Pan American Health Organization

ADVISORY COMMITTEE ON MEDICAL RESEARCH

Eighth Meeting

Washington, D.C., 9-13 June 1969

Item 11.2 of the Agenda

THE SOCIAL AND ECONOMIC CONSEQUENCES OF ZOONOSES

(Wasted Resources)

Ref: RD 8/13

2 June 1969

PAN AMERICAN HEALTH ORGANIZATION
Pan American Sanitary Bureau, Regional Office of the
WORLD HEALTH ORGANIZATION
Washington, D.C.

THE SOCIAL AND ECONOMIC CONSEQUENCES OF THE ZOONOSES*

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(Wasted Resources)

The lack of application of available knowledge is among the greatest weaknesses of Latin America, Africa, and Asia today. This is especially obvious when we consider diseases in man and animals. The losses attributed to diseases common to man and animals are astronomical. The attached Chart (fig. 1) entitled "Epidemiological Aspects of Some of the Zoonoses" lists more than 100 diseases which affect health both human and animal, of practically all the underdeveloped, some of the developing, and even some advanced nations. The President pointed out in his International Health Message in 1967 that animal disease problems plague three-quarters of the world's rural population. The animal and human populations of the world are enumerated. (fig. 2). It is estimated that more than half of the world's human beings still reside in rural areas, and many work and live with their animals. It has been found by the Food and Agriculture Organization of the United Nations and the World Health Organization that animal diseases are major health problems on every continent. It is impossible to review all the zoonoses, but let us look at a few.

ANTHRAX

Anthrax is one of the oldest recognized diseases of animals known to affect man. Virgil in the Georgics (1) describes the disease in such terms that no one can mistake it.

> And now they died by whole companies, the corpses rotting
> with vile decay lay piled in the very sheep-folds, till men
> had learnt to put them in pits, covered with earth.
> The hide was no good, and no man
> Could cleanse the carcase in water or burn it up with fire:
> You could not even shear the fleece it was so corroded
> with the foul pus, or work that rotten wool in the loom:
> But if you were so foolhardy as to wear the hideous garment,
> Inflamed pustules and a noxious-smelling sweat appeared
> All over your limbs: not long then
> Before the fiery curse ate up your tettered frame.

(1) The Georgics of Virgil. Book #3 lines 555-566. OxfordUniv. Press, New York 1947

*Prepared for the VIII Meeting of the PAHO/ACMR by Dr. James H. Steele, Veterinary Public Health, National Communicable Disease Center, Public Health Service, U.S. Department of Health, Education, and Welfare, Atlanta, Georgia, USA.

For the next 2,000 years, anthrax took its toll on human and animal health. Today the advanced countries have the disease under control, but vast areas of the Americas, Africa, and Asia still suffer dreadful losses. A world survey a decade ago estimated that 25,000 human cases occurred annually. The WHO /FAO Expert Committee on Zoonoses in their 3rd Report estimated the number to be considerably higher. As to losses in animals, it is difficult to develop any reasonable estimate. Representatives from South America and Africa reported to the Expert Committee that Anthrax was a major health problem on both continents, that it affected thousands of animals and destroyed millions of dollars worth of animal products every year. The question is, Why? - with the superior vaccines that are available. The answer is a lack of vaccine and even more important, often it is the effectiveness of the vaccine. Many countries have no means of supervising vaccine production, and the poor quality vaccine results in loss of confidence and in disease and suffering. The resources wasted, both human and animal, are enormous.

BRUCELLOSIS

Brucellosis is one of the major zoonoses of the world. The disease, like anthrax, was known in ancient times, but it was not until the beginning of the present century that epidemiology of brucellosis was understood. The losses to developing societies are frightful.

Epidemiologists and public health specialists in Latin America have estimated that more than 100,000 new human cases occur annually. The animal losses measured by calf and kid crops, milk production, and sterility run into hundreds of millions of dollars in the Americas. What the losses are on other continents is difficult to calculate, but they equal or exceed those

of the western hemisphere. The lack of good vaccines for cattle and goats is a major problem in many countries. Even though strain 19 brucella vaccine has been quite effective in North America and Europe, Latin America has not been able to inaugurate bovine brucellosis control. As to caprine brucellosis, little attention has been given to control because most goats are owned or kept by the poorest farmers, who are frequently nomads. The Elberg-Meyer vaccine, Rev 1, has been proven in Malta, Spain and Iran. A large-scale demonstration control project is planned in Peru, with some vaccine being provided by the University of California.

Perú suffered a severe epidemic of brucellosis in 1967; some 3,000 or more cases occurred in the greater Lima area. In 1968 there was a similar but smaller epidemic. The losses as measured by increased medical costs for human care amounted to almost $1,000,000 during the epidemic peak late in 1967. In many southern countries, the human incidence of brucellosis is considerably higher than in Peru, and the losses are greater. None can afford to continue to waste their limited resources.

SALMONELLOSIS

Salmonellosis is a pandemic problem affecting most of the world. There is hardly a country or a continent that does not know the toll of salmonella-induced infections and disease. The losses in advanced countries are staggering; what they may be in developing and under-developed areas is not known, except that they are greater. In the United States, more than 20,000 bacteriologically proven cases are reported to the NCDC annually, but this is thought to be only 1 to 2 percent of the total number of human cases. Fortunately, the case fatality rate is low, but there are deaths, usually among the newborn or the aged and debilitated. The incidence of disease in tropical countries is known to be high in all species. The

control of salmonellosis in man and animals has no easy solution. There are no effective vaccines or drug therapy. The answer today is based on good management, clean water, pathogen-free feeds, and elimination of carrier animals. A good vaccine or an effective antibiotic is needed for all gram-negative infections but particularly the salmonella infections.

TUBERCULOSIS

Animal tuberculosis is a major animal health problem. The losses are staggering. It has long been known that animals with tuberculosis have 30 per cent less milk production, and similar amounts of meat are lost. In a recent survey of South America, it was found that the incidence of bovine tuberculosis ranged from 10 to 40 per cent, and in some big city milk-sheds the infection rate was as high as 75 per cent. The same report estimated the overall incidence at 12 percent. South America has over 166 million cattle, hence close to 20 million animals can be expected to have tuberculosis. Fortunately the incidence of bovine tuberculosis in man is not as high because milk is nearly always boiled, and cattle are not housed in barns as in Europe and North America. Regardless, the losses are shocking - 20 million diseased animals whose production and value is decreased 30 per cent or more by disease! The cost could be over a billion dollars if the loss for each animal is estimated at only $50 per head. No country or world can afford such waste of their resources.

PARASITIC DISEASES

The parasite load of the animals of the world is estimated to be more than two pounds of parasites for large animals. The money losses caused by parasitic disease in animals exceed all the foreign aid extended by the advanced countries of Europe and North America, which is more than $3 billion. Examples include many different diseases.

Trypanosomiasis is epizootic in most of Africa below the Sahara, affecting the economy of an area of four million square miles, much of which cannot maintain animals because of disease. Control is costly; likewise, treatment is expensive. The disease is a great drain on the limited resources of the poor nations.

Beef and pork tapeworms are big disease problems in almost every developing or underdeveloped country. The incidence of human taeniasis is second only to that of cattle and swine. In some areas the annual incidence in man exceeds 100 percent. Some persons have reinfections. Unfortunately the losses in animals are hard to measure because even though the flesh may be encysted, it is used for food in many countries because no one would condemn the meat. Regardless, the losses are great - more waste.

Hydatid disease is another tapeworm problem which affects millions of cattle, sheep and even pigs in the Americas, Asia, Africa, and Australia. The number of human infections is calculated in the hundreds of thousands, while the rate of parasitism in food animals is high in many areas. Unfortunately there is no really effective means of controlling the disease except by control of dogs and their worms. There is an urgent need for a good vaccine or taenicide to prevent or limit dissemination of infectious ova. The medical cost of human care and surgery is sizeable in many countries where the disease is endemic. The control of dog populations by chemical means may provide a solution - the indiscriminate breeding of dogs is no longer acceptable, especially if it leads to further waste of resources.

RICKETTSIAL INFECTIONS

The animal rickettsial diseases have not caused any undue apprehension until the recent discovery that cattle and goats may be part of the reservoir

of typhus fever in Africa. Q fever is a worldwide zoonosis. It seems to be a latent disease that seldom produces clinical signs in cattle, sheep, or goats, but can cause serious disease in man leading to death. Other animal rickettsial diseases are limited to certain geographical areas where they cause considerable loss and waste.

VIRUS DISEASES

The viral diseases may constitute the most important group of diseases that affect man and animals. Losses attributed to arthropod-borne diseases are spectacular in many countries. The encephalitides of man and animals are known throughout the civilized world. The toll they have taken in recent years is impossible to calculate -- the cost of prevention and treatment runs into the millions.

Venezuelan encephalitis this past year killed and debilitated thousands of animals and hundreds of people in South America. The disease has now spread all around the Gulf of Mexico and the Caribbean Sea. How much it costs each year no one knows, but it wastes both human and animal resources.

Vesicular stomatitis is now a well recognized zoonosis that is found the length of the Americas and will cause great concern wherever it appears because of its similarity to foot and mouth disease.

Foot and mouth disease is no doubt the most expensive animal health entity in the world. The losses in South America approach a billion dollars. The market loss alone is estimated at more than one -half billion dollars. Losses on the farm or ranch in abortions, calf mortality, range losses, and sterility are of a similar magnitude. The need for good vaccines that will lead to control is the most pressing problem facing the animal industry of South America. The disease in Africa takes an enormous toll. In Asia, including mainland China, big losses are reported annually for all countries except Japan and Taiwan. These two countries will not import meat from places where foot and mouth disease exists. If the foot and mouth disease problem could be controlled and eradicated, the need for continued aid would be done away with in many countries. Until then the toll on society continues. The waste due to foot and mouth disease is great. How long will it continue and threaten our resources?

Rabies is usually thought of as a public health problem, but in the Americas it is a costly farm animal problem. The loss in the United States is insignificant when compared with Latin America's losses.

1967, was the first year in recorded U.S. Public Health history that there was no indigenous human death from the disease, but to the south, deaths numbered in the hundreds. Livestock losses in all the Americas are considerable, but the losses for Mexico and Brazil exceed all others. Mexico believes that vampire-bat-transmitted rabies among cattle costs that country alone hundreds of thousands of dollars. Brazil has a similar problem. Both countries are greatly concerned with

the quality of vaccine available. The United Nations special project fund surveyed the Americas a few years ago and reported that probably a million or more food animals die of rabies annually. The value of these animals is at least $100 per head, so the minimum loss is at lease $100 million annually -- besides the human fatalities and anguish. Rabies is an important contributor to wasted resources.

The disease problems mentioned are of major importance in themselves as they relate to human and animal health, but their effect on society does not stop there. The profit and income losses due to disease have a far greater effect that we realize. If the owner of a ranch or farm does not succeed, the workers cannot improve their lot, and the community suffers in turn. There are fewer commodities to be processed and traded, there is less business, there are fewer persons to carry the tax load, and social problems, i.e. education, health, and housing, cannot be resolved. Animal industries have probably the oldest form of organized labor in the world. At least one-half the world is dependent on developing industry to feed and clothe their people until they can develop other industries. To succeed, a realistic animal health program is needed, with a sound biological and pharmaceutical industry as the base. No veterinary services can hope to resolve their respective problems unless they have access to proven available knowledge and the means to apply the knowledge. No country can advance without technology and its application, nor can any country continue to waste its human and animal resources.

Fig. 2

ANIMAL AND HUMAN POPULATIONS

(Numbers in Thousands)

Continent	Cattle	Goats	Horses	Sheep	Swine	TOTAL	Man*
Africa	131,295	115,271	3,804	143,348	6,092	399,810	322,820
South America	184,078	27,828	16,799	124,590	76,850	430,145	190,568
Central America	23,199	2,902	2,090	1,356	7,620	37,167	42,041
North America	155,000	17,191	8,247	31,316	73,523	285,277	278,320
Europe	219,625	18,862	16,950	267,479	179,148	702,064	702,747
Asia	346,817	198,732	15,685	245,120	249,970	1,056,324	2,067,441
Oceania	26,447	164	635	221,759	3,555	252,560	15,538
TOTAL	1,086,461	380,950	64,210	1,034,968	596,758	3,163,347	3,619,475

Source: FAO-WHO-OIE Animal Health Yearbook, 1967.

* The 1967 population projections for man were compared to those made by the U.S. Census Bureau, the United Nations, and other organizations.