The Classical Swine Fever Eradication Plan for The Americas

Santiago, Chile
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Food and Agriculture Organization of the United Nations
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1.0 INTRODUCTION

Classic Swine Fever (CSF), also known as Hog Cholera, is a viral disease confined to domestic and wild swine, which is highly contagious and causes high morbidity and mortality. Transmission may be directly through contact with sick animals or indirectly via human intervention, fomites, excrement and/or feed of porcine origin.

Generally animals are infected orally or transplacentally. The CSF virus is very environmentally resistant, able to survive several weeks in pork products and up to three weeks outside.

Differential diagnosis is complicated but necessary due to the presence of viral strains of varying degrees of virulence which affect animals differently and the disease's clinical similarity with African Swine Fever, Salmonellosis, acute Erysipelas, Pasteurellosis, anticoagulant intoxication?, and other diseases such as Bovine Viral Diarrhea which may also affect swine.

Swine raising in the Americas is characterized by two strata: family production and industrial raising. The traditional family raiser is small scale, transforming food and crop residues to meat, which makes this kind of production highly susceptible to CSF. The small number of animals per owner and wide dispersion of premises make disease control difficult. The family owned pig, although raised with little technology and efficiency, is important both as a source of protein and a readily marketable source of cash.

In contrast, intensive industrial scale production uses advance technology including good veterinary services complemented by a wide network of slaughterhouses and processing plants. In the Americas in recent years growth of this sector has been explosive, with both pig slaughter numbers and per capita pork consumption increasing.

Likewise pork and pork product exportation has increased during the last decade; however the major obstacle to full development of production in the region is the presence of CSF which is the main limiting factor to the international trade in swine and their products.

As evidence of CSF’s economic impact, in 1998 it was estimated that only in Guatemala, El Salvador, Honduras and Nicaragua, annual losses, counting only mortality, weight and other losses during the period of convalescence of those surviving infection, were $20 million US dollars. These losses are especially suffered by the poorest populations of rural areas.1.

Important advances in the control and eradication of foot and mouth disease and other diseases of domestic animals that affect the majority of the hemisphere’s countries have led to significant infrastructure development of veterinary services, definition and strengthening of coordination between the private and public sectors, as well as establishing the mechanisms of coordinated complementary support which international organizations provide to animal health programs.

This experience could also be applied to the control and eradication of CSF, which would be a very significant step to facilitate international commerce for the swine production of Latin America and the Caribbean to other markets, particularly to Asian markets which are great pork consumers.

In consideration of the above this document is the first step in defining a Plan to Eradicate CSF from the Americas. It is the result of a discussion between specialists in the disease and various official Veterinary Services of the region taking into consideration their experiences with control and eradication of CSF during a workshop organized for the purpose by FAO and the Agriculture and Livestock Service of Chile in Santiago from 27 through 29 October, 1999.

1.1 Swine Population

It is believed that swine were domesticated in Asia approximately 6000 years ago. Swine populations in the Americas descend from European breeds, which were introduced by early travelers. Populations grew rapidly in all countries. In 1999 the world population was about 916 million. Table one demonstrates the world distribution as well as pig -human population ratios.

### Table Number 1: World Swine Distribution

<table>
<thead>
<tr>
<th>CONTINENT</th>
<th>REGION</th>
<th>COUNTRY</th>
<th>pig population in millions</th>
<th>%</th>
<th>millions of inhabitants</th>
<th>%</th>
<th>number of swine/inhabitant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asia</td>
<td></td>
<td></td>
<td>523</td>
<td>57.1</td>
<td>3585</td>
<td>59.8</td>
<td>0.15</td>
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<tr>
<td>Europe</td>
<td></td>
<td></td>
<td>210</td>
<td>22.9</td>
<td>729</td>
<td>12.2</td>
<td>0.29</td>
</tr>
<tr>
<td>America</td>
<td></td>
<td></td>
<td>151</td>
<td>16.5</td>
<td>907</td>
<td>15.1</td>
<td>0.17</td>
</tr>
<tr>
<td>North America</td>
<td></td>
<td></td>
<td>89</td>
<td>9.7</td>
<td>404</td>
<td>6.7</td>
<td>0.22</td>
</tr>
<tr>
<td>USA</td>
<td></td>
<td></td>
<td>62</td>
<td>6.8</td>
<td>274</td>
<td>4.6</td>
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<tr>
<td>Canada</td>
<td></td>
<td></td>
<td>12</td>
<td>1.3</td>
<td>31</td>
<td>0.5</td>
<td>0.39</td>
</tr>
<tr>
<td>Mexico</td>
<td></td>
<td></td>
<td>14</td>
<td>1.5</td>
<td>96</td>
<td>1.6</td>
<td>0.15</td>
</tr>
<tr>
<td>South America</td>
<td></td>
<td></td>
<td>55</td>
<td>6.0</td>
<td>336</td>
<td>5.6</td>
<td>0.16</td>
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<tr>
<td>Argentina</td>
<td></td>
<td></td>
<td>3</td>
<td>0.3</td>
<td>36</td>
<td>0.6</td>
<td>0.08</td>
</tr>
<tr>
<td>Brazil</td>
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<td></td>
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<td>3.4</td>
<td>166</td>
<td>2.8</td>
<td>0.19</td>
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<td></td>
<td></td>
<td>2</td>
<td>0.2</td>
<td>15</td>
<td>0.3</td>
<td>0.13</td>
</tr>
<tr>
<td>Colombia</td>
<td></td>
<td></td>
<td>2</td>
<td>0.2</td>
<td>41</td>
<td>0.7</td>
<td>0.05</td>
</tr>
<tr>
<td>Ecuador</td>
<td></td>
<td></td>
<td>3</td>
<td>0.3</td>
<td>12</td>
<td>0.2</td>
<td>0.25</td>
</tr>
<tr>
<td>Paraguay</td>
<td></td>
<td></td>
<td>3</td>
<td>0.3</td>
<td>5</td>
<td>0.1</td>
<td>0.60</td>
</tr>
<tr>
<td>Peru</td>
<td></td>
<td></td>
<td>3</td>
<td>0.3</td>
<td>25</td>
<td>0.4</td>
<td>0.12</td>
</tr>
<tr>
<td>Venezuela</td>
<td></td>
<td></td>
<td>5</td>
<td>0.5</td>
<td>23</td>
<td>0.4</td>
<td>0.22</td>
</tr>
<tr>
<td>The Caribbean</td>
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<td>4</td>
<td>0.4</td>
<td>37</td>
<td>0.6</td>
<td>0.11</td>
</tr>
<tr>
<td>Cuba</td>
<td></td>
<td></td>
<td>2</td>
<td>0.2</td>
<td>11</td>
<td>0.2</td>
<td>0.18</td>
</tr>
<tr>
<td>Central America</td>
<td></td>
<td></td>
<td>3</td>
<td>0.3</td>
<td>130</td>
<td>2.2</td>
<td>0.02</td>
</tr>
<tr>
<td>Africa</td>
<td></td>
<td></td>
<td>27</td>
<td>2.9</td>
<td>749</td>
<td>12.5</td>
<td>0.04</td>
</tr>
<tr>
<td>Oceania</td>
<td></td>
<td></td>
<td>5</td>
<td>0.5</td>
<td>30</td>
<td>0.5</td>
<td>0.17</td>
</tr>
<tr>
<td>Total:</td>
<td></td>
<td></td>
<td>916</td>
<td>100.0</td>
<td>6000</td>
<td>100.0</td>
<td>0.15</td>
</tr>
</tbody>
</table>

Of the world regions the swine population of the Americas ranks third in importance, and it is considered that a very large proportion of traditional raising of the species here compared with Europe and Asia has limited the development of production.

### 1.2 Swine Production

From the standpoint of protein production swine are one of the most efficient domestic animal species, under industrial raising conditions reaching market weight (90 to 100 kilos live weight) between five and seven months of age. A feed conversion ratio of 3.5 allows this weight to be achieved with 350 kilograms of feed.

These advantages should lead to better productivity, particularly in the extensive family swine raising sector. For this population not only meat consumption but also the weight and number of animals farmers would be able to market would improve.

A recent study by the FAO and the International Food Policy Research Institute (IFPRI) considered that the demand for animal origin protein will significantly increase during the next 20 years, resulting from improved prosperity in the great majority of regions. Pork and poultry will predominate in satisfying animal protein requirements, particularly in emerging Asian markets.

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2 Source: FAOSTAT

Because of the enormous growth potential of swine production in Latin America and the emergence of new markets within the region (NAFTA, CARICOM, MERCOSUR, Andean Community, etc.) as well as emerging Asian markets, the eradication of CSF from the hemisphere in order to eliminate this sanitary barrier is seen as a strategic necessity for increasing both production and international commerce.

2.0 CLASSIC SWINE FEVER SITUATION IN THE AMERICAS

2.1 North America

Canada: Has an area of 9.9 million square kilometers with a swine population of 12 million. Free of the disease since 1963.


Mexico: An area of 1.9 million square kilometers with a swine population of 14 million. Presently 10 of its 32 States are CSF free. The State of Sonora [182,052 Km²] exports to Canada and the USA as a result of their official recognition of its freedom. In spite of these efforts, in 1996 24 outbreaks were detected, followed by 150 in 1997 and 108 in 1998. The great majority of outbreaks occurred in the State of Tamaulipas and central zones of the country. (OIE,1997, OIE 1998 and OIRSA 1999).

2.2 Central America

Costa Rica: A swine population of 280,000 and an area of 51,000 Km². The country was CSF free until 1994 when an outbreak extended from Nicaragua, causing severe production and economic losses. After an eradication program during which seventeen outbreaks were detected, the country achieved CSF freedom in July 1997. Declared officially free in 1998, it awaits recognition of this status by the international community.

Panama: An area of 75,000 Km² with a swine population of 240,000. Employing vaccination, freed of the disease in 1961 and awaiting international recognition of this status.

Belize: 23,000 pigs and an area of 22,000 Km². During 1988 achieved eradication of CSF and awaits via serological survey international recognition.

Nicaragua: 400,000 swine and an area of 130,000 Km². The Department of Rivas has participated in a special program, and since 1995 no cases have been detected and vaccination is not practiced there, resulting in increased swine production. (OIE 1997, OIE 1998, OIRSA 1999).

El Salvador: 21,000 Km² and 310,000 pigs. In 1932 the first CSF cases were declared, caused by the introduction of vaccines or raw pork imported for production of products. In the beginning of the 1950’s, the disease also was established in Guatemala, Belize, Honduras and Panama. Presently CSF is endemic in El Salvador; in 1997 26 outbreaks were reported and in 1998, 18.

Guatemala: 100,000 Km² area with a swine population of 820,000. CSF is endemic with 38 outbreaks recorded in 1998.

Honduras: 700,000 pigs in an area of 110,000 Km². In the country CSF is endemic, recording 5 outbreaks in 1998 [OIE 1997, OIE 1998].

2.3 The Caribbean

Cuba: 1.5 million swine population in area of 110,000 Km². The disease was first recorded in the country in 1930. During the period of 1933 through April of 1997, 264 outbreaks occurred throughout the country. Although no outbreaks occurred during 1998, it is considered that the disease is endemic in the country.

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Haiti: 800,000 pigs in the country’s 27,000 Km2 area. Adjacent to the island of Hispanola’s other country, the Dominican Republic. CSF is considered endemic in the country, with a severe outbreak of unknown origin having occurred throughout the country in 1996.

Dominican Republic: Presently a 960,000 swine population in the country’s 48,000 Km2 area. After the eradication of African Swine Fever the Dominican Republic was free of CSF until March of 1997 when the disease spread from Haiti causing 22 outbreaks that year. With 232 outbreaks in 1998, CSF is again considered endemic in the country.

Territories of the USA in the Caribbean have been free of CSF since the 1970’s. In Puerto Rico the last outbreak was recorded in 1974.

The remainder of the countries and territories of the Caribbean at the time of the meeting had not reported to the international community and/or nationally about the presence of CSF in their territories. These countries and territories are Antigua and Barbuda, Aruba, the Bahamas, Bermuda, the British Virgin Islands, Dominica, Grenada, Guadeloupe, Jamaica, Martinique, Monserrat, the Netherland Antilles, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and Trinidad and Tobago, all of which have a swine population of approximately 510,000.

2.4 South America

2.4.1 The Andean Region

Bolivia: Presently has a swine population of 2.6 million head in its area of 1 million Km2. During 1996 some CSF outbreaks were recorded, and in 1998 there was only one report. Apparently all the national territory is affected but the country lacks resources for adequate surveillance and diagnosis of the disease.

Colombia: 2.4 million pig population in the country’s 1.4 million Km2 territory. In 1942 the disease was introduced into the country (Cucuta) possibly from Venezuela. Similarly to other countries in the Andean Region Colombia informed the OIE of the occurrence of 5 CSF outbreaks in 1977 and launched a program for the disease’s prevention and control. From 1986 through September of 1999 the program recorded a total of 392 CSF outbreaks.

Ecuador: Swine population of 2.7 million in the country’s 270,000 Km2 area. In 1996 the OIE was informed of 12 outbreaks and more recently there is lack of information about the epidemiology of the disease.

Peru: Has an area of 1.2 million Km2 with a pig population of 2.5 million head. During 1996 informed the OIE of 9 outbreaks but there is incomplete information about the subsequent years.

Venezuela: 4.7 million swine in the country’s area of 910,000 Km2. During 1996 notified the OIE of the presence of the disease in the country but no further information is known about CSF’s evolution.

2.4.2 The Amazon Region

Brazil: With an area of 8.5 million Km2 the country has a pig population of 31.4 million. A national program for the disease’s control and eradication prohibited the use of CSF vaccine in May of 1998. In December of 1998 an outbreak occurred in the State of Sao Paulo (OIE 1998). The States of Santa Catarina and Rio Grande do Sul, however, which contain more than half of Brazil’s swine population, have not recorded outbreaks since, respectively, 1990 and 1991. By means of serological sampling of this population to demonstrate the lack of viral activity it is hoped to obtain international recognition of freedom from CSF.

Guyana: 20,000 pigs distributed in a national territory of 210,000 Km2. Presently free of CSF.

The Republic of Guyana: With 10,000 pigs in an area of 91,000 Km2, the territory has been able to maintain itself free of CSF.

Surinam: 20,000 pigs in an area of 160,000 Km2. There is no recent information about the epidemiology of the disease.

6 Personal communication, Dr. Bob H. Bokma, USDA
2.4.3 Southern Cone Region

**Argentina:** Presently has 3.2 million swine in the country’s 2.7 million Km2. CSF free between April 1995 until 1998 when 7 outbreaks were recorded. In July of this same year a national campaign was begun, however in spite of efforts to achieve vaccination of 1.9 million pigs, outbreaks beginning in February 1999 occurred throughout the year.

**Chile:** A swine population of 1.7 million in a national territory of 750,000 Km2. A successful national campaign led to the suspension of vaccination for CSF in 1997. Presently the country is free of CSF and all other OIE List A diseases.

**Paraguay:** Since July of 1995 there have been no reports of CSF in the swine population of 2.5 million distributed throughout the country’s 400,000 Km2.

**Uruguay:** 170,000 Km2 with 270,000 pigs. The first recorded outbreak in 1938. During eradication of the disease most cases were in the Provinces of Canelones and Montevideo. CSF vaccination was suspended nationally in 1995 and no outbreaks have occurred since then. The country is considered free of CSF and all other OIE List A diseases.

3.0 ERADICATION PLAN FOR THE AMERICAS

This plan proposes a common regional strategy to control and eradicate CSF which will facilitate the harmonization of the technical, financial and human resources of the countries which participate, progressively consolidating countries and/or areas free of the disease and permitting its coordinated control and eventual elimination from now endemic countries.

3.1 Justification

During the last decade American countries have made great efforts to control and eradicate CSF, giving priority to individual programs with investments which exceed hundreds of millions of U.S. dollars. On occasion there has been little success due to a lack of hemispheric strategy and lack of international coordination between these programs.

Recent changes in economic policy in the hemisphere to stimulate livestock and livestock product commerce have led to increased legal and illegal trade across international borders which has occasionally expanded geographical areas infected with CSF.

There has been also been an improved structure and organization of Veterinary Services with increased participation of the private sector, which has been fundamental in bettering operations and efficiency. Increasing development of vertical integration in swine production also will facilitate the development of a hemisphere wide program, all of which lead to the feasibility and convenience of controlling and eradicating CSF from the Americas.

There is also good technical capacity of professionals in the Region which enhances prospects for the development of a CSF Eradication Plan, requiring strengthening of mechanisms for reporting, communication, use of epidemiological indicators, and also the various efforts which require coordination to perform risk analysis.

3.2 Regions

This plan proposes an initial phase of eradicating the disease from various areas of the hemisphere, then consolidating and maintaining them CSF free. For the second phase there is a regionalization model based on advances made by countries in the initial process of eradication (Annex 1). This regionalization will be of use for the steering committee and the technical secretariat as a reference to evaluate progress in countries according to plans developed individually by each one. This regionalization can then be modified according to advances made in the control and elimination of the disease.

3.3 Objectives

3.3.1 Eradicate Classical Swine Fever from the Americas
3.3.2 Reinforce, restructure and/or reorient national programs according to the CSF Eradication Plan for the Americas. This requires that each country makes a plan in accordance with contents of the Plan.

3.3.3. Maintenance and consolidation of the CSF free status of those countries which have free areas or are free of the disease.

3.3.4 Publish operations manuals and guides for the diagnosis of the disease, quality control of CSF vaccine, definition of outbreaks and methods of control, as well as control and eradication areas.

3.3.5 Implement a surveillance system for transboundary diseases of swine

3.3.6 Strengthen the international trade of swine and their products, minimizing sanitary risks.

3.3.7 Increase the volume and reduce the costs of swine production, stimulating investment in the swine raising sector.

3.3.8 Strengthen the professional and technical bases related with the Plan and the relationships and confidence between the public and private sectors.

3.4 Goal

Eradicate the disease from the Americas by the year 2020. Incorporate initially in the plan the concepts of countries and zones which are in control or eradication phases and those which are free of the disease. This could be defined and accomplished by the third year of the program, passing to the second phase in which for each country and/or group of countries an estimate will be made of the time that will be required for eradication.

4.0 STRATEGY

The execution of the Plan will be focused fundamentally on three different levels: the Americas level, the regional and/or subregional, and individual country programs to eradicate CSF.

Three different kinds of zones will be established according to program progress: control, eradication and CSF free zones.

An important prerequisite for the strategy and accomplishment of the objectives will be the decision by the countries of the Americas to politically support the Plan.

4.1 Sanitary Zones

For purposes of application of the Plan three kinds of zones and areas of different countries are defined, each with its different epidemiological situation requiring specific activities:

4.1.1 Control Zone

In the control zone the disease is endemic, not permitting the suspension of vaccination for the disease. Actions are oriented to reducing the sources of infection via strict control of outbreaks to levels compatible with eradication. The following measures are required:

- Census of domestic swine (industrial, semindustrial, transport), feral swine and estimates of the peccaries and wild boar if they exist in the country
- Intensification of epidemiological surveillance (passive and active).
- Establishment of effective and valid diagnosis for the disease
- Implement and strengthen an effective swine movement control system
- Outbreak control activities for different sanitary areas
- Establish quality control for vaccines which assures innocuity and efficacy and a minimal residual of antigen in tonsils
• Implementation of vaccination campaigns
• Disinfection procedures at the farm level
• Management of food wastes and establishing epidemiological methods for measuring prevalence of the disease
• Promotion of reporting of hemorrhagic diseases of swine and others suspicious of CSF

4.1.2 Eradication Zone

This zone is one which has ceased to have outbreaks, permitting measures to accelerate the disease’s eradication, such as suspending vaccination according to OIE norms. When an outbreak should occur a team of specialists will destroy infected and possibly exposed swine, in addition to adopting among others the following measures:

• Animal movement quarantine control measures
• Sacrifice and destruction of sick and possibly exposed swine
• Evaluation of owner indemnity programs
• Establishment of availability of national and international resources for the eradication phase (indemnity funds for destroyed animals).
• Placement and sampling of sentinel swine
• Epidemiological surveillance integrated with laboratory diagnosis
• Cost/benefit determination with social and political implications
• Legal support
• Participation of civil and military authorities to assure execution of sanitary measures
• Training in eradication procedures including outbreak simulations.
• Favoring of collective security systems for eventual outbreaks in the zone which will implicate sacrifice, and subsequent measures

4.2.3 Free Zone

The chapter on CSF in the OIE International Animal Health Code defines a free country as one that has had no disease for a minimum of two years. For countries which destroy all animals in outbreaks and vaccinate in the area, however, this period is reduced to one year and for countries which destroy the animals in outbreaks without vaccinating, six months.

It must also be demonstrated that the virus is not present in the zone, with swine, particularly those between four and six months of age, having no antibodies against the virus.

Once a country or zone is recognized as CSF free by the international community, it is important to maintain this status for trade without restrictions. The following actions are advisable to maintain this free status:

• Quarantine and movement control of animals and products from cases suspicious of CSF
• Epidemiological surveillance with associated laboratory diagnosis
• Public sensitization campaigns for professionals associated with animal health and swine producers so that they will declare disease outbreaks suspicious of CSF
• Conduct simulated outbreak training for reintroduced disease
• Information campaigns for the general public emphasizing the economic benefits resulting from eradication and the risks of the disease’s reintroduction
• Establishment of an emergency system for eradication of reintroduced outbreaks

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8 Sacrifice of infected and exposed animals should be done in eradication zones when the number of outbreaks is considerably reduced. It is economically unlivable to do so when outbreaks are numerous and frequent.
5.0 MEASURES AT THE AMERICAS

The strategy for the implementation of the Plan at the Americas level are outlined by the following measures:

- Detailed regionalization of Americas and animal health measures based on characterization of the disease, macrosystems of swine rearing, presence of CSF, and ecological, economic, political and cultural aspects.
- Achievement of new free areas, assisting those countries that have sufficient scientific evidence to demonstrate that the country or zones within the country are free of the disease, as well as provision of technical assistance for recognition of the same, if this is the immediate aim.
- Technical coordination and management of regional, subregional and national programs with the objective of complementing their measures and maximizing their available human and physical resources.
- Incorporation and participation of the community, emphasizing the dynamic and decisive role that organized swine raisers will have via their associations, the meat packing industry, private veterinarians, biologics producers, universities and research institutes, among others. Incorporation of veterinary schools in the effort is considered very relevant.
- Definition of selected regional eradication strategies based on the different swine raising systems such as reproduction, industrial scale fattening and traditional extensive production.
- Promotion of the application of the Plan by means of written and other media regarding its objective and to prevent the spread of CSF in the hemisphere. With the aim of obtaining the support of professionals involved in animal health, the livestock sector and the urban, suburban and rural public, as well as obtaining the basic swine raising information necessary to detail the measures and strategies for the Hemispheric Plan; the selection and training of personnel who will be involved with the Plan. Meanwhile work to support the establishment of:
  - national and international quarantine systems
  - sensitization of public opinion regarding the sanitary and economic risk the presence of transboundary diseases such as CSF represents
  - epidemiological surveillance
- Diagnostic activities and veterinary biologicals must meet international standards (annex 1) and the laboratories involved must meet the minimum biosafety standards that an operating CSF reference laboratory needs to support Plan activities, including International Standards Organization (ISO) or equivalent recognition regarding good laboratory practices (annex 3)\(^9\)
- Continuous training on prevention and control of transboundary diseases including using simulated outbreaks of CSF introduction
- The determination of risk factors that influence the epidemiology of the disease on a national or hemispheric level
- Conduction of studies to determine pathogenicity of field or slaughterhouse sampled strains in order to detect the presence of CSF virus (carrier pigs)
- The establishment of National Animal Health Emergency Systems
- The creation of a contingency fund for animal health emergencies
- International reporting of the disease via FAO/ OIE/ WHO

5.1 Management of The CSF Eradication Plan For The Americas

The main purpose of Plan management is to facilitate the development, implementation and execution of projects and programs whose objective in the short term is to achieve freedom from the disease of extensive areas as part of a process which will lead to eradication of CSF from the hemisphere. This will be achieved by establishment of a Steering Committee and an International Technical Advisory Board (ITAB).

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5.1.1 The Steering Committee

The Steering Committee is the ultimate authority for international standardization of the CSF Eradication Plan for the Americas. It will be comprised of International Agencies involved in obtaining resources for its implementation and by two representative countries of each region and/or subregion. The president of the committee will be elected by representatives of the countries. A Technical Secretary will have the responsibility of overseeing the international standards of the program and the agreements which will be made by the committee. In accordance with its mandate and technical capacity the FAO will be the responsible institution for the Technical Secretariat. The committee will have the following functions:

- To generate and oversee the achievement of the international standardization that guides the establishment and development of national plans for control and eradication of CSF from the countries of the hemisphere.
- To promote the establishment of national “Strategic Alliances” comprised of the public sector responsible for animal health and the private sector (swine producers, feed manufacturers, veterinary medicine producers) for the financial support of national programs and the promotion of the hemispheric plan.
- To establish and support Reference Laboratories which will provide the following reference services for national veterinary diagnostic laboratories:
  - definition, standardization of and training in diagnostic techniques selected by the ITAB
  - production and distribution of standard diagnostic reagents defined and approved by the ITAB
  - support to national laboratories for the typing of virus isolates
  - at the request of countries quality control of biologicals used in vaccination programs.
- At the request of countries provide technical assistance and training in the different methods and techniques used in various phases of national programs.
- Systematic compilation and publication of epidemiological information about CSF in the Americas.
- Periodic evaluation of national program advances via regional or hemispheric fora (It is suggested that the hemispheric forum be scheduled simultaneously with either the meeting of the Ministers for Animal Health or the Regional Conference of the OIE so as to benefit from the presence of senior animal health officials of the countries).
- At the request of one or more countries provide technical assistance for the preparation of national eradication plans as well as project documents necessary for requesting financial support for control/eradication programs.
- Establish a mechanism for promotion and evaluation of the participation of the private sector related to swine production in the management and financing of national CSF programs.

The costs of participation in meetings of the Steering Committee will be the responsibility of each member. The Steering Committee will devise its program of activities in accordance with its functions, the financing of which will be provided proportionally by the International Organizations comprising the Committee. This could originate in the regular budget of the organizations or from extra budgetary sources according to the possibilities and the decisions taken during the meetings of the Committee. The agendas of the meetings should consider the possibility of making agreements between countries in order to meet the objective of control and eradication of CSF. In addition to international standardization other circumstances may arise regarding practical application of the Hemispheric Plan.

5.1.2 The International Technical Advisory Board

The ITAB will be the technical advisor of the Steering Committee and will be comprised of representatives of international agencies which express interest in technically and financially supporting the Hemispheric Plan, the Pan-American Veterinary Association (PANVET) as the professional authority for the Americas, a representative of the official Veterinary Services of each region, a representative of the swine producers of each region, the Technical Secretary and the Regional Coordinators of the Hemispheric Plan. The ITAB will meet every two years.\(^\text{10}\)

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\(^\text{10}\) The regional representatives of official Veterinary Services and of the swine producers will be elected by each region and a regulation for the periodic rotation of these representatives will be established.
5.2 The Role of International Organizations in Program Execution

Countries and regions will base their specific plans on the reference Hemispheric Plan. Each country and region will determine their own work and goals, with an agenda according to the timeframe of the Hemispheric Plan. It should be made clear that the plans will be countries’ responsibilities, with international agencies only coordinators of the Hemispheric Plan.

It is recommended that priority be given to infected areas which are near those which are CSF free. In problem areas and especially those near borders upon request of the countries involved international agencies may assist.

Plans to control and eradicate CSF such as those being developed by the Regional International Organization for Animal and Plant Health OIRSA for Central America could complement the Hemispheric Plan, maintaining the plans and obligations agreed to by those nations involved.

The international agencies involved will determine their specific support for the Plan. These agencies are: FAO, the Pan American Health Organization (PAHO), OIRSA, the Pan American Center for Foot and Mouth Disease (PANAFTOSA) / World Health Organization, the Office International des Epizooties (OIE), the U.S Department of Agriculture (USDA) and PANVET, in addition to others to consider such as the International Institute for Cooperation in Agriculture (IICA) and the International Agency for Atomic Energy (IAEA).

It has been accepted that the FAO be responsible for the Technical Secretariat in accordance with its mandate and technical capacity. 11

The PANAFTOSA - Pan American Health Organization is supporting the fight against CSF by coordinating the system for Americas disease surveillance. This system is undergoing modernization in order to help eradication efforts. Any additional contributions must be previously discussed with the PAHO headquarters.

PANVET, as the professional organization 12 will be able to support the following aspects of the Plan:

- Sponsor debates, symposiums and workshops of specialist groups in countries and regions
- Incorporate the topic in the Pan American Congresses of Veterinary Sciences
- Sponsor regional and hemispheric encounter groups
- Support and disseminate national eradication plans
- Stimulate and cooperate in communications among specialist groups and PANVET member or associate universities
- Help to sensitize Governments to the importance of the Plan. Promote that Governments establish safeguards to confront reappearance of outbreaks
- Promote local experiences with surveillance and eradication in the framework of regional integrated agriculture and livestock development plans
- Participate actively in community education including personnel involved in programs
- Sensitize rural associations and livestock raisers to rapidly report outbreaks
- Favor the organization and training of accredited and specialized veterinarians
- Promote the participation of professional organizations in the accreditation of veterinarians and suspension of accreditation when relevant norms are disregarded, thus avoiding conflicts between official veterinarians and professional groups
- Stimulate and disseminate practices of accreditation of private veterinarians
- Harmonize hemispheric norms for the accreditation of private veterinarians
- Promote and harmonize processes and criteria for accreditation of advanced training courses for specialists and professional certification.

11 Workshop to define the Americas strategy to eradicate CSF, 27-29 October 1999, Santiago, Chile
12 resulting from its participation in federations, colleges and societies of veterinarians of which it is comprised
6.0 MEASURES AT THE NATIONAL LEVEL

6.1 Research and Epidemiological Surveillance

Objective: To know the evolution in space and time of factors influencing the presentation of disease and to evaluate the risk of introduction and dissemination of the etiological agent.

Strategy: Define, document and analyze the required information and the epidemiological indicators of the disease situation in various provinces as well as the region. Investigate, sing recommended standardized sampling methodologies and population data interpretation which will lead to deeper understanding of the epidemiology of CSF in zones and countries and the technical feasibility of making the transition to control, eradication and disease free phases.

Goals:

- Report monthly to central and regional levels a resume of the occurrence and distribution of CSF in each country.
- A detailed annual report which includes analysis of activities and risk factors which influence epidemiological situations
- Conduct studies in order to determine enlargement of eradication and disease free zones as well as declarations of countries which are free of CSF

Activities:

- Determine the kind and frequency of information required of each country and provinces within these countries
- Define and select epidemiological indicators in provinces and international border areas in each country
- Analyze information received from and processed by each country
- Compile and analyze information of epidemiological importance
- Establish a monthly situation report from each country including its provinces
- Establish an annual hemispheric epidemiological report which includes each country
- Conduct epidemiological studies which characterize the pathogenicity of field isolates
- Maintain current worldwide CSF situation reports
- Conduct feasibility studies on establishing disease free zones
- Conduct studies characterizing eradication zones
- Conduct studies on the feasibility of expanding eradication zones
- Conduct feasibility studies on declaration of CSF free countries
- Maintain a permanent sampling system of abattoirs of the different countries with sampling frequencies determined by program progress
- Identify the origins of food wastes which are fed to swine
- Identify premises which feed food wastes to swine

6.2 Sanitary Control

Objective: Control all situations where the CSF virus is detected and take the measures necessary to stop its dissemination according to the strategy defined by each country for its epidemiological zones

Strategies:

A: Control Zone

A reported possible CSF outbreak will be controlled by quarantine measures and confirmation of the diagnosis will employ epidemiological as well as clinical, anatopathological and laboratory information.

A CSF outbreak will be considered as one or more virologically confirmed cases in a determined place.
Official quarantine of a premise will be established according to legal dispositions of each country using its operational procedures. Quarantine will be lifted when the situation indicates that the danger of disease dissemination has ceased.

Investigation of the origin of infection includes livestock markets, slaughterhouses and garbage premises. An intensive vaccination campaign using specified and quality assured vaccine will be conducted.

Goal: Address 100% of outbreaks, investigating their origin and conducting periodic inspection of places with a high risk of disseminating the virus (markets, abattoirs, garbage dumps etc.).

B: Eradication Zone

Upon suspicion of a CSF outbreak quarantine measures will be taken and when disease is confirmed diseased and pigs exposed to disease will be processed in authorized slaughterhouses where careful examination is done and animals with lesions are decommissioned.

Decommissioned animals including their bones, blood and viscera will be submitted to heat treatment at a temperature which assures CSF virus destruction. At the same time there will be an investigation of premises, markets, slaughterhouses, and garbage dumps to determine the origin and possible dissemination of the infection. In final phases of eradication all swine in an outbreak will be destroyed.

In this zone sale and use of CSF vaccine are forbidden. The importation of pigs for any purpose which originate from control zones is forbidden.

C: CSF Free Zone

A case suspicious for CSF will result in quarantine and confirmation of the disease will lead to slaughter of all sick and contact pigs. Slaughtered swine will be buried on the premise. Repopulation of the premise will occur only when the risk of disease has passed. If circumstances make the destruction of all swine impossible, procedures used in an eradication zone will be conducted and the zone will temporarily lose its free status. An epidemiological study will be done. Sale and use of CSF vaccine in a free zone are prohibited.

In a free zone swine only for reproduction from another free zone with the proper certification may be imported. The importation of raw pork and pork products into the zone from any but other free zones is prohibited.

In a free zone a safeguard system assuring the participation of pig producers including immediate notification of any suspicious outbreaks is required. Availability of emergency teams to convene at any time is recommended.

Activities:

- Receive, register and investigate disease reports
- Control disease outbreaks
- Periodically inspect slaughterhouses, markets and garbage dumps
- Follow-up investigation of outbreaks in slaughterhouses, markets and garbage dumps in order to determine the origin of virus
- Select and authorize slaughterhouses within eradication zones for the processing of diseased and contact swine
- Certify breeding swine for destinations in eradication and disease free zones
- Authorize the shipment of slaughter pigs to abattoirs in eradication zones

6.3 LABORATORY DIAGNOSIS

Concerning some of the diagnostic techniques described in this section, it is possible that it may be uneconomical for some countries to develop a capability for all of them. This requires defining criteria for regional reference laboratories which could offer certain diagnostic services to various countries.
**Objective**: Conduct a complete, precise and rapid diagnosis of all disease cases which are suspicious for CSF

**Strategy**: Maintain the use of the most efficient techniques for diagnosing the disease and for assuring vaccine quality

**Goal**: Analyze 100% of samples received and evaluate the quality of 100% of the vaccine used

**Activities**:

- Have available for use at least the following diagnostic techniques
- Direct immunofluorescence for slides, tissues and cell cultures
- Indirect immunofluorescence
- Seroneutralization
- Enzyme linked immunosorbent assay (ELISA)
- Produce an adequate amount of the tissue culture line PK15 for both diagnostic and quality control purposes
- Diagnose suspicious samples which are received
- Analyze routine slaughterhouse survey samples
- Analyze serological samples taken to determine the declaration of disease free zones and countries
- Analyze samples taken to certify breeding swine to be sent to eradication and disease free zones
- Conduct quality control on domestic or imported vaccines using techniques recommended by international CSF reference laboratories for determining:
  - Capacity for protection
  - Duration of immunity
  - Virus persistence in tonsils
- Produce sufficient rabbits for titering vaccines
- Test swine for susceptibility to the disease for vaccine potency testing
- Test vaccines for residual pathogenicity and vaccine virus dissemination
- Investigate virus seed strains for vaccine production
- Investigate vaccine virus persistence in tonsils and duration of antibodies in vaccinates

### 6.4 Sanitary Education

**Objectives**:

- Improve the community's knowledge of the disease in order to increase the amount of reporting
- Inform the community of the Program's activities and objectives in order to achieve its cooperation

**Strategy**:

- Determine the community's level of knowledge about CSF
- Formulate and distribute informational material about the Program to the various epidemiological zones.

**Goals**:

- 100% of swine raisers will know sanitary measures to take in the event of an outbreak of the disease
- Producers including small-scale swine raisers as well as all agencies involved with the problem will be informed of the characteristics of control, eradication and CSF free zones once they have been declared

**Activities**:

- Perform an interview survey of producers in order to determine their knowledge of the disease as well as measures which should be taken regarding CSF
The Classical Swine fever Eradication Plan for The Americas

- Cooperate in training veterinarians who will participate in this interview process
- Participate in determining the content of informational material on the disease which will be distributed
- Promote and participate in discussion groups and meetings of agricultural agencies involved with the disease and rural community groups
- Participate in discussion groups and meetings regarding the disease with police and customs agents who are posted in ports, airports and border crossings

6.5 Biostatistics and Analysis

Objectives: Establishment and maintenance of an information system which will permit continuing knowledge of the evolution of the disease and development of the Program regarding its activities and progress in accomplishing its goals and objectives.

Strategy:
- With the existing structure and its communication system, obtain periodic information about:
  - achieving the program objective
  - accomplishing program activities
  - use of human and physical resources
- Design and analyze interview surveys for the purpose of declaring zones and countries free of CSF
- Design and analyze interview surveys to determine the level of swine raisers’ knowledge and their behavior regarding CSF

Goal: Establish an information system during the first six months of year one of the Hemispheric Plan.

Activities:
- Determine that information which should be compiled in accordance with the indicators selected for its evaluation
- Determine the mechanisms for its compilation and documentation
- Adapt the existing procedure manuals for compilation, processing, analysis and publication of information to the requirements of the Hemispheric Plan
- Document, analyze and periodically disseminate 100% of the information produced by the Hemispheric Plan
- Produce an annual report evaluating the activities and progress of the Hemispheric Plan
- Design a survey which will be used to determine the behavior of swine raisers
- Design a survey which will be used to characterize eradication zones
- Design a survey which will be used to expand eradication zones
- Formulate serological survey designs for the purpose of declaring countries as free of CSF

6.6 Legislation

Objective: Have available a legislative framework suitable for the Hemispheric Plan which will permit easy interpretation and comprehensive application

Goal: Have during the Hemispheric Plan’s first year a suitable legal framework

Activities:
- Compile the existing norms
- Adapt and complement the above for the purpose of having a coherent and codified text suitable for the requirements of the Hemispheric Plan taking into consideration the existing disease situation
- Enact and publish this text for the use of program personnel, swine raisers and organizations involved with or related to swine production
- Formulate resolutions for the declaration of zones and countries free of the disease
6.7 Training

Object: Achieve the training necessary for their assigned duties of personnel of organizations that participate in the Hemispheric Plan

Strategy:
- Conduct training courses for veterinarians in the etiology, pathology, diagnosis and epidemiology of CSF, as well as aspects of the Hemispheric Plan, current legislation and measures to take for a disease outbreak
- Conduct training courses for veterinarians working in livestock markets and slaughterhouses about their responsibilities related to as well as general aspects of the Hemispheric Plan
- International training courses of personnel of the Plan in the following subjects: diagnosis, management of animal health programs, economic evaluation of animal health projects and epidemiology

Goals:
- 100% of veterinarians participating in the Hemispheric Plan will each be trained in three day courses during years 1, 4, 8, 12, 16, and 19 of the Plan
- During the first year of the project there will be two courses for veterinarians working in livestock markets and slaughterhouses
- During year one, two professionals of each country will be trained in diagnosis, vaccine quality control, and epidemiology of the disease
- During year two, one professional of every country will be trained in management of animal health projects

Activities:
- Prepare training materials for courses for veterinarians of official Veterinary Services and those which work in livestock markets and slaughterhouses
- Hold training courses years 1, 4, 8, 12 and 16 of the Project
- Hold training courses for veterinarians who work in livestock markets and slaughterhouses
- Make use of training scholarships in foreign countries

6.8 Administration

Objective: Establish and maintain in use administrative procedures in each country which will permit programmed activities to be readily conducted, efficiently using the required human, material and financial resources.

Strategy:
- Include the Program’s operating procedures in those of each country’s official Veterinary Services
- Manage funds on an annual basis, distributed according to region or program activity while detecting administrative problems which arise

Goal: Have available the human, material and financial resources required for each program phase and to support the Hemispheric Plan

Activities:
- Evaluate responsibilities of personnel of all levels who participate in the Plan
- Document annually resource requirements for each program activity
- Obtain costs
- Acquire equipment and resources via official procedures
- Inventory equipment and determine needs
- Replace needed equipment
- Establish time schedules for requirements and incorporate these into a programming system
ANNEX 1

REGIONALIZATION OF THE CLASSICAL SWINE FEVER ERADICATION PLAN FOR THE AMERICAS

North America
- United States of America
- Canada
- Mexico

Central America
- Belize
- Costa Rica
- El Salvador
- Guatemala
- Honduras
- Nicaragua
- Panama

Andean Region
- Bolivia
- Colombia
- Ecuador
- Peru
- Venezuela

Amazon Region
- Brazil
- French Guyana
- Guyana
- Surinam

The Caribbean
- Antigua and Barbuda
- Aruba
- Bahamas
- Bermuda
- British Virgin Islands
- Cuba
- Dominica
- Dominican Republic
- Grenada
- Guadeloupe
- Haiti
- Jamaica
- Martinique
- Montserrat
- Netherlands Antilles
- Puerto Rico
- Saint Kitts and Nevis
- Saint Lucia
- Saint Vincent
- Trinidad and Tobago
- U. S Virgin Islands

Southern Cone Region
- Argentina
- Chile
- Paraguay
- Uruguay
ANNEX 2

DIAGNOSTIC AND BIOLOGICAL TECHNIQUES FOR CSF AND ESTABLISHMENT OF REFERENCE LABORATORIES

The causal agent of CSF, like those of Bovine Virus Diarrhea and Border Disease with which it is very closely genetically and antigenically related, is a small RNA virus of the Pestivirus genus of the Flaviviridae family. The close relation requires methods for differential diagnosis of the three viruses. The great variety of symptoms and lesions of CSF as well as similarities with other hemorrhagic diseases of swine (African Swine Fever, Pasteurellosis, Salmonellosis, Erysipelas, etc) makes clinical diagnosis inadequate and the laboratory necessary for the definitive diagnosis of the disease.

Value and types of laboratory diagnosis

Because of the above all Plan activities require laboratory diagnosis of CSF. It is worth rephrasing:

a) the very close genetic and antigenic similarities between pestiviruses which with some strains can be up to 80%

b) that pestiviruses are not universally cytopathogenic, leading to the possibility of some tissue culture lines used for virus isolation being contaminated

The various kinds of interrelated laboratory diagnostic techniques for the disease include:

- serological
- virological
- molecular
- histopathological

1. Serological Diagnosis

Applications, advantages and limitations

The principal applications and advantages of serological diagnostic techniques are:

- to demonstrate disease free areas
- their capacity to analyze a great number of samples
- to evaluate sentinel animals
- to check animals for vaccine testing

The principal limitations are:

- the appearance of antibodies after infection may take up to from 21 to 30 days which inhibits their value to diagnose an outbreak
- the possibility of having cross reactions with other pestiviruses

The techniques recommended to conduct studies associated with the Plan are:

- Immunoperoxidase neutralization
- Immunofluorescence neutralization
- Indirect and competitive ELISA

2. Virological and Molecular Diagnosis

The principal applications are:

- Confirmation of the disease in a new area
- Diagnosing virus carrier pigs
- Rapid diagnosis

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The recommended techniques are:

- viral isolation in tissue culture cell lines PK 15 and/or SK 6
- direct immunofluorescense employing polyclonal antibodies
- reverse transcript polymerase chain reaction

With the Plan the confirmation of an outbreak requires a positive diagnosis using two complementary diagnostic techniques.

3. **Anatomopathological Diagnosis**

**Applications and limitations**

The lesions in acute CSF are not pathognomonic, being similar to those of other septicemic diseases causing hemorrhagic lesions such as African Swine Fever, Erysipelas, Salmonellosis and others. With acute CSF lesions normally are necrotic in the tonsils, splenic infaracts, and hemorrhagic in lymph nodes, kidney, bladder, larynx and mucosa of the gastrointestinal and respiratory systems.

In the chronic form only one anatomical system may have lesions which are quite influenced by secondary bacterial infection. Necrotic enteritis with button ulcers of the ileocecal valve and swollen costochondral joints may be found.

Histologically a significant percentage of animals show nonpurulent meningoencephalitis.

In fixed tissues [especially tonsils, lymphnodes and spleen] the viral antigen can be demonstrated using monoclonal antibodies and commercial immunoperoxidase kits.

**Differential Diagnosis**

Differential diagnosis especially in threatened countries must first be made with African Swine Fever, and then other hemorrhagic? diseases of pigs such as

- Salmonellosis
- Erysipelas
- Pasteurellosis, among others

Also because of the very close relationship of Pestiviruses, differential diagnosis is required with

- Bovine Viral Diarrhea [BVD]
- Border Disease

**Selection of Samples and Submission to the Laboratory**

It is very important for the execution of the Plan that not only the right samples but samples in good condition arrive at the laboratory. **THERE IS NO GOOD DIAGNOSIS WITHOUT A GOOD SAMPLE.**

For CSF the samples to submit are:

- HEPARINIZED BLOOD
- COAGULATED BLOOD [SERUM]
- TONSILS
- MESENTERIC GANGLIA
- SPLEEN
- ILEUM

Samples must arrive at the lab using the surest and most rapid method possible and under no circumstances must they be kept at ambient temperature FOR MORE THAN A BRIEF TIME.

Once collected from the animal samples must be precisely and durably identified (adhesive tape or labels wrapped around containers) and kept at 4 degrees Centigrade. A separate container, hermetically sealed, must be used for each animal.

If the laboratory testing will be done in less than 72 hours after collection it is better to maintain samples at 4 degrees rather than freezing them.
ANNEX 3

MINIMUM BIOSECURITY REQUIREMENTS FOR AN OPERATING
CSF REFERENCE LABORATORY SUPPORTING THE PLAN

1.0 ADMINISTRATIVE

1.1 Legal and/or administrative responsibility
1.2 Complies with OIE and FAO international norms
1.3 A clear written operating system with responsibilities defined
1.4 Has established laboratory protocols
1.5 Can receive samples sent by land, sea or air transport
1.6 Has protocols for the submission and receipt of samples
1.7 Filing system for samples and their traceability
1.8 Has a sample registration book
1.9 Protocol for reporting results of analysis
1.10 Periodic internal and external auditing

2.0 INFRASTRUCTURE AND PERSONNEL

2.1 Infrastructure and personnel:

2.1.1 The Building
Fully acceptable from the standpoint of space, light, ambient conditions, personnel health, etc
Emergency power source for preservation of stored samples and reagents
Physical security according to CSF presence in lab vicinity

2.1.2 Equipment
Furnished with everything necessary to make a good serological and virological diagnosis of CSF?
Is equipment periodically examined?
Equipped for preventive maintenance?
Lab results graphically logged?

2.1.3 Personnel
Are personnel continuously formally trained (seminars, courses, etc)?
Are there relations with other CSF laboratories?
Are there sufficient personnel for the laboratory’s responsibilities?

2.1.4 Standardized procedures
Are there up to date protocols for each test?
Are these international standard protocols?
Are tests adequately controlled?
Is international check testing of laboratory samples performed?

2.2 Technical Capacity:

2.2.1 Techniques established for routine diagnosis
2.2.2 Special non routine techniques established
2.2.3 Daily capacity for processing of:
Serum samples
Animal tissues
Samples for virus isolation
2.2.4 Capacity for routine serology and virology
2.2.5 Adequate equipment
2.2.6 Ability to purchase reagents
2.2.7 Capacity to work weekends and on holidays

2.3 Quality Control

2.3.1 Is traceability of samples throughout processing assured?
2.3.2 Is external check testing of samples done?
2.3.3 Is internal check testing done? How often?
2.3.4 Is there capability for the interpretation of lab results?

3.0 REAGENTS AND REFERENCE LABORATORIES

There are various reagents and diagnostic kits commercially available. Given the differences which have been observed between geographic areas, it is intended that each available reagent be evaluated for each area.

To date those CSF reference laboratories working in the hemisphere which have been recognized by regional authorities and/or international organizations are:

- Central Veterinary Laboratory of Nicaragua, in Managua (recognized by OIRSA)
- Plum Island Animal Disease Center, New York, USDA, APHIS (recognized by FAO, OIE)
- Research Center for Animal Health, (CENSA), Havana (recognized by FAO and European Union)

During the operation of the Plan the potential of Cuba’s National Center for Animal and Plant Health [CENSA] as the reference laboratory for Central America and the Caribbean should be considered. An important aspect of the Plan will be the harmonization of means and methods for CSF diagnosis with this and among all responsible reference laboratories of the hemisphere.

4. VACCINE QUALITY CONTROL

All vaccines which will be used for CSF control and eradication in the Plan must be comprised of virus strains for which efficacy and innocuity have been proven. In all cases the attempt must also be made to choose a virus strain which interferes the least possible with the diagnosis of virus carriers of the disease. IT IS FUNDAMENTAL THAT VACCINE CONTROLS BE MADE OFFICIALLY BY EACH COUNTRY.

Other parameters that must be considered are:

- Vaccine potency
- Duration of immunity against the disease and against infection
- Persistence of vaccine virus in tonsils.