Organization of veterinary public health in the United States of America and Canada

J.R. HELD * and D.J. GREGORY **

Summary: Veterinarians in the United States of America and Canada are involved in a variety of activities which contribute to improving human health and well-being. Some of these activities can be considered as a part of veterinary public health (VPH), including: zoonoses control, food safety, environmental protection, comparative medicine, disaster medicine and animal welfare. Both countries have federal systems, and their VPH activities are dependent on close interaction between health and agricultural agencies at the national, state or provincial, and local levels. In addition to governmental agencies, other entities such as academic institutions and various professional associations are also important contributors to VPH activities in the two countries.

KEYWORDS: Canada - Comparative medicine - Environment - Food safety - United States of America - Veterinary public health - Zoonoses.

INTRODUCTION

Veterinarians contribute to improving human health and well-being in the United States of America and Canada through a broad range of activities. For the purposes of this review, the term veterinary public health (VPH) will be considered to apply primarily to the following five activities: zoonoses control, food safety, environmental protection, comparative medicine and disaster medicine. One other area, that of animal welfare, is also included because it transcends many veterinary activities and has become a special concern to agencies concerned with VPH.

Canada and the USA, with Mexico, share the North American continent. Canada has an area of 9,976,186 sq. km compared to 9,171,032 sq. km for the USA. Conversely, the USA has the greater population with approximately 250 million persons, compared to 26 million in Canada. Both countries have federal systems, with democratically elected forms of representative government. Canada has ten provinces and two territories. The USA has fifty states; with the exception of Hawaii, located in the Pacific ocean, all of the states are located on the continent. The USA also has island territories in the Caribbean sea and the Pacific ocean.

Domestic animals are extremely important to the people of the USA and Canada. With about 280 million inhabitants, or approximately 6% of the world's population,
the two countries keep 9% of the world's bovines and produce 23% of the beef and veal, and 14% of the milk. Production rates for swine and poultry are similarly high, and livestock production is important economically. There are also traditions of maintaining companion animals, especially dogs and cats. Equines too are popular for various recreational purposes. Both countries use animals for biomedical purposes including research, testing and education. Thus animals are closely woven into the cultural and economic fabric of the two countries, and VPH activities are correspondingly important.

**DIVISION OF RESPONSIBILITY AND AUTHORITY**

In the federal systems of the USA and Canada, responsibility for various policies and actions is divided among national, state or provincial, and local levels of government. VPH activities are present in various forms at all of these levels. A list of federal agencies with VPH activities in both countries is presented in Appendix I. Other entities such as academic institutions, private practitioners, industry and professional associations also play an important role in VPH. Among the academic institutions, the thirty-one schools of veterinary medicine (twenty-seven in the USA and four in Canada) are the basic source of education in VPH and many also carry out important, VPH-related research. The schools of public health, which admit and train veterinarians on the same basis as persons with other backgrounds, have also had an important impact on the preparation of veterinarians for responsibilities in public health. Certain quasi-governmental institutions, such as the National Academy of Sciences in the USA, are also involved in the development of policies and activities which are of importance to the field of VPH. Some of the non-governmental organizations concerned with VPH in both countries are listed in Appendix II.

The use of a multidisciplinary approach has been a strength of public health practice on the North American continent. Traditionally veterinarians have been a part of the public health team at all levels. In fact it is at the local level, especially in relation to food safety, and zoonoses control, that many are employed. Because of special expertise and individual abilities, many veterinarians have successfully filled roles in the field of public health which are not necessarily those of the veterinarian. For example, veterinarians at the state and local levels in the United States currently fill positions not only as public health veterinarians, but also as epidemiologists, environmental officers and laboratory specialists. Scientists who are not veterinarians are also incorporated into the VPH team for their expertise. There is a wide variation in the organization and types of VPH activities at the state or provincial and local levels, and it is not possible to review these adequately in a paper of this scope. This report will be limited to the organization of VPH activities at the federal or national levels.

**FEDERAL AGENCIES CONCERNED WITH VETERINARY PUBLIC HEALTH**

**United States of America**

The two principal federal departments concerned with VPH activities in the USA are the Department of Health and Human Services (DHHS) and the Department of Agriculture (USDA). The Department of Defense (DOD) also conducts numerous
VPH activities related to the protection of military personnel and their dependants. There are 2,920 veterinarians employed in federal service (Table I): 1,991 in the USDA, 708 in the DOD, 180 in the DHHS and 41 in other agencies. Most of those working in the DHHS and the DOD participate in VPH activities, as do many of those in the USDA and the other agencies.

**TABLE I**

*Federally employed veterinarians in executive branch agencies in the USA*

Adapted from (3)

<table>
<thead>
<tr>
<th>Agency*</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Department of Agriculture (USDA)</strong></td>
<td></td>
</tr>
<tr>
<td>Food Safety Inspection Service (FSIS)</td>
<td>1,293</td>
</tr>
<tr>
<td>Animal and Plant Health Inspection Service (APHIS)</td>
<td>552</td>
</tr>
<tr>
<td>Agricultural Research Service (ARS)</td>
<td>62</td>
</tr>
<tr>
<td>Extension Service</td>
<td>80</td>
</tr>
<tr>
<td>Other USDA</td>
<td>4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>1,991</td>
</tr>
<tr>
<td><strong>Department of Defense (DOD)</strong></td>
<td></td>
</tr>
<tr>
<td>U.S. Army</td>
<td>537</td>
</tr>
<tr>
<td>U.S. Air Force</td>
<td>166</td>
</tr>
<tr>
<td>Other DOD</td>
<td>5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>708</td>
</tr>
<tr>
<td><strong>Department of Health and Human Services (DHHS)</strong></td>
<td></td>
</tr>
<tr>
<td>Public Health Service (USPHS)</td>
<td></td>
</tr>
<tr>
<td>National Institutes of Health (NIH)</td>
<td>77</td>
</tr>
<tr>
<td>Food and Drug Administration (FDA)</td>
<td>68</td>
</tr>
<tr>
<td>Centers for Disease Control (CDC)</td>
<td>28</td>
</tr>
<tr>
<td>Other USPHS</td>
<td>7</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>180</td>
</tr>
<tr>
<td><strong>Department of Veterans Affairs</strong></td>
<td>21</td>
</tr>
<tr>
<td><strong>Department of the Interior</strong></td>
<td></td>
</tr>
<tr>
<td>Fish and Wildlife Service (FWS)</td>
<td>9</td>
</tr>
<tr>
<td><strong>Environmental Protection Agency (EPA)</strong></td>
<td>6</td>
</tr>
<tr>
<td><strong>Smithsonian Institution, National Zoo</strong></td>
<td>3</td>
</tr>
<tr>
<td><strong>Department of Commerce</strong></td>
<td></td>
</tr>
<tr>
<td>National Marine Fisheries Service</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>2,920</td>
</tr>
</tbody>
</table>

* Agencies are presented in order of number of veterinarians employed
The principal health components of the DHHS are grouped together as the Public Health Service (USPHS) and include the Centers for Disease Control (CDC), the Food and Drug Administration (FDA) and the National Institutes of Health (NIH). The CDC for many years served as a focal point for VPH activities and once had a specifically designated Veterinary Public Health Section (8). The establishment of this Section, and the leadership provided by Dr J.H. Steele as its Chief, were undoubtedly decisive factors in the development of VPH at all levels in the USA. In later years, in response to changing priorities in an industrialized society, a CDC reorganization eliminated entities oriented towards one profession, such as veterinary medicine, nursing, sanitary engineering and statistics. Ultimately, the demonstration provided by the earlier VPH Section of the value of veterinary involvement in the development and execution of public health programs, coupled with the reorganization, led to other opportunities for veterinarians. Indeed, by virtue of their background and training, veterinarians are seen as qualifying for a wide range of activities and responsibilities. Many activities which once resided within the VPH Section were integrated into other entities, and veterinarians are now dispersed throughout the CDC centers, institutes and offices. They participate in activities related to control and research on zoonoses, and also non-zoonotic human diseases, occupational diseases and biosafety. The national focal point for the control of infectious diseases in humans, including zoonoses, is the CDC’s Center for Infectious Diseases (CID). The current Director of the CID is a veterinarian. The occurrence and control status of some of the zoonoses in the United States is presented in Table II.

**TABLE II**

*Occurrence and control of some zoonoses reported in the USA, 1990*(a)

<table>
<thead>
<tr>
<th>Zoonosis</th>
<th>Occurrence</th>
<th>Control measures</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Humans</td>
<td>Domestic animals</td>
</tr>
<tr>
<td>Anthrax</td>
<td>0</td>
<td>+ +</td>
</tr>
<tr>
<td>B-virus (Simian herpesvirus)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Botulism</td>
<td>86</td>
<td>0</td>
</tr>
<tr>
<td>Brucellosis</td>
<td>77</td>
<td>959(d)</td>
</tr>
<tr>
<td>Campylobacteriosis</td>
<td>10,179(e)</td>
<td>+ + +</td>
</tr>
<tr>
<td>Cat scratch fever</td>
<td>+</td>
<td>...</td>
</tr>
<tr>
<td>Echinococcosis</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Equine encephalitis</td>
<td>1,159(f)</td>
<td>+ +</td>
</tr>
<tr>
<td>Lyme disease (Boreliosis)</td>
<td>7,997(g)</td>
<td>+ +</td>
</tr>
<tr>
<td>Leptospirosis</td>
<td>60</td>
<td>+ + +</td>
</tr>
<tr>
<td>Listeriosis</td>
<td>+</td>
<td>+ +</td>
</tr>
<tr>
<td>Plague</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>Psittacosis/ornithosis</td>
<td>109</td>
<td>+ +</td>
</tr>
<tr>
<td>Zoonosis</td>
<td>Occurrence</td>
<td>Control measures</td>
</tr>
<tr>
<td>--------------------------</td>
<td>--------------</td>
<td>------------------</td>
</tr>
<tr>
<td></td>
<td>Humans</td>
<td>Domestic animals</td>
</tr>
<tr>
<td>Q fever</td>
<td>+ + +</td>
<td>...</td>
</tr>
<tr>
<td>Rabies</td>
<td>1 554(i)</td>
<td>4,324(i)</td>
</tr>
<tr>
<td>Ringworm</td>
<td>+ + +</td>
<td>...</td>
</tr>
<tr>
<td>Salmonellosis</td>
<td>41,730(e)</td>
<td>+ + +</td>
</tr>
<tr>
<td>Taeniasis</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Tetanus</td>
<td>60</td>
<td>+</td>
</tr>
<tr>
<td>Toxoplasmosis</td>
<td>+ + +</td>
<td>...</td>
</tr>
<tr>
<td>Trichinellosis</td>
<td>30</td>
<td>+</td>
</tr>
<tr>
<td>Tuberculosis</td>
<td>23,720(k)</td>
<td>19(d)</td>
</tr>
<tr>
<td>Tularaemia</td>
<td>137</td>
<td>+</td>
</tr>
<tr>
<td>Typhus fever, tick-borne</td>
<td>654</td>
<td>+</td>
</tr>
</tbody>
</table>

- Rare or absent
- Occurs, but infrequently
- Occasional
- Relatively common
- Unknown

(a) Except as otherwise noted, numerical data was obtained from (2)
(b) State agencies responsible for control activities
(c) Common in macaques used for biomedical purposes
(d) Under the nationwide control programs, during the fiscal year 1990, 959 bovine herds were quarantined because of brucellosis, and 19 because of tuberculosis (data from 5, 6)
(e) Data for 1989 (Jane Koehler, CDC, personal communication)
(f) In 1990 approximately 29% of human cases were attributed to St Louis encephalitis and 5% to the California Group of arboviruses; Western and Eastern equine encephalitis periodically occur in epidemics in various parts of the USA (Annette Olin, CDC, personal communication)
(g) Karin Peterson, CDC, personal communication
(h) USDA APHIS is responsible for ensuring the proper treatment and quarantine of psittacine birds being imported into the USA
(i) Provisional totals (Daniel Fishbein, CDC, personal communication)
(j) APHIS, CDC and FDA have formed a *Salmonella enteriditis* task force which is developing a control program
(k) Presumably all of human origin. Recent increase in incidence related to the AIDS epidemic
The FDA has four components concerned with VPH activities:

1. the Center for Veterinary Medicine (CVM), which is responsible for the licensing of veterinary drugs

2. the Center for Food Safety and Applied Nutrition (CFSAN), which is concerned with food safety related to products other than meat and poultry

3. the Center for Biologics Evaluation and Research (CBER), which is responsible for licensing of biologics for use in humans, including those which are related to zoonotic agents

4. the National Center for Toxicological Research (NCTR).

The NIH is the nation’s principal focal point for biomedical research. It conducts intramural programs and also supports research in institutions throughout the world by means of grants and contracts. It is involved in VPH activities because of the extensive research it supports related to the zoonoses and comparative medicine. All the NIH Institutes have veterinary programs, and in addition, there are two centralized veterinary components, the Veterinary Resources Program (VRP), to support intramural research, and the Comparative Medicine Program (CMP), to support animal resource activities in the extramural programs. VRP and CMP are located within the NIH’s National Center for Research Resources (NCRR), which is currently headed by a veterinarian.

The USDA has three major components involved in VPH activities:

1. the Food Safety Inspection Service (FSIS)

2. the Animal and Plant Health Inspection Service (APHIS)

3. the Agricultural Research Service (ARS).

The FSIS, the agency responsible for meat and poultry inspection, is the largest national employer of veterinarians. APHIS responsibilities include the control of livestock diseases, many of which are zoonotic, and licensing of veterinary biologics, many of which are used in the control of zoonoses. APHIS also administers the national Animal Welfare Act, most aspects of which have become of special concern to those responsible for VPH activities. The ARS is the national agency with principal responsibility for agricultural research, and through its own research programs, or those that it supports in other institutions, conducts many studies related to VPH.

The Environmental Protection Agency (EPA) and the Department of the Interior (Fish and Wildlife Service; FWS) are also involved with VPH activities. The EPA is particularly concerned with contamination problems which may arise through the presence of animals in our environment, and also uses animals as sentinels in monitoring problems in the environment. The FWS actively deals with problems related to the presence of zoonotic diseases in wildlife.

Canada

In Canada, Agriculture Canada (AC) and Health and Welfare Canada (HWC) are the two national agencies most concerned with VPH activities. Within AC, the Food Production and Inspection Branch has two components especially involved in VPH:
- Animal and Plant Health Directorate
- Food Inspection Directorate.

Of 689 participating veterinarians, 662 are to be found with AC, 435 in Meat Hygiene, 111 in Animal Health, 92 in Research and Diagnostics and 23 with Agri-Food Safety (Table III). The Animal and Plant Health Directorate is responsible for the control of zoonoses in animals and carries out a wide range of diagnostic and research activities on these diseases at its five federal laboratories. The Food Inspection Directorate is responsible for inspection of a variety of agricultural products through its Divisions of Agri-Food Safety and Strategies, and Dairy, Fruit and Vegetables. The Directorate also contains the Meat and Poultry Products Division which has national responsibility for meat inspection.

Health and Welfare Canada has a Health Protection Branch, with five Directorates involved in VPH activities:

1. Drugs Directorate
2. Food Directorate
3. Field Operations Directorate
4. Environmental Health Directorate
5. Laboratory Center for Disease Control Directorate.

Most of the veterinarians involved with VPH in the Health Protection Branch are to be found in the Bureaux of Veterinary Drugs and Communicable Disease Epidemiology.

<table>
<thead>
<tr>
<th>Agency</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture Canada (AC)</td>
<td></td>
</tr>
<tr>
<td>Food Production and Inspection Branch (FPI)</td>
<td></td>
</tr>
<tr>
<td>Meat Hygiene</td>
<td>435</td>
</tr>
<tr>
<td>Agri-Food Safety</td>
<td>23</td>
</tr>
<tr>
<td>Animal Health</td>
<td>111</td>
</tr>
<tr>
<td>Research and Diagnostics</td>
<td>92</td>
</tr>
<tr>
<td>Racetrack</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>662</td>
</tr>
<tr>
<td>Health and Welfare Canada (HWC)</td>
<td></td>
</tr>
<tr>
<td>Health Protection Branch (HPB)</td>
<td>26</td>
</tr>
<tr>
<td>Dept. National Defence (DND)</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>689</td>
</tr>
<tr>
<td>Federal Parliamentary Ministers (Not associated with VPH)</td>
<td>4</td>
</tr>
</tbody>
</table>

**Table III**

_Federally employed veterinarians in Canada_
While veterinarians play a role in VPH activities, in Canada a VPH unit as such does not exist within a health unit on the national level, to the extent that it does in the United States. At the provincial level, however, senior veterinary consultants have been hired by the public agencies for positions related to the control of zoonoses and food-borne diseases. For the control of diseases such as rabies and salmonellosis, interaction of a number of federal, provincial and municipal entities occurs at the program level. The inter-relationship of these agency entities can be very complex as is shown by the example of rabies control (Fig. 1). The zoonoses considered to be of greatest importance in Canada are brucellosis, bovine tuberculosis, rabies, cysticercosis and salmonellosis.

Cooperation between AC and HWC occurs at all directorate levels in regard to zoonoses. The occurrence and control status of some Canadian zoonoses is presented in Table IV. However, the lines of responsibility are not always clear-cut. At the policy/program level, the working relationship is between HWC’s bureaux of Veterinary Drugs, Biologics, Microbial Hazards and Disease Surveillance and AC’s Directorate of Animal and Plant Health and Food Inspection. At the field/investigational level, AC veterinary inspectors liaise with medical authorities, provincial epidemiologists and provincial public health authorities, and these may report to the bureaux of HWC.

INTERNATIONAL AGENCIES

Both Canada and the USA are members of various international agencies which are concerned with VPH activities. These organizations play an important role in the exchange of information, and coordination of activities with other countries. VPH activities, especially the control of the zoonoses, and food safety, are considerably enhanced. Special mention should be made in this context of the Office International des Epizooties (OIE), the World Health Organization (WHO), the Pan American Health Organization (PAHO) and the Food and Agriculture Organization of the United Nations (FAO).

SPECIFIC VETERINARY PUBLIC HEALTH ACTIVITIES

Zoonoses control

Zoonoses control in the USA and Canada depends upon constant cooperation between various human health and animal health agencies at the national level, as well as with counterpart agencies at the state or provincial, and local levels. In addition, since many of these problems are common to both countries, coordinated actions are needed, and there is a long tradition of collaboration between agencies with similar responsibilities on each side of one of the world’s longest international borders.

National health agencies in both countries — CDC in the USA and the Health Protection Branch in Canada — maintain constant surveillance, through reports received from the states or provinces, regarding the occurrence of specific zoonotic diseases in humans. The agencies analyze the data received and produce and distribute reports to other concerned agencies. When epidemics of zoonoses occur in humans, the health agencies are primarily responsible for investigation and control, but their
Canadian entities involved in control of a zoonosis (rabies)
<table>
<thead>
<tr>
<th>Zoonosis</th>
<th>Humans</th>
<th>Occurrence</th>
<th>Control measures</th>
<th>Agriculture</th>
<th>Health &amp; Welfare</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Domestic animals</td>
<td>Wildlife</td>
<td>Canada</td>
<td>Canada</td>
</tr>
<tr>
<td>Anthrax</td>
<td>0</td>
<td>0</td>
<td>-</td>
<td>R, I, Q, V, C</td>
<td>R, I</td>
</tr>
<tr>
<td>B-virus (Simian herpesvirus)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>I</td>
<td>R, I</td>
</tr>
<tr>
<td>Botulism</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>-</td>
<td>R, I</td>
</tr>
<tr>
<td>Brucellosis</td>
<td>0</td>
<td>0(b)</td>
<td>1</td>
<td>R, I, Q, D, C, V</td>
<td>R, I</td>
</tr>
<tr>
<td>Campylobacteriosis</td>
<td>202</td>
<td>+ +</td>
<td>...</td>
<td>I</td>
<td>R, I</td>
</tr>
<tr>
<td>Cat scratch fever</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>-</td>
<td>-</td>
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<tr>
<td>Echinococcosis</td>
<td>0</td>
<td>0</td>
<td>...</td>
<td>I</td>
<td>-</td>
</tr>
<tr>
<td>Equine encephalitis</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>I, V</td>
<td>R, I</td>
</tr>
<tr>
<td>Lyme disease (Borreliosis)</td>
<td>18</td>
<td>0</td>
<td>0</td>
<td>I</td>
<td>R, I</td>
</tr>
<tr>
<td>Leptospirosis</td>
<td>+ +</td>
<td>+ +</td>
<td>...</td>
<td>I</td>
<td>-</td>
</tr>
<tr>
<td>Listeriosis</td>
<td>18</td>
<td>+ +</td>
<td>...</td>
<td>I</td>
<td>R, I</td>
</tr>
<tr>
<td>Plague</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>I</td>
<td>R, I</td>
</tr>
<tr>
<td>Psittacosis/ornithosis</td>
<td>1</td>
<td>+</td>
<td>...</td>
<td>I</td>
<td>R, I</td>
</tr>
<tr>
<td>Q Fever</td>
<td>19</td>
<td>+</td>
<td>...</td>
<td>I</td>
<td>R, I</td>
</tr>
<tr>
<td>Rabies</td>
<td>0</td>
<td>745</td>
<td>1,746</td>
<td>R, I, Q, V, C</td>
<td>R, I</td>
</tr>
<tr>
<td>Ringworm</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Salmonellosis</td>
<td>2,907</td>
<td>...</td>
<td>...</td>
<td>(c)</td>
<td>R, I</td>
</tr>
<tr>
<td>Taeniasis</td>
<td>0</td>
<td>45</td>
<td>...</td>
<td>R, Q, D, C</td>
<td>-</td>
</tr>
<tr>
<td>Tetanus</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>-</td>
<td>R, I</td>
</tr>
<tr>
<td>Toxoplasmosis</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Trichinellosis</td>
<td>0</td>
<td>0</td>
<td>...</td>
<td>R, I, Q, D, C</td>
<td>R, I</td>
</tr>
<tr>
<td>Tuberculosis</td>
<td>276(d)</td>
<td>5</td>
<td>-</td>
<td>R, I, Q, D, C</td>
<td>R, I</td>
</tr>
<tr>
<td>Tularaemia</td>
<td>1</td>
<td>0</td>
<td>...</td>
<td>I</td>
<td>R, I</td>
</tr>
</tbody>
</table>

- Rare or absent
+ Occurs, but infrequently
++ Occasional
... Unknown

(a) Numerical data obtained from (1, 4)
(b) Brucellosis has been eradicated in Canada
(c) Control program being developed in Canada
(d) Presumably all of human origin
actions involve collaboration with other groups, such as the national animal health agencies in the agricultural sector, and the state or provincial and local health departments. In both countries, the data collected through the surveillance systems are used to identify emerging as well as chronic zoonotic disease problems and to develop programs to eliminate them from animal reservoirs.

In Canada, the primary national focal point for the control of animal diseases is the Animal and Plant Health Directorate in AC. Control program components include laboratory activities of diagnosis, research and reference, epidemiological surveillance and field control and eradication. In the United States the USDA, APHIS is the agency with primary responsibility for the control of livestock diseases, including zoonoses. Along with many similarities between the two systems, there are also notable differences. For example, rabies control at the national level in Canada is the responsibility of the Animal and Plant Health Directorate whereas it is the responsibility of CDC in the USA. In both countries the animal health groups in the agricultural agencies have brought about many advances in the control of a variety of animal zoonotic diseases, such as brucellosis, bovine tuberculosis and trichinellosis, but they have routinely done so with the support and collaboration of the health sector.

**Food safety**

Food safety requires similar cooperative arrangements, and food safety activities are essential to the control of many zoonoses. Furthermore, these activities seek to ensure that the consumer receives a wholesome product, free of contamination with various microbial and non-microbial agents.

The USDA, FSIS has primary responsibility for the inspection of meat and poultry in the USA, while the AC Food Inspection Directorate, Meat and Poultry Products Division, plays a similar role in Canada. AC is dedicated to the well-being of all Canadians through the advancement of the agriculture and food sectors. Its mission is to ensure the safety, quality and marketability of agricultural and food products. The FDA, CVM in the United States, and the Health Protection Branch, Drugs Directorate, Bureau of Veterinary Drugs (BVD) in Canada also have important functions relative to food safety in products of animal origin. These agencies are responsible for ensuring that drugs administered to animals are safe and effective, and that their use in food-producing animals does not leave residues that may be hazardous to human health.

There has been a recent trend of even closer cooperation between the USA and Canada because of an evolving Free Trade Agreement. The USDA and the FDA, CVM, and the Canadian BVD and AC are actively involved in a Veterinary Drugs and Feeds Technical Working Group of the Free Trade Agreement. There are also various sub-groups under its aegis, and these deal with issues such as veterinary drug tolerances, method validations, labeling, animal feeds and feedmill inspections and Good Manufacturing Practices (7).

**Comparative medicine**

Comparative medicine depends upon the active exchange of knowledge between the human and veterinary medical professions. Both professions benefit from this type of interaction. Veterinarians have become increasingly involved in biomedical research programs in both countries. These activities are related to the study and solution of human as well as animal disease problems. The relationship between the
public health veterinarian and comparative medical research lies essentially in the liaison role of the former: it is his role to bring to the attention of health workers all veterinary information that could be of use in advancing human health. It has now become the norm in both countries for veterinarians to be a part of the research team in universities, other academic institutions and the pharmaceutical industry. These individuals provide support to the research effort by ensuring that suitable animal models are available and that they are properly used in adequate facilities. Veterinarians are also directly involved as investigators, and research carried out with animals is enhanced by their special skills and knowledge.

Since most medical advances are dependent upon animal research and testing, there has been a special effort to ensure that adequate animal resources are available to meet biomedical needs. The NIH, NCRR Comparative Medicine Program (CMP) has been instrumental in this effort. CMP provides financial support through grants and contracts for the development of facilities, the training of professionals, research into animal models and the exchange of information which has been central to the development of this field.

Environmental protection

Although environmental protection involves a variety of agencies, in the USA the Environmental Protection Agency (EPA) was established and designated to provide leadership in this field. The EPA has traditionally included veterinarians on its staff who play an important role in the development of national policies and regulations related to the environment. They have also been active in environmental research. As is true with other VPH activities, the EPA relies on close exchange and interaction with state and local agencies, where many additional veterinarians participate in environmental control activities.

Environment Canada includes the Canadian Parks Service and the Conservation and Protection Branch. The latter has three directorates dealing directly with environmental protection:

1. Environmental Protection Directorate (EPD; equivalent to EPA)
2. Canadian Wildlife Service
3. Inland Waters Directorate.

While there are no veterinarians at present on the staff of EPD, a greater public awareness of environmental issues and the involvement of veterinarians from other agencies in environment-assessment procedures for many policies may change this situation. However, as with other VPH activities, the actions of EPD will depend on the close exchange and interaction of provincial and local agencies to resolve issues such as disposal of biomedical waste.

Disaster medicine

In attempting to prepare for disaster situations, countries organize all available resources of medical knowledge and skill. This includes the veterinary profession and services which assist in the control of communicable diseases and the safeguarding of food and water supplies. It is necessary to bring together all the agencies concerned into one organizational structure so that in the event of a national disaster each agency knows its role in the national plan.
In Canada the Animal Health Division of the Food Production and Inspection Branch of AC is responsible for preparing actions against animal disease outbreaks. This is accomplished by Regional Alert Teams and, at the national level, the Foreign Animal Disease Program. An important aspect of AC operations is the Emergency Preparedness Program. Each employee plays an active role in meeting and resolving emergency situations which threaten the Canadian Agri-Food Sector by contributing actively to the development and maintenance of emergency response plans and procedures and adhering to them in an emergency. AC established the Food and Agriculture Emergency Response System (FAERS) in response to the Emergency Preparedness Act 1988 and Emergencies Act and Departmental Policy concerning emergency preparedness. FAERS has been designed to provide guidelines for bringing together, as appropriate, federal, provincial and private sector resources in a unified effort under the Minister of Agriculture to effectively manage any emergency situation. This would provide links to the medical profession through HWC and to the private sector through the Agricultural Development Branch (at the provincial level).

In the United States, the USDA/APHIS Veterinary Services Emergency Programs Staff plays a similar role in preparing for the control of animal disease outbreaks. In this context APHIS has organized and administers Regional Emergency Animal Disease Eradication Organizations (READEO) to cope with animal disease emergencies. APHIS also has a special agreement with the Department of Defense whereby the latter provides assistance from its veterinary components in case of animal disease outbreaks. The US Government also has an independent Federal Emergency Agency (FEMA) which serves as a national focal point for dealing with disasters of any kind. Regular liaisons exist between FEMA and all US Government agencies, and FEMA may call upon any of them for their special expertise in coping with a disaster. FEMA also has regular liaisons with the states. For example, in every state there is a FEMA-coordinated Food and Agriculture Council (FAC), with representatives of the USDA and various state agencies. The FACs are responsible for providing assistance and coordination during an emergency for all matters relating to animals and plants.

Animal welfare

While both Canada and the USA have long traditions of concern for animal welfare, the visibility and public involvement in this issue in recent years have increased. This concern extends to research animals, the husbandry of food-producing animals, animals used for recreational and exhibition purposes and to almost anything involving animals. In the USA, the Animal Welfare Act deals with this subject and is administered by the USDA, APHIS. Ensuring compliance with this law is a primary responsibility of the veterinary profession.

Along with the Animal Welfare Act, the NIH through its Office for Protection from Research Risks (OPRR), Division of Animal Welfare ensures that institutions receiving USPHS research funding have programs and activities to ensure that animals are used only when necessary, and that certain standards of care and housing are respected. A private group, the American Association for Accreditation of Laboratory Animal Care (AAALAC), has become an important part of this process, and the NIH accepts AAALAC accreditation as evidence of compliance with many of its requirements.
The Canadian Council for Animal Care (CCAC) is a quasi-governmental agency concerned with animal welfare issues in Canada as they apply to animals used in research, testing and education. CCAC helps to ensure that such animals are properly housed, cared for and used. Research animals are often reared under guidelines approved by AAALAC. CCAC has become highly effective in regard to the dissemination of information and training on the subject. AC has regulations which govern the humane transport and the humane slaughter of animals. In conjunction with industry and the Canadian Confederation of Humane Societies, AC is developing Codes of Practice for rearing of animals, e.g. a Recommended Code of Practice for the care and handling of poultry from hatching to processing plant.

CONCLUSIONS

Veterinary public health activities in Canada and the United States of America clearly contribute in many important ways to improving human health and well-being. A variety of governmental and non-governmental agencies at the federal, state or provincial, and local levels are involved in these activities, and their effectiveness requires close collaboration and coordination among the various entities. It is important that agencies with VPH concerns have a focal point for these activities to encourage a flow of information between the veterinary and human health sciences. Improvement of the veterinary role in human health requires continued improvement of interagency communication, and development of appropriate infrastructures, career channels and manpower. This is necessary to bring about the most effective possible programs to control zoonoses, protect food supplies and the environment, and develop new information essential for disease treatment and prevention.

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ORGANISATION DE LA SANTÉ PUBLIQUE VÉTÉRINAIRE AUX ÉTATS-UNIS D'AMÉRIQUE ET AU CANADA. – J.R. Held et D.J. Gregory.

Résumé : Par leurs diverses activités, les vétérinaires des États-Unis d'Amérique et du Canada contribuent à l'amélioration de la santé et du bien-être des hommes. Parmi ces activités, certaines peuvent être considérées comme relevant de la santé publique vétérinaire (SPV) ; c’est le cas notamment du contrôle des zoonoses, de la sécurité alimentaire, de la sauvegarde de l’environnement, de la médecine comparée, de la médecine d’urgence et de la protection animale. Les deux pays ont une structure fédérale, et leurs activités de SPV sont organisées en interdépendance étroite par les Services de la santé et de l’agriculture, au niveau national, fédéral ou provincial, et local. Outre ces Services gouvernementaux, d’autres entités telles que les institutions académiques et diverses associations professionnelles apportent une contribution active à la SPV dans les deux pays.

ORGANIZACIÓN DE LA SALUD PÚBLICA VETERINARIA EN LOS ESTADOS UNIDOS DE AMÉRICA Y EN CANADÁ. – J.R. Held y D.J. Gregory.

Resumen: Los médicos veterinarios de los Estados Unidos de América y de Canadá desempeñan actividades diversas que contribuyen a mejorar la salud y el bienestar del hombre. Se puede considerar que algunas de estas actividades forman parte de la salud pública veterinaria (SPV). Es el caso, en particular, del control de zoonosis, la inocuidad de los alimentos, la protección del medio ambiente, la medicina comparada, la medicina de urgencia y la protección de los animales. Ambos países tienen un sistema federal, y sus actividades de SPV dependen de una estrecha colaboración entre las Agencias de salud y agricultura a los niveles nacional, estatal o provincial, y local. Además de las Agencias gubernamentales, otras entidades tales como los institutos académicos y varias asociaciones profesionales, brindan una importante contribución a las actividades de SPV en ambos países.


Appendix I

U.S. AND CANADIAN FEDERAL GOVERNMENT AGENCY COMPONENTS CONCERNED WITH VPH
(Adapted from Caring for Animals – 1991 AVMA Directory)

U.S. Department of Health and Human Services

U.S. Public Health Service (USPHS)

Centers For Disease Control (CDC)
1600 Clifton Road, N.E.
Atlanta, Georgia 30333
– Epidemiology Program Office (EPO)
– International Health Program Office (IHPO)
– Center for Chronic Disease Prevention and Health Promotion
– Center for Environmental Health and Injury Control (CEHIC)
– Center for Infectious Diseases (CID)
– National Institute for Occupational Safety and Health (NIOSH)

Food and Drug Administration
5600 Fishers Lane
Rockville, Maryland 20857
– Center for Veterinary Medicine (CVM)
– Center for Food Safety and Applied Nutrition (CFSAN)

National Institutes of Health
9000 Rockville Pike
Bethesda, Maryland 20892
- Office of Animal Care and Use
- Office for Protection from Research Risks
  Division of Animal Welfare
- National Center for Research Resources
  Comparative Medicine Program
  Veterinary Resources Program
- National Institute of Allergy and Infectious Diseases
- National Institute of Arthritis and Musculoskeletal and Skin Diseases
- National Cancer Institute
- National Institute of Child Health and Human Development
- National Institute on Deafness and Other Communication Disorders
- National Institute of Dental Research
- National Institute of Diabetes and Digestive and Kidney Diseases
- National Institute of Environmental Health Sciences
- National Eye Institute
- National Heart, Lung, and Blood Institute
- National Institute of Neurological Disorders and Stroke
- National Library of Medicine
- Warren Grant Magnuson Clinical Center

U.S. Department of Agriculture (USDA)

*Animal and Plant Health Inspection Service (APHIS)*
Washington, DC 20250

- Office of the Administrator
- Veterinary Services
- International Programs
- Biotechnology, Biologics, and Environmental Protection
- Veterinary Biologics
- Science and Technology
- Regulatory Enforcement and Animal Care

*Food Safety and Inspection Service (FSIS)*
Washington, DC 20250

- Office of the Administrator
- Science and Technology
- Inspection Operations
- Regulatory Programs
- International Programs

*Agricultural Research Service (ARS)*
Washington, DC 20250

- National Program Staff, Animal and Postharvest Sciences Staff
- Beltsville Agricultural Research Center
- Plum Island Animal Disease Center
- National Animal Disease Center
- Richard B. Russell Agricultural Research Center
Other Laboratories:
- Southeast Poultry Research
- Regional Parasite Research
- Animal Disease Research
- Knipling-Bushland U.S. Livestock Insects Research
- Veterinary Toxicology and Entomology Research
- Arthropod-borne Animal Diseases Research
- Poisonous Plant Research
- South Central Poultry Research
- Avian Disease and Oncology
- Medical and Veterinary Entomology Research
- Bovine Respiratory Disease Research
- Screwworm Research
- Livestock Insect Research
- Animal Metabolism-Agricultural Chemicals Research
- Poultry Research

U.S. Department of the Interior
Fish and Wildlife Service
Washington, DC 20240

U.S. Department of Defense
Department of the Army
- U.S. Army Veterinary Corps
  HQDA (DASG-VC)
  5109 Leesburg Pike
  Falls Church, Virginia 22041-3258

Department of the Air Force
- Biomedical Sciences Corps for Environmental Health Sciences
  HQ U.S. Air Force/SGB
  Bolling AFB, DC 20332-6188

Agriculture Canada
Food Production & Inspection Branch
4th Floor, Sir John Carling Building
930 Carling Avenue
Ottawa, Ontario K1A 0C5
- Animal & Plant Health Directorate
  Animal Health Division
    Import/Export
    Disease Control
    Veterinary Biologics and Bio-technology
  Diagnostic Services
  Research
  Laboratories
- Food Inspection Directorate
  Agri-Food Safety & Strategies Division

**Health and Welfare Canada**

*Health Protection Branch*
Tunney’s Pasture
Ottawa, Ontario K1A 0L2

- Drugs Directorate

  Bureau of Dangerous Drugs
  Jackson Building
  122 Bank Street
  Ottawa, Ontario K1A 1B9

  Bureau of Veterinary Drugs
  Brooke Claxton Building
  Tunney’s Pasture
  Ottawa, Ontario K1A 1B7

  Bureau of Biologics
  Virus Building
  Tunney’s Pasture
  Ottawa, Ontario K1A 0L2

- Food Directorate

  Bureau of Microbial Hazards

- Field Directorate

- Environmental Health Directorate

- Laboratory Centre for Disease Control

  LCDC Building
  Tunney’s Pasture
  Ottawa, Ontario K1A 0L2

  Bureau of Microbiology
  Bureau of Communicable Disease Epidemiology

**Environment Canada**

Terrasses de la Chaudière
10 Wellington Street
Hull, Quebec K1A 0H3

*Canadian Parks Service*

  Conservation and Protection
  Place Vincent Massey
  351 St. Joseph Building
  Hull, Quebec K1A 0H3
Appendix II

CANADIAN AND U.S. ORGANIZATIONS CONCERNED WITH VPH
(Adapted from Caring for Animals — 1991 AVMA Directory)

CANADA

Association of Local Official Health Agencies
277 Lakeshore Road East, Suite 402
Oakville, Ontario L6J 6J3

Canadian Council on Animal Care
1000-151 Slater Street
Ottawa, Ontario K1P 5H3

Canadian Institute of Public Health Inspectors
Hamilton-Wentworth Public Health Inspection Service
P.O. Box 897
Hamilton, Ontario L8N 3P6

Canadian Public Health Association
1565 Carling Avenue, Suite 400
Ottawa, Ontario K1Z 8R1

Canadian Veterinary Medical Association
339 Booth Street
Ottawa, Ontario K1R 7K1

Canadian Association of Veterinary Epidemiology
and Preventive Medicine
Box A-23
339 Booth Street
Ottawa, Ontario K1R 7K1

UNITED STATES OF AMERICA

American Academy of Veterinary Preventive Medicine
1023 15th Street, NW, Suite 300
Washington, DC 20005-2601

American Association for Accreditation of Laboratory Animal Care
9650 Rockville Pike
Bethesda, Maryland 20814

American Association for Laboratory Animal Science
70 Timber Creek Drive, Suite 5
Cordova, Tennessee 38018
American Association of Food Hygiene Veterinarians  
c/o Dr Joseph L. Blair  
4910 Magdalene Court  
Annandale, Virginia 22003-4363  

American College of Veterinary Preventive Medicine  
c/o Dr Stanley O. Hewins  
3126 Horning Creek  
San Antonio, Texas 78247  

American Veterinary Medical Association  
930 North Meacham Road  
Schaumburg, Illinois 60196-1074  

Association of Teachers of Veterinary Public Health and Preventive Medicine  
c/o Dr Chester B. Thomas  
School of Veterinary Medicine  
2015 Linden Drive West  
Madison, Wisconsin 53706  

Conference of Public Health Veterinarians  
c/o Dr Paul C. Bartlett  
Michigan State University  
A-220 West Fee Hall  
East Lansing, Michigan 48824-1316  

Institute of Laboratory Animal Resources  
National Research Council  
2101 Constitution Avenue, N.W.  
Washington, DC 20418  

National Association of Federal Veterinarians  
1023 15th Street N.W., Suite 300  
Washington, DC 20005-2602  

National Association of State Public Health Veterinarians  
c/o Dr Keith A. Clark  
Texas Department of Health  
1100 West 49th Street  
Austin, Texas 78756  

United States Animal Health Association  
P.O. Box 28176  
Richmond, Virginia 23228-0176  

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REFERENCES  


