The foot and mouth disease network in the Southern Cone of South America: an example of regional governance

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Summary
The fact that foot and mouth disease is highly contagious, easily spread and of major commercial importance makes it a redoubtable challenge for animal health in South American countries and the world over. A number of factors impact directly on the effectiveness of national programmes to eradicate foot and mouth disease. Therefore, in order to meet the challenges posed by today’s globalised world, it is of the utmost importance that national level eradication programmes be considered state policies and that they be the subject of broad political agreement at the highest level and consolidated as regional programmes between national Veterinary Services.

The programmes, agreements and technical cooperation projects established jointly by Member Countries of the Southern Common Market (MERCOSUR) were a key factor in building management capacity to control foot and mouth disease in the area. Another key factor has been a partnership with one of the most sensitive sectors – the private production sector. Its active and responsible participation in operational functions has done much to strengthen and ensure the competitive development of South American countries and consolidate their role as global beef exporters.

However, to prevent further outbreaks it is essential to maintain and reinforce the structure of national programmes and to have strong and highly trained Veterinary Services and sufficient funding to ensure efficient and sustainable plans. These plans must enable Veterinary Services, by means of good governance, to implement effective measures in the areas of animal health and international trade in animals and animal products/by-products, thereby achieving rapid and more equitable social and economic development.

Keywords
Eradication – Foot and mouth disease – Good governance – South America – Veterinary Services.

Introduction

Foot and mouth disease (FMD) is a highly contagious disease that is enzootic in many parts of the world, affecting mainly cloven-hoofed animals, both domestic and wild. Its high morbidity rate causes huge losses to the production sector, chiefly as a result of restrictions on international trade in animals and animal products and by-products, posing serious obstacles to the sector’s development. Foot and mouth disease is considered one of the priority transboundary diseases for the South American continent. As Table I shows, the Member Countries of the Southern Common Market (MERCOSUR) account for 45% of the world’s beef production and exports. The Food and Agriculture Organization of the United Nations (FAO) anticipates huge global demand for meat, especially in countries with emerging economies.
History of foot and mouth disease in South America

Even though FMD has been known for over 2,000 years, it was not until 1870 that the first data emerged on its almost simultaneous occurrence in North and South America. The virus entered Argentina via the province of Buenos Aires, possibly as a result of imported cattle from Europe. The following year it spread from Argentina to Uruguay, later reaching Brazil, possibly as a result of zebu imported from India. The disease continued its spread into Chile (1871), Paraguay and Peru (1910), and Bolivia (1912), becoming endemic in vast livestock production areas and periodically causing epidemics of varying magnitudes. One of the severest occurred around the River Plate in 1944 (10).

By the mid-20th Century FMD had already spread to every country in South America (5), except fairly peripheral areas such as the north-western department of Chocó in Colombia, Chilean and Argentine Patagonia, Guyana, French Guiana and Surinam (Fig. 1).

Establishment of regional international organisations

In the period between 1870 and 1950, the lack of regional reference bodies and Veterinary Services able to implement FMD control facilitated the widespread dissemination of the disease on the continent. In response to this situation and the need for a coordinated, timely, organised and ongoing response to the challenges posed by animal diseases for animal health, public health and international trade, the various regional hemispheric organisations and Veterinary Services were established for the Southern Cone. (For the purposes of this article, ‘Southern Cone’ is used to refer to the Member Countries [Argentina, Brazil, Paraguay and Uruguay] and Associate Member Countries [Bolivia and Chile] of the Southern Common Market (MERCOSUR)). Today they continue to evolve and adapt to social, economic and political changes in line with the criteria laid down by international organisations (8).

These organisations are key to ensuring the transparency of Veterinary Services by means of information and notification systems on animal health and advances with animal health programmes.

Veterinary Services are part of the public sector and building their capacity improves animal health, which is a global public good. As they are responsible for implementing policies guaranteeing animal health and food safety, they need to be supported by effective legislation and sustainable, transparently managed financial resources, technical competence, ethics and leadership – in other words, good governance.

In the case of Paraguay, the Veterinary Service is not just responsible for implementing policies because, in its capacity as an autarchic and autonomous body reporting directly to the executive branch of government, it is responsible for ‘defining, implementing and monitoring compliance with animal health policies’ (Law 2426/04).

Hemispheric and regional organisations and programmes

When the Pan American Foot and Mouth Disease Center (PANAFTOSA) was set up in 1951 as part of the Pan American Health Organization of the World Health Organization (PAHO/WHO), it was agreed in early meetings that bilateral and multilateral actions needed to be coordinated (Venezuela 1958; Colombia 1959). This led
to the development of coordinated activities for planning, research, technology transfer, training and evaluation of animal health strategies. The knowledge amassed from these activities and research provided the necessary tools to implement programmes to control FMD and eradicate it from the Americas.

A meeting of chief veterinary officers of Southern Cone countries, held in Rio de Janeiro (Brazil) in 1960 to discuss FMD control, issued a set of recommendations, including one that PANAFTOSA should host a meeting between Argentina, Brazil, Chile, Paraguay and Uruguay to assess their respective national programmes and propose coordinated actions to control FMD in those countries. The meeting was held in Montevideo (Uruguay) in February 1962. The technical committees (Argentina/Brazil/Paraguay; Argentina/Brazil/Uruguay; and Argentina/Chile), issued recommendations on the:

- international movement of animals
- promotion of technical meetings at border level
- need to standardise FMD control measures in border areas.
All these actions paved the way for today’s progress towards harmonisation or equivalence of animal health and trade regulations, in support of good regional governance.

The Inter-American Ministerial Meeting on Control of Foot and Mouth Disease and Other Zoonoses (RICAZ) was established in 1968 as a forum for ministers of agriculture of PAHO Member States, and was renamed the Inter-American Ministerial Meeting on Animal Health (RIMSA) in 1980. When the ministers of health of these countries joined in 2001 the name was changed again, this time to Inter-American Ministerial Meeting on Health and Agriculture (although it retained the acronym RIMSA). This marked the start of a public multi-sector partnership aimed chiefly at improving public health.

The primary role of RIMSA is to create political conditions that are conducive to discussing countries’ needs and PAHO proposals on veterinary public health, in collaboration with the PAHO Veterinary Public Health Unit. The aim of the discussions is to develop national and regional strategies and measures for preventing and controlling zoonotic and foodborne diseases, eradicating FMD and ensuring food safety (4).

Other regional organisations, including the Regional Technical Commission for Animal Health (COTERSA), have also been set up to meet the need to develop and implement border agreements between the countries concerned so as to promote regional integration for the control of FMD and other animal diseases of major economic importance (7).

In 1972, the fifth RICAZ meeting established the South American Committee for the Control of Foot and Mouth Disease (COSALFA), which was tasked with coordinating, promoting and evaluating the harmonisation of animal health standards and bilateral and multilateral agreements for FMD control region-wide (11).

In 1985, COSALFA was officially endorsed by all Member Country governments as a standing committee for South America tasked with assessing (i) each country’s FMD status and trends, (ii) progress with activities under prevention, control and eradication programmes, and (iii) the operation of the continental epidemiological information and surveillance system.

In 1987, PAHO established the Hemispheric Committee for the Eradication of Foot and Mouth Disease (COHEFA) at the request of RIMSA. This Committee meets every two years and is composed of public- and private-sector representatives from the six sub-regions of the Americas: the North America, Caribbean and Central America regions (free from FMD); and the Amazon, Andean and Southern Cone regions (with some zones free from the disease, some free with vaccination and others still endemic). The Committee coordinates and supports the 1988 Hemispheric Plan for the Eradication of Foot and Mouth Disease (PHEFA).

PHEFA’s main FMD control and eradication activities include:
- strengthening the information system on FMD outbreaks
- reinforcing the network of laboratories for FMD diagnosis, focusing on differential diagnostic capability
- setting up FMD vaccine and antigen banks
- improving prevention and emergency response systems
- carrying out epidemiological characterisation of the presence/absence of the FMD virus.

Over the years, PHEFA’s implementation and its adoption by South American countries have helped to strengthen both public and private veterinary systems by means of joint cooperation on FMD management, control and eradication (6, 15) (Fig. 2).

On 26 March 1991, the Argentine Republic, Federative Republic of Brazil, Republic of Paraguay and Oriental Republic of Uruguay signed the Treaty of Asunción establishing MERCOSUR, with the aim of expanding their respective domestic markets, through integration, as a vital prerequisite for accelerating their processes of economic development with social justice. The main objective of the Treaty of Asunción was to integrate the four States Parties by means of the: free movement of goods, services and factors of production; establishment of a common external tariff and adoption of a common trade policy; coordination of macroeconomic and sectoral policies; and harmonisation of legislation in the relevant areas. This led to the establishment of the MERCOSUR Free from Foot- and-Mouth Disease Action Program (PAMA) on 8 December 2005 in response to the need to promote.

Fig. 2
Closure of the 32nd meeting of the South American Committee for the Control of Foot and Mouth Disease (COSALFA), held in Lima (Peru) on 11 March 2005
within MERCOSUR Member States and Associate Member States, animal health actions for achieving FMD-freedom in livestock-producing countries.

PAMA complements national programmes in ensuring their development, shortening implementation times and standardising measures across countries and regions. It aims to remedy weaknesses or inconsistencies in national programmes. PAMA actions are geared mainly to intervention in areas with a history of persistent FMD and structural weaknesses, and to developing an audit programme coordinated by PANAFTOSA.

The MERCOSUR Structural Convergence Fund (FOCEM) was established by Decision CMC 45/04 of the Common Market Council in order to fund programmes to: promote structural convergence; increase competitiveness; promote social cohesion, particularly in smaller economies and less developed regions; support the operation of the institutional structure; and enhance the integration process. Within this context, FOCEM supports FMD eradication within MERCOSUR by helping to structure and operate a sound sub-regional system of veterinary care. It also contributes to the regional development of livestock production in order to integrate it into the international market, as well as to building the capacity of animal health structures to prevent other exotic diseases with a similar economic impact.

In April 2003, the ministries of agriculture of Argentina, Bolivia, Brazil, Chile, Paraguay and Uruguay signed an agreement establishing the Southern Agricultural Council (CAS) as a regional forum for consultation and the coordination of regional activities. The CAS is responsible for a number of agricultural areas, including the Cooperative Programme for Agrifood and Agroindustrial Technological Development in the Southern Cone (PROCISUR).

The Regional Forum of the Private Agricultural Sector is composed of agricultural and industrial trade organisations and CAS Member Countries. It was established at the suggestion of the respective ministers of agriculture to serve as a forum for dialogue and negotiation with the CAS and to inform ministers of agriculture of the private sector’s vision and approach on key agricultural-sector issues. One of the members of the Regional Forum is the Federation of Rural Associations of MERCOSUR (FARM), which was set up with a view to instituting a public–private partnership.

The CAS meeting of 31 May 2003 established the Permanent Veterinary Committee of the Southern Cone (CVP). As the CVP is composed of the chief officers of the official services for animal health and food safety of animal products in Argentina, Bolivia, Brazil, Chile, Paraguay and Uruguay, it has a great deal of political power and decision-making capacity, enabling the services to take coordinated, organised and timely action against FMD and other diseases (4).

The CVP meets the need to provide an effective and ongoing response to the requirements of blocs and countries that trade with the region, as well as to establish joint actions by the six countries to defend their common commercial interests (dependent upon animal health region-wide). The CVP was established by a protocol of the Latin American Integration Association (ALADI). Table II provides a timeline of the establishment of some of the organisations involved in FMD programmes.

<table>
<thead>
<tr>
<th>Year</th>
<th>Organisation</th>
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<tbody>
<tr>
<td>1951</td>
<td>Veterinary programme of the Pan American Health Organization (PAHO)</td>
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<tr>
<td>1951</td>
<td>Pan American Foot and Mouth Disease Center (PANAFTOSA – Centro Panamericano de Fiebre Aftosa)</td>
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<tr>
<td>1968</td>
<td>Inter-American Ministerial Meetings on Control of Foot and Mouth Disease and Other Zoonoses (RICAZ – Reuniones Interamericanas para el Control de la Fiebre Aftosa y otras Zoonosis a Nivel Ministerial)</td>
</tr>
<tr>
<td>1972</td>
<td>South American Committee for the Control of Foot and Mouth Disease (CDSALFA – Comisión Sudamericana para la Lucha contra la Fiebre Aftosa)</td>
</tr>
<tr>
<td>1980</td>
<td>Inter-American Ministerial Meetings on Animal Health (replaced RICAZ meetings) (RIMSA – Reunión Interamericana a Nivel Ministerial de Salud Animal)</td>
</tr>
<tr>
<td>1987</td>
<td>Hemispheric Committee for the Eradication of Foot and Mouth Disease (CDEHEFA – Comité Hemisférico para la Erradicación de la Fiebre Aftosa)</td>
</tr>
<tr>
<td>1988</td>
<td>Hemispheric Plan for the Eradication of Foot and Mouth Disease (PHEFA – Plan Hemisférico de Erradicación de Fiebre Aftosa)</td>
</tr>
<tr>
<td>1991</td>
<td>Southern Common Market (MERCOSUR – Mercado Común del Sur)</td>
</tr>
<tr>
<td>2003</td>
<td>Southern Agricultural Council (CAS – Consejo Agropecuario del Sur)</td>
</tr>
<tr>
<td>2003</td>
<td>Permanent Veterinary Committee of the Southern Cone (CVP – Comité Veterinario Permanente del Cono Sur)</td>
</tr>
<tr>
<td>2005</td>
<td>MERCOSUR Free from Foot-and-Mouth Disease Action Program (PAMA – Programa de Acción Mercosur Libre de Fiebre Aftosa)</td>
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Veterinary Services and foot and mouth disease control in South America

The economic importance of FMD, in terms of the direct and indirect losses it causes and its constraints on the growth of livestock trade, has prompted most South American governments to set up FMD control and eradication programmes.
North American countries (the United States in 1929, Mexico between 1947 and 1954 and Canada in 1952) were the first to launch campaigns to eradicate FMD from the continent (13). In the 1960s, the South American countries were next to impose effective measures for preventing the entry and spread of the disease in their territories by implementing coordinated prevention and control programmes. Argentina established its programme in 1961, Paraguay and Uruguay in 1968, and Brazil and Chile in 1970 (4, 14). All South American countries are currently implementing national control and eradication programmes, funded either by their governments or by cooperation projects with the international organisations listed in Table II.

As time went by, Veterinary Services in the Southern Cone were forced to improve and evolve to meet the socio-economic and health requirements of a globalised world (9). Their structures and actions are currently supported by laws, regulations and standards in the form of MERCOSUR legal instruments, resolutions and rules, and the national legislation of countries in the bloc, ensuring that:

- Veterinary Services function with dynamic operating systems that are designed specifically for the control and eradication of animal diseases, e.g. epidemiological surveillance systems, diagnostic laboratory networks, quarantine systems, and programmes for risk analysis, identification and traceability (10)

- optimum use is made of public and private resources, allowing Veterinary Services to work in a harmonious and coordinated manner with other governmental and private institutions

- audit systems are implemented to ensure proficiency and transparency.

In the 1990s, several Southern Cone countries used vaccination and other control measures to secure the status of 'FMD-free where vaccination is practised', and were able to maintain this status for a number of years.

However, in early 2001 the FMD situation changed enormously worldwide. South America did not emerge unscathed and the disease struck several Southern Cone countries (3, 16). Owing to the way in which outbreaks developed in subsequent years (see Table III), the Scientific Commission for Animal Diseases of the World Organisation for Animal Health (OIE) recommended an in situ evaluation of the region, using the results as the basis for deciding on applications by Southern Cone countries for official recognition as FMD-free.

As a result of these outbreaks, and following an in situ evaluation by an OIE mission in 2006, an agreement for the regional control of FMD was signed between the OIE and CVP Member Countries.

The agreement established a high-level surveillance zone (HSZ), covering a 15-km area on either side of the borders of four countries (Argentina, Bolivia, Brazil and Paraguay). This zone was designed to facilitate a common regional approach to FMD control in border areas and to develop joint surveillance actions by the countries using harmonised vaccination, geo-referencing, epidemiological surveillance, sample collection and other procedures (Fig. 3).

On the advice of PANAFTOSA, the four HSZ countries, via the MERCOSUR Free from Foot-and-Mouth Disease Action Program (FOCEM-PAMA), developed a procedures manual for implementing activities within the longitudinal epidemiological surveillance system in the zone, which has introduced a new model of joint surveillance for use by HSZ countries (13).

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**Table III**

Foot and mouth disease outbreaks reported between 1996 and 2010 in Member Countries and Associate Member Countries of the Southern Common Market (MERCOSUR)

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<td>Argentina</td>
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<td>–</td>
<td>2,394</td>
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<td>18</td>
<td>16</td>
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<td>0</td>
<td>5</td>
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<tr>
<td>Brasil</td>
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<td>48</td>
<td>38</td>
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<td>5</td>
<td>41</td>
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<td>Chile**</td>
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<td>Paraguay</td>
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<td>Uruguay</td>
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<td>2,057</td>
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*Country free of foot and mouth disease without vaccination

**Associate Member Countries

n/a: data not available
Based on an OIE technical team audit to verify compliance with activities in the HSZ, the status of ‘FMD-free where vaccination is practised’ was reinstated at the 79th General Session of the World Assembly of OIE Delegates in May 2011.

Two factors may explain the resurgence of FMD outbreaks in some endemic areas of the world. One is the low immunity conferred by inappropriate vaccination strategies (quality, coverage and periods) and the second is poor control of movements of animals and animal products (12). Based on these factors, FMD resurgence in some regions, particularly South America, may to some extent be due to their more difficult local conditions and less efficient Veterinary Services, compounded by problems with storing the types of vaccine used, which are relatively unstable and need to be kept refrigerated (16). The availability of effective vaccines against FMD virus serotypes is a key prerequisite for controlling the disease.

Animal diseases such as FMD can only be controlled successfully by means of a regional approach and integrated regional strategies to improve biosecurity and regulations on animal movements between and within countries (12).

Conclusions

Today the countries of South America are among the world’s largest beef exporters. To achieve this status they have had to establish major strategies, policies, actions and international cooperation programmes, as well as strategic partnerships with the private sector. This has enabled them to make significant progress in controlling FMD, the main proof being the absence, or limited outbreaks, of the disease in the region in recent years.

The results of countries’ efforts and commitment have been astonishing. Chile and Uruguay have secured the status of FMD-free without vaccination, while Argentina, Brazil and Paraguay obtained and have maintained their status as FMD-free with vaccination (Fig. 4). Although nobody can deny the enormous progress made at hemispheric and regional level in controlling and/or eradicating FMD, there is still a long way to go to achieve effective and sustainable eradication region-wide (Fig. 5).

The two OIE Reference Laboratories now operating in the region have made a fundamental contribution to the harmonised application of techniques for FMD diagnosis and vaccine control. They have also had an important role to play in building a regional laboratory network and transferring technology, including techniques to determine FMD virus types and sub-types and their distribution in the region. The Reference Laboratories have also had a key role in the production of vaccines that optimise antigen quality and the selection of strains based on their epidemiological significance and immunogenicity for regional strains (1).
In support of eradication campaigns, tests have been developed and validated over the past decade to evaluate sub-clinical viral activity in animal populations, based on the detection of antibodies against viral non-capsid proteins, which in principle are induced only during infection (2). These tests have become a valuable tool in South American control programmes.

However, to consolidate the process in the final stages of eradicating FMD from the region, a further set of actions needs to be reinforced in order to support extensive areas of the continent, which involve both MERCOSUR and other sub-regions. They are actions to:

- strengthen national and continental information and surveillance systems
- produce quality vaccines under biosecurity conditions
- develop a system for FMD prevention in free areas
- develop training, technical assistance and social media programmes
- strengthen the network of laboratories for FMD diagnosis, focusing on differential diagnostic capacity.

References


