Laboratories which produce veterinary vaccines

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Summary
Borders, continents and oceans no longer provide a significant barrier to the movement of goods and services. Under the regulations of the General Agreement on Tariffs and Trade and the World Trade Organisation, governments may no longer prevent the importation of veterinary vaccines without scientific proof that the product would pose a threat to the health and safety of the nation. The origins of production laboratories for veterinary vaccines and the management of those laboratories are as diverse as the government programmes by which they are regulated. Both processed-based and performance-based approaches can be equally effective in the quality assurance of products. Seven international and regulatory initiatives have been developed to review these regulatory systems and, where possible, to harmonise standards and/or recognise equivalents to ease the movement of products. Continued exchange of information on a regional and world-wide basis can ensure the quality and availability of veterinary vaccines for animal health programmes around the world.

Keywords
Animal health — Biologicals — Harmonisation — International organisations — Vaccine production — Vaccine regulation — Veterinary medicine — Veterinary vaccines.

Introduction
As the millennium approaches, the world is shrinking. International travel and transportation has advanced to the point at which borders, continents and oceans no longer constitute significant barriers to the movement of goods and services. The economy of every country has felt the impact of this global movement. The General Agreement on Tariffs and Trade (GATT) has led to the creation of the World Trade Organisation (WTO), an organisation dedicated to the continued removal of trade barriers between countries. In the relatively short time since its creation, the WTO has had a significant impact on international trade. Governments may no longer prevent the importation of products without scientific proof that the product would be a threat to the safety and health of their nation. As a result of that impact, especially with regard to the lifting of trade barriers, laboratories producing veterinary vaccines have been notably affected. From the smallest producer of an animal vaccine or diagnostic to the multinational corporation marketing hundreds of products, all are affected in some way by this international activity.

Laboratories which produce veterinary vaccines
A general overview of the laboratories which produce veterinary vaccines around the world will reveal wide variation in management and control structures. Some of that variation is based on the needs and the economic development of the particular country. Other variations are based on whether the economy is market- or government-driven. Management and control of vaccine laboratories also reflect the evolutionary process of the vaccine industry in that country. These evolutionary influences may stem from internal forces or from external influences, such as former colonial or political alliances. Another variation seen is
in the special facilities required for production of the vaccine, whether for small animal or large animal, bacterial or viral, inactivated or modified live, a passive antibody product such as serum, newer generation technologies or recombinant-derived products.

In developing countries which must deal with basic human needs, the focus tends to be on production of veterinary vaccines that will protect against or treat those diseases that have an adverse impact on human health or the health of food-producing or working animals. As those diseases are brought under control, the focus shifts towards diseases that affect internal commerce and now also international trade. As countries develop, their governments may also contract with producers in foreign countries to prepare vaccines for them. The speed of international transport, the reduction in shipping costs and international competition has made this option quite viable. Individuals may also easily import vaccine to use on their own animals, either by having it shipped directly to them or by bringing it with them as international travellers. In developing countries there is often little or no regulatory control over the quality of the vaccines prepared or imported. Even in cases where government registration is required, developing countries cannot usually afford the expense of testing the vaccines or inspecting the facilities to ensure that products are safe and effective. In most cases these countries must depend on the exporting country to certify that the product meets standards. Establishing international standards or at least establishing an exchange of information would facilitate this process. Even general meetings with open discussions and reports between exporting and importing countries will help to inform the international community about standards in individual countries.

In contrast to developing countries, nations with large market economies tend to move away from state-run facilities towards private enterprise with general government control. Manufacturers in these countries often prepare products for global distribution. Commercial manufacturers prepare vaccines to prevent and treat a variety of diseases that affect not only animals raised for food and fibre but also working and companion animals. These products are now available and can be easily transported anywhere in the world. Ease of shipment has increased competition and reduced costs to importing countries, which has in turn forced the international manufacturer and distributor to look for even more ways to reduce costs. As a result, the pressure on government regulators to ensure that products meet standards has increased.

Some countries still require separate production buildings for non-indigenous disease micro-organisms. The United Kingdom (UK), a rabies-free country, does not permit the production of rabies vaccine in a facility if products from that facility are to be imported. The United States of America (USA) has similar import restrictions for facilities where vaccines for foot and mouth disease or rinderpest are manufactured. The Foot and Mouth Vaccine Laboratory in Pirbright, UK, is an example within Europe of several countries co-operating in a special isolated facility.

A current trend for multinational corporations with production facilities in several continents is the return to specialised production facilities. In those cases where there is open trade between countries, a laboratory in one country will prepare the killed virus products, another country will provide the modified live viruses, another the aerobic bacterial and a fourth the anaerobic bacterial products. These management decisions are often based on the costs of production in each country. In the USA, where part of the

Facilities for vaccine production

In the early 1900s, environmental sanitation and protection from cross-contamination between products in production facilities was accomplished by the use of separate production buildings for each type of product. For example, aerobic bacteria, anaerobic bacteria and viruses were prepared in separate buildings. Production of micro-organisms in live animals was also isolated from in vitro production.

With the improvement in facilities, equipment and sanitation, several different micro-organisms or products can now be safely prepared in the same building if strict control procedures are used to ensure that products do not cross-contaminate or infect the environment. Nowadays, separation has been replaced by control and management of the environment where products are prepared. Strict regulation of the flow of ingredients, equipment and personnel throughout the laboratory and the use of high-efficiency particle air filter systems (in and out) along with appropriate sanitising chemicals is the norm for vaccine production today.

Production of micro-organisms in animals has almost totally given way to in vitro production methods. A few manufacturers still make antibody products in live animals. As in the past, these specialised facilities for animal production are separated from the in vitro production facilities.

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quality assurance (QA) burden is carried by the government, some types of vaccines may be prepared more economically than in countries where manufacturers must maintain expensive internal QA programmes themselves.

Specialised vaccine production manufacturers still exist in all parts of the world. An example of how common husbandry practices have led to a niche for speciality products is the use of autogenous vaccines in cattle. In the USA, cattle are brought together in large holding pens to be fed highly concentrated feed for several weeks just prior to slaughter. Concentration of large numbers of cattle in close quarters provides the opportunity for disease transmission. One of the products to limit disease spread favoured by veterinarians responsible for the health of animals in these feedyards is autogenous killed bacterial products. Micro-organisms isolated from a sick animal are used to prepare vaccine which is then administered back to the other animals in the pens to help ameliorate and prevent the onset of disease before the animals go to slaughter. It is believed that many diseases are caused by newly emerging strains of micro-organisms for which no licensed vaccine is available. Since other strains of the same micro-organisms have proved to be effective as inactivated commercial vaccines, it is considered reasonable to expect that the recent isolates will also be effective. Often these feedyards have their own laboratories to isolate micro-organisms and prepare their autogenous vaccines. Prior to 1985, these laboratories were not required to meet Federal standards. In 1985, a new Federal law was passed in the USA to bring these production facilities under Federal regulatory control. These autogenous production facilities must now meet USA Federal requirements, including standards for purity and safety and a reasonable expectation of effectiveness.

Exemptions from Federal government registration in the USA have been provided for products prepared by a person for use on animals which he/she owns. Corporate livestock and poultry producers may prepare and use their own non-Federally licensed vaccines in animals owned by the corporation. A veterinarian may also prepare products for use in his or her clinical practice. Also, an individual State in the USA may establish its own programme to regulate veterinary vaccines provided that the programme is determined to be consistent with the Federal requirements. California currently has such a programme. Products manufactured under a California license are not Federally regulated. They may only be used in California and may not be shipped within the USA or exported.

The size of production laboratories varies greatly around the world. There are small laboratories which employ less than ten people who prepare one or two products to meet special niche markets. In contrast to the small laboratory is the multinational corporation with thousands of employees who make complete lines of products for both food/fibre animals and for companion animals. The difference in size calls for different strategies of management and control. Smaller manufacturers need fewer internal controls and checks and less record keeping as managers are usually also the scientists and technicians, and thus know and control all the details in the laboratory personally. As the laboratory size increases, more detailed and sophisticated control and management systems such as ‘good manufacturing practice’ (GMP) or systems adhering to the standards of the International Organisation for Standardisation (ISO) are required. Special testing and record keeping are added at each step to assure quality and consistency of manufacture.

### Special equipment

Manufacturing of veterinary vaccines also reflects the technological advances in equipment used to grow bacteria and viruses. As manufacturers expand and grow they move from small to ever-larger production batches. Technological advances in equipment, culture media and growth systems have permitted the production of tremendously large batches of bacteria and viruses. Bacterial growth has moved from small one-litre glass containers to large stainless steel fermentation vessels holding thousands of litres of culture. Viruses are now moving from roller bottle production to large micro-carrier systems with the ability to produce thousands of doses of high-titre vaccine in a single run.

In addition to increased production batch size, technology now permits manufacturers to purchase and install technologically advanced systems for processing large bacterial and virus harvests into vaccines. There is new equipment for concentration, separation of fractions, purification, mixing, inactivation, batching, filling and finishing.

These large batches come at the cost of additional QA systems at each step in the process. Since thousands of dollars are invested in each batch of bacteria or virus, the manufacturer must reduce the risk of loss to an absolute minimum.

### Manufacturing trends

While many companies still prepare products for local or regional distribution, the trend has been to expand to reach a wider market. Over the past thirty years, production facilities have tended to grow from small, single-product facilities producing for the local market to larger manufacturers preparing products for specific types of animals, such as small animal products for dogs and cats. Others focus on the poultry, cattle or equine markets. Larger companies try to provide a full range of products for both companion and food/fibre animals. As laboratories grow they may be purchased by other companies who want to add specific products to their marketing line (or remove competitors from
the market. The unwanted products are either eliminated or the manufacturing process is sold to others. Redundant facilities are then put on the market and are often purchased by new companies.

Another trend in manufacturing veterinary vaccines today is to increase the size of the batch of vaccine so that the number of doses represented in the batch testing is also increased. Batch testing represents the most expensive part of producing vaccines. A larger batch size increases the risk to the manufacturer since more doses are destroyed if the batch is found to be substandard. The percentage of requests to reprocess batches has increased in the USA as manufacturers become more concerned about financial losses and are reluctant to destroy large batches. In the USA batches may only be reprocessed to increase potency levels and then only if the manufacturer can demonstrate that the process will have no detrimental effect on the product.

Another phenomenon seen when financial concerns are prioritised is the trend to dilute vaccines closer to the potency breakpoint - that is, the point at which the product is considered unsatisfactory according to the potency test. The corporation is able to market more doses in this way; however, there is increased risk that the product will fall below the potency breakpoint. In the past, manufacturers were willing to add extra antigen to the product to ensure that it would always pass potency. Economic influences are causing this to change. The testing of vaccines, although greatly improved over the past few years, is still an inexact science. Often the variability inherent in the test system is not taken into account when planning the marketing strategy (diluting the vaccine to get more doses). Variations in test results of the same batch at the producing manufacturer and between the manufacturer and the government laboratory can occur. Products diluted too near the breakpoint can become a problem as the test results fluctuate above and below the acceptable level. Thus some effective products may be rejected and some marginal products may be released because of the inexact aspects of testing.

Management and control

The management and control of vaccine production facilities reflects the system of government in the country. Vaccine production facilities are usually run by the state in countries where the government provides the majority of services. In countries with a more diversified market economy, private vaccine laboratories dominate, usually with government regulatory oversight of the production, testing and marketing of the products. In developing countries the management and control of vaccine laboratories reflects previous colonial or political alliances. Thus, countries in Africa and Asia which were previously associated with the UK use systems for the management and control of animal vaccine production which are very similar to those found in the UK, while those formerly associated with France have a French style of management and control. Canada and the USA, as close neighbours on the continent of North America, have similar systems. Countries formerly associated with the USA, such as the Philippines, reflect the system found in the USA.

In the USA there are no state-run vaccine production facilities: however, the government does contract with private manufacturers to prepare vaccines and diagnostics used in national animal disease eradication programmes, such as those for bovine brucellosis and tuberculosis. In emergencies, the laboratories of the Federal government may prepare certain vaccine antigens for further manufacture by commercially owned laboratories.

Regulating production laboratories

Regulating this wide diversity of production laboratories can be a difficult task. Rules that apply to large corporations with thousands of workers are not always reasonable for small manufacturers with few employees. Governments tend to create rules for good manufacturing practices with large manufacturers in mind, and these do not always fit the small manufacturer. Due to the expense of implementing extensive QA rules, there is a possibility that some small manufacturers will be unable to fulfill these requirements, thus the animal industry will be deprived of products that meet the particular needs of small populations of animals. Often, new and innovative products come from these small laboratories. Therefore, when writing regulations, governments must keep in mind the small manufacturer while still assuring the user that these products fully meet all the standards for efficacy and safety. A reasonable approach in implementation of requirements should be based on the need to ensure the purity, potency, safety and efficacy of the product.

Regulatory systems tend to be as diverse as the type of facilities being regulated. Regulatory systems for veterinary vaccines either emphasise the end product (performance-based) or the product formulation (process-based). Performance-based systems, similar to the one that has evolved in the USA, depend on testing the final product to assure the product is not worthless, dangerous, contaminated or harmful (3, 4). The USA introduced the performance-based testing system in 1961. Within five years it was apparent that testing alone was not sufficient to ensure quality products. A process-based inspection component was added in 1968 and is now part of the USA regulatory programme. In the USA, the government shares part of the QA responsibility with the manufacturer through its extensive testing programme. In addition to the testing and inspection programmes, regulations in the USA have a strong pre-registration component. Facilities, equipment, personnel and practices are
extensively reviewed and seeds, cells and ingredients are rigorously tested to ensure that they meet exacting standards before a product or facility is licensed.

The process-based regulatory system operates on the premise that once a production system is in place and validated, production can be repeated with consistent results. The best example of this system is found in the UK and has been proposed as a system for the European Union. This system was first developed for regulating pharmaceutical products after it was found that compounding of chemicals can be consistently carried out with identical results. This works up to a certain point for biological products, but technology has not reached the point of being able to validate the replication of genetic material within the micro-organism. That point may be reached in the future, but until that happens, challenges to the system by testing must be continued to ensure that the results are consistent. Therefore, the process-based regulatory system for veterinary biologicals must be supplemented with quality control testing and QA controls by either government or the manufacturer. In the USA, the Food and Drug Administration uses a process-based regulatory system for their human biologicals but includes a government testing and batch-release element. In the UK, the manufacturer must provide the quality control (QC/QA) strength and the regulatory authority focuses inspection on these areas to ensure compliance.

This type of regulatory system places the responsibility for validation and quality assurance on the manufacturer, with the government providing oversight. Inspection of process-based systems can be quite different from performance-based inspections: the focus of process-based systems is on the QC/QA systems at the manufacturing site, whereas performance-based inspections focus on the processes as an external QA oversight.

Taken alone, neither of these two systems is adequate to fully regulate the production, testing and distribution of veterinary vaccines. Both systems must include good QA provided by the manufacturer or the government, and there must be a combination of both performance-based and process-based inspection.

Another variation seen in regulatory systems around the world is the placement of the veterinary vaccine regulatory programme within the structure of the government. Some countries have evolved veterinary vaccine programmes in co-ordination with government agriculture programmes. While other countries have placed animal vaccines with all other human and animal medical products. Although placed in different cultural atmospheres, the programmes nonetheless reflect either the process or the performance type of regulatory control system. It is curious that animal pharmaceuticals in several countries are regulated by the medical products group, which thus leaves the animal vaccines as the lone medical group in agriculture. In most countries, the animal vaccine regulatory programme is quite small and is usually overshadowed by the larger animal pharmaceutical and human medicines programmes.

**Inspection programmes**

Focused on engineering and design of laboratory facilities in the past, the UK regulatory system ensured that facilities were constructed to provide the optimum product, human and animal health safety. The system in the UK has now evolved towards well-designed facilities integrated with a strong QA system. Around the world, the UK registration and inspection system is considered the gold standard for international acceptance of veterinary biologicals facilities and products. The UK began international animal vaccine control earlier than any other country, presumably because of its links with distant commonwealth trading partners. Approval by the regulatory officials of the UK, probably the toughest in the world, would guarantee the product was prepared and manufactured in good facilities using good manufacturing techniques, experienced well-trained personnel and a good QC system. Their inspectors had a wide range of experiences around the world and could be relied on for tough inspections.

In the 1960s, the inspection system in the USA for laboratories preparing veterinary vaccines shifted abruptly away from facilities (process) to product performance. The USA created a large government testing laboratory to challenge the QC system of manufacturers. In a short time it became evident that the testing was not sufficient to ensure quality products, thus in 1968 facility inspection was reintroduced to better balance performance testing with process control. The USA continues to maintain a strong testing laboratory.

Despite being one of the oldest (established in 1913) and by far the largest (140 people with a budget of US$10 million) animal vaccine regulatory programmes in the world, the USA began international inspection relatively recently. Until the 1980s, the USA did not permit products to be imported except from countries that were free from foot and mouth disease, rinderpest or other diseases not found in the country. With the signing of the GATT and the subsequent creation of the WTO and its sanitary and phytosanitary (SPS) rules, the USA has begun to accept foreign vaccines. Regulators in the USA have started to look at other regulatory systems and there has been a change to a more scientific approach towards imports. As more countries become involved in the international trading business, inspectors from the USA, Germany, the UK, Canada, South Africa, Australia, New Zealand and other countries meet at facilities around the world.
International harmonisation

The cost of regulating laboratories that prepare veterinary vaccines is constantly increasing. New technology requires new and more expensive types of validation and control. QA, an additional expense, is now accepted world-wide as the norm for manufacturing animal vaccines. The cost to individual countries in dealing with registration and inspection of foreign products and laboratories is an added burden at a time when government budgets are being reduced and regulatory agencies are faced with reductions in numbers of personnel and cuts to services. It has become increasingly apparent that some international standards and agreements need to be developed to reduce the cost of duplication. Most of the regulatory systems in the developed countries, although not identical, are equivalent. Reaching a consensus on the finer details of these complex regulatory programmes can be challenging; however, the goal of effective and safe products is ultimately reached.

In addition to registration and inspection, the need for a good international pharmacovigilance system has become apparent. With the pressure from market economies to increase profits, there is new pressure to market substandard products. There are reports in the news media that unscrupulous manufacturers are distributing contaminated or worthless products from or to countries that do not adequately regulate veterinary vaccines. With the ease of shipment anywhere in the world, governments must be aware of the possibility of exporting or importing substandard or dangerous products. International standards must be developed and implemented. When substandard vaccines are found, countries must work together to remove these products from the international marketing channels.

Several parallel initiatives have been established in the past few years to address international harmonisation of standards and move towards mutual recognition of regulatory systems for veterinary vaccines around the world. Some initiatives have been operating for several years and others are new. A few countries have mutual recognition agreements while others are in the process of sorting out the equivalencies. Listed below are some of those organisations and agreements.

Organisations working on international harmonisation

The Office International des Epizooties

The Office International des Epizooties (OIE) has become the world organisation for animal health. Nations from every continent have joined the Office, which was founded in 1924. The OIE promotes international understanding, facilitates international trade and protects animal health and public health. The OIE has played a major role in facilitating international harmonisation of veterinary vaccine regulation during the past ten years.

The International Association of Biological Standardisation

The International Association of Biological Standardisation (IABS) started in 1955 in order to bring together the government regulator, manufacturers and research workers interested in the control and standardisation of biological products. The scope of the organisation includes both human and veterinary biologicals. Since 1955 the IABS has organised more than 70 congresses and has published over 70 books. The IABS may be contacted at their permanent office at: BIOSTANDARDS, Case postale 456, CH-1211 Geneva 4, Switzerland.

The International Technical Consultation on Veterinary Drug Registration

The objective of the International Technical Consultation on Veterinary Drug Registration (ITCVDR) is to promote the exchange of information relevant to veterinary drugs among government registration authorities. Since 1983 the ITCVDR has met every two years to exchange information on current problems associated with the registration of veterinary pharmaceutical and biological products. The ITCVDR is open to all registration authorities involved with veterinary pharmaceutical or biological products and to international organisations interested in these issues. Representatives from industry are invited to participate in special sessions. The first meeting was in the USA in 1983 and subsequent meetings have been held in Norway, France, Australia, the Netherlands, Argentina, France and the Czech Republic.

The International Co-operation on Harmonisation of Technical Requirements for Registration of Veterinary Medicinal Products

Formed in April 1996, the International Co-operation on Harmonisation of Technical Requirements for Registration of Veterinary Medicinal Products (VICH) organisation was modelled on the Human Pharmaceutical Initiative (ICH) and has the European Union (EU), Japan and the USA as members, the OIE as chair and the World Animal Health Industry Organisation (Consultation mondiale de l'industrie de la santé animale: COMISA) as secretariat. Observers include government and industry representatives from Australia/New Zealand and South America.
Private initiatives in international harmonisation

Institute for International Cooperation in Animal Biologics

The Institute for International Cooperation in Animal Biologics (IICAB) is a unique partnership in the USA between Iowa State University and the US Department of Agriculture, created in 1993 with the objective of improving the availability, safety, efficacy and use of veterinary biologicals throughout the world (5). This organisation has sponsored harmonisation symposiums in North and South America and Africa, has worked with the Ukraine and Macedonia to improve biologicals for animal production and has provided training for international government regulators.

University of Wisconsin

In July 1997 the First International Veterinary Vaccines and Diagnostics Conference was held at the University of Wisconsin. The conference focused on the technical aspects of vaccine development and use.

IBC Technical Services Limited

This company organises conferences on various veterinary topics and frequently on vaccine production and control. Well-known speakers from government, industry and academia are invited to present lectures and workshops on topics of current interest. Participants have the opportunity to discuss important issues among themselves and with the lecturers.

Other initiatives

Quality assurance systems developed by manufacturers and by private QA companies are now available to assist manufacturers and governments in validating and regulating the production and testing of veterinary vaccines. ISO and GMP standards provide the models for excellent systems that can be used or adapted to control the production and testing of these products. These commercially available systems are being used all over the world to improve both manufacturing QA systems and governmental registration and inspection.

Specific international initiatives

European Union

In January 1992 a symposium was held in Ploufragan, France, entitled 'The first steps towards an international harmonisation of veterinary biologicals: 1993 and free circulation of vaccines within the EEC' (1). The symposium was organised by the Centre national d'études vétérinaires et alimentaires (National Food and Veterinary Studies Centre) Ploufragan, France under the auspices of the IABS and with the participation of the OIE. Members of the European Community and guests from around the world met to discuss rules for regulating veterinary vaccines with focus on the then soon-to-be European Union. To date, the EU has established GMP guidelines but has yet to implement a central system to ensure compliance. Each member state is responsible for implementation of the rules. There is a variety of regulatory systems within the member states, from the strong GMP tradition and a national centralised inspection established in the UK to a more performance-based batch-release system with local inspection in Germany.

The United States of America and Canada

The USA and Canada have a long history of co-operation in animal disease control. With similar heritage and government development, management and control of veterinary vaccine laboratories has been parallel. The two countries have been working together for the past several years under the Canadian/US trade agreement. As of June 1998 the two countries were very close to mutual acceptance of inspections and testing (batch-release) control systems, and are in the process of working out the details for joint registration.

The United States of America and the European Union

In 1995 the EU and the USA initiated talks with the goal of mutually recognising the regulatory systems for a variety of small machinery and medical products. The agreements for veterinary vaccines were to be signed in January 1998 but are still at the discussion stage.

Asia

The First Asian Conference on Harmonisation of Veterinary Vaccines was held in October 1995 in Singapore (2). Guests from the USA and the EU were invited to participate. This first meeting was to acquaint the Asian community with the various systems of production and management of veterinary vaccines in the Asian region and to explore possibilities for sharing some of the QC responsibilities. A shared vaccine testing laboratory was proposed.

The Second Asian Conference on Harmonisation of Veterinary Vaccines was held in New Delhi in November 1997. The thrust of this conference was to start discussions for regional harmonisation. Visitors from Europe and America attended.

South America

Several alliances for co-operation on the regulation of veterinary vaccines are in place in South America (MERCOSUR and JUNAC; Junata del Acuerdo de Cartagena). In addition, discussions and experiences have been shared with all countries on the continent of America. In 1997 the IICAB sponsored a two-day symposium of government regulators with invited industry guests in conjunction with the Pan-American Veterinary Congress in Campo Grande, Brazil. The OIE and the Pan-American Health Organisation provided advice and participated in the conference.
Eastern Europe

In September 1996 the ITCVDR held their biennial meeting in Prague, Czech Republic (6). The special focus of this meeting was the exchange of information between the countries of Eastern Europe and with the rest of the world. In addition to the attendees from the developed nations and Eastern Europe, there were a significant number of representatives from Africa.

Africa

In May 1994 the ITCVDR held their biennial meeting on veterinary drugs and vaccines at the headquarters of the OIE in Paris. Attended by representatives from around the world, there were special invitations to countries in Africa, particularly those with previous affiliations with France. Representatives from eastern and southern Africa, particularly those countries with previous affiliations with the UK, were also present at the following ITCVDR held in the Czech Republic in 1996. In 1997 a meeting, partly sponsored by the IICAB, of representatives from eastern and southern Africa was held in South Africa. Visitors from the EU and North America were invited.

Australia and New Zealand

New Zealand and Australia have joined together in the face of reduced budgets to establish new programmes to mutually recognise the regulation of a wide variety of products, including veterinary vaccines. The two countries are in the process of establishing guidelines and procedures to implement these new programmes.

Conclusion

Global trade has undoubtedly influenced the production of veterinary vaccines around the world, and the process of change will continue as border barriers are lowered and new technology comes into use. There will still be a place for the small regional laboratory to provide specialised products for special needs. New technology will continue to originate from small manufacturers: however, large multinational corporations will persist in dominating the market place. Competition for market share will be seen as corporations keep on buying and selling laboratories that prepare veterinary vaccines. With the economic bottom line being a continual search, locations of manufacture will continue to shift, possibly to countries with weaker regulatory systems. Competition for trade with less-developed nations will also influence manufacturing and control of vaccines, and more pressure will be placed on governments to allow products of lower standard to be distributed.

The exchange of information on a regional and world-wide basis will continue to ensure the quality and availability of veterinary vaccines on the international market. At the same time, regulatory officials around the world must be vigilant to ensure that substandard, dangerous or contaminated vaccines do not enter the market place. A system must be in place to identify and remove those products when they are found.

Laboratoires vétérinaires producteurs de vaccins

D.C. Randall

Résumé

Désormais, les frontières naturelles et politiques ne constituent plus un barrage à la libre circulation des biens et des services. Aux termes de l’Accord général sur les tarifs douaniers et le commerce et des dispositions de l’Organisation mondiale du commerce, un gouvernement ne peut plus s’opposer à l’importation de vaccins vétérinaires s’il n’apporte pas la preuve, scientifiquement fondée, des risques sanitaires et de sécurité que l’importation de tels produits peut faire encourir à son pays. Les raisons à l’origine de la création des laboratoires vétérinaires producteurs de vaccins et les modes de gestion de ces laboratoires sont aussi variés que les programmes publics qui réglementent la production de vaccins. Les méthodes d’assurance qualité basées sur un contrôle en cours de fabrication comme celles basées sur les performances finales peuvent avoir la même efficacité. Sept initiatives internationales de réglementation ont été mises en place pour examiner ces systèmes de contrôle et, dans la mesure du possible,
harmoniser les méthodes normalisées et/ou reconnaître des méthodes équivalentes afin de faciliter la circulation de ces produits. Des échanges permanents d’informations, à l’échelle régionale et mondiale, peuvent contribuer à la qualité et à la disponibilité de vaccins vétérinaires pour les programmes de santé animale mis en œuvre dans les diverses régions du monde.

Mots-clés

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Resumen
Las fronteras, continentes y océanos dejaron de constituir un obstáculo de relieve para el libre movimiento de bienes y servicios. En virtud de las disposiciones del Acuerdo General sobre Aranceles Aduaneros y Comercio y de la Organización Mundial del Comercio, los gobiernos nacionales ya no pueden oponerse a la importación de vacunas veterinarias sin demostrar científicamente que el producto en cuestión supondría una amenaza para la salud o la seguridad de su país. El origen y los modos de gestión de los laboratorios que fabrican vacunas veterinarias son tan diversos como los programas públicos que encuadran y reglamentan sus actividades. A la hora de garantizar la calidad del producto final, tan efectivos pueden ser los métodos basados en el control del proceso de fabricación como los basados en el control de la eficacia e inocuidad del producto. A nivel internacional han visto la luz siete iniciativas, que responden al propósito común de revisar esos sistemas reglamentarios y, cuando sea posible, armonizar normativas y/o reconocer equivalencias para facilitar el movimiento de productos. Un intercambio continuo de información, en nivel tanto regional como mundial, puede ser de gran ayuda para garantizar la calidad de las vacunas veterinarias y asegurar que cualquier programa zoonotario del mundo pueda procurárselas.

Palabras clave
References


