

# A Rabies Control Program in Ohio

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THE TASK of delineating human populations at risk of contracting a given disease is not too difficult provided adequate diagnostic tools and reporting procedures are available. The accurate vital statistics currently maintained by most official health agencies allow determination of morbidity and mortality rates with breakdowns by age, sex, race, residence, and other pertinent characteristics for the majority of our common diseases, both communicable and noncommunicable.

In domestic animals, however, an entirely different situation prevails. Definitive diagnosis is just as important in the practice of veterinary medicine as it is in human medicine. However, economic factors, which play a greater role in veterinary medicine, often preclude the use of more sophisticated diagnostic procedures, thus preventing an accurate determination of the cause of illness or death.

Another obstacle blocks attempts at gathering accurate data on the zoonoses. Many infectious diseases transmissible to human beings either pass unnoticed by the owner of an animal or are a diagnostic enigma to the practicing veterinarian. Q fever, to the best of our knowledge, causes no clinical illness in domestic animals (1); trichinosis is rarely diagnosed clinically in swine (2); and psittacosis may go undetected for weeks or months in psittacine birds (3).

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A classic exception to this statement is rabies, in which the usual clinical symptoms are quite striking and almost invariably end in death in both human beings and animals. The disease as it occurs in bats may belie this, for present evidence strongly indicates that the order Chiroptera is capable of harboring the rabies virus for long periods without dying and occasionally without evidencing clinical illness (4).

Once a diagnosis has been obtained, there are still many difficulties in getting the necessary statistics, since relatively few areas have a well-developed system for reporting the morbidity and mortality of domestic animals. Even these areas have difficulty formulating baseline data on animal populations. Numbers of animals, age and sex distributions, and age-specific death rates are unobtainable, even for purebred registered livestock.

Another complicating factor is the relatively short lifespan of domestic animals. When we realize that much poultry reaches market at the early age of 10–12 weeks, lambs at 4–5 months, swine at 5–5½ months, and cattle at 12–18 months, it becomes apparent that the disease experiences of these animals occur over an extremely short period.

Among commercial livestock, only with breeding animals and dairy cattle do we have a sufficient age differential to add materially to our knowledge of the natural history of disease. And in these animal populations, man has drastically altered the normal sex ratio.

Our companions, the dog and cat, despite all our efforts to prolong life, are totally unable to cope with the nemesis of civilization, the automobile. The mean lifespan of these animals is estimated at less than 5 years (5).

Factors such as these necessitate a somewhat different approach to the task of defining and coping with animal populations at risk of disease than that followed with human populations. The zoonoses are peculiar in that human-to-human transmission is rare. Human beings become infected only as a side chain and are of minor importance as reservoirs. Thus, to prevent human infection, we must control the disease in animals (6).

Since rabies is one of the zoonoses in which the diagnosis is somewhat less difficult and reporting of cases is relatively accurate, it might be of interest to review a recent experience with this disease in Ohio. Because man lives in much more intimate contact with dogs than with any of the other common transmitters of rabies, the primary concern is the elimination of canine rabies, for, according to Lepine (7), 86 percent of the human cases of rabies are contracted from dogs.

One of the prime considerations in disease control is surveillance. No outbreak can be controlled unless it is first recognized. One technique of surveillance is spot mapping cases to disclose geographic foci of infection. Figure 1, depicting the total number of cases of animal rabies in Ohio in 1955, shows an enzootic area in the extreme southern portion of the State, primarily in Lawrence and Scioto Counties. In that year, 243 cases were reported throughout the State, 141 in dogs.

A comparison with figure 2, the 1956 rabies cases in Ohio, indicates an increase in both the total (300) and the cases in dogs (214). The disease had spread into two contiguous counties, Jackson and Pike. In 1957, rabies continued to be the most serious in the original two counties and in those neighboring counties to which the enzootic had spread (fig. 3).

In the 3-year period (1955-57) Jackson, Lawrence, and Scioto Counties with less than an estimated 1 percent of the State's dog population (based on human population figures) were responsible for 65 percent of the reported cases of canine rabies. In 30 of the 36 months, cases from these three counties equaled or exceeded the total number from the other 85 counties of the State.

A breakdown of the animal species with the disease during the 3-year period in these three

Figure 1. Locations of 243 cases of animal rabies (141 in dogs) reported in Ohio, 1955



counties revealed that more than 95 percent of the reported cases were in dogs, with most of the remaining 5 percent in wildlife. Investigation of individual case reports showed that nearly one of every four cases of rabies was in a stray dog.

The situation was complicated by lack of public awareness or concern.

The approach to rabies control in this situation was fourfold: education, immunization, control of strays, and surveillance of wildlife. Control programs were started in the three counties between April 1957 and May 1958.

### Education

Because apathy is more difficult to overcome than ignorance, the educational approach, in addition to stressing the public health dangers, emphasized the fact that considerable sums of money had been expended in these counties on antirabies treatment of exposed individuals. This expenditure, continued in 1958, was contributing nothing toward the elimination of the reservoir of the disease.

According to the county auditor's records, in one county with a population of less than 54,000, more than \$4,000 had been spent for

**Figure 2. Locations of 300 cases of animal rabies (214 in dogs) reported in Ohio, 1956**



**Figure 3. Locations of 288 cases of animal rabies (153 in dogs) reported in Ohio, 1957**



antirabies treatment and supplementary medical care for 110 persons during the 3-month period January–March 1958. (A fee of \$2 per injection was charged for the course of treatment.) However, the situation was growing worse, and in February 1958 there was a human death caused by rabies. These data and objective facts about rabies were presented to the public through the usual mass communications media.

Since a large proportion of the dogs in Ohio are children's pets, we decided to concentrate one phase of the educational effort in the public school system. A total of 40,000 children, approximately 90 percent of the total enrollment of Jackson, Lawrence, and Scioto Counties, attended a special program, consisting of a description of the situation, a movie on rabies, a question and answer period, and the distribution of fact sheets. These programs in the schools took place 2 or 3 days before a vaccination clinic for animals was scheduled for that area. It is our feeling that the school programs were effective in getting publicity on the rabies control efforts into the homes and that they were probably the most successful phase of the educational approach.

The remainder of our efforts, like many other

communicable disease control programs, were designed to separate susceptible animals from shedding animals, that is, to break the chain of infection.

### Vaccination Clinics

The vaccination clinics were operated on the premise that the person with sufficient sense of responsibility to obtain a dog license will immunize and confine his pet when he learns rabies exists in the area. Our objective was to vaccinate the unlicensed dogs. To eliminate obstacles and make it as convenient as possible for owners to cooperate, at least two mass clinics were held in each area of population concentration. Licensure was not necessary for immunization at these public clinics. The cost of immunization was low. The vaccine was purchased by the county commissioners and administered by local veterinarians for a \$1 fee per dog. Chick embryo vaccine was used at the clinics.

Since two of the counties with a high rabies incidence had only one practicing veterinarian, every effort was made to conduct the clinics as efficiently as possible. Local and State health department and volunteer personnel assisted

and approximately 100 dogs per hour were handled without difficulty. Clerical and manual assistance from local service clubs and women's clubs created a feeling of community participation in the clinics.

The clinics were conducted in essentially the same manner throughout the three counties. Every effort was made to publicize each clinic in advance and to hold them in such locations that everyone was within reasonable proximity of at least one clinic.

In Lawrence County, with 49,000 people in 456 square miles, it was necessary to schedule 26 clinics because of the scattered population and bad weather and poor roads at that time of year. Despite these handicaps, a total of 5,670 dogs and cats were vaccinated at the clinics, and more than 500 other animals by private practitioners during March 1958. At only one clinic were fewer than 100 animals vaccinated. Thus, more than 6,000 animals were immunized in Lawrence County during 1 month, although the county had issued only 2,897 dog licenses during 1957.

### Control of Strays

A countywide 90-day quarantine was the first step in intensifying the control of stray animals. Any dog found running loose was impounded regardless of licensure or immunization status, and none was permitted to leave the pound without first being immunized.

The dog warden was thoroughly indoctrinated with the importance of his work in the control effort and the necessity of his thoroughly understanding all the effects of rabies.

Local police officers assisted the regular warden in picking up stray dogs. Home call service for unwanted pets was started to de-

crease the practice of dropping the animals along the roadside where they would become strays to be captured later. Revamping the dog-holding facilities was necessary to permit greater segregation of suspect animals.

### Wildlife Surveillance

In these counties rabies in wildlife did not appear to be an immediate threat despite an apparently numerous wildlife population. This phase of the rabies control program was confined to surveillance. Whenever possible an accurate, definitive diagnosis on wildlife deaths was sought, and reports of wildlife seen acting in a suspicious manner were investigated.

### Evaluation

In a program of this nature, we can evaluate the results only by comparing the incidence of cases before and after controls have been implemented. Other factors such as the normal seasonal fluctuation of a disease may affect the results.

However, in this three-county area enzootic rabies had prevailed for years, with an average of 109 cases of canine rabies annually for the 1955-57 period. Moreover, in the 5 previous years, the incidence of rabies had been unusually high, although varying in intensity from year to year.

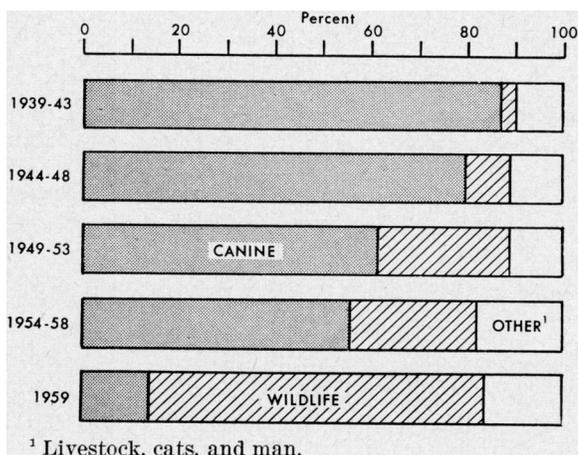
In the beginning, the center of the enzootic area seems to have been Lawrence and Scioto Counties, with the disease slowly growing in intensity and spreading into surrounding counties. During the 1955-57 period the number of human exposures to rabies grew to such a size as to create an intolerable public health situation, and in 1958, two persons died from rabies

**Effect of organized control programs on canine rabies in three Ohio counties**

County	Date of program	Number vaccinated in program	Number dogs licensed, 1957	Number cases 12 months preceding	Number cases 12 months following	Months since last case <sup>1</sup>
Jackson.....	April 1957.....	5, 070	2, 803	69	7	32
Lawrence.....	March 1958.....	6, 170	2, 897	40	1	24
Scioto.....	May 1958.....	3, 800	7, 829	33	1	19

<sup>1</sup> As of January 1, 1961.

**Figure 4. Species distribution of rabies cases reported in Ohio, 1939-59**



in Ohio, one death occurring in the three-county area and the other in a nearby county.

The table compares the incidence of canine rabies for the year before and the year following a countywide control program. For purposes of evaluation the following year was a 12-month period starting a full month after the control program in a particular county had ended. (Maximum immunity following vaccination takes 3 to 4 weeks to develop.)

Investigation revealed that at least two of the Jackson County cases in the year following its control program actually originated in the surrounding counties that lacked such organized programs. Scioto County had attempted partial control programs in 1956 and in 1957, when 5,000 dogs were vaccinated, but the number of vaccinations performed was apparently insufficient to control the disease effectively. Although the programs may have had some beneficial effect, the numerous dog population required a larger number of immunizations than were performed.

In addition, Scioto County, adjacent to other enzootic areas without control programs, permitted infected animals to enter the county. More than 90 percent of the Scioto County cases occurred in the eastern half, adjacent to Jackson and Lawrence Counties. The Scioto River, flowing north to south, apparently formed a natural barrier which was relatively effective in preventing spread of rabies to the western half of the county.

The three-county area has had only two cases of canine rabies in the 24 months since the last control program was concluded in June 1958. The number of human exposures has been negligible compared with the hundreds who received treatment annually before the control efforts.

The decline of rabies in this area has meant a drastic reduction in the number of canine rabies cases for the entire State. The 1953-57 mean of 152 dropped to 71 cases reported in 1958, 15 in 1959, and 9 in 1960. Only 22 cases of canine rabies were reported for all of Ohio in the 12 months following the last program.

This change in incidence has so altered the species distribution of rabies in Ohio (fig. 4) that the major emphasis in control is being shifted from the canine to the wildlife population. In 1959, 70 percent of the cases were in wildlife and only 14 percent in dogs.

### Summary

Economic factors, undiagnosed illnesses of animals, and their relatively short lifespan hamper efforts to gather vital statistics on the zoonoses. Rabies, at least in most animals, is the classic exception to this.

Enzootic rabies in a southern Ohio area accounted for 65 percent of the State's reported cases of canine rabies for a 3-year period. Hundreds of persons received antirabies treatment, but little was done to eliminate the reservoir of the disease.

Control programs were conducted between April 1957 and May 1958 in Lawrence, Jackson, and Scioto Counties. To combat public apathy, the cost of treatment as well as the threat to public health was stressed. Programs in the schools alerted children and their families to the situation and publicized vaccination clinics for unlicensed dogs.

At the clinics, held wherever there were population concentrations, pets were immunized for a \$1 fee at the rate of 100 per hour. In Lawrence County more than 6,000 animals were immunized, although the county had issued less than half that number of dog licenses the previous year.

Only two cases of canine rabies have occurred in the three counties since the control programs

ended, and, in Ohio, the species distribution of rabies has been drastically altered. Major emphasis in control in the State is being shifted from the canine to the wildlife population.

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## Challenges of the Sixties

"Challenges of the Sixties" was the theme of the 11th annual meeting of the Middle States Branch of the American Public Health Association held April 27-29, 1960, in Indianapolis, Ind. Among resolutions adopted at the meeting, the Middle States Branch included the following recommendations:

- Assumption of responsibility by every professional discipline concerned with public health programs for increasing the knowledge of accident prevention among its professional workers.
- Assignment by the health officer to one staff member of the responsibility for coordinating accident prevention activities of the public health team.
- Inclusion of nutrition, dental health, and rehabilitation in home care programs that are cognizant of the needs of children and adolescents as well as of older age groups.
- Development or extension of community programs to meet the nursing care needs of patients in their own homes, with continual evaluation by the public health nursing profession and other public health disciplines in terms of patients' needs.
- Development of guidelines by State official and voluntary health agencies for establishing homemaker or housekeeper programs.
- Application of health education skills to support sound accounting, performance evaluation, budgeting, and promotion of health programs.
- Study of costs of sanitation services to provide guides for communities and health departments as an aid to programing and financing, with emphasis on man-hours rather than cash.
- Expansion of training courses in radiological health.
- Encouragement of comprehensive State programs for rehabilitation by establishment of a central State planning and coordinating agency; promotion of the rehabilitation concept in nursing education and services; and inclusion of nutrition and dental health in rehabilitation programs.
- Provision of training in rehabilitation techniques by States with rehabilitation facilities in hospitals or other agencies.