



# CLASSICAL SWINE FEVER

## Information for Veterinary Practitioners

### Introduction

Classical swine fever (CSF) is a highly contagious viral disease of domestic and wild swine. CSF is also known as Hog Cholera or pig plague (Schweinepest). It is caused by the CSF virus (CSFV) in the genus Pestivirus of the family Flaviviridae. CSFV is very similar to ruminant pestiviruses such as bovine viral diarrhoea and border disease. There is only one serotype of CSF virus which is divided into three genotypes.

CSF is a disease listed by the OIE World Organisation for Animal Health (OIE) Terrestrial Animal Health Code and must be reported to the OIE (OIE Terrestrial Animal Health Code).

CSF is unrelated to African Swine Fever but affected pigs show very similar clinical signs.

### Geographical distribution

Ireland is CSF free with the last case reported in 1958. Ireland is recognised as free from CSF by the World Organisation for Animal Health (former OIE).

CSF is found in central and South America, Asia, in Parts of Africa and parts of Europe (non-EU). The EU, North America, Australia and New Zealand are currently CSF free

CSF was last reported in the EU in Latvia in 2015. In the 1990s, large CSF outbreaks were reported in the Netherlands, Germany, Belgium and Italy.

### Species affected

CSF affects all members of the *Suidae* family i.e., domestic pigs, European wild boar, warthogs, and wild pigs. All age groups are susceptible. CSF does not affect humans.

### Clinical signs

CSF occurs in several different forms, which include acute, chronic, congenital and mild. The acute form of CSF appears within 3–7 days of infection, with death occurring in up to 100% of animals within 10 days of onset of infection. Milder forms of the disease can be associated with less severe and non-specific signs.

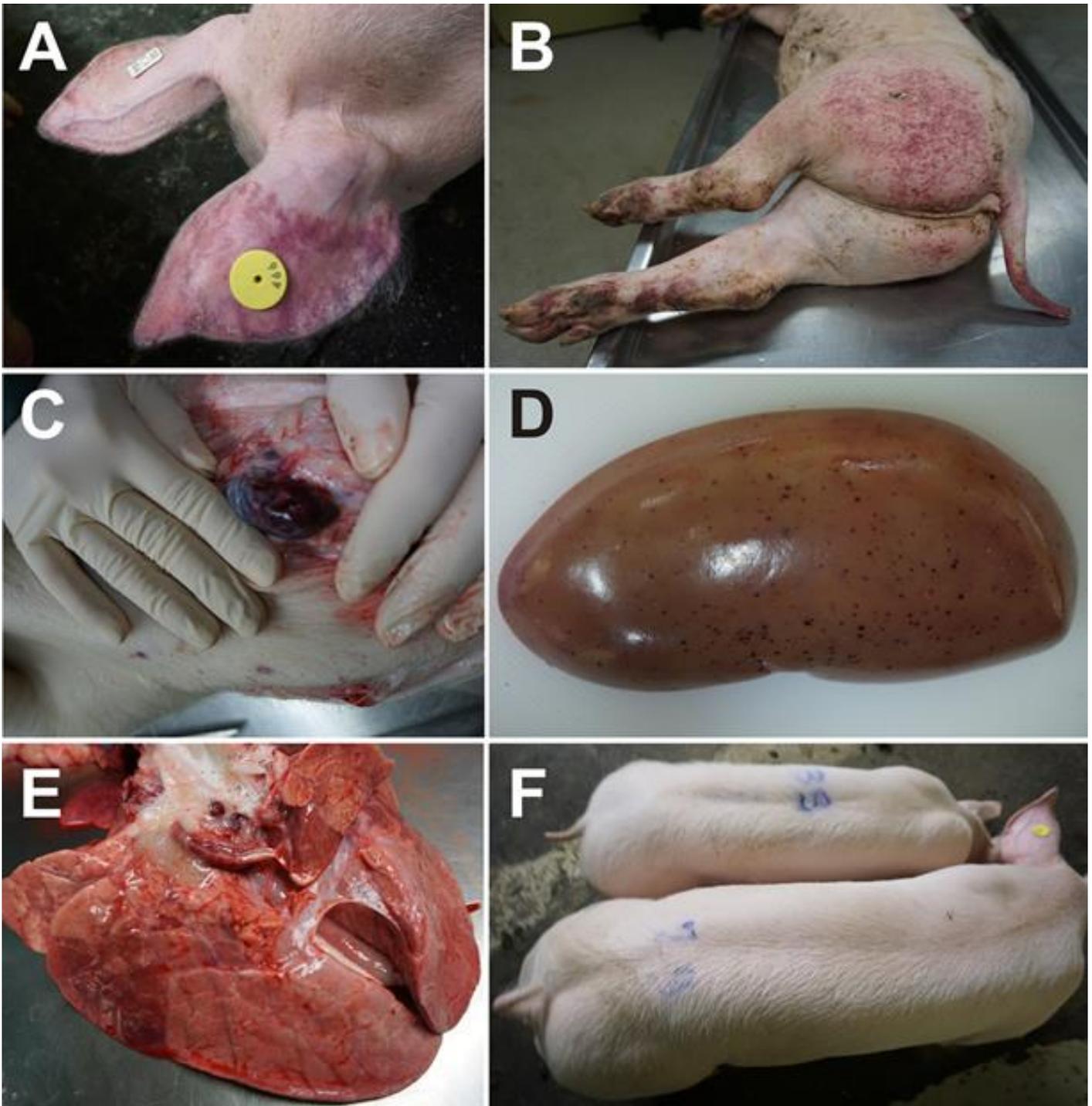
CSF causes a wide range of clinical signs, which may include:

- High temperature (41°C)
- Dullness
- Inappetence
- Reddening of the skin
- Blue discoloration of extremities
- Haemorrhages
- Vomiting
- Constipation followed by diarrhoea and /or vomiting
- Sudden death
- Abortion in pregnant pigs

The disease can be present in various forms but when the disease is newly introduced to an area, it usually presents with acute clinical signs. Clinical signs of CSF can be very similar to other diseases such as African swine fever (ASF) and

porcine dermatitis and nephropathy syndrome (PDNS). For this reason, any suspicion of CSF needs to be confirmed by laboratory testing.

<b>Classical Swine Fever Clinical Signs Table</b>
<p><b>Acute form</b></p> <ul style="list-style-type: none"> <li>• More virulent virus strains and/or younger pigs</li> <li>• Sudden death</li> <li>• Fever (around 41°C)</li> <li>• Depressed, recumbent, anorexia, and huddle together</li> <li>• Ataxia, paresis, convulsions</li> <li>• Respiratory signs such as dyspnoea and coughing</li> <li>• Cyanosis of the skin (especially at extremities)</li> <li>• Conjunctivitis (severe crusting of the eyelids)</li> <li>• Constipation followed by diarrhoea (yellowish tinged)</li> <li>• Vomiting</li> <li>• Death usually occurs within 5-25 days after onset of clinical signs</li> <li>• Mortality rate depends on the virulence of the strain and age of the animal</li> <li>• Mortality rates up to 100% may occur in young pigs</li> <li>• Abortions, congenital abnormalities</li> </ul>
<p><b>Chronic form</b></p> <ul style="list-style-type: none"> <li>• Associated with less virulent strains</li> <li>• Ruffled appearance of pigs</li> <li>• Growth retardation</li> <li>• Poor reproductive performance may be the only sign in some herds</li> <li>• Apparent recovery with relapse and death within about 3 months</li> </ul>
<p><b>Congenital form</b></p> <ul style="list-style-type: none"> <li>• Depends on virulence of CSF strain and stage of gestation</li> <li>• Foetal death, resorption, mummification, stillbirth</li> <li>• Abortion</li> <li>• Congenital tremor, weakness</li> <li>• Runting and poor growth over a period of weeks/months leading to death</li> <li>• Born clinically normal but persistently viraemic with no antibody response: important intermittent shedders of virus until dying in 6–12 months (late onset form)</li> </ul>
<p><b>Mild form</b></p> <ul style="list-style-type: none"> <li>• Usually older pigs; outcome depends on virulence of strain</li> <li>• Transient fever and inappetence</li> <li>• Recovery and lifelong immunity</li> </ul>



Clinical signs and pathological alterations frequently observed in acute (panel A–E) and chronically (panel F) CSFV diseased pigs. (A) Bleedings, cyanosis, and necrosis of the ears. (B) Skin bleedings at the hind legs, the joints, and the tail. (C) Enlarged and highly haemorrhagic inguinal lymph node. (D) Petechial bleeding of the kidney. (E) Severe bronchopneumonia with mucopurulent secretion (secondary infection) and haemorrhagic lymph nodes. (F) Wasting of a chronically CSFV-infected pig (top) compared to a convalescent pig (bottom) from the same litter.

Courtesy of: Postel, A., Austermann-Busch, S., Petrov, A., Moennig, V. and Becher, P., 2018. Epidemiology, diagnosis, and control of classical swine fever: Recent developments and future challenges. *Transboundary and Emerging Diseases*, 65, pp.248-261.

## Transmission of the virus

The virus can be found in blood, secretions and excretions, such as oronasal and lachrymal discharges, urine, faeces and semen, of infected pigs. Pigs generally come in contact with the virus through the oral or oronasal route.

Spread of disease can occur through:

- Direct contact with blood or secretions (ornasal/lacrimal) or excretions (urine/faeces/semen) via the oral or oronasal route
- Indirect contact via objects such as equipment, vehicles, dirty boots, contaminated clothing of people who have been in contact with infected pigs, or the ingestion of contaminated food products (swill)
- Transplacental infection of foetuses.

The feeding of contaminated meat or meat products to pigs is the most likely means of introduction of the virus into Ireland. CSF virus can survive in meat for months when refrigerated and for years when it is frozen. Therefore, it is important to note **that it is illegal to feed waste food to pigs** in Ireland and in Europe to prevent spread of CSF and other serious viruses such as ASF and Foot and Mouth disease virus

The most common method of transmission in CSF affected parts of world is through direct contact between healthy swine and those infected with CSF. The virus is shed in secretions and excretions of infected animals. Shedding starts before clinical signs appear and continues through course acute/subclinical disease. Chronically infected/persistently infected animals can shed the virus continuously for months in faeces, these animals may show not show clinical signs of illness. Piglets infected in utero can shed the virus for many months after birth.

Other methods of transmission include:

- Contact with contaminated objects (fomites) such as vehicles, pens, feed, or clothing. These items can be contaminated with virus from infected pigs and can then spread the virus. Hence the importance of biosecurity measures on pig farms to prevent the spread of the virus
- CSF virus shed by wild boar carriers in parts of the world where there are wild pig populations and where biosecurity and fencing are poor and does not prevent contact between wild boar and domestic pigs
- Both legal and illegal transport of pigs can spread CSF from infected regions to previously non infected regions
- International travellers accidentally or otherwise bringing in CSF contaminated meat product and feeding to pet or farmed pigs.

## Differential Diagnoses

CSF can present in a similar manner to other swine diseases and is clinically indistinguishable from African swine fever (ASF). ASF is also a notifiable disease and is found in a number of countries in the EU. Any suspicion of CSF or ASF must be either confirmed or ruled out using laboratory testing.

Other Differential Diagnoses

- **Haemorrhage:** porcine dermatitis and nephropathy syndrome (PDNS), coumarin poisoning, thrombocytopenic purpura, haemolytic disease of the newborn
- **Septicaemias:** erysipelas, salmonellosis, *Mycoplasma suis*, Streptococcosis, Pasteurellosis, *Haemophilus parasuis*
- **Runting:** post weaning multisystemic wasting syndrome (PMWS), swine dysentery, campylobacteriosis, enterotoxigenic
- **Abortions:** Aujeszky's, acute porcine reproductive and respiratory syndrome (PRRS), parvovirus
- **Nervous Signs:** salt poisoning, viral encephalomyelitis

	<b>CSF</b>	<b>ASF</b>
<b>Family</b>	Pestivirus	Asfarviridae
<b>Serotypes</b>	1	Many, serotype 2 prevalent worldwide
<b>Contagious</b>	Highly contagious	
<b>Case fatality</b>	Up to 100%	
<b>Most likely source</b>	Contaminated meat products fed to pigs, fomites, infected pigs	
<b>Vaccine</b>	Yes*	No
<b>Zoonotic threat</b>	No	
<b>Significance</b>	Threat to pig populations, food security, animal welfare, and international trade	
<b>Clinical signs</b>	Similar, both haemorrhagic viruses with high fatality, pyrexia, cyanosis, lethargy, erythema	
<b>World status</b>	Found in Central and South America, Asia, parts of Africa, Europe (non-EU)	Endemic in Asia, eastern Europe, sub-Saharan Africa, spreading rapidly
<b>EU status</b>	Free	Active in 10 member states,
<b>Ireland Status</b>	CSF Free	ASF free
<b>High vigilance needed</b>	Ports, airports, pig farms	
<b>Notifiable</b>	Yes	
<b>Diagnosis</b>	Post-mortem, serology	
<b>What to do if suspected</b>	Remain on farm. Contact the local Regional Veterinary Office (RVO) or the National Disease Emergency Hotline on 01 492 8026 (outside of office hours) without delay.	
<b>* Vaccines are not authorised for use in Ireland and would only be authorised if needed to control an outbreak of CSF</b>		

### What should I do if I suspect CSF?

CSF is a notifiable disease. If you suspect the disease you must report it immediately.

To report a suspect case, please contact your local [Regional Veterinary Office \(RVO\)](#) (9am-5pm). Outside of office hours, you can ring the National Disease Emergency Hotline on 01-4928026 (which is operational 365 days of the year).

An automatic standstill on animals, animal products, feed, waste, or any other thing which could spread the disease both on and off the premises. If you are present on a farm at the time of suspicion, you should remain onsite until a veterinary inspector from the Department of Agriculture Food and the Marine arrives. You should then stand down from any contact with pigs until CSF has been ruled out.

## Post-mortem

Veterinary practitioners should not perform post-mortem examinations or take samples for laboratory testing from pigs suspected of being infected with CSF. The facts below are for information purposes only:

### Post-mortem findings

#### External lesions:

- Carcasses of pigs are often in good condition if they die in the per-acute/acute stage of disease
- Erythema +/- cyanosis of the extremities, chest, and abdomen. Areas are often clearly demarcated
- Subcutaneous haemorrhage may be visible in light skinned pigs
- Bloody froth from the nose and mouth, ocular discharge, soiling of the tail and perineum with bloody faeces

#### Internal lesions

##### Acute:

- Enlarged haemorrhagic lymph node
- Severe tonsillitis with necrotic foci
- Multi-focal infarction of the margin of the spleen is nearly pathognomic
- Congested haemorrhagic lungs
- Encephalomyelitis with perivascular cuffing
- Leucopenia/thrombocytopenia

##### Chronic:

- Button ulcers in the mucosa of the caecum and large intestine
- Transverse striations of unmodelled growth cartilage at costochondral junctions in growing pigs
- Generalised depletion of Lymphoid tissue
- Haemorrhagic/inflammatory lesions often absent
- Lesions usually complicated by secondary infection

##### Congenital:

- Cerebellar Hypoplasia, micro encephalopathy

## Laboratory Diagnosis

Clotted blood and EDTA samples are required. Tissue samples required for CSF diagnosis are:

- Tonsils
- Spleen
- Kidney
- At least two lymph nodes
- Distal ileum (+ lung for ASF differentiation)
- Long bone or sternum in the case of autolysed carcasses

## Control measures where CSF is confirmed

No treatment exists for CSF. If CSF is confirmed, all infected and exposed pigs on the premises are humanely killed, carcasses appropriately disposed of, and the premises cleaned and disinfected. Tracing of potentially infected or exposed pigs is carried out. Strict controls are placed on movements of pigs and pig products within a 3 km protection zone and a 10 km surveillance zone. An outbreak would result in Ireland losing its CSF free status, leading to trade restrictions on exports of porcine products.

## Vaccines

Vaccines are available for the control of CSF; however, vaccination is generally restricted to countries with endemic infection. CSF disease free countries such as Ireland generally adopt a control strategy without prophylactic (preventative) vaccination but have established legal provisions for emergency vaccination, if necessary. The use of vaccines is only permitted under certain conditions with the prior approval of the Department of Agriculture Food

and the Marine. Therefore, during epidemic incidents in otherwise free areas, emergency vaccination can be an additional tool to control and eradicate the disease.

#### Further information

- **European Commission DG SANCO - [Disease Information and Control Plans: Classical Swine Fever - European Commission](#)**
- **World Organisation for Animal Health (formerly OIE): [Disease Information Card](#)**
- **World Organisation for Animal Health (formerly OIE): [Classical Swine Fever webpage](#)**
- **Center for Food Security and Public Health at Iowa State University, College of Veterinary Medicine - [CSF Technical Factsheet](#)**