Organisation of veterinary public health in the Western Pacific region

C.R. WILKS and P. MADIE *

Summary: Information on veterinary public health organisation and activities was obtained from government sources in countries located in the Western Pacific region. This region has a wide range of geographical features, population densities, farming practices, social structures and disease prevalences. In spite of this variation, there is common agreement on the importance of veterinary public health both for the provision of safe food and for the control of zoonotic diseases. Not all countries, however, are able to put all the resources they would wish into these activities; financial, social and personnel constraints are recognised.

KEYWORDS: Food hygiene - Government departments - Laboratory services - Veterinary public health - Zoonoses.

INTRODUCTION

Prior to the Second World War many of the countries in this region had government structures which were essentially controlled by European powers. Since 1945 most of these countries have achieved independence and have established government departments to encourage national development in many areas, including veterinary public health. In some cases, notably Malaysia, the present organisation of veterinary public health is derived from a continuous government commitment to this area for over one hundred years.

The challenges to veterinary public health officials in this region are diverse, as there is a wide range of human population densities and living conditions from large, heavily-populated modern cities to small isolated village communities engaged in subsistence agriculture.

The quality of animal-derived food, the exposure to zoonotic diseases and the employment of veterinary and related staff resources also vary greatly from country to country (Table I).

* Public Health and Meat Hygiene, Massey University, Department of Veterinary Pathology and Public Health, Palmerston North, New Zealand.
TABLE I

_Veterinarians involved in teaching and laboratory work in some Western Pacific countries_

<table>
<thead>
<tr>
<th>Country</th>
<th>Number of veterinarians employed in training institutes, universities and laboratories</th>
<th>% of total number of veterinarians</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indonesia</td>
<td>837</td>
<td>27.0</td>
</tr>
<tr>
<td>Japan</td>
<td>1,386</td>
<td>5.1</td>
</tr>
<tr>
<td>Republic of Korea</td>
<td>300</td>
<td>4.8</td>
</tr>
<tr>
<td>Malaysia</td>
<td>90</td>
<td>15.1</td>
</tr>
<tr>
<td>Papua New Guinea</td>
<td>2</td>
<td>17.3</td>
</tr>
</tbody>
</table>

PEOPLE’S REPUBLIC OF CHINA

The People’s Republic of China is situated in eastern Asia and covers an area of 9,572,900 km², with a population of 1,133,683,000 (1990 census). The population density is 118.4 persons per square kilometre, and approximately 48% of people live in rural areas.

The country is divided into twenty-two provinces, five autonomous regions, and three municipalities (Beijing, Shanghai and Tientsin) with a population of over 32 million people.

The People’s Republic of China has a large number of physicians (one per 673 persons) and more than 400,000 veterinarians and animal health inspectors. The size of the livestock population is shown in Table II.

TABLE II

_Estimated livestock population in the People’s Republic of China (1990)_

<table>
<thead>
<tr>
<th>Species</th>
<th>Numbers (× 10³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cattle</td>
<td>77,141</td>
</tr>
<tr>
<td>Buffalo</td>
<td>21,935</td>
</tr>
<tr>
<td>Sheep</td>
<td>102,655</td>
</tr>
<tr>
<td>Goats</td>
<td>77,883</td>
</tr>
<tr>
<td>Pigs</td>
<td>334,954</td>
</tr>
<tr>
<td>Chickens</td>
<td>1,981,000</td>
</tr>
</tbody>
</table>

A large number of asses (11.3 million) and horses (10.7 million) are used mainly as draft animals.

Structure of government departments responsible for veterinary public health

The Ministry of Agriculture of the People’s Republic of China has overall responsibility for the national veterinary public health system and has delegated
administrative powers to the national Department for Animal Husbandry and Veterinary Services. This Department has established bureaus of animal husbandry in each province, prefecture and county, and through these is involved in the management of animal and zoonotic diseases research, legislation and veterinary medical administration (Fig. 1).

Executive power is delegated to the National Station for Animal Husbandry and Veterinary Sciences which has established animal husbandry and veterinary science working stations in each province, prefecture and county. The staff at these stations - more than 400,000 nation wide - are engaged in the monitoring, treatment and prevention of animal diseases.

The Department of Animal and Plant Quarantine, a branch of the Ministry of Agriculture, is responsible for the control and quarantine of imported products of animal and plant origin. The Department administers 44 offices at the major ports of entry.

The People's Republic of China has five major veterinary research institutes: Harbin Veterinary Sciences Research Institute, Lanzhou Veterinary Sciences Research Institute, China Traditional Veterinary Sciences Research Institute, the Research Institute for Parasitic Diseases of Livestock and the Chinese Academy of Agricultural Sciences. In addition, there are research institutes of animal husbandry and veterinary sciences in each of the 22 provinces.

The Ministry of Agriculture has four major biological products factories manufacturing veterinary drugs and equipment, while an additional 24 factories operate under provincial governments. The production of special vehicles used in epizootic disease campaigns is the responsibility of the Ministry of Agriculture.

Acts and regulations pertaining to animal diseases in general, the prevention of epizootic diseases, the administration of animal by-products, and the import and export of animal products are issued by both the China State Council and the Ministry of Agriculture.

Education

The Ministry of Agriculture is responsible for the management of eight major agricultural universities and both traditional Chinese veterinary science and modern (Western) veterinary science are taught.

Zoonotic diseases

Information regarding the presence and prevalence of zoonotic diseases in the People's Republic of China is very limited; sporadic cases of anthrax, swine erysipelas and rabies (canine and feline) have been reported. Of non-zoonotic diseases, fowl cholera, Newcastle disease, sheep and goat pox, and hog cholera appear to be of some importance.

INDONESIA

Indonesia is an island republic in southeastern Asia comprising some 13,667 islands and covering an area of 1,948,732 km². The country extends over a distance of about
FIG. 1

Government departments associated with aspects of veterinary public health in the People's Republic of China
5,100 km, from Sumatra in the west to Papua New Guinea in the east. The human population is 181 million (1990 estimate) corresponding to a density of 94 people per square kilometre. Most people (74%) live in rural areas. Only about 7% of the land area is arable, with more than 90% devoted to rice. Approximately 6% of the land is available as pasture. The numbers of livestock are shown in Table III.

**TABLE III**

*Estimated livestock population in Indonesia (1990)*

<table>
<thead>
<tr>
<th>Species</th>
<th>Numbers (× 10^6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cattle</td>
<td>10.0</td>
</tr>
<tr>
<td>Sheep</td>
<td>5.5</td>
</tr>
<tr>
<td>Goats</td>
<td>12.7</td>
</tr>
<tr>
<td>Buffalo</td>
<td>3.3</td>
</tr>
<tr>
<td>Pigs</td>
<td>6.7</td>
</tr>
<tr>
<td>Chickens</td>
<td>444.0</td>
</tr>
</tbody>
</table>

Almost a quarter (24.1%) of the gross domestic product derives from agriculture; independent farmers account for most of the production.

Of the 3,100 veterinarians in Indonesia, approximately one third (1,036) are employed in private practice. Of the remainder, 625 are employed by the Ministry of Agriculture and working with central or provincial government agencies. Compared with other countries in the Western Pacific region, a relatively large number of veterinarians in Indonesia are involved in education at universities and other training institutions or in laboratory work (Table I). A total of 602 are engaged in other veterinary work, and there are 1,320 animal health assistants working under the supervision of veterinarians.

**Structure of government departments responsible for veterinary public health**

The Department of Veterinary Public Health is a subsidiary of the Directorate of Animal Health which, in turn, is a branch of the Directorate General of Livestock Services (Fig. 2).

The Veterinary Public Health Department monitors foods of animal origin and evaluates their suitability for human consumption, ensures that requirements pertaining to sanitation and to hygienic production methods are adhered to and is also involved in the control of zoonotic diseases.

**Major zoonotic diseases**

Indonesian Animal Health Authorities report (1989) the presence of anthrax, brucellosis, leptospirosis, swine erysipelas, toxoplasmosis and cysticercosis.

**Specific zoonotic disease control programmes**

Anthrax is widespread in cattle, sporadic in goats, horses and pigs. A National Health Programme aims to eradicate bovine anthrax, while anthrax in goats, horses and pigs is controlled at the district level.
Sporadic cases of bovine and porcine brucellosis are reported but *Brucella melitensis*, apparently, has never been isolated in Indonesia. A modified nation-wide "stamping-out" policy is in operation, aimed at the elimination of brucellosis.

Leptospirosis has been reported in cattle, but not in any of the other common hosts (e.g. pigs and dogs). There is no programme in place for the control of the apparently sporadic cases of bovine leptospirosis.

Toxoplasmosis has been reported in canines, and rabies in felines, canines and wild animals, but not in livestock. *Cysticercus cellulosae* is sporadic in occurrence.

**Training**

The courses in veterinary public health attended by staff of the Provincial Livestock Services (there are 24 provinces and 2 autonomous districts) have been recently discontinued due to a lack of funding. The Indonesian Animal Health authorities acknowledge the importance of such courses and hope that further continuing education on veterinary public health may be conducted in collaboration with foreign agencies having expertise in this field.
JAPAN

Japan consists of four main islands and thousands of adjacent smaller islands. The archipelago runs from north to south in an arc covering approximately 3,800 km. The total land area is 377,815 km$^2$ of which 71% is mountains. The human population has been estimated (1990) at 123.5 million, or 323 persons per square kilometre.

Agriculture is mainly confined to rice-growing.

The estimated (1989) population of important types of livestock is listed in Table IV.

**TABLE IV**

*Estimated livestock population in Japan (1989)*

<table>
<thead>
<tr>
<th>Species</th>
<th>Numbers ($ \times 10^3$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cattle</td>
<td>6,000</td>
</tr>
<tr>
<td>Sheep</td>
<td>27</td>
</tr>
<tr>
<td>Pigs</td>
<td>12,000</td>
</tr>
<tr>
<td>Chickens</td>
<td>334,000</td>
</tr>
</tbody>
</table>

Self-sufficiency in consumption of meat (beef and pork) is 78% (1986), a fall from over 90% in 1960 despite a significant increase in meat production.

The number of veterinarians in different employment groups is listed in Table V.

About 4,800 veterinarians are engaged in the areas of food hygiene, abattoir inspection, rabies prevention, water hygiene and sanitary management of the environment including disposal of dead animals.

**TABLE V**

*Veterinarians in different employment groups in Japan*

<table>
<thead>
<tr>
<th>Category</th>
<th>No. of veterinarians</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government officials</td>
<td>8,229</td>
</tr>
<tr>
<td>Laboratories, universities, training</td>
<td>1,386</td>
</tr>
<tr>
<td>Private practitioners</td>
<td>14,391</td>
</tr>
<tr>
<td>Other veterinarians</td>
<td>2,935</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>26,941</strong></td>
</tr>
</tbody>
</table>

*Source: FAO/OIE/WHO Animal Health Yearbook, 1989*

Structure of government departments responsible for veterinary public health

The administrative organisation of veterinary public health at national and local level is shown in Figures 3 and 4.
FIG. 3

Organisation of national government (veterinary public health) in Japan
National and local government (veterinary public health) in Japan
Veterinarians are employed at all levels of the national and local health and welfare system, and play a major role in all food hygiene programmes. The major areas of veterinary involvement in public health in Japan are food hygiene, inspection of slaughtered animals and the control of zoonotic diseases, especially the prevention of rabies. These activities are detailed below.

**Food hygiene and inspection**

The manufacture, distribution, sale and import of food are controlled by the Food Hygiene Law. About 6,700 qualified personnel (e.g. medical doctors, veterinarians and pharmacists employed by the Ministry of Health and Welfare and by prefectural and municipal governments) are engaged as food hygiene inspectors whose main task is the surveillance and inspection of the foods handled at about 4.3 million food-related facilities. They are also engaged in the surveillance and inspection of imported foods at ports.

About 3,000 of these food hygiene inspectors are veterinarians, who play a major role in the food hygiene programmes in the country by inspecting milk, meat, fish and shellfish as well as related processed foods and other general foods.

Besides veterinarians involved in the routine food hygiene inspection and surveillance programmes, other veterinarians are employed by the investigation, inspection and research agencies of the Ministry of Health and Welfare and prefectural governments, with the aim of improving the safety of various foods.

There are approximately 2,100 veterinarians engaged in abattoir inspection throughout the country, some of whom are simultaneously involved in food hygiene surveillance and rabies prevention.

Legislation controlling hygienic meat production was first implemented in 1906. The law was revised in 1953 under the new constitution, and the Abattoir Law was enacted under which the hygiene of meat for human consumption is currently maintained. The major points of the Abattoir Law include the following:

- Standards are set out for the structure and facilities of abattoirs; abattoirs are established by permission of the prefectural governor.

- Requirements are stipulated for the maintenance of hygiene at abattoirs and the hygiene measures to be taken during slaughter.

- Slaughter and dismemberment of cattle, horses, pigs, sheep and goats is prohibited at places other than abattoirs.

- Meat may not be removed from an abattoir prior to inspection by the veterinarian appointed by the prefecture. The inspector may issue an order to prohibit the slaughter or dismemberment of certain animals and disposal.

There are 407 abattoirs in Japan at which more than 22 million animals — almost exclusively pigs (94%) — are slaughtered annually (Table VI).

In recent years, the number of slaughtered animals has increased as the demand for meat has become greater. However, the number of meatworks is decreasing every year as the abattoirs are being modernised, better equipped and made larger by amalgamation.
### TABLE VI

*Changes in the number of slaughtered animals over the years in Japan (1969-1990)*

<table>
<thead>
<tr>
<th>Year</th>
<th>Total</th>
<th>Oxen and cows</th>
<th>Male calves</th>
<th>Horses</th>
<th>Pigs</th>
<th>Sheep</th>
<th>Goats</th>
</tr>
</thead>
<tbody>
<tr>
<td>1969</td>
<td>10,493,412</td>
<td>822,865</td>
<td>329,367</td>
<td>47,811</td>
<td>9,172,034</td>
<td>10,410</td>
<td>110,925</td>
</tr>
<tr>
<td>1970</td>
<td>12,910,052</td>
<td>978,763</td>
<td>317,169</td>
<td>39,820</td>
<td>11,467,398</td>
<td>6,633</td>
<td>100,269</td>
</tr>
<tr>
<td>1971</td>
<td>14,367,335</td>
<td>1,026,647</td>
<td>223,719</td>
<td>34,043</td>
<td>12,998,418</td>
<td>4,357</td>
<td>80,151</td>
</tr>
<tr>
<td>1972</td>
<td>14,380,043</td>
<td>1,083,577</td>
<td>127,042</td>
<td>24,489</td>
<td>13,072,128</td>
<td>3,089</td>
<td>69,178</td>
</tr>
<tr>
<td>1973</td>
<td>15,225,573</td>
<td>808,467</td>
<td>36,246</td>
<td>17,413</td>
<td>14,306,948</td>
<td>1,851</td>
<td>56,648</td>
</tr>
<tr>
<td>1974</td>
<td>16,932,819</td>
<td>986,544</td>
<td>178,477</td>
<td>16,301</td>
<td>15,715,663</td>
<td>1,551</td>
<td>34,083</td>
</tr>
<tr>
<td>1975</td>
<td>15,475,669</td>
<td>1,146,973</td>
<td>128,727</td>
<td>19,925</td>
<td>14,406,880</td>
<td>1,696</td>
<td>25,768</td>
</tr>
<tr>
<td>1976</td>
<td>15,363,168</td>
<td>948,738</td>
<td>77,172</td>
<td>21,978</td>
<td>14,297,285</td>
<td>1,675</td>
<td>15,780</td>
</tr>
<tr>
<td>1977</td>
<td>17,311,106</td>
<td>1,109,123</td>
<td>93,908</td>
<td>19,618</td>
<td>16,077,669</td>
<td>1,625</td>
<td>9,163</td>
</tr>
<tr>
<td>1978</td>
<td>18,741,303</td>
<td>1,202,255</td>
<td>68,626</td>
<td>17,445</td>
<td>17,445,637</td>
<td>1,501</td>
<td>7,011</td>
</tr>
<tr>
<td>1979</td>
<td>20,485,093</td>
<td>1,187,708</td>
<td>44,176</td>
<td>14,312</td>
<td>19,232,096</td>
<td>1,525</td>
<td>5,276</td>
</tr>
<tr>
<td>1980</td>
<td>21,224,420</td>
<td>1,190,202</td>
<td>45,955</td>
<td>12,859</td>
<td>19,969,004</td>
<td>1,773</td>
<td>4,627</td>
</tr>
<tr>
<td>1981</td>
<td>21,119,519</td>
<td>1,327,318</td>
<td>45,599</td>
<td>13,095</td>
<td>18,727,428</td>
<td>2,265</td>
<td>3,854</td>
</tr>
<tr>
<td>1982</td>
<td>20,555,228</td>
<td>1,365,865</td>
<td>45,133</td>
<td>14,357</td>
<td>19,122,954</td>
<td>3,215</td>
<td>3,704</td>
</tr>
<tr>
<td>1983</td>
<td>20,572,726</td>
<td>1,392,191</td>
<td>47,346</td>
<td>15,429</td>
<td>19,110,400</td>
<td>4,115</td>
<td>3,604</td>
</tr>
<tr>
<td>1984</td>
<td>20,853,946</td>
<td>1,494,154</td>
<td>46,052</td>
<td>16,343</td>
<td>19,287,937</td>
<td>4,578</td>
<td>4,882</td>
</tr>
<tr>
<td>1985</td>
<td>22,270,532</td>
<td>1,538,704</td>
<td>41,010</td>
<td>16,837</td>
<td>20,660,869</td>
<td>5,722</td>
<td>7,390</td>
</tr>
<tr>
<td>1986</td>
<td>22,599,240</td>
<td>1,526,344</td>
<td>31,644</td>
<td>17,323</td>
<td>21,009,855</td>
<td>6,280</td>
<td>7,774</td>
</tr>
<tr>
<td>1987</td>
<td>22,980,297</td>
<td>1,490,515</td>
<td>23,401</td>
<td>15,062</td>
<td>21,436,632</td>
<td>7,387</td>
<td>7,300</td>
</tr>
<tr>
<td>1988</td>
<td>22,730,044</td>
<td>1,443,767</td>
<td>20,270</td>
<td>12,637</td>
<td>21,238,414</td>
<td>7,798</td>
<td>7,158</td>
</tr>
<tr>
<td>1989</td>
<td>22,855,893</td>
<td>1,379,518</td>
<td>17,510</td>
<td>13,386</td>
<td>21,430,490</td>
<td>8,429</td>
<td>6,560</td>
</tr>
<tr>
<td>1990</td>
<td>22,363,480</td>
<td>1,380,065</td>
<td>17,588</td>
<td>13,712</td>
<td>20,935,547</td>
<td>10,044</td>
<td>6,524</td>
</tr>
</tbody>
</table>

In the inspection of slaughtered animals, more scientific and precise examination procedures are required. This is due to the changes in the overall status of animal diseases caused by improved methods of raising animals and the general prevention and treatment of diseases. Active encouragement is therefore given to the establishment of hygienic inspection centres for meat for human consumption which are equipped to conduct the required examinations.

**Prevention of rabies**

No outbreak of rabies has taken place in recent years. But on the basis of the Rabies Prevention Law, inoculation and quarantine are continuing and efforts are being made to prevent the re-introduction of this disease.

The preventive programmes are carried out by a number of veterinarians employed by central or local government, or by private veterinary practitioners.

**Major zoonotic diseases**

The zoonotic diseases present in Japan — brucellosis, tuberculosis, swine erysipelas and toxoplasmosis — all occur sporadically. The last cases of caprine and bovine anthrax were reported in 1949 and 1988 respectively.
Specific control and eradication programmes

Both tuberculosis and brucellosis are notifiable diseases. The control of these diseases in cattle is based on testing, a "stamping-out" policy and strict quarantine and movement control measures. Caprine brucellosis caused by \textit{B. melitensis} has not been reported since 1949.

The swine erysipelas control programme is similar to the programme for tuberculosis and brucellosis, but also includes treatment of affected animals and vaccination. There does not appear to be a particular programme aimed at porcine toxoplasmosis.

Japanese B encephalitis (last reported in 1985) is controlled by strict quarantine measures and vaccination programmes.

REPUBLIC OF KOREA

The Republic of Korea occupies a land area of 99,237 km\(^2\) and has a human population of 43 million, almost 70\% of whom live in urban areas. Agricultural products contribute approximately 11\% of the gross domestic product. Estimated numbers of the major domestic animal species are shown in Table VII.

\begin{table}[h]
\centering
\caption{Estimated livestock population in the Republic of Korea (1990)}
\begin{tabular}{ll}
Species & Numbers (\(\times 10^3\)) \\
\hline
Cattle & 2,000 \\
Sheep & 3 \\
Pigs & 4,900 \\
Chickens & 58,000 \\
\end{tabular}
\end{table}

Of the more than 6,000 veterinarians in the Republic of Korea, over 2,000 are involved in government service or in laboratories, universities and training institutions. Their activities are complemented by over 30,000 animal health assistants.

Structure of government departments responsible for veterinary public health

\textit{National level}

The Animal Health Division of the Ministry of Agriculture, Forestry and Fisheries in the Republic of Korea has overall responsibility for veterinary services including animal health and veterinary public health (Fig. 5).

The auxiliary organisations are the National Animal Quarantine Service and the Institute of Veterinary Research which is under the Office of Rural Development.

Veterinarians are also involved in the public health service under the Food Sanitary Division of the Ministry of Health and Social Affairs.
FIG. 5

Organisation of the National Veterinary Service in the Republic of Korea
The functions of the Animal Health Division include:

- the supervision and licensing of milk production plants, abattoirs and livestock processing establishments;
- the sanitary inspection of livestock products;
- the planning and quality control of the production of veterinary biologicals;
- the establishment of quarantine regulations for the import and export of animals and animal products;
- the authorisation of veterinary pharmaceutical companies and the import and export of veterinary drugs.

**Provincial level**

Under the responsibility of either the Mayor or Governor, the Section of Veterinary Affairs attached to the Bureau of Agricultural Production is responsible for such matters as those affecting the Veterinary Health Laboratories, which are in charge of animal disease control and the sanitary control of food of animal origin produced in the region (Fig. 6).

Each province has one main Veterinary Health Laboratory and three or four branch laboratories which perform surveys for the major infectious diseases, provide diagnostic services and carry out sanitary inspections of livestock products.

All local veterinary and public health services are conducted in accordance with the rules and instructions of the national government and the regulations of the provincial government.

**Zoonotic diseases**

Zoonotic diseases present in the Republic of Korea include leptospirosis, echinococcosis/hydatidosis, salmonellosis and Japanese encephalitis. Quarantine, surveillance and vaccination are carried out in border regions for such diseases as rabies.

**MALAYSIA**

The land area of Malaysia covers the Malaysian peninsula, and the territories of Sarawak and Sabah, and extends over a total of 330,433 km$^2$, with a human population of 18 million. Although there are large cities such as Kuala Lumpur (with a population of over 1 million), approximately 80% of the population live in rural settlements. Much of the topography is rugged and forested, with between 60% and 80% of the total area covered by dense, evergreen rainforest.

Estimated numbers of the major domestic animal species are shown in Table VIII.

Of the almost 600 veterinarians in Malaysia, nearly 93% are located in peninsular Malaysia, but of the more than 500 animal health assistants, including those involved with food hygiene and meat inspection, some 46% are located in Sabah and Sarawak.
* Each province has one main Veterinary Health Laboratory and three or four branches which carry out the function of periodical survey for major infectious animal disease, diagnostic services and sanitary inspection of livestock products in each locality.

**FIG. 6**

Organisation of the Provincial Veterinary Service in the Republic of Korea
Structure of government departments responsible for veterinary public health

Veterinary public health activities in Malaysia (then known as Malaya) started in the 1800s. In those early years, the Veterinary Services in the country were a branch of the Medical Department. There was close collaboration between medical research scientists and veterinarians. Right from its founding in 1900, the Institute of Medical Research (IMR) had been closely associated with problems of veterinary medicine and public health.

The Department of Veterinary Services gained its own identity in 1930 with the appointment of the Principal Veterinary Officer for the Straits Settlements and Federated Malay States, and the Veterinary Research Institute was established in 1948 to carry out research on animal diseases. The early efforts of the Veterinary Services were concentrated on the control and eradication of epizootic and zoonotic diseases such as foot and mouth disease, rinderpest and rabies. Recognition of the importance of veterinary public health programmes within the Department of Veterinary Services (DVS) was emphasised once more in 1978 with the presentation of a strategy paper at a departmental meeting. The Veterinary Public Health section became a distinct unit within the DVS from 1981, as part of the Fourth Malaysia Plan (1981-85). The organisation of veterinary public health within the DVS is shown in Figures 7 and 8, and the structure of the Veterinary Public Health Laboratory in Figure 9.

These structures apply to peninsular Malaysia, while in the eastern states of Sabah and Sarawak veterinary public health is organised and administered under the control of the respective state governments. In Sabah, this is within the Department of Veterinary Sciences and Animal Industry, while in Sarawak it is under the Veterinary Branch of the Department of Agriculture. In spite of this organisational structure, there is a free exchange of information to ensure that the most appropriate actions are taken.

Control of food-borne diseases

Meat hygiene and meat inspection

The Malaysian Government has given the responsibility of abattoir development and operation in the country to the DVS. Currently, it is solely responsible for the operation of eight major regional abattoirs. It is also assisting the local/town councils in the improvement of meat hygiene and inspection in the smaller abattoirs. Eventually there will be only 79 abattoirs in the country, all under the jurisdiction of the DVS. A set of regulations (Meat Inspection Rules 1985) has been gazetted to assist the DVS.

---

### Table VIII

*Estimated livestock population in Malaysia (1990)*

<table>
<thead>
<tr>
<th>Species</th>
<th>Numbers (%10^6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cattle</td>
<td>0.7</td>
</tr>
<tr>
<td>Sheep</td>
<td>0.1</td>
</tr>
<tr>
<td>Buffalo</td>
<td>0.22</td>
</tr>
<tr>
<td>Pigs</td>
<td>2.4</td>
</tr>
<tr>
<td>Chickens</td>
<td>59.0</td>
</tr>
</tbody>
</table>
Organisation of the Department of Veterinary Services in Malaysia

FIG. 7
FIG. 8

Organisation of veterinary public health in the Department of Veterinary Services in Malaysia
Research and Development work mainly concerns residues; hence this work is presently carried out by the Contaminants and Residue Unit.

* Research and Development work mainly concerns residues; hence this work is presently carried out by the Contaminants and Residue Unit

**FIG. 9**

Organisation of the Veterinary Public Health Laboratory in Malaysia
in enforcing meat hygiene and meat inspection standards. Abattoirs in the country will be classified into three categories: abattoirs for export purposes; large and medium city abattoirs; and small rural abattoirs.

Meat inspection in Malaysia is performed by veterinarians and veterinary assistants. Owing to religious requirements, new abattoirs for ruminant and pig slaughter must be completely separated. Some abattoirs will be leased for operation by the private sector, but the DVS will continue to regulate public health aspects. Meat imported into the country is also subjected to an examination at the port of entry and random bacteriological examination at the Veterinary Public Health Laboratory, Petaling Jaya.

Meat and hygiene inspection are also conducted at poultry slaughterhouses and meat processing plants, especially those exporting to countries requiring veterinary health certification. The aim is for poultry to be slaughtered only in designated, clean and hygienic premises with proper meat inspection.

*Milk hygiene*

The DVS has embarked on a smallhold dairy development programme. Milk collecting centres (MCC) have been established in the country to collect the farmers' milk. Many of the farms have also grown to commercial scale. Milk is only accepted and collected by the MCC when it passes some preliminary tests, viz. alcohol test and specific gravity test. The milk from the MCCs is also subjected to random laboratory examination at the Veterinary Public Health Laboratory, Petaling Jaya. Emphasis is now placed on quality, and a payment-by-quality scheme will be introduced. The dairy farming programme has also contributed to an increase in the nutritional status of about 5,000 dairy farming families and their neighbours. However there are still many logistic problems associated with the sale and distribution of fresh milk.

*Control of zoonotic diseases*

The DVS has given paramount importance to the eradication of the animal diseases of zoonotic significance. The country has eradicated rabies and is free from diseases such as anthrax, trichinellosis, hydatidosis, western, eastern and Venezuelan equine encephalitis, glanders and brucellosis caused by *B. melitensis*.

In the early 1950s, the DVS embarked on a very intensive rabies eradication programme involving dog licensing, stray dog elimination, and vaccination of dogs in susceptible areas. Today there remains an area 30-50 km wide in the northern states of peninsular Malaysia bordering southern Thailand, where dogs are regularly vaccinated against rabies. This constitutes an "immune belt" separating Southern Thailand from the rest of peninsular Malaysia. All dogs to be imported into the country are prohibited except under permit and accompanied by a veterinary health certification, and are inspected on arrival. Dogs from countries not free from rabies are subjected to quarantine for thirty days at gazetted DVS quarantine stations. Dog licensing and control of stray dogs is still being practised in the country. All reported dog bite cases are investigated by DVS, and the dog subjected to a ten-day house quarantine and observation. The states of Sabah and Sarawak in eastern Malaysia are also free from rabies. Investigations have revealed no reservoir of rabies in the wild fauna.

Diseases such as cysticercosis (*C. bovis*), tuberculosis and brucellosis are of very low incidence. The DVS has embarked upon a cattle herd health scheme to eradicate
tuberculosis and brucellosis. Salmonellosis, melioidosis and leptospirosis occur sporadically in livestock and are controlled by treatment carried out by veterinarians.

Brucellosis is well under control in government cattle-breeding stations. Systematic herd health programmes are also conducted throughout the country for cattle on smallholdings, especially dairy herds, to screen and eradicate reactors to this disease. From 1982 to 1985, a total of 185,503 head of cattle were screened, and the reactor rate was low (1.15%). Positive reactors are culled for slaughter, and compensation is paid to farmers.

Cattle are also screened for tuberculosis in the same herd health programme. The reactor rate has been very low (of 32,751 head of cattle tested in 1981-85, only 0.19% and 0.009% were positive, based on caudal fold and comparative cervical tests respectively). Positive reactors are culled for slaughter and compensation is paid to farmers.

Environmental pollution from animal waste

The DVS has also given attention to environmental pollution from animal industries, especially from pig farms. The pig industry has grown from a small backyard enterprise to a multi-million dollar industry, with medium to large commercial farms. These farms, with intensive production and high stocking rates, have resulted in environmental pollution in many areas. This animal waste pollution has not only resulted in serious environmental problems but also posed socio-political problems.

The DVS has initiated many studies on this problem, working in collaboration with other agencies such as the Department of Environment, the Standards and Industrial Research Institute Malaysia (SIRIM) and the Universiti Pertanian Malaysia. Projects with assistance from the International Development and Research Centre (IDRC) and the United Nations Development Programme (UNDP) have characterised wastewater, studied the concept of centralised waste treatment systems and started on the planning of self-contained pig-rearing estates with proper pollution control measures and recycling of resources. These on-going projects will assist the country in resolving the pollution problem, while making the pig industry into a more modern, progressive and productive enterprise.

The DVS is also looking into the potential waste problem from intensive cattle feedlot farms. In an effort to boost beef production in the country, large-scale cattle feedlot farms based on the use of agriculture waste-products as feed are being actively encouraged.

An animal waste analysis laboratory at Petaling Jaya was started in 1985 to study and characterise the waste discharge from animal industries and to provide support services to field officers monitoring environmental pollution.

Control of drugs and residues

Currently, the importation and retail of all drugs (including those for veterinary usage) are controlled by pharmacists. Control of drug usage at the farm level is less than satisfactory. Much wastage and ineffective usage due to "shotgun" antibiotic therapy is occurring in many pig and poultry farms.
Under a drug evaluation programme, the national Veterinary Public Health Laboratory determines the presence and levels of drug residues in meat, milk and related products which may cause health hazards to humans, and aims to control the use of antibiotics and other veterinary drugs in animal feeds as well as in food-producing animals.

Apart from drug residues, livestock also accumulate pesticides, herbicides and heavy metals in their tissues from the environment as well as from their feed. Monitoring of these residues will form part of the programme by controlling environmental pollution resulting from the use of these substances.

**Liaison with medical and other professions**

The veterinary profession in Malaysia enjoys a very good rapport with the medical and allied professions, both on an official and unofficial basis. There is a Standing Committee on Veterinary Medical Liaison between the DVS and the Ministry of Health. The terms of reference of this Committee are:

- to establish effective liaison between veterinary, medical and other related groups for the protection and improvement of animal and human health and welfare;
- to conduct joint projects between veterinary, medical and other related groups for the protection and improvement of animal and human health and welfare.

The Director General of Veterinary Services is also a member of the Malaysian Poisons Board and the Malaysian Pesticide Board. Veterinary Officers of the DVS are also on SIRIM committees (especially regarding products of animal origin), and steering and technical committees on environmental pollution from animal waste.

**Personnel development**

Personnel development in veterinary public health in Malaysia still leaves much to be desired. Much ground has been covered in the encouragement and strengthening of veterinary education in the country, especially since the inception of the Faculty of Veterinary Medicine and Animal Science at Universiti Pertanian Malaysia. At present, veterinary public health is taught to fourth-year DVM students and to third-year students in the three-and-a-half-year course leading to the Diploma of Animal Health and Production. Currently, there is a need for the training of more veterinary personnel in the public health components of veterinary medicine, either as postgraduates or in continuing education. In this respect the DVS hopes to pay more attention to personnel development, especially under the revised organisational structure of the Department, which treats veterinary public health as a separate entity.

**Summary**

Veterinary public health is an important and actively developing field in Malaysia. The DVS has embarked upon many Veterinary Public Health programmes, in particular: the eradication or control of zoonotic diseases (such as brucellosis, tuberculosis and salmonellosis) which also have animal production significance; the improvement of animal quarantine services; the development of abattoirs and meat hygiene; improved poultry slaughtering; better quality milk production; improved veterinary public health laboratory services; environmental pollution control, and liaison between veterinary, medical and other allied professions.
PAPUA NEW GUINEA

Papua New Guinea is situated in the southwestern Pacific Ocean and comprises the eastern part of the island of New Guinea, the islands of Bismarck, Trobriand, Woodlark, the Louisiade Archipelago, the D’Entrecasteaux Islands and parts of the Solomon Islands. The total land area is 462,840 km² and the human population is between 3.5 and 4 million (1990 estimate) corresponding to about 8 persons per square kilometre. Approximately 87% of the population lives in rural areas. Agricultural land and areas under permanent cultivation comprise approximately 1% and forested land 85% of the total land area.

Agriculture in Papua New Guinea can be roughly divided into three sectors: village subsistence farming, smallholdings and intensive commercial farming. Although the village economy is still largely based on subsistence agriculture, this is increasingly supplemented by cash crops.

There are no accurate data on the size of the livestock population, especially with regard to village pigs and poultry. A summary of the estimated numbers of livestock is shown in Table IX.

### Table IX

<table>
<thead>
<tr>
<th>Species</th>
<th>1980</th>
<th>1985</th>
<th>1990</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cattle</td>
<td>127,000</td>
<td>111,600</td>
<td>95,000</td>
</tr>
<tr>
<td>Buffalo</td>
<td>2,000</td>
<td>2,600</td>
<td>600</td>
</tr>
<tr>
<td>Goats</td>
<td>2,000-6,000</td>
<td>6,000-10,000</td>
<td>15,000</td>
</tr>
<tr>
<td>Sheep</td>
<td>2,800</td>
<td>4,500</td>
<td>12,000</td>
</tr>
<tr>
<td>Chickens</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Broilers (commercial)</td>
<td>3,500,000</td>
<td>8,400,000</td>
<td>9,000,000</td>
</tr>
<tr>
<td>Layers (commercial)</td>
<td>120,000</td>
<td>100,000</td>
<td>200,000</td>
</tr>
<tr>
<td>Chickens (subsistence)</td>
<td>3,000,000</td>
<td>1,600,000</td>
<td>1.2-1.6m</td>
</tr>
<tr>
<td>Pigs (commercial)</td>
<td>1,100</td>
<td>1,800</td>
<td>2,000</td>
</tr>
<tr>
<td>Pigs (subsistence)</td>
<td>1,500,000</td>
<td>1,500,000</td>
<td>1.5-2.0m</td>
</tr>
<tr>
<td>Deer (feral)</td>
<td>&lt;100,000</td>
<td>&lt;100,000</td>
<td>80,000-100,000</td>
</tr>
<tr>
<td>Crocodiles (ranchered)</td>
<td>&lt;500</td>
<td>33,500</td>
<td>36,000</td>
</tr>
</tbody>
</table>

(a) Annual production  
(b) Number of sows

Papua New Guinea is remarkably free of major animal diseases. This is believed to be due to a combination of geography, history, strict quarantine and probably also to good fortune. None of the Office International des Epizooties (OIE) List A diseases occur in this country. The major emphasis of veterinary services is on preventive rather than curative medicine for all three agricultural sectors.

The greatest number of veterinarians employed in Papua New Guinea was nineteen in 1970. Since then, there has been a decline, which has been dramatic over the last few years, leading to the present acute shortage which affects both field and laboratory services. This is a consequence of a number of factors such as the government policy aimed at reducing the size of the public service due to the economic squeeze, with
accompanying restrictions on recruitment; this is in addition to non-competitive salaries and unattractive living conditions resulting from serious law-and-order problems in the country.

**Structure of government departments responsible for veterinary public health**

Prior to independence in 1975, government veterinary services were part of a single central agricultural department. After independence and the formation of nineteen provinces, the Veterinary Services and other agricultural sections devolved to largely autonomous provincial departments, leaving the much-reduced central department in a role of guidance and assistance only. Government Veterinary Services thus lost direct control of and responsibility for the provincial animal health and production services. However, some direct authority was maintained through regulatory services such as meat inspection and stock inspection, as the inspectors responsible for these activities continued to report directly to the central department on technical matters.

Since independence, the central or national department has been reorganised several times, with accompanying name changes, and has evolved into the present Department of Agriculture and Livestock, comprising seven divisions. The animal health and animal production sector forms part of two separate divisions: the Agricultural Protection Division and the Investment Division. This separation, unfortunately, has led to a tendency to view animal health staff as not concerned with planning, development and production, but to be consulted only after health problems have occurred.

The present organisation of the Department of Agriculture and Livestock is shown in Figure 10.

**Food hygiene and inspection**

The Acts of Parliament which govern veterinary public health include the following:

- the Slaughtering Act;
- the Animal Diseases and Control Act;
- the Quarantine Act.

These Acts are enforced by the Agricultural Protection Division.

Meat inspection is carried out by the Veterinary Field Services, which employ qualified meat inspectors at all major slaughter establishments. They also collect samples for laboratory examination. Village slaughtering is never inspected. All commercial livestock other than poultry is inspected at licensed slaughterhouses. Schedule II of the Slaughtering Act lists the requirements for licensing.

Under the Animal Disease and Control Act, there are Stock Inspectors or Veterinarians located in most provinces.

The Quarantine Act is the first line of defence against the introduction of foreign animal and zoonotic diseases. The main areas of activity include all ports of entry and the border between Australia, Indonesia and Papua New Guinea. The successful operation of this Act has contributed to preventing the introduction of rabies, schistosomiasis, etc.
FIG. 10

Organisation of the Department of Agriculture and Livestock in Papua New Guinea
The national Veterinary Laboratory carries out diagnostic work on samples sent in from slaughterhouses and from the field, and serves as a surveillance centre for animal diseases prevalent in the commercial livestock sector. On behalf of the Department of Fisheries and Marine Resources, the Laboratory also monitors the quality, including bacteriological levels, of marine products destined for export as well as some for local consumption.

Zoonotic diseases in companion animals are given low priority.

Livestock diseases – control, surveillance and eradication

Despite organisational and institutional barriers, the Veterinary Services continue to play an important role in livestock development and production, as well as in the health and welfare of livestock. In the latter role, the quarantine services, veterinary field services and veterinary laboratory sectors are key participants and liaise with relevant sections of the Department of Health on veterinary public health matters.

The following are some of the issues of particular interest to both the Agricultural Protection Division and the Department of Health, involving co-operation and participation in control, surveillance and eradication.

The tapeworm *Taenia solium*, the cause of taeniasis in man and cysticercosis (*C. cellulosae*) in both man and pigs, was introduced into Irian Jaya (Indonesia) in recent times and has become established in parts of the highlands of the province. Both the Division of Agricultural Protection and the Department of Health are very conscious of the serious implications this parasite would have for villagers in Papua New Guinea if it were to become established there. Stock and Meat Inspectors based in the two border provinces of Papua New Guinea, as well as staff of the Department of Health and mission hospitals, are aware of the potential problem and undertake monitoring in their respective fields. It is a difficult task, however, as traditionally there is much exchange and movement of people across the border and, in the case of pigs, virtually all are killed and eaten in villages without official inspection.

Trichinellosis, caused by *Trichinella* spp. was first found in Papua New Guinea in 1988 near the southern end of the border with Irian Jaya. Extensive monitoring of pigs slaughtered in various parts of the country has failed to disclose any other site of infection. The pathogenic larval stage is of the non-encapsulated type, but species identification of the parasite remains inconclusive. Stock Inspectors in the affected locality are continuing to collect samples of pork and also relevant tissue samples from other domestic and wild animals as part of the on-going investigation into the problem.

Surra, a disease caused by *Trypanosoma evansi*, is present in Irian Jaya and is one of the diseases monitored by joint surveys conducted by Papua New Guinea and Australia once or twice a year along the southern half of the border between Papua New Guinea and Indonesia. In the future it is proposed that the survey be extended to include the northern half of the border. So far, there is no evidence that surra has become established in Papua New Guinea.

Part of the work of the same joint survey involves the screening of livestock, including poultry, for a range of arboviruses at eight locations, including along the border with Irian Jaya. This serological monitoring has been in progress for two years and has revealed no significant pathogens.
The main poultry disease monitored in the border survey is Newcastle disease which occurs in Irian Jaya but not in Papua New Guinea.

Anthrax caused by a strain of relatively low pathogenicity in pigs is endemic, particularly in the highland provinces, but is of no significance as far as public health is concerned. Outbreaks are controlled by vaccination.

Brucellosis has been eradicated from Papua New Guinea but serological testing of cattle and pigs slaughtered at abattoirs is still carried out routinely.

Bovine tuberculosis has also been eradicated, except for a herd of buffalo imported from the Northern Territory of Australia a few years ago, which remains infected. The aim is to dispose of this herd, but animals which have escaped and become feral are complicating the programme.

Although "pig bel", a gastro-intestinal condition of humans caused by *Clostridium perfringens*, is basically a medical problem, there is a fundamental link to the consumption of pork under certain traditional circumstances, and this involves some liaising between the Department of Health and veterinarians. Food poisoning continues to occur due to various bacterial species including *Salmonella* spp., *Escherichia coli* and *Staphylococcus* spp.

**Training**

Compared to the medical profession, the veterinary profession appears to be unattractive to Papua New Guinea students; only a few have shown interest in pursuing a veterinary career, and only three have actually graduated to date. One of the three is pursuing an MSc course in Australia and another, having completed an MSc degree, is currently employed also in Australia. One Papua New Guinea student is expected to graduate from New Zealand this year and, it is hoped, will return to the national Veterinary Laboratory. There is, at present, only one potential undergraduate for 1992. Papua New Guinea will thus be dependent on expatriate veterinary officers for many years to come. Under the present conditions, it is proving particularly difficult to recruit to key senior positions.

Training of auxiliary staff, including quarantine staff, is carried out both at in-service centres and overseas. New Zealand has assisted with instruction on various aspects of quarantine and also with the training of field staff linked to the sheep project, due to the close association of New Zealand with the promotion of sheep farming in Papua New Guinea.

Aid is made available by the Australian government in the form of sponsorships and scholarships in a range of rural and technical fields. Australia is also involved, through its quarantine and inspection service (AQIS), in collaborative disease surveys in Papua New Guinea.

**ACKNOWLEDGEMENTS**

The information contained in this chapter is derived from reports prepared by the following:

- Dr A. Ningiga, Agriculture Protection Division, Department of Agriculture and Livestock, Papua New Guinea.
The Director of Animal Health, Directorate General of Livestock Services, Department of Agriculture, Indonesia.

Dr Saleha Abdul Aziz, Faculty of Veterinary Medicine and Animal Science, Universiti Pertanian, Malaysia.

Dr Abdul Aziz bin Mangkat, Director, Veterinary Public Health Section, Ministry of Agriculture, Malaysia.

The Deputy Director, Department of Animal Husbandry, Ministry of Agriculture, People’s Republic of China.

Dr Ok-Kyung Kim, Director, Animal Health Division, Ministry of Agriculture, Forestry and Fisheries, Republic of Korea.

Dr Rentaro Itoh, Director of Veterinary Sanitation Division, Environmental Health Bureau, Ministry of Health and Welfare, Japan.

In addition, Mrs B. Royds is thanked for typing preparation of this manuscript.

**

ORGANISATION DE LA SANTÉ PUBLIQUE VÉTÉRINAIRE DANS LA RÉGION DU PACIFIQUE OCCIDENTAL. - C.R. Wilks et P. Madie.

Résumé: Les informations portant sur l'organisation et les activités de santé publique vétérinaire dans le Pacifique occidental ont été recueillies auprès des Services gouvernementaux des pays intéressés. Cette région présente une grande diversité géographique et démographique; les pratiques agricoles, les structures sociales et la prévalence des maladies diffèrent aussi selon les pays. En dépit de ces variations, les pays s'accordent à reconnaître l'importance de la santé publique vétérinaire dans le domaine de l'hygiène alimentaire et du contrôle des zoonoses. Les auteurs décrivent les contraintes budgétaires et sociales et les insuffisances en personnel qui empêchent certains pays de consacrer les ressources souhaitables à ces activités.

MOTS-CLÉS: Hygiène alimentaire - Santé publique vétérinaire - Services de laboratoire - Services gouvernementaux - Zoonoses.

**

ORGANIZACIÓN DE LA SALUD PÚBLICA VETERINARIA EN LA REGIÓN DEL PACÍFICO OCCIDENTAL. – C.R. Wilks y P. Madie.

Resumen: Las informaciones relativas a la organización y a las actividades de salud pública veterinaria en la región del Pacífico occidental han sido suministradas por los Servicios gubernamentales de cada país. Los países de esta región son heterogéneos en su geografía, demografía, prácticas agropecuarias y estructuras sociales; la prevalencia de las enfermedades también difiere según los países. A pesar de estas variaciones, se admite la importancia de la salud pública veterinaria, tanto para la higiene alimentaria como para el control de las zoonosis. Sin embargo, no todos los países disponen de los recursos suficientes para llevar a cabo estas actividades; se analizan los constreñimientos de índole económica y social y las necesidades en recursos humanos.

PALABRAS CLAVE: Higiene alimentaria - Salud pública veterinaria - Servicios de laboratorio - Servicios gubernamentales - Zoonosis.