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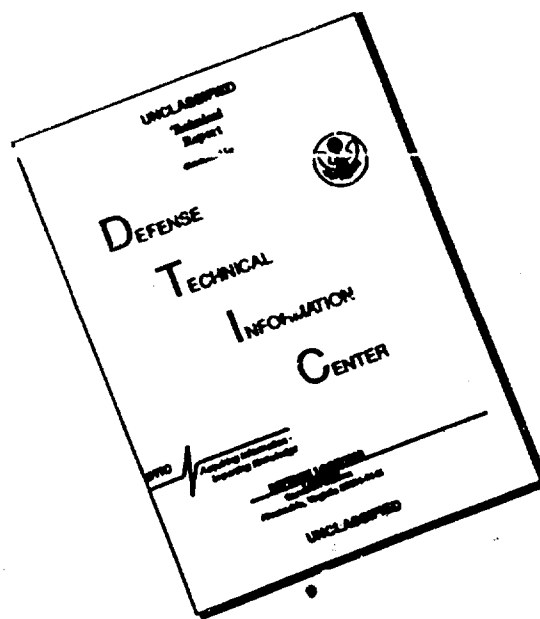
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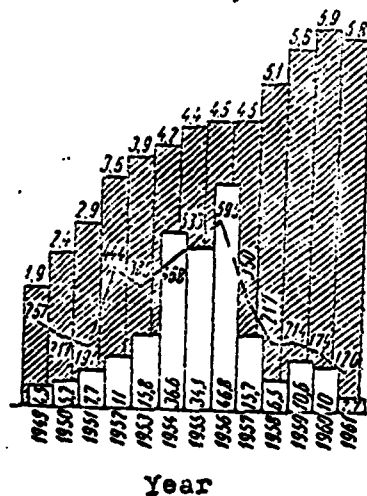
EXPERIENCE IN THE CONTROL OF BRUCELLOSIS  
IN STAVROPOL'SKIY KRAY

(Following is a translation of an article by  
A.N. Likhonos of the Stavropol'skiy Kray Sanitary  
Epidemiological Station in the Russian-language  
periodical Zhurnal mikrobiologii, epidemiologii,  
i immunobiologii (Journal of Microbiology,  
Epidemiology, and Immunobiology), No 6, 1963,  
pages 3-8. The article was submitted on 25 May  
1962.)

In analyzing the epidemiological and epizootic  
state of brucellosis in Stavropol'skiy Kray it is possible  
to distinguish two periods.

The first period was the entire post-war period to  
1956 when brucellosis became widespread among sheep and  
cattle. The frequency of the detection of sheep infected  
with brucellosis in the kray increased from 0.3% in 1950  
(based on allergic reaction) to 1.5% in 1956 (based on  
multiple tests). The incidence of brucellosis among human  
beings remained at a high level throughout the entire  
post-war period in Stavropol'skiy Kray and increased  
almost each year up to 1950.

The second period was a period of gradual improve-  
ment of the epizootic conditions in the kray along with  
a steady annual lowering of the incidence of the disease  
among human beings, despite an increase in the number of  
sheep (Figure 1).



- Incidence of the disease among human beings
- Number of brucellosis-infected sheep (in thousands)
- ▨ Number of sheep in the kray (in millions)

Figure 1. Dynamics of the incidence of brucellosis among human beings, the state of the brucellosis epizootic situation in sheep, and the increase in the number of sheep in Stavropol'skiy Kray for 13 years.

The main source of brucellosis in the kray has been sheep. Thus, during the last 10 years 83% of all the new cases of brucellosis have been connected with infection from sheep. Cattle have been the source on an average of 5.3%, and goats have been the source in 3.1% of the cases (Figure 2). It should be noted that during the last 3-4 years the relative weight of cattle as the source of infection has increased (to 20.8% in 1960). This is explained basically by the migration of *Br. melitensis* from sheep to cattle. Infection with brucellosis from swine has been recorded only in individual cases.

The infection of human beings with brucellosis occurs in the majority of cases as a result of contact with animals during the process of caring for them. Only 3.3% of all the recorded cases have been a result of alimentary infection.

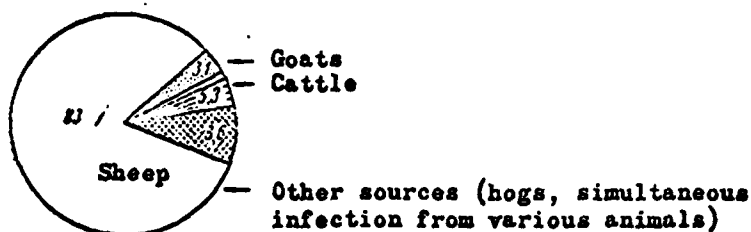


Figure 2. Sources of the infection of people with brucellosis in Stavropol'skiy Kray according to the data for 10 years (average figures in percentages with respect to the total number of new occurrences).

A characteristic of the epidemiology of brucellosis in Stavropol'skiy Kray has been the predominant infection of working groups involved in caring for animals, especially sheep. The greatest number of occurrences have been observed among shepherds and various other brigade workers, including personnel drawn for work during the lambing period (Figure 3).

During the first period medical and veterinary personnel conducted extensive work which, given the very severe epizootic conditions, to some degree restrained the increase of the incidence of the disease among people. A most important tactical error in the conduct of anti-brucellosis measures during this period was the fact that medical workers devoted their basic attention to areas and farms where the situation with respect to brucellosis was

unfavorable, i.e., they followed the tact of putting out fires. As a result, on the farms where the situation was unfavorable it was possible to achieve a lowering of the incidence of the disease, whereas on other farms where the situation had previously been considered to be favorable or relatively favorable, new epidemic outbreaks occurred.

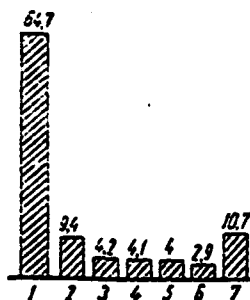


Figure 3. Breakdown of persons suffering from brucellosis in Stavropol'skiy Kray according to type of work (data for 10 years in percentages of the total number of new occurrences).

1 -- shepherds, sackmen, temporary workers (for the lambing period), shearers; 2 -- persons having domestic cattle at their personal disposal; 3 -- workers at meat plants and other enterprises; 4 -- other livestock workers (recorders, brigade leaders, etc.); 5 -- veterinary workers; 6 -- cowherds, cattleyard workers, milkmaids; 7 -- others.

During the second period, beginning in 1957, a lowering was achieved in the incidence of new cases of brucellosis. In comparison with 1956, the incidence of the disease was lowered by 38.4% in 1957 and by 62.2% in 1958. The lowering of the incidence of the disease during these years was connected to a considerable degree with the improvement of the epizootic conditions of brucellosis in sheep.

Along with the work on the active foci of brucellosis, great attention was devoted to this period to the organization and accomplishment of a complex of preventative

measures in the rayons and on the farms where the situation was favorable with respect to brucellosis. At the beginning of 1957 the kray executive committee proposed the accomplishment of a series of measures to protect people from brucellosis on the farms where conditions were favorable. Each year during the epidemic and pre-epidemic periods 30-40 epidemiological detachments and individual specialists who gave practical help to the medical personnel on the scene in organizing and conducting the entire series of antibrucellosis measures were sent to the rayons of the kray. The strictness of the medical workers towards individuals guilty of infractions of rules was increased sharply.

Along with this, educational work among the population and instruction on the prevention of brucellosis were begun.

In 1959, a further lowering of the incidence of brucellosis was not achieved and it remained almost at the level of 1958. The fact was that the epizootic situation with respect to brucellosis again became worse in the kray in 1959. The sanitary veterinary measures were disrupted to a considerable degree due to the epizootic conditions of stomatitis aphthosa which enveloped the entire kray.

In addition, in 1958-1959 the majority of sheep farmers shifted to three lambings in two years, in connection with which the length of the epidemic period was lengthened considerably, which disrupted the periods for conducting vaccinations among the people.

Thus, the level of the veterinary and medico-sanitary measures which had provided a considerable lowering of the incidence of brucellosis among human beings for the epizootic conditions of 1957-1958 was insufficient in order to produce a further lowering under the conditions of 1959 and only prevented a new substantial rise.

The problem of the control of brucellosis in the kray was discussed in the bureau of the kray committee of the CPSU which adopted an appropriate decision. The latter helped to a considerable degree in the subsequent control of brucellosis.

Considering the unfavorable epizootic situation, broader use was made of inoculations with live vaccine

against brucellosis. All measures to increase the effectiveness of the vaccinations were adopted; careful control over the proper storage of the vaccine was organized; all series of the vaccine were checked prior to being distributed to the rayons in the department of especially dangerous departments where a determination was made of the survival of the Brucella organisms; selective checks were made on the vaccine issued to medical sectors and points manned by medical assistants.

In 1958-1959 a careful investigation was introduced in cases of the occurrence of brucellosis among persons who had been vaccinated against this disease. This brought to light errors and infractions in the technique of the vaccinations which undoubtedly influenced the effectiveness of the inoculations. A check was made on the epidemiological effectiveness of vaccination by comparing the incidence of the disease among vaccinated and unvaccinated groups. The incidence of the disease among vaccinated persons was 2, 3, and 6 times lower than among the unvaccinated persons. The results of the investigation were discussed with the medical personnel of the corresponding rayons and medical sectors.

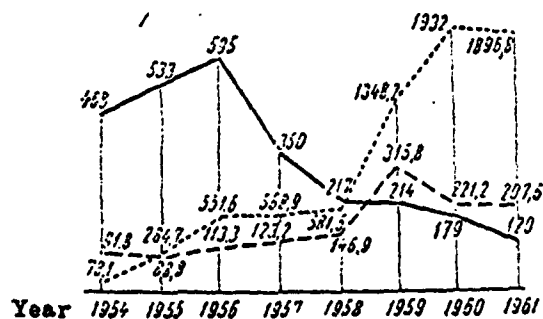
Under the conditions of an extended epidemiological period the inoculations for shepherds and other regular workers were accomplished to the extent possible in accordance with the periods of the beginning of the lambing period in the flocks. The personnel who might be drawn for work with sheep during the lambing period as temporary workers were generally inoculated during the early fall months. In this respect it was necessary to consider the fact that work with sheep during lambing in the winter period is the most dangerous from an epidemiological standpoint.

Along with the intensification of the sanitary-educational and explanatory work among the population, instruction was also introduced for livestock workers and some other professional groups on the measures for the prevention and control of brucellosis; seminar instruction was emphasized.

All this made it possible in 1960 to lower the incidence of new cases of brucellosis among human beings by 16.4% in comparison with the preceding year.



At the same time substantial sanitary-veterinary measures were accomplished in 1960 which created a basis for a significant improvement in the epizootic conditions with respect to brucellosis in 1961. A particular role in this was played by the introduction in the kray of large scale vaccination of sheep on farms where the situation was satisfactory but where there was a threat of the entry of infection (Figure 4).



— Incidence of disease among human beings  
 -- Number of vaccinated persons (in thousands)  
 .... number of vaccinated sheep (in thousands)

Figure 4. Specific prevention of brucellosis and the incidence of the disease among human beings in Stavropol'skiy Kray for 8 years.

In December 1960 an interdepartmental scientific-practical conference was conducted in the kray on problems of the control of brucellosis. The conference was organized by the kray department of public health and the kray agricultural directorate in order to analyze the experience which had been accumulated in recent years and to resolve the question of the ways to achieve the most rapid lowering of the incidence of brucellosis among human beings and the liquidation of brucellosis among farm animals under the

new conditions of livestock raising. Representatives of soviet, Party, and trade union organs, medical and veterinary personnel of neighboring oblasts and republics, and personnel of the Institute imeni Gamalaya participated in the work of the conference. Of the 66 reports, 49 were presented by doctors of the rayon and sector level and by personnel of veterinary hospitals and bacteriological laboratories and sectors. The compilation of the experience of the leading rayons and farms and also the analysis of the reasons for indicated failures showed the existence of real opportunities in 1961 and in succeeding years for the improvement of the health of the sheep and for a further lowering of the incidence of cases of brucellosis among human beings.

The basis for the actual accomplishment of the measures indicated by the conference was the timely and complete slaughter of all sheep infected with brucellosis.

In 1961, 120 cases of brucellosis were recorded in the kray in comparison with 179 cases in 1960. Thus, the number of cases was lowered by 32.9%, while in comparison with 1956 there was a decrease of almost five times in the number of new cases.

However, some problems were still not resolved. Thus, at the conference on brucellosis some personnel of rayon sanitary-epidemiological stations pointed out the fact that the conduct of annual mass preventative inoculations among the population, although justified under the conditions of an extended epidemic period, does have some negative aspects. In connection with this the question was raised as to the possibility of limiting the scale of preventative vaccination of people in rayons and on farms where farm animals are vaccinated and re-vaccinated and where the danger of the infection of the population has been sharply lowered; it was suggested that inoculations be given basically to the regular workers of shepherd brigades, to veterinary personnel, and to some other groups of regular livestock workers. However, the solution of this question was rather complicated, especially in view of the fact that official documents allow only persons who have been vaccinated against brucellosis to work with livestock on farms which are considered unsatisfactory.

In Stavropol'skiy Kray, despite the existing shortcomings, as a whole considerable success has been achieved with respect to the timely diagnosis of clinically ex-

pressed brucellosis. Thus, whereas 3-4 years ago during the period of the month after the beginning of the disease it was possible to detect 58-60% of all the cases of newly acquired brucellosis, in 1960 this figure had reached 75.9%, with more than half of the recorded cases being discovered during the course of the first ten days.

During the past 2-3 years much work has been done in regulating the diagnosis and recording of cases of brucellosis and in lowering the invalidism from this disease. Medical help is given to persons suffering from brucellosis at sector and rayon medical facilities and at Kumagorsk Infectious Hospital (150 beds), where balneologic factors are considered extensively. The question of the free treatment of brucellosis patients with antibiotics has been solved.

The situation is worse with respect to the diagnosis of chronic and especially of residual brucellosis.

Despite the fact that in recent years there has been a considerable lowering of the number of new cases of brucellosis in the kray, the primary incidence remains high. To a certain degree this is explained by the fact that since 1958-1959 the question of the complete detection and recording of all cases of chronic brucellosis has received sharp attention in the kray; this has resulted in an increase in the number of recordings of primary complaints of brucellosis. However, the reason lies not only in this. An analysis shows that of the number of recorded patients, a relatively small part is comprised of persons who suffered acute brucellosis in preceding years which for some reason or other was not diagnosed. These persons were not taken into account. Such cases are still observed up to the present time. A very large group is made up of persons who have gone to a doctor over the course of many years. In the majority of the cases no organic damage was found. Their inclusion in the chart of primary reports in our opinion is completely unnecessary.

The situation is most complicated with respect to a third and rather numerous group. The persons in this group go to medical personnel primarily because of various arthralgias. Both in anamnesis and upon an objective examination they lack the characteristic symptoms of brucellosis; however, they do display weakly positive Wright and Huddleson reactions or a positive

Boerne test. A considerable number of these persons had previously received inoculations against brucellosis with subsequent revaccinations. Evidently in many cases the arthralgias of this type do not apply to the brucellosis infection. In other cases it is more probable that the brucellosis had a hidden course. Great difficulties are encountered with respect to the diagnosis of such cases by practical doctors, especially at the sector and rayon level.

### Conclusions

1. In Stavropol'skiy Kray over the course of the last 5 years there has been a persistent lowering of the incidence of brucellosis among people as a result of the following: a) the multiple conduct of antibrucellosis measures at all farms regardless of their epizootic state and in close cooperation with the work of veterinary and medical personnel and with the support of soviet and Party organs; b) the liquidation of brucellosis isolation places of sheep; c) the improvement of the diagnosis of brucellosis in sheep and the immediate elimination of animals with brucellosis as well as the inoculation of sheep against brucellosis; d) the conduct of large scale preventative vaccination of the rural population.

2. In Stavropol'skiy Kray all the conditions exist for a further lowering of the incidence of clinically expressed brucellosis among human beings.

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