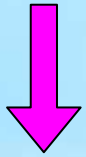
AGENCE FRANÇAISE
DE SÉCURITÉ SANITAIRE
DES ALIMENTS

THREATS AND NEW TRENDS IN PREVENTING EPIZOOTIC DISEASES IN LIVESTOCK AND POULTRY IN THE EUROPEAN UNION

P. VANNIER
AFSSA (French Food Safety Agency)

In recent years → important changes in the E.U.:

- **Enlargement to 27 countries**
- **Length of new borders**
- **Increase of trade flow and increase of number of MSs**



Difficulties of management of health status of livestock

↗ Risk of introduction of an agent

A - Increase Threat for (Re) Appearance of Epizootic Diseases

Numerous factors

I/ **legal and illegal Movements of live animals and products**

Consensus to say EU procedures and requirements ← third countries have been effective to prevent introduction animal diseases.

If not: high probability of ↗ outbreaks

But unnotified and fraudulent trade → important and largely unaddressed issue

FMD IN UK – 2001 seems to be related to the illegal use of swill in a pig farm coming from an asian restaurant.

Subtyping → illegal import of food from animal origin ← virus source

HPAI including H5N1

Legal of informal trade of live domestic birds → major factor of introducing a virus when appropriate measures not in place.

Ban in EU in 2005 → efficient

Illegal trade is certainly a key route of introduction H5N1 in countries not previously infected : Africa … (poultry farms, no wild birds) in 2006 « herald tribune » → in Italy police seized avian poultry products introduced illegally.

In EU flow of imported items ↗ ⇒ meat and animal products originating from infected animals imported illegally : greater risk in EU than imports from countries with established and regulated meat trade with EU.

↗ Trade-driven movements of livestock commodities from FMD endemic areas in Asia. Supply demand gravitates towards Europe or countries in EU neighbouring regions (N. Africa, Middle East)

Pork and beef **exports from China and India**

Moldova = 4 000 tons, Ukraine = 8 000 tons,
Albania = 3 500 tons, Georgia = 12 600 tons,
Turkey = 2 300 tons.

First conclusion

There will be a continuing tension between trade policies objectives and Animal health Policies.

- ↗ **Need for a more risk based approach to border Inspections.**
- ↗ **Need of a shifting and sharing responsibility**
- ↗ **Need for improving risk management at third country level**

II/ Evolution of human behaviour and food consumption

Human populations are moving more and more ← migrations (poverty, wars, tourism) when immigrants are well integrated in EU MSs → relatives visit to family ↗ risk of import of traditional food

⇒ Steady flow of small quantities (≅ 5 kg on average) of animal product being brought in by 1% to 5% of travellers from Asia or Africa

FMD endemic areas → high number of passengers → EU from Far East, Middle East, Near East

→ 2000 tons for animal products per year

III/ Wild Fauna

Several infectious diseases have emerged in the last few decades

- **Avian Influenza (HPAI) H5N1 ← 3 routes responsible of introduction of the virus : legal, illegal trade**

  Wild birds following migratory or non migratory routes → introduction into EU

  Aquatic wild birds → healthy carriers even if role not totally explained.

III/ Wild Fauna

- **Nipah virus**

From 1998 to 1999, highly contagious respiratory and neurological disease of pigs → Malaysian peninsula.

viral encephalitis among employees (pig farms – abattoirs) Nipah virus isolated from pigs and human victims

Fruit bats (genus *pteropus)*

III/ Wild Fauna

- **West Nile Virus**

1999 → WNV emerged in North America → threat to human and equine health and wild bird populations.

Flavivirus is maintained in a wide species range of wild birds and birds feeding mosquitoes.

2002-2003 – WNVirus infection → 4000 horses in USA – 20% neurological disease.

III/ Wild Fauna

Several EU MSs, wild boar appear as the reservoir of CSF virus in spite of the eradication of infection in the domestic pig population :

Direct contact → transmission of the virus by illegal feeding swill from wild boar waste → infection domestic pigs

IV/ Climatic changes and the global warming

Example of Blue tongue

1998 : BT virus appeared again in Western Europe.

Recent epizooty differs from the previous transitory appearance of BTV 9 years → Mediterranean basin → 8 serotypes (South of EU)

IV/ Climatic changes and the global warming

Main vector is *Culicoïdes imicola* adapted more and more to Northern countries

- Other *Culicoïdes (dewulfi* and *obsoletus* complex) present in the North and global climatic changes (↗ 1,5℃) and particularly warming
⇒ adaptation and increase capacity of vectors increasing the risk of spreading of BTV.

- Appearance of new vector borne diseases.

Same applies to other diseases such as water- borne diseases or parasites.

V/ Evolution of the farming structure and the herds management

Last 3 decades, under social pressure, demand from consumers, economical factors (types of production = poultry, pigs, goats…), 2 models of farming opposed → certain confusion of risk factors associated with the onset and spreading of infectious diseases.

HPAI (H5N1) →↗ exposure in outdoors farming with ↗ contacts with wild birds (Especially in Asia : aquatic domestic and wild birds in same pools high level of infection in clinically normal domestic ducks → factor to epidemic → Thaïland, Vietnam, Southern China.

Measures for preventing contamination :

- **Industrial farming allows biosecurity**
- **Protection in Thaïland, Turkey**
- **Failure of implementation in UK.**

VI/ Farming structure and herds management

But when failure of biosecurity → high number of animals at the same place + high density of farms → quick spreading of highly contagious viruses and multiplication of outbreaks

H7N7 in NL in 2003

Second conclusion

Previous examples show that the EU is faced to new challenges and new threats.

To prevent introduction of a pathogen or emergence of known or new hazards → implementation of a set of measures and tools adapted to new challenges → Necessary

B - Conditions for prevention of the onset of an Epizooty

I/ Preventive measures depending on epidemiological situation

a) Movements of the animals and trade

Several recommentations in Evaluation Report of CAHP :

. To ↘ Movements for live animals
. To ↗ and reinforce the Border Inspection Posts Controls
with approach based on three pillars = risks analysis based border controls, ↗ cooperation between customs authorities and veterinary services, to harmonise operations of BIPs in the EU.

b) Biosecurity

Key issue for the future – type of farming :

- ⇨ to ↗ implementation of bio-security measures in all farms
- ⇨ to sensitise farmers about importance
- ⇨ to prevent any introduction of agents through passive vectors (boots, straw, wheels, trucks, clothes…
- ⇨ In outdoors herds, to prevent contact with wild birds and wild fauna = nets, double fence, winter «gardens»…
- ⇨ To impose a minimum distance between farms

c) Vaccines

New generation of vaccines appeared → Differenciate Vaccinated from Infected Animals (DIVA) allowing control of infection with vaccination by companion diagnosis tests = FMD, CSF,AD, AI, IBR.

Major progress, but use cannot replace sanitary prophylactic measures.

Past experience → limits and advantages → powerful tool in a set of measures to control and eradicate a contagious disease, to be adapted :

. to the epidemiological situation
. to the contagiousness of the disease
. to presence or absence of conditions → capacity to control the spread of the disease

To control a disease =
key point = detect clinically inapparent infected animals (healthy carriers)

where vaccination = critical stage of alert induced by the appearance of clinical signs → removed or suppressed.

- **Vaccines → clinical protection AND to prevent viral excretion (pv and pi)**

- **Diagnosis kits → Sensitivity as high as possible to ↘ false negative results**

Most experience = Aujeszky's disease (AD)

→ Mass vaccination of pigs and detection of infection

→ To implement sanitary measures gradually in vaccinated infected herds by culling infected sows at # stages detected by ELISA kits

So, vaccination has a combined effect : Mass vaccination during several years

⇒ ↘ level of viral excretion by infected pigs

⇒ preventing airborne transmission between farms

⇒ limits economical losses due to mortality

After several years → vaccination allows ↘ of prevalence, as infected animals → to slaughter houses according to the herd management and regular culling of the oldest sows.

Cost of vaccination has to be taken into account when calculating total cost of a prophylactic programme.

In country or region, where prevalence is high → mass vaccination only tool, but identification of animals, screening and culling of infected breeding animals are essential → to eradication

Other examples such as Classical Swine Fever show that use of vaccine → do not change in depth the control of the situation.

1997 → epizooty of CSF to → NL, Be, Sp. Many people say that vaccines could prevent massive destruction of pigs.

Indeed, it is not true as more than 22 herds were already infected when primary outbreak detected is Venhorst on 4 february 1997. Situation dramatic as farmers sold piglets before restriction measures in the infected area ⇒ Rapid spread of the virus in South of the country.

CSF

In such situation: use of a marker vaccine would not have altered the nature of the problem as it does not obviate the need for action on potentially infected animals :

- **To identify them**
- **To bleed them**
- **To strictly control the movements of pigs.**

At the beginning of an epizooty, success of control measures depends on quickness of implementation before extensive, undetected spread. Vaccination is not a substitute for basic measures to control contagious diseases.

In high density regions, at start of an epizooty, ring or zonal vaccination can also be envisaged → to prevent the virus from replicating too rapidly with control measures.

FMD

Last approach pertinent for highly contagious diseases as airborne transmission is one of main epidemiological factors of spreading of the virus.

First outbreaks, in high density of susceptible herds and epidemiological conditions → airborne spread (pigs # cattle # sheep) ring vaccination (use of Models) ⇒ to limit speed and extent of the infection.

Greater risk of vaccinated herds for undetected spread than unvaccinated herds.

Third conclusion

Successful programme can be based on vaccination but should also include sanitary measures :

When vaccination is part of a control programme = should be implemented only for a certain period of time,

When prevalence of the infection decreased significantly,

When epidemiological unit protected against new introduction:

so, vaccination should be replaced by sanitary measures also less costly.

II/ Early warning system

Detection and prophylactic measures

Detection of first outbreak in the first few hours after infection is KEY element determining control (or not) of the spreading of the infection. A set of tools of measures is needed to fulfill such a requirement which needs considerable means/organisation/structure of Vet. Services in a country.

EWS : Needs to succeed

- Active and passive surveillance in the wild fauna
- Appropriate information and sensitisation of farmers and veterinarians
- Existence of an efficient network of field veterinarians → early warning of competent authorities
- System with rapid compensation of the losses of the farmers
- Early notification of an outbreak
- Existence of efficient and competent network of laboratories+ quick transportation of samples (field → labs)
- Structured veterinarian official services and organized state → power of decision, tools of action to implement effective control of measures = stamping out, control of movements, assessment of efficiency of measures.

EWS

ALL PREVIOUS CONDITIONS are essential to allow an effective control of the spreading of the infection.

Onset of epizooty or quick disappearance of the infection will depend on the precocity of the detection of the first outbreak (Index case), on the quickness and strength of measures taken by the competent authority.

General conclusion

Thanks to the knowledge acquired from the past and the onset of modern vaccinal and diagnosis tools, a set of measures can be implemented to prevent or to react when highly contagious agent is introduced in the EU.

For most of the agents, these tools are adapted and efficient. In spite of that, in recent past, dramatic epizooties occured → are failure of this apparatus. Experience drawn from failure is also essential to analyse the causes and to improve the system to prevent a reoccurence.