; Lange et al., 2009). No live and infective virus has been found so far in the faeces of infected animals. Brookes et al. (submitted for publication) occasionally detected viral RNA in supernatants from rectal swabs taken from 2 out of a total of 11 infected animals. The absence of lesions in the digestive tract suggests that the virus does not multiply in these organs. Lange et al. (2009) reported diarrhoea in several infected and contact pigs, but they attributed this to the degradation of the general condition of the infected animals and not to changes to the digestive system caused by the virus.
- The 'IP' Gecu therefore considers that:
 - the way in which humans are infected by pigs with the 2009 A (H1N1) influenza virus is similar to the way they are infected by other SIVs, i.e. by the respiratory route, via nasal or oral discharge and aerosols emitted by infected individuals;
 - the risk to humans of infection through un-protected contact with pigs on pig farms infected with the 2009 A (H1N1) influenza virus would be 'high'. This level of risk is considered to be identical on infected farms, in trucks transporting infected pigs and in reception areas for infected animals at slaughterhouses.

1.3 "What is the danger that this new virus might evolve (through recombination or antigenic drift) in the pig population? Particularly, what is the risk of the new H1N1nv virus recombining with other influenza viruses, especially avian influenza viruses?"

- Influenza viruses can evolve through several mechanisms, particularly:
 - point mutations which, if they concern the genes coding viral HA and/or NA proteins, are responsible for antigenic drift;
 - reassortments, by exchanging entire genome segments between two influenza viruses during cellular co-infections, which, if they concern the HA and/or NA genes, provoke antigenic shift leading to the emergence of new sub-types of virus.
- Point mutations and reassortments can affect other genome segments and induce variations other than antigenic, especially in terms of replication, virulence, etc.
- Antigenic drift of influenza viruses may occur in pig populations, but SIVs are much more stable than human influenza viruses. The slow antigenic drift to which they are subject makes pigs a reservoir of old strains of influenza for which the human population has become 'naive' (de Jonge et al., 2007; Done and Brown, 1994; Kuntz-Simon and Madec, 2009; Kyriakis et al., in press).
- Reassortment of influenza viruses in pigs has been described as occurring between viruses adapted to the swine species, but also between SIVs and human seasonal viruses and/or avian viruses. Examples of viruses generated after successive reassortments include the American triple-reassortant viruses H3N2, H1N2 and H1N1. Genome segments of the H3N2 virus (A/Hong-Kong/1/68) and the H1N1 virus

(A/USSR/90/77), responsible respectively for the pandemic of 1968 and the epidemic of 1977, are included in the genome of the reassortant swine viruses H3N2 and H1N2 circulating in Europe at the current time (Kuntz-Simon and Madec, 2009). Among the strains of SIVs isolated in Europe and in France over the last ten years, researchers have also occasionally described viruses issuing from reassortments between enzootic SIV strains H1N1 and H1N2 (Kyriakis et al., in press; Kuntz-Simon and Franck, 2007).

The risk of reassortment in pigs of the 2009 A (H1N1) influenza virus with other influenza viruses can therefore be assessed with regard to the receptivity of pigs to the influenza viruses of the various animal species:

- the main risk of reassortment of the 2009 A (H1N1) influenza virus is likely to reside in the co-infection of pigs with enzootic swine viruses, such as avian-like swine H1N1 and human-like reassortant swine H1N2 in France;
 - this risk is probably lower with human seasonal viruses;
 - this risk is probably even lower with viruses adapted to avian species.
- The 'IP' Gecu adds that neither the nature, the time of occurrence nor the consequences of such genetic events can be anticipated given our current knowledge of influenza viruses. Nevertheless, the Gecu emphasises the key role played in this evolution by co-infections of pigs with different influenza viruses, which allow viral reassortments and the emergence of new sub-types of influenza and, consequently, emphasises the benefits of attempting to reduce the exposure of pigs to these different viruses.

1.4 "What is the epidemiological frequency and extent of exchanges of influenza viruses from pigs?"

- As indicated in points 1.2 and 1.3, exchanges of swine influenza viruses between pigs and humans and between pigs and avian species is a known phenomenon, well described in the literature (Garten et al., 2009; Kuntz-Simon and Franck, 2007, AFSSA, 2008). The risk of exchanges between humans and pigs appears to be higher for persons in contact with infected pigs (Kluska et al., 1961; Nowotny et al., 1997; Schnurrenberger et al., 1970; Woods et al., 1968 and 1981; Kuntz-Simon and Madec, 2009).
- It should be noted that influenza viruses adapted to the swine species preferentially link to the $\alpha 2,6$ receptors, predominant in humans and pigs, while the $\alpha 2,3$ receptors are more characteristic of avian species. Furthermore, it has been shown that the avian-like swine H1N1 virus, of avian origin, adapted to $\alpha 2,6$ receptors after passage and establishment in the swine population (Kuntz-Simon and Madec, 2009). SIVs are therefore more easily transmitted to pigs and humans than to poultry which only have $\alpha 2,3$ receptors. However, they may be transmitted to poultry species that have both $\alpha 2,3$ and $\alpha 2,6$ receptors (particularly turkeys and quails).
- The 'IP' Gecu states that it is difficult to assess the frequency of exchanges given our current knowledge of SIVs.
With regard to the specificity of the receptors to influenza viruses in the different species, frequency of transmission of SIVs may be considered as:
 - Being higher between swine and humans than between swine and poultry;
 - Being higher between swine and turkeys or quail than between swine and chickens.

1.5 "What routes of infection could lead to people being infected with influenza viruses from pigs?"

This question was dealt with and answered in Point 1.2 of this Opinion.

2/ Objectives of the European Community guidelines for control and surveillance of the Influenza A (H1N1) virus, 2009

2.1 "Is the objective justified, particularly regarding the characteristics of the new H1N1nv virus, compared to other influenza viruses? Or should it also be applied to all emerging influenza viruses?"

• Monitoring:

The members of the 'IP' Gecu consider that in the current epidemiological situation of human infection by the Influenza A (H1N1) virus, 2009, bearing in mind its increasing importance as a public health issue and the low sensitivity of epidemiosurveillance systems for SIVs, **the objective** for specific surveillance of the 2009 A (H1N1) influenza virus recommended in the Community guidelines is relevant with respect to the other SIVs.

They consider, however, that this surveillance objective should be applied, **in the short and medium term**, to all SIVs. Surveillance of influenza syndromes in the pig should therefore lead to an in-depth genetic and antigenic characterisation of a sample of the influenza viruses isolated.

• Control:

Concerning control measures, the objective is adapted to our current scientific knowledge of SIVs on pig farms. The members of the 'IP' Gecu consider that the recommendation that infected herds should not be slaughtered is justified.

2.2 "Is this objective realistic and can it be achieved?"

- Insofar as the surveillance and control measures for countering the virus as laid down in the Community guidelines apply only to the Influenza A (H1N1) virus, 2009, they are realistic and achievable, according to the members of the 'IP' Gecu. However, if surveillance of influenza viruses were to include laboratory investigation of all influenza syndromes declared on pig farms, followed by the isolation of all SIVs detected for the purpose of in-depth genetic and antigenic characterisation, this objective would be difficult to achieve.

3/ The biosecurity measures implemented in France

It should be stressed that the measures to avoid swine influenza on pig farms, whether sanitary or medical, share the same goal of sanitary and economic protection of the French pig sector.

They also help to reduce the risk of viral reassortments. In this respect, their efficacy should not be judged in terms of impact at a regional or national level but at an international level, bearing in mind the highly contagious nature of infection by the Influenza A (H1N1) virus, 2009. They should therefore be applied in every country confronted by this pandemic, as otherwise the results in terms of the risk of reassortments are bound to be limited.

The measures specific to the 2009 A (H1N1) influenza virus are based on epidemiological data available as of 22 September 2009:

- indicating that only a few pig farms are infected with the virus;
- not reporting virus transmission to humans from infected pigs.

3.1 "Are there any other biosecurity measures that should be recommended for use on pig farms?"

- As indicated in the request, "the objective of these biosecurity measures is to prevent any introduction of the virus into the swine population. A summary sheet about biosecurity measures has been drawn up for future distribution to professionals in the

pig sector and has been submitted to the 'IP' Gecu for its opinion. It includes recommendations for any farmer or person working in the pig sector presenting clinical symptoms corresponding to the definition of a possible case of infection by the 2009 A (H1N1) influenza virus according to the French Institute for Public Health Surveillance (InVS). It is recommended that such persons avoid all contact with pigs throughout the duration of the symptoms."

*The 'IP' Gecu emphasises the importance of respecting the biosecurity measures on pig farms in order to **reduce the risks** of introducing the Influenza A (H1N1) virus, 2009, but considers that, however rigorously they may be applied, these measures are insufficient to **prevent any introduction** of the virus into the swine population.*

Furthermore, it considers that it is important to distinguish clearly between the general biosecurity measures to be applied to pig farms and the specific measures for countering the Influenza A (H1N1) virus, 2009. A specific information sheet on this subject should therefore be made available to all those working in the pig sector.

- *Concerning the general biosecurity measures laid out in the document supplied with the Request by the DGAL, the 'IP' Gecu regrets that the proposed arrangements no longer include mention of a quarantine facility. Such a facility should be reintroduced in the biosecurity measures to be implemented on all pig farms.*
- *Concerning the measures specific to the Influenza A (H1N1) virus, 2009, the 'IP' Gecu suggests that the document about biosecurity on pig farms in the United States of America, presented in Annexe 2 of this Opinion should be used as an example. Among the items suggested in this document, the following measures seem particularly relevant:*
 - **Avoid contact between persons presenting influenza symptoms and pigs:**
If farmers or their workers present respiratory symptoms, even mild ones, they should not return to the farm for several days after their symptoms have ceased. Furthermore, if members of their families present symptoms suggesting influenza, it is preferable that all concerned avoid contact with the livestock. If such contact is unavoidable, care should be taken to wear appropriate masks and gloves, in addition to the specific clothing for use with livestock that are part of the basic rules for hygiene.
 - **Restrict visits:**
Visits by people from outside the farm should be restricted. If entry is unavoidable, care should be taken to use appropriate masks and gloves in addition to the specific clothing for use with livestock and to limit contact with the animals.
 - **Other relevant biosecurity measures:** *use of specific equipment for given livestock and for the workers concerned (clothes and boots), reinforcing hygiene measures, limiting the recirculation of air inside livestock barns.*

3.2 "Should biosecurity measures be applied on poultry farms to avoid possible recombinations?"

- *Due to the susceptibility to SIVs of certain species of poultry, particularly turkeys and quails, the 'IP' Gecu considers that it is necessary to reinforce the application of the general biosecurity measures on farms raising these species in France.*
- *Concerning the specific measures to be implemented on farms with regard to the risk created by the Influenza A (H1N1) virus, 2009, these should be similar to those that will be drawn up for pig farms by taking example from the American document (see Annexe 2).*

- For the case of farms with mixed livestock, where pigs coexist with particularly sensitive poultry species (particularly turkeys and quail), the members of the 'IP' Gecu insist on the importance of separating the personnel and equipment used for different types of livestock, so that they may be considered as distinct and independent epidemiological units, and thus avoid any viral circulation from one place to another.

3.3 "Should vaccination for the new virus be a priority for personnel coming into contact with pigs (farmers, veterinary surgeons, farm workers) as soon as vaccines become available in France?"

The 'IP' Gecu considers that **at the present time, the vaccination of persons working in the pig sector (farmers, veterinary surgeons, farm workers etc.) not belonging to the priority categories stipulated by the High Council for Public Health (Haut conseil de la santé publique) do not constitute a priority relative to the rest of the population;** however, one member of the Gecu considers that vaccination should be particularly recommended for these categories of personnel.

Opinion of the French Food Safety Agency

Concerning vaccination of personnel in contact with pigs (point 3.3 above), AFSSA, taking into account the following points:

- Pig-transmitted human infection with the 2009 A (H1N1) influenza virus occurs through the respiratory system, via nasal and oral discharge and the aerosols emitted by infected animals, as for other SIVs, with the risk being exacerbated proportionally to the degree of confinement;
- the protection of persons in contact with pigs is part of a dual strategy:
 - o to limit the exposure of pig farms to the 2009 A (H1N1) influenza virus which is now circulating in the manner of a pandemic, in order to avoid co-infection by this virus and by enzootic SIVs in circulation in the swine population, a situation favouring reassortments;
 - o to protect human populations against a possible return of this virus after passage in pigs, which could have undergone possible modifications in its pathogenic characteristics;
- the risk of pigs being infected with the 2009 A (H1N1) influenza virus by infected persons is increased because of the pandemic nature of the the disease in humans;
- the number of pig farms in the world found to be infected with the 2009 A (H1N1) influenza virus since the beginning of the pandemic (several farms in Canada, Argentina, Australia and most recently a farm in Northern Ireland) is increasing;
- asymptomatic carriage of the A (H1N1) virus remains a possibility and increases the risk of exposure for personnel;
- the sanitary prevention measures, whether general or specific to the Influenza A (H1N1) virus, 2009, are sometimes difficult to apply on farms and would only partially achieve the objective of protecting personnel working on pig farms;

considers that the vaccination of these persons would be a relevant complementary measure as part of a strategy to reduce the risk associated with the Influenza A (H1N1) virus, 2009.

Therefore, once the priorities for vaccination as defined by the High Council for Public Health have been achieved, AFSSA recommends that preventive vaccination of persons working on pig farms be organised as rapidly as possible.

Conclusion

These are AFSSA's conclusions following its assessment of the latest information available concerning the epidemiology of infections by the Influenza A (H1N1) virus, 2009.

Keywords: influenza, pigs, swine, Influenza A (H1N1) virus, 2009, SIV »

Director-General of the French Food Safety
Agency

Marc MORTUREUX

ANNEXE 1
(source: *Chen et al., 2009*)

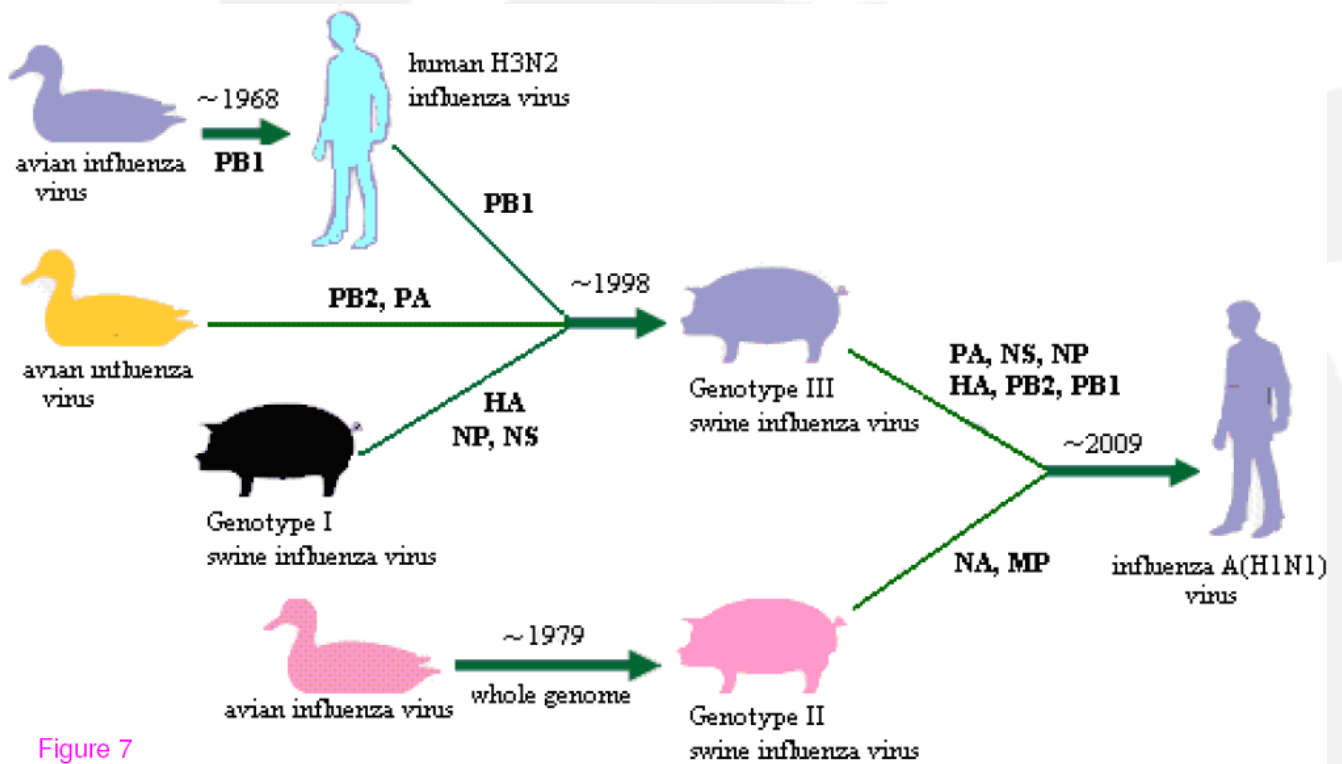


Figure 7

ANNEXE 2

(source: <http://www.pork.org/NewsAndInformation/WebFeaturePage2.aspx?Id=472>)

H1N1 flu heightens emphasis on biosecurity

At this time, no U.S. pigs have been found to be infected or sick with the virus. It is unknown if this new strain causes any type of illness in swine. However, because it is novel, the National Pork Board is urging producers to take extra precautions to protect our industry's workers and our animals.

To prevent the introduction of the new strain of influenza virus H1N1 into your operation, follow good biosecurity practices. Because people have been reported sick with this virus, make sure your biosecurity practices place special emphasis on protecting your animals and your operation's workers by monitoring all persons having access to your operation.

Consider the following practices:

1. Establish, implement and enforce strict sick leave policies for workers presenting influenza-like symptoms such as fever, cough, body aches, and sometimes vomiting and diarrhoea.

- Prevent workers exhibiting these symptoms from entering swine facilities for at least seven days after presenting symptoms of respiratory illness, even mild ones.
- Recommend that workers with these symptoms be seen by a medical provider immediately.
- Encourage workers to report if members of their household develop influenza-like symptoms or have been diagnosed with influenza. Consider restricting the contact that this worker has with the animals.

2. Implement biosecurity for workers reporting international travel.

- This recommendation is not limited to those people who had contact with animals in foreign countries.
- Consider preventing the entry of workers who have travelled internationally, and particularly to Mexico, into your operation.
- If entry is essential, consider requiring that these people use face masks, or preferably properly fitted, valveless N95 respirators, and gloves, upon entering and while inside a swine housing facility.
- If workers reporting international travel present influenza-like symptoms, restrict their access to the farm. Recommend that they seek immediate medical attention and that they report their travel to the medical professional.

3. Limit visitors to swine facilities

- Limit the entry of people into your facility to workers and essential service personnel.
- Prevent international visitors from entering your facilities.
- Prevent the entry of people who report international travel (especially from Mexico) as recently as in the past two weeks.

4. Follow other generally accepted biosecurity practices, including:

- **Enforce basic hygiene practices –**
- Workers should shower and change into farm-specific clothes and shoes before entering swine facilities. If this is not possible, enforce at least the use of farm shoes and hand and arm washing before contact with pigs.
- Recommend frequent hand-washing of workers, in barns and in offices.
- **Pay attention to ventilation** - Ventilation systems in production facilities should be designed to minimize re-circulation of air inside animal housing facilities. This is important to reduce the exposure of pigs to viruses from other pigs, to reduce their exposure to human influenza viruses.
- **Implement and enforce the use of personal protective equipment-** Provide basic personal protective equipment (PPE) to the people working in barns. This should include face masks, or preferably respirators; eye protection and gloves when appropriate.
- **Recommend that all workers be vaccinated against the seasonal influenza virus** -The vaccine is produced on a yearly basis and contains only human, not swine, strains of influenza viruses. Vaccination of swine farm workers will help to prevent human infections from seasonal human influenza strains. Seasonal influenza vaccination will not protect against the new H1N1 strain. However, vaccination of farm workers will reduce the amounts of viruses they shed if infected during seasonal human influenza outbreaks, and limit the potential for human influenza virus infection of pigs.
- **Review herd health programs with your veterinarian to ensure they are up to date and effective for conditions on your farm**

If you observe, or employees report, respiratory illness in pigs, contact a swine veterinarian immediately, especially if the onset or presentation of this illness is unusual. If deemed necessary, your veterinarian may require samples be taken from animals to send to veterinary diagnostic laboratories. If animals develop a fever or go off feed, the veterinarian may take lung tissues samples and nasal swabs to send to a veterinary diagnostic laboratory.

If you have workers collect these samples, require that they use personal protective equipment including a properly fitted, valveless N95 respirator, gloves and safety goggles.

Talk to your veterinarian if influenza-like symptoms have been reported or observed in any of the people that have, or have had, contact with your animals and report that upon submission of the samples to a diagnostic laboratory.

ANNEXE 3 Main bibliographical references

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