

# Review on Evaluation of the Efficiency of Epidemiological Surveillance for Echinococcosis in the Kyrgyz Republic

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## ABSTRACT

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## Introduction

The work assessed the effectiveness of epidemiological surveillance of echinococcosis in the Kyrgyz Republic (KR), set out in the Order of the Ministry of Health of the KR № 666 "On strengthening measures to control and prevent echinococcosis and alveococcosis in the KR " dated December 18, 2008, based on the following criteria: effectiveness anti-epidemic and preventive measures: epidemiological, social, economic, diagnostic and clinical, the degree of simplicity, the degree of acceptability and efficiency. The research materials were statistical reports of the Department of Disease Prevention and State Sanitary and Epidemiological Surveillance of the Ministry of Health of the KR. Were analyzed and systematized the legal norms governing the prevention and control of echinococcosis in dogs, and human protection, studied the laws

and by-laws of the KR in the field of veterinary medicine, sanitary rules and norms, as well as epidemiological and epizootic reporting. Research methods: retrospective epidemiological, descriptive, analytical, statistical. Based on the favorable trend of many criteria characterizing the effectiveness of anti-epidemic and anti-epizootic measures, a preliminary conclusion can be drawn about the correct choice of organizational and methodological approaches in conducting epidemiological surveillance of echinococcosis in the KR and the following criteria are assessed: the effectiveness of anti-epidemic and preventive measures is satisfactory, epidemiological effectiveness - low, social efficiency - high, economic efficiency - satisfactory, diagnostic and clinical efficiency - high, degree of simplicity - high, degree of acceptability - low, efficiency - high.

The years of potentially lost life in echinococcosis in the KR have been calculated. Echinococcosis is a zoonotic natural anthroponotic helminthiasis caused by tapeworms *Echinococcus granulosus* (*Echinococcus*) and *Echinococcus multilocularis* (*Alveococcus*). Human echinococcosis is a serious parasitic disease that affects both different segments of the population and different age groups [1,2]. Echinococcosis is widespread throughout the world, the prevalence of the population is higher in areas with developed pasture animal husbandry. The source of the pathogen for farm animals, pigs - dogs affected by larvae (hydatids) of echinococcus, for wild ruminants - wolves, foxes, jackals and arctic foxes, infested by the imaginal stage and excreting mature segments of this parasite with feces, and for carnivores - ruminants and pigs. The transmission factors of the pathogen are grass, various types of feed and water contaminated with segments and eggs of echinococci, excreted by dogs, wolves and other carnivores with feces and swallowed by ruminants and omnivores. The factor of transmission of echinococcus to definitive hosts is the organ affected by parasites. Shepherds, shepherds, fur breeders, hunters and other persons who have constant contact with the final hosts of echinococcus or alveococcus get sick more often [3,4]. Echinococcosis is an urgent socio-economic problem in the Central Asian region and the Kyrgyz Republic in particular. Echinococcosis subsequently leads to severe complications, both in the postoperative period and in the long-term.

Despite the long-standing struggle against these parasitic diseases, the Kyrgyz Republic still remains an unfavorable hyperendemic region in terms of the prevalence of echinococcosis, which has the status of a nationwide problem due to its wide distribution and huge economic damage to public health and animal husbandry [5]. Measures to combat hydatidosis are carried out in a complex way (by medical, veterinary, communal and hunting organizations). Mutual information about cases of hydatidosis in humans, farm and wild animals should be provided between medical and veterinary workers [6]. Recently, the epidemic situation of echinococcosis in the Kyrgyz Republic is quite tense. At the end of the 20th and the beginning of the 21st century, a sharp increase in the incidence of echinococcosis began throughout the territory of the Kyrgyz Republic, including among the child population [7,8]. This was the reason for the development of a new program of epidemiological surveillance, set out in the Order of the Ministry of Health of the Kyrgyz Republic No. 666 "On strengthening measures to combat and prevent echinococcosis and alveococcosis in the Kyrgyz Republic" dated 12/18/2008. The purpose of this work is to evaluate the effectiveness of epidemiological surveillance of echinococcosis in the Kyrgyz Republic.

## Tasks

- To determine the criteria for evaluating the effectiveness of epidemiological surveillance of echinococcosis;
- To conduct a comparative epidemiological analysis of these criteria for evaluating the effectiveness of epidemiological surveillance of echinococcosis;
- On the basis of the analysis carried out, to assess the effectiveness of epidemiological surveillance of echinococcosis in the Kyrgyz Republic.

## Materials and Methods

Statistical reports of the Ministry of Health of the Kyrgyz Republic DPZiSSES served as the research materials. The legal norms regulating the implementation of the prevention and control of canine echinococcosis, and human protection were analyzed and systematized, the laws and by-laws of the Kyrgyz Republic in the field of veterinary medicine, sanitary rules and regulations, as well as epidemiological and epizootological reporting were studied. Research methods: retrospective epidemiological, descriptive, analytical, statistical.

## Results and Its Discussion

As our studies show, the epidemiological situation of echinococcosis in the Kyrgyz Republic is rather ambiguous. Despite the introduction of a new epidemic surveillance program, the incidence of echinococcosis and alveococcosis continued to grow until 2014 and 2015, respectively, and it was under the new program that the peak incidence of both diseases was recorded. On the one hand, this is due to the increase in the quantity and quality of preventive examinations and examinations according to epidemic indications, as well as the introduction of new methods for diagnosing echinococcosis, which increased the detection of these parasitic diseases, which, in turn, affected the growth of infestation. This also explains the serious decline in incidence following the peak, also due to an increase in the quantity and quality of preventive and anti-epidemic measures, as well as the diagnosis and treatment of echinococcosis. On the other hand, it is impossible not to note the cyclicity characteristic of echinococcosis in 7-8 years. It is this cycle that can explain the observed decline in the incidence of this disease in the population. 2019 is the borderline, the lowest point of the cycle, after which there may be another growth characteristic of the beginning of the next cycle.

The trend towards an increase in the incidence of echinococcosis during the introduction of a new epidemiological surveillance

program also does not inspire confidence in the effectiveness of the new epidemiological surveillance program for echinococcosis, but does not give a clear answer due to the increased detection rate. Despite this, the impact of the child population in the Kyrgyz Republic gives less controversial results. The increase in the proportion of childhood susceptibility to echinococcosis and alveococcosis in the Kyrgyz Republic, as well as the increase in the proportion of child susceptibility, indicate the low epidemic effectiveness of the new program for epidemiological surveillance of echinococcosis. It should be noted that this could also be affected by an increase in the detection of echinococcosis among the child population due to new diagnostic methods and an increase in preventive examinations, but in this case this is unlikely. Considering all of the above, we can conclude that this period is not enough for a full assessment of the effectiveness of anti-epidemic and preventive measures. For an accurate assessment, it is necessary to continue monitoring the incidence of echinococcosis in subsequent years in order to dismiss, or vice versa, confirm the role of cyclicity in the decline in incidence in the period after the introduction of a new program for epidemiological surveillance of echinococcosis.

However, during the implementation of the program, modern complex diagnostic methods and screening studies of the population were used, which helped to establish not only natural, but also anthropurgic foci of alveococcosis, as well as the proportion of children under 14 years of age with these invasions. Therefore, the effectiveness of preventive and anti-epidemic measures, as well as the epidemiological effectiveness of the current program for epidemiological surveillance of echinococcosis is not at a high, but at a satisfactory level. It is also impossible to discount the features of the clinical picture of echinococcosis, when the manifest stage of the disease is remote from the time of infection and manifests itself after many years of invasion with severe complications leading to disability and, often, death of the patient. A complete epidemiological characterization of the incidence of echinococcosis is possible only on the basis of the results of mass sero-epidemiological surveys of the population from risk groups (living in endemic areas or at occupational risk of infection with echinococcosis) [9]. Evaluation of social efficiency is also difficult for objective reasons. First, especially in remote regions, there is a serious problem with the registration of deaths from echinococcosis.

Patients after surgery with a diagnosis of echinococcosis and alveococcosis, after death, other diagnoses are made, such as: cirrhosis of the liver, hepatitis, liver failure, and therefore these cases are not included in the reporting form No. 1 of the State statistical reporting "Report on infectious and parasitic diseases" as dead from echinococcoses. In this regard, the mortality rate from echinococcosis is slightly underestimated compared to the real situation. Secondly, due to the lack of criteria regulating indications

for disability for echinococcosis, there is no way to evaluate it. But, even taking into account these two factors, the current program for the epidemiological surveillance of echinococcosis provides for more rational accounting, registration of morbidity and mortality from echinococcosis in medical institutions and centers of state sanitary and epidemiological surveillance with monitoring of reporting data horizontally and vertically, which, with relatively equivalent mortality rates, indicates a higher social efficiency of the new program for epidemiological surveillance of echinococcosis. Since during the operation of the new epidemic surveillance program the number of sanitary and educational activities carried out with the use of radio, TV, newspapers, seminars, conferences increased, many rural gatherings began to be held, etc., the number and quality of preventive and anti-epidemic measures increased, as well as however, more expensive diagnostic methods have been introduced, naturally, and the costs of implementing epidemiological surveillance have increased compared to the period before the introduction of the new program.

However, given that at the moment the program of epidemiological surveillance of echinococcosis has shown satisfactory effectiveness of preventive and anti-epidemic measures, the economic efficiency is also at a satisfactory level. The introduction into wide practice of serological testing of patients suspected of being affected by echinococcosis, provided for by new methodological guidelines for the clinical and laboratory diagnosis and treatment of echinococcosis and alveococcosis, has made it possible to increase the detection rate and thus start the treatment of these parasitic diseases in a timely manner. This indicates a high diagnostic efficiency of the new program for epidemiological surveillance of echinococcosis. The text of the Order of the Ministry of Health of the Kyrgyz Republic No. 666 "On Strengthening Measures for the Control and Prevention of Echinococcosis and Alveococcosis in the Kyrgyz Republic" dated December 18, 2008 was executed in accordance with all the rules for compiling regulatory documentation, all terms and formulations used are of an exclusively legal and medical nature, do not have fuzzy wording or phrases with two meanings. Therefore, the degree of simplicity of the echinococcosis epidemiological surveillance program is assessed as understandable by specialists whose work duties are regulated by this regulatory document. In general, the surveillance system for echinococcosis is simple to implement. However, the omission of the implementation of anti-epidemic and anti-epizootic measures depends on the qualifications of specialists, the degree of acceptability of administration employees, medical organizations and ordinary citizens. In medical institutions, the collection, processing, transmission and analysis of information, as well as keeping journals, compiling forms and reports according to the schemes provided for by the Order of the Ministry of Health of the Kyrgyz Republic No. 666, is carried out in a timely manner

and on time. The system of registration, registration of new cases of infection and deaths from echinococcosis, as well as epidemiological investigations of each case of echinococcosis and identification of foci has been worked out, which ensures completeness, reliability, timeliness and high efficiency of epidemiological surveillance of echinococcosis.

## Conclusion

1. After analyzing the data collected for the period before and after the introduction of epidemiological surveillance of echinococcosis, set out in the Order of the Ministry of Health of the Kyrgyz Republic No. 666 "On strengthening measures for the control and prevention of echinococcosis and alveococcosis in the Kyrgyz Republic" dated December 18, 2008, the following criteria were assessed
  - A. The effectiveness of anti-epidemic and preventive measures is satisfactory.
  - B. Epidemiological effectiveness is low.
  - C. Social efficiency is high.
  - D. Economic efficiency is satisfactory
  - E. The degree of simplicity is high
  - F. Efficiency is high
  - G. Diagnostic and clinical efficiency is high
  - H. The degree of acceptability is low

Therefore, based on the evaluation of the criteria characterizing the effectiveness of anti-epidemic and anti-epizootic measures for echinococcosis, we can conclude that the correct choice of organizational and methodological approaches in conducting epidemiological surveillance of echinococcosis, set out in the Order of the Ministry of Health of the Kyrgyz Republic No. 666 "On strengthening measures to combat and prevent echinococcosis and alveococcosis in the Kyrgyz Republic" from 12/18/2008.

2. Years of potentially lost life due to echinococcosis for the period from 2013 to 2019 in the Kyrgyz Republic amounted to 4331.9 years.

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