

**RISK FACTORS OF ALVEOLAR AND CYSTIC ECHINOCOCCOSIS IN  
PATIENTS FROM MEDICAL INSTITUTIONS OF YEREVAN,  
REPUBLIC OF ARMENIA  
  
A CASE-CONTROL STUDY**

Master of Public Health Integrating Experience Project

Research Grant Proposal Framework

by

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## LIST OF ABBREVIATIONS

**AE-** Alveolar echinococcosis

**CDC-** Centers for disease control and prevention

**CE-** Cystic echinococcosis

**CIS-** Commonwealth of Independent States

**DALY's-** Disability-adjusted Life-years

**MOH-** Ministry of Health

**RA-** Republic of Armenia

**WHO-** World Health Organization

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## EXECUTIVE SUMMARY

Human echinococcosis is a zoonotic disease, transmitted from animals to humans, which is caused by the larval stages (metacestode) of tapeworms (taeniid cestodes). The cyst(s) is (are) located mostly in the liver and lungs. Both cystic echinococcosis (hydatidosis) (CE) and alveolar echinococcosis (AE) are the most important forms in humans and are a medical and public health problem of global concern. The highest prevalence rates of human CE are observed globally in places associated with herding and the main domestic dog-sheep cycle for *E. granulosus* is transmitted in it. AE is related to dog ownership or contact, less to domestic cats. For AE, the mortality rate is 50-75% if left untreated or not treated in a timely manner. Even those treated are often left with decreased quality of life.

Published research concerning these infections in the RA, especially associated with dogs and cats, is lacking. Further evaluation of risk factors in RA can result in effective, targeted interventions that prevent this dangerous disease, to lower its risk, and/or decrease its complications. To address these concerns a case-control study is proposed with cases who are patients 18 years of age and older hospitalized with a diagnosis of CE or AE and had surgery during 2015 in medical institutions of Yerevan, RA and controls who are adults 18 years of age and older who had never received a diagnosis of AE or CE and do not have specific clinical symptoms of AE or CE. The calculated sample size is 327 total. The investigator will conduct face-to-face interview with case and control participants. The study questionnaire includes 85 questions and the following domains/sections: socio-demographic characteristics, working habits, possible transmission factors and knowledge of echinococcosis infection. The estimated budget of the study is 2,450,600 AMD. Some of the costs of echinococcosis control can simultaneously benefit control programmes against other diseases such as rabies and tapeworm infections.

## **1.0 Introduction**

According to the World Health Organization (WHO) “Human echinococcosis is a zoonotic disease (a disease that is transmitted to humans from animals), that is caused by parasites, namely tapeworms of the genus *Echinococcus*.”<sup>1</sup> According to the US Centers for Disease Control and Prevention (CDC) “The infectious agents are the larval stages (metacestode) of taeniid cestodes.”<sup>2</sup> Humans are accidental intermediate hosts, which means that they ingest the parasite eggs and the larval stages develop in their internal organs, and do not transmit the disease. These species may cause asymptomatic infection or lead to severe disease that may even be fatal.

Cystic Echinococcosis (CE) and Alveolar Echinococcosis (AE) account for substantial disease burden. According to the WHO “More than 1 million people are affected with echinococcosis at any one time.”<sup>1</sup> Even if treated those people are often left with decreased quality of life. Around 3 billion US dollars are spent on treating CE alone and in terms of losses to the livestock industry yearly.<sup>1</sup>

Currently a lack of published research exists concerning these infections in the Republic of Armenia (RA) especially associated with dogs and cats. Further evaluation of risk factors in the RA can result in designing effective interventions to prevent this dangerous disease, to lower the risk and to decrease the rates of complications.

## **1. Literature review**

This section presents the review of literature on Echinococcosis disease mainly focusing on Cystic and Alveolar forms. In addition, this section provides a description of the risk factors and the situation in Armenia related to the disease, as well as illustrates the importance of further research in regards to the risk factors of Echinococcosis in Armenia.

- 1.1. Etiology of Echinococcosis

According to the WHO “Echinococcosis occurs in 4 forms: cystic echinococcosis, also known as hydatid disease or hydatidosis, caused by infection with *Echinococcus granulosus*;

- alveolar echinococcosis, caused by infection with *E. multilocularis*;
- polycystic echinococcosis, caused by infection with *E. vogeli*; and
- unicystic echinococcosis, caused by infection with *E. oligarthrus*.”<sup>1</sup>

Both cystic echinococcosis (hydatidosis) and alveolar echinococcosis are the most important forms in humans and are a medical and public health problem of global concern.<sup>1-3</sup>

The sheep, cattle and pig strains are spread in many areas of the Russian Federation and adjacent countries, such as Georgia and Armenia.<sup>3</sup> The highest prevalence rates of human CE are observed globally in places associated with herding and the main domestic dog-sheep cycle for *E. granulosus* is transmitted in it.<sup>3,4</sup> AE is related to dog ownership or contact, less to domestic cats.<sup>5,6</sup> Definitive hosts for *Echinococcus granulosus* are Canidae: domestic dog, wolf, coyote, dingo, silver-backed jackal, golden jackal, hunting dog, cape silver fox, red fox, culpeo fox, magellan fox, raccoon-dog; Hyaenidae: spotted hyaena; Felidae: lion.

Intermediate hosts are usually livestock animals.<sup>3</sup> Definitive hosts for *Echinococcus multilocularis* are Canidae: red fox, arctic fox, domestic dog, coyote, wolf, dog fox, corsac fox, raccoon-dog; Felidae: domestic cat, wildcat, lynx (*Lynx lynx*).

No ecological separation exists if infected foxes, dogs or cats reside closely connected with people.<sup>3</sup> The cyst(s) is (are) located in the liver and lungs accounting for 90% of the affected localizations in patients with CE. The cyst(s) can be found in any organ and cyst(s) that is (are) found in the kidneys, heart, spleen, bone and central nervous system (brains and eyes including) account for the rest 10% of the affected localizations. Nearly 40-80% of the people with CE have only one organ infected where a single cyst is located.<sup>2,7</sup>

In children, liver and lungs are the most common organs involved.<sup>8</sup> If the embryo appears then it appears permanently in the liver and it can spread to lungs and brain in patients with AE.<sup>2,3</sup> In CE, a cyst may rupture spontaneously or more frequently as a result of trauma.

In AE, parasitic tumor-like vesicles can invade and destroy nearby organs via direct infiltration or distant organs by larval metastases as a result of the spread of parasite cells through lymph and blood system.<sup>1-3</sup> The symptoms that are not specific are anorexia, weight loss and weakness. The rate of the occurrence of the symptoms usually depends on where the cyst is located. In addition, systemic immunological reactions can be noticed such as hives (urticaria), asthma, allergic reaction (anaphylaxis) and a kidney disorder (membranous nephropathy).<sup>2,3</sup> The asymptomatic incubation period (up to 60% of the cases may be asymptomatic<sup>3</sup>) can remain for years. The signs and symptoms include discomfort or pain in the upper abdominal region or chest, nausea, vomiting or chronic coughing because of the enlarging cysts, shortness of breath, and other signs. The fluid from the rupture of the cyst can result in mild to severe anaphylactic reactions and even death.<sup>1,2,7</sup>

The clinical symptoms and signs of AE are discomfort or pain in the upper abdominal region, general malaise and hepatic (liver) failure, etc. The symptoms may imitate those of liver cirrhosis or cancer.<sup>1</sup> The symptoms in around 1/3 of cases are mainly cholestatic jaundice and/or in around 1/3 of cases epigastric pain. In 1/3 of cases it is detected accidentally during medical examination for symptoms such as fatigue, weight loss, hepatomegaly or during abnormal routine laboratory findings.<sup>3</sup> The age at which AE is diagnosed is much higher than for CE.

Treatment preferences include mainly surgery and chemotherapy. Surgery is the most preferable one presently, because it can remove cysts and direct to complete cure. In up to 90% patients surgery will be successful, if a cyst is not localized in a risky area or if the

disease is not in a far too advancement. The specific risk is that a secondary echinococcosis may occur, as a result of spillage of viable parasite material. In case of surgery the medical team must have experience in major liver surgery and treatment of AE. A relapse can occur as well a postoperative fatality.<sup>3</sup>

For AE, the mortality rate is 50-75% if left untreated or not treated in a timely manner.<sup>7</sup>

Education for individuals and populations is an important part of the prevention of AE.

Some measures aimed at the decrease of the infection risk as well as of the morbidity/mortality for individuals are proper sanitation and proper cleaning of consumables.

Control measures for infection in dogs is also important for prevention of CE in people.

Control measures may have four phases: preparatory or planning, attack (implementation), consolidation through surveillance and maintenance of eradication phase (after the parasite has been eliminated).<sup>3</sup> Education of individuals and the population by the appropriate bodies should include information on the life-cycle of the parasite, routes of infection, risks, prevention methods, etc.

Some of the costs of echinococcosis control at the same time can be beneficial for control programmes against other diseases, such as rabies and tapeworm infections.<sup>3</sup>

The WHO assists in identifying countries with infection to develop as well as implement pilot projects that will lead to globally effective control strategies of CE by 2018.<sup>1</sup>

## 1.2 Epidemiology of Echinococcosis

The causative agent of CE is global; high prevalence rates are found in the Mediterranean region, the Russian Federation and adjacent independent states.<sup>1,3</sup> The causative agent of AE is ubiquitous, but is more common in the northern hemisphere. It is endemic in some places of the Mediterranean region (e.g., Iran), in some regions in the Russian Federation, and adjacent countries, including Georgia and Armenia.<sup>1,3</sup> Annually around 18,235 new cases of AE are recorded globally, with 16,629 (91%) in China alone.<sup>9</sup> In endemic regions, human

incidence rates for CE can be higher than 50 per 100,000 person-years and global prevalence is estimated at 2-3 million cases with 200,000 new cases diagnosed annually.

Clinically diagnosed cases represent only a small proportion of the total number of infected people (those that receive medical attention at healthcare facilities) and underestimate the true incidence and prevalence of CE.<sup>1</sup> The infection is estimated to be 2-6% in endemic population.<sup>10</sup> The highest prevalence rates are registered in rural areas.<sup>1,3</sup> Both sexes and all ages are at risk. The occupational distribution of disease differs from region to region, dependent on epidemiological and socio-economic circumstances.<sup>3,11</sup> Because of high prevalence and morbidity, CE becomes a rising public health issue.<sup>12</sup> Socio-economic consequences as a result of CE include cost for infection diagnosis, surgical and medical fees (including costs of hospitalization, nursing and drugs), loss of working days, travel cost for treatment, mortality, suffering, disability and loss of farming or agricultural income as well as income from other occupations.<sup>3</sup>

Predicted global burden of CE depicted in Disability-adjusted life years (DALYs) lost, with 95% CIs has been calculated based on recorded human cases. The estimated global number, adjusted for disease underreporting, was 285,407. This is taken to be the most conservative estimate. Estimated number with consideration of non-reported surgical cases was higher at 1,009,662. Loss of around 650 thousand DALYs annually is a result of AE, most of the burden focused in western China. CE alone causes around 3 billion US dollars costs for treatment of the cases as well as losses to the livestock industry yearly.<sup>1</sup>

In Cyprus in 1970 the annual surgical incidence rate was 12.9 per 100,000 people. The first CE eradication campaign started in 1971 in Cyprus, which effectively substantially reduced disease burden.<sup>13</sup> According to some data and calculations efficient services, modern techniques and interventions used for diagnosis, admission, surgery and treatment are able to decrease the hospitalization period by half in just few years.<sup>3</sup>

### 1.3 Risk factors of Echinococcosis

Probable transmission routes of the tapeworm eggs to people include the following:

- contamination by hand to mouth from the infected fur of animals such as foxes, dogs, cats or from plants, faeces, or soil,
- eating contaminated uncooked food, such as vegetables, salads, fruits,
- drinking contaminated spring water,
- inhaling dust that contain tapeworm eggs,
- handling infected dogs, cats, foxes and other carnivores.<sup>3,14,15,16</sup>

Despite all of these identified risk factors, studies related to the epidemiological significance of different possible routes of transmission are lacking.<sup>3</sup>

Ownership of dogs that are left in the garden/outdoors unattended or ownership of dogs that kill game is a more relevant risk than just ownership of dogs, deworming dogs at infrequent intervals, because those can be observed in a more reliable way by the owners. In addition ownership of cats that roamed outdoors unattended was a relevant risk. Being a farmer, living in a farmhouse, growing leaf or root vegetables, going into forests for vocational reasons, collecting wood, living in a dwelling close to fields, chewing grass and eating unwashed strawberries were also identified as risk factors.<sup>14</sup>

An investigation of AE conducted in Ganzu, China showed that the number of dogs owned over time and the degree of contact with dogs were the most important risk factors.<sup>17</sup>

A matched case-control study conducted for CE in a peri-urban population of Lima, Peru showed that ownership of 10 or more dogs and raising sheep were independent risk factors. Belief that CE can be transmitted by food and storing water in covered containers and that dogs were carriers was protective. Feeding uncooked viscera to dogs has been reported twice as often by cases than controls.<sup>18</sup>

A case-control in Soria province, Spain OR for CE showed lower risk with larger size of residence and place of birth as well as increasing with number of dogs and the years of coexistence with dogs. So birthplace population size is an important risk factor, as persons who go to live in bigger towns pay frequent visits to the towns of origin. A marked dose-response was observed related to the overall number of years of dog ownership. Similarly, the conditions in which dogs are kept are of great importance. Allowing dogs to remain loose, with the possibility of them ingesting animal offal, increases the risk of disease to a relevant degree. The risk of CE, in the nominal variable related to the conditions in which dogs were kept, was higher in those people who let their dogs roam without a leash and entered the house. However, it is notable that people who coexisted with more than 15 dogs in their life have less risk than those with 7-15 dogs; this might be attributable to the fact that larger numbers of dogs were kept in kennels, thus had less chance to eat infested offal, a risk factor for developing tapeworm disease.<sup>19</sup>

CE disease has been shown to be at higher rates where sheep is the main livestock raised and where dogs are being used in the management of sheep.<sup>20</sup>

The highest risk for getting infected has been observed in pastoral herdsmen. Among this population, risk factors included the number of owned dogs, the frequency of contact with dogs, as well as sources of drinking water and general hygiene.<sup>11</sup>

Some evidence from studies conducted in the US find that domestic dog has an important role in the zoonotic risk for human AE.<sup>21</sup>

The presence of an animal pen next to a dwelling offered no excess risk of echinococcosis. There is an increased association between CE and residence in rural areas versus urban, probably due in part to the presence of animals.<sup>19,22</sup>

Different risk factors for the same disease exist in different places around the world.<sup>23</sup>

Living environment also has an impact on risk. Raw ingestion of green vegetables, especially those that grow on a family plot at ground surface level, that are contaminated with oncospheres can be a cause of CE.<sup>24</sup> This can be a route of infection especially for those who have always resided in an urban area and have no other risk factors.<sup>19</sup>

In another case-control study for CE conducted among children in Argentina the main risk factors for CE were having a family member with CE, having a father who slaughtered sheep at his workplace and spending the first years of life in contact with a big number of dogs. Drinking tap water was a protective factor.<sup>25</sup>

In a study conducted in Poland the disease was observed mainly in adults, the frequency was higher among women and the incidence in rural areas was higher.<sup>26</sup>

Agricultural occupation, eating raw salads, having handled a fox at least once or owning a dog have been found as risks for AE in France.<sup>27</sup>

In another study a rate of 70% of geophagy was reported in hydatidosis cases.<sup>28</sup> According to an article on CE some factors such as the diverse existence of livestock production systems (mainly extensive, traditional animal husbandry), small and badly equipped, as well as unsupervised slaughter-houses, illegal and family slaughtering, low level of public awareness of CE and of course the high population of stray dogs lead to the increase of prevalence and spread of CE.<sup>12</sup>

According to published data, 33 regions of the Russian Federation are endemic for AE and in 73 regions for CE. The rate reaches even more than 10 cases per 100,000 inhabitants.<sup>29</sup>

According to previous studies human CE risk factors are livestock breeding, pastoral life, female sex, ethnicity, ownership of dog, poor hygiene, occupation in rangeland, and low socioeconomic status.<sup>25,30</sup>

According to a study on CE people of some occupations are at a greater risk, for eg. slaughters, tanners, stockbreeders, shepherds, butchers, and veterinarians.<sup>31</sup>

In another study conducted in Iran the highest rate was observed in housewives. There was direct relationship with illiteracy of the families and the infestation rate.<sup>32</sup>

Preventive measures such as education on prevention have shown to decrease the CE prevalence.<sup>33</sup> So far Cyprus is the only country where a successful implementation of eradication program has been implemented.<sup>12</sup>

Possible risk factors are ownership of dogs and eating unwashed vegetables. Possible effective measures are deworming at frequent intervals and washing vegetables thoroughly.

#### 1.4 Situation in Armenia

“Two species that have medical importance are registered in Commonwealth of Independent States (CIS) countries, which include *E. granulosus*, causing human disease in the larval stage - single chamber or hydatid echinococcosis, and *E. multilocularis* - multilocular echinococcosis or alveococcosis.”<sup>34</sup> Armenia is endemic for this disease and a significant similarity between the parasites of humans and sheep exists. This suggests higher virulence for humans with the ovine strain. In Armenia, cattle is “ecological impasse” for echinococcus.

The definitive hosts are the dog, wolf, jackal, fox, raccoon like dog and corsac in CIS countries. People get infested from dogs, on the wool and tongue of which may exist the tapeworm eggs and segments. Armenian researchers R.O. Eolyan (1931), A.O. Tovmasyan (1949), and others have pointed out that eating contaminated greenery, vegetables and fruits during summer and fall is one of the reasons for the wide spread of echinococcosis in the population. In some cases, transmission factors of echinococcosis to a human may become milk and fermented mare's milk, since echinococcus eggs sometimes get on the udder of cows and mares. Flies can carry echinococcus eggs from excrements and vomit masses of

carnivores on food and household items. Cat hair may be contaminated with eggs of Echinococcus. Thus, these animals may serve as mechanical vectors of echinococcus eggs. A human in the natural hotbed may become infested either directly from wild carnivores through swallowing eggs that are on their fur, or as a result of collecting and eating wild herbs and berries or drinking water from natural water bodies, irrigation ditches contaminated with feces of wild carnivores. The possibility of human infestation also through the dust is not excluded.

Echinococcosis infestation risk is much higher in the shepherds and the members of their families, milkers and sheep shearers, hunters, fur farmers, workers of workshops, due to the long personal contact with the dogs and the environment in which they live.<sup>34</sup>

According to a survey conducted in 1970-1980s high seroprevalence was recorded in animals: in dogs - 49.5 %, in ruminants - 26.9-75.0%, in cattle – 16.8-46.9%, in pigs - 22.7-47.0 %.<sup>35</sup> According to the authors several causes exist of the increase of infestation intensity with echinococcosis of the population.<sup>34</sup> The first reason is the increase of livestock infestation which had impact on the increase of morbidity intensity with echinococcosis in the republic. The development of animal husbandry in the face of livestock infestation contributed to that circumstance. The second reason is the neglect and quality of medical care to the population. The third reason is the conflict with Azerbaijan, a country endemic for echinococcosis, which resulted in a huge flow of Armenian refugees into Armenia. conditions. The fourth reason is poor sanitary conditions and insufficient sanitary-educational work among the population. Slaughter of the livestock without control of veterinary service (in courtyards, in the field, in primitive slaughterhouses, etc.) and without preventive measures (when organs infested with echinococcosis are detected) occurs. Due to practically complete absence of sanitary - epidemiological measures for the interruption of transmission chain of the causative agent, an increase in the

morbidity with echinococcosis is observed. The situation worsened with the earthquake of 1988 and socio-economic shocks. The fifth reason is the defects of the sanitary condition of towns and villages of the republic. Rare watering of streets and dry cleaning play a role in the infestation of lungs.

The authors V. A. Davidyants and A. S. Khachatryan have collected materials on 1470 cases of echinococcosis from 1997 to 2003 from therapeutic-preventive institutions in 10 age groups, based on archive materials of surgical departments of all hospitals, reporting forms of sanitary- epidemiological stations, prosectors and others. According to these data around 53% patients with echinococcosis were women, the rest were men. The highest infestation was recorded in the age group of 50-59 years old, high rates were recorded in the age groups of 60-69 years old and 11-16 years old. Infestation decreased with age after 70 years of age. In Armenia echinococcosis is ubiquitous all over but the highest prevalence/incidence rates were recorded in capital Yerevan; Armavir, then Aragatsotn, Shirak, Ararat, Gegharkunik, Kotayk, Vayots Dzor, Syunik, Lori and Tavush regions. Out of all the patients with a diagnosis of "echinococcosis" around 52% were residents of urban areas and the rest of rural settlements. The incidence of occurrence of echinococcosis in Armenia in urban residents was around 0.46 and in the residents of rural settlements the indicator was on average around 0.81 per 10,000 population. According to the data in hospitals and prosectors, during 1997 to 2003, 378 children were registered with the serious forms of infection in Armenia. Compared with previous years, infestation of children with echinococcosis has markedly increased. Thus, children should also be attributed to the risk groups. Poverty, antis sanitation, and sometimes homelessness of children that were observed throughout years made the morbidity more frequent.

Average annual mortality indicator of echinococcosis equals 0.007 per 10,000 population in Armenia. The main cause of mortality from echinococcosis in Armenia is the late admission

of patients for surgical treatment and also a very high percentage of diagnostic errors in the case of complicated echinococcosis.

Retrospective comparison of the results of the research of the authors with the material of E.S. Martikyan (1681 cases of hydatid echinococcosis were documented from 1922 to 1962) and with the material of V. A. Davidyants (578 cases of hydatid echinococcosis from 1994 to 1996) showed that the average annual indicator of infestation of the population of Armenia with echinococcosis from 1997 to 2003 comprised 0.58 per 10,000 population, which is higher than the mean annual indicator between 1922 to 1962 by 2.32 times. Compared to previous years a substantial "rejuvenation" of the disease is observed, the morbidity in rural residents with echinococcosis has visibly increased. Also the number of multiple forms of echinococcosis disease has increased which represents serious difficulties in the diagnosis and treatment plan.

For practical healthcare the study conducted by V.A. Davidyants and A. S. Khachatryan allows to use the results of the completed research in the development of measures for the prevention and struggle against echinococcosis, improvement and rationalization of parasitological and laboratory service in terms of supervision of echinococcosis. Data of the distribution of cases by sex, age, infestation of rural and urban populations should be considered to identify the main risk groups of infestation. As well as the study allows to implement the research materials in the form of manuals and methodical recommendations for graduate and postgraduate training of MOH specialists of preventive (epidemiologists, parasitologists) and therapeutic (pathoanatomists, surgeons, pediatricians) profiles.<sup>34</sup>

A cross-sectional study on echinococcosis in surgical cases was conducted in Aragatsotn region of Armenia in 2014. The highest rates of surgical cases were recorded in this region between 2008 and 2014. According to the results, infectivity rates were 3.4%. From the surveyed population 74% used the meat of sick animals to feed their animals

without thermally processing it. Dog ownership in the surveyed population was recorded in 81 % among Yezidis and 48 % of Armenians. Low level of deworming practices was recorded in them.

The challenges that exist in Armenia are the following:

- ❖ RA Ministry of Health does not carry out passive surveillance in farm animals or dogs' deworming;
- ❖ Proper sanitation practice and disposal of animal feces is not being conducted;
- ❖ Surgical incidence of echinococcosis in humans is high with the high coverage of children;
- ❖ Surveillance/seroprevalence studies in humans are not being conducted;
- ❖ Health education campaigns are not being carried out.<sup>35</sup>

Further reduction in mortality may be achieved if early diagnosis, timely hospitalization and treatment is done before the development of severe complications, worsening the prognosis and the outcome of surgical intervention.<sup>34</sup>

The number of total surgeries undertaken in the hospitals of RA, including Yerevan has increased from 2009 to 2014 (Table 1). Out of which the number of persons with Echinococcosis diagnosis who have undergone surgery has remained relatively stable (Table 2). But as mentioned above clinical cases do not represent the overall burden of the disease to the fullest. Though the number of cases is not very high, echinococcosis is an important public health problem as the frequency of infections in specific geographic clusters is high, the organ damage in cases of infiltrative parasitic growth or hematogenous spread is severe, as well as costly long term treatment and follow-up is necessary.

## 1.5 Study aims and research questions

The aims of the study are to:

- Identify the behavioral risk factors related to dog, cat ownership/contact that are

associated with Alveolar and Cystic echinococcosis in humans in the Republic of Armenia.

- Identify the socio-demographic risk factors associated with Alveolar and Cystic echinococcosis in humans in the Republic of Armenia.
- Measure the association between the level of knowledge about prevention of Alveolar and Cystic echinococcosis in humans and the risk of becoming infected.

The research questions are the following:

- What are behavioral risk factors related to dog, cat ownership/contact that are associated with Alveolar and Cystic echinococcosis in humans in the Republic of Armenia?
- What are socio-demographic risk factors associated with Alveolar and Cystic echinococcosis in humans in the Republic of Armenia?
- Is the level of knowledge about prevention of Alveolar and Cystic echinococcosis in humans associated with the risk of becoming infected?

## 2. METHODOLOGY

This section includes detailed description of the study design and study population, calculation of the sample size, description of the data collection process and of the study instrument, definition of the study variables, as well as the process of conducting data analysis. All cases and controls will be interviewed by the investigator using the interviewer administered questionnaire to obtain exposure and confounder data.

### 2.1 Study design

A case-control study design matched on neighborhood was selected for this study because it provides the advantage of evaluating many potential risk factors for the

outcome of having echinococcosis, as well as test hypothesis.<sup>36</sup> In addition also because cases are readily accessible in the hospitals.

The dependent (outcome) variable of the study is definitive diagnosis of presence or assumed absence of CE and AE, as documented in the medical records and confirmed during the face-to-face interview. Dog and cat ownership/contact is a potentially important risk factor for CE and AE and is the main exposure variable of interest for the proposed research. Therefore, this risk factor was chosen as the main exposure of interest for the sample size calculation.

## 2.2 Study population

Definition of cases (inclusion criteria for cases): Cases are patients hospitalized with a diagnosis of CE or AE who had surgery from January 1 to December 31, 2015.

Considerable scientific and practical interest constitutes the examination of surgical cases, as those indicate that the infestation has turned into the echinococcosis disease.<sup>34</sup> The pool of cases for the study are patients with Alveolar and Cystic echinococcosis who have undergone surgery in medical institutions of Yerevan, Republic of Armenia. It includes cases hospitalized for surgery in 2015 at medical institutions, such as Erebouni medical center, “Heratsi” hospital complex №1 (clinic of surgery), “Saint Gregory the Illuminator” medical center, Institute of surgery after A. Mikaelyan, Izmirlian Medical Center, the Armenia Republican Medical Center, and the Kanaker-Zeytun Medical Center. The majority of these surgeries in Armenia are conducted in these institutions.

Including most medical institutions dealing with CE and AE will increase the generalizability of the findings of the study.

Definition of controls (inclusion criteria for controls): Controls are those who had never received a diagnosis of AE or CE and do not have specific clinical symptoms of AE or CE.

We assume that the overwhelming number of controls will not be infected (with no prior diagnosis), as rates of echinococcosis infection in humans are relatively low.

Exclusion criteria for both cases and controls: having a history of echinococcosis previous to 2015, under 18 years old, residency outside of the Republic of Armenia, absence of contact information, and not understanding Armenian language or inability to speak it.

### 2.3 Sampling

Consecutive cases will be selected from surgical cases over a period of the year of 2015, sufficient to meet the sample size and will be selected from the listing of the former surgical patients maintained in the medical institutions. Controls will be selected from the cases' neighbors, selecting the closest dwelling to the household of the case. If any potential control refuses to participate, the next closest dwelling will be selected until two controls for each patient are interviewed, thus matching on neighborhood or village. The home city/village is defined as the city/village where the patients lived for at least ten years before the diagnosis.

As there is no official statistical data available, the percentages used in the calculation of the sample size are based on the professional opinion of various experienced and well-known veterinary doctors that are practicing in the RA, such as Vahan Khachatryan the head of the clinical laboratory of the National Agrarian University of Armenia.

With 95% confidence interval ( $\alpha=0.05$ - a two-sided significance level) and 80% power to reject the null hypothesis (0.8), with an odds ratio of being infected if a person feeds a dog versus does not feed a dog of 2.58.<sup>37</sup> Also with an estimated mean 14.3% dog and cat ownership among controls for all of Armenia (urban consisting of 62.7% of the population and rural 37.3% consisting of the population combined).<sup>38</sup> Also based on 0.05% dog and cat ownership in urban and 30% in rural Armenia, and with 1:2 ratio of cases to controls using EpiInfo statistical software, we calculated the sample size to be 261 people (87 cases and 174

controls).<sup>39</sup>

So EpiInfo computed the Fleiss C-C sample size based on the formulas below:

### 3.4 UNEQUAL SAMPLE SIZES

45

Section 3.2 leads to the value

$$m = \frac{m'}{4} \left[ 1 + \sqrt{1 + \frac{2(r+1)}{m'r|P_2 - P_1|}} \right]^2 \quad (3.18)$$

as the required sample size from the first population and  $rm$  as that from the second. In (3.18),

$$m' = \frac{\left[ c_{\alpha/2} \sqrt{(r+1)\bar{P}\bar{Q}} - c_{1-\beta} \sqrt{rP_1Q_1 + P_2Q_2} \right]^2}{r(P_2 - P_1)^2}, \quad (3.19)$$

39

After taking into account a potential 20% non-response/refusal rate based on previous studies conducted in Armenia, we consider a response rate of 80% for both groups. Thus, the sample size in total to be surveyed is 327, with 109 cases ( $87/(1-.20)$ ) and 218 controls ( $174/(1-.20)$ ) for the proposed study.

## 2.4 Data collection

We propose to start the data collection process in March 2016, which will last around seven months. To obtain permission from the medical institutions, support letters describing the purpose of the study and asking permission for accessing medical records will be provided to the administrators and head doctors. The investigator will conduct face-to-face interviews with participants giving consent at their homes to acquire the data required. A household visit for a case will allow visiting and acquiring data from the two neighborhood-matched controls giving consent at the same time. The contact information and necessary related clinical data for cases will be obtained from records at the selected medical institutions. Oral informed consent will be obtained before starting interviews. The interview will last approximately 20 minutes.

## 2.5 Study variables and instrument

The dependent (outcome) variable of the study is definitive diagnosis of presence or assumed absence of CE and AE, as documented in the medical records and confirmed during the face-to-face interview.

Independent variables are included as potential risk factors and confounders for CE and AE; Table 3 lists the risk factors of interest. People will be considered to be dog or cat owners or to have farmed (the main independent variable of interest) if the duration exceeds one year period at the time of the interview.

Questions, the risk factors for the creation of which were abstracted from other research, are predominantly close-ended, with some open-ended questions when response options are not very clear. The interviewer-administered questionnaire includes screening questions to confirm eligibility of cases and controls. The questionnaire consists of 85 questions and domains/sections include socio-demographic characteristics (sex, date and place of birth, place of residence, educational level and household description), working habits (agriculture and livestock farming and other related factors), possible transmission factors and knowledge of echinococcosis infection (Appendix 1). Many questions focus on dog and cat ownership/contact and related behaviors, occupation, eating and sanitary behaviors habits. The questionnaire was translated into Armenian (Appendix 2).

## 2.6 Data analysis

The statistical software package SPSS 16 will be used for data entry, data cleaning through sorting and spot checks, as well as for data analysis. Double entry of the data will be conducted, merging and cleaning will follow to further reduce data entry mistakes.

Afterwards the data will be transferred into STATA statistical software to conduct statistical analysis. Descriptive analysis will include frequencies for categorical variables, means and standard deviations for continuous variables and will be conducted for cases and controls.

Following this analysis, bivariate analysis for both dog-and-cat-ownership and contact behavioral factors and socio-demographic factors with disease will be conducted. Multivariate logistic regression analysis will be conducted afterwards, carrying over variables from the bivariate-analysis which show statistical or near statistical significance with the outcome variable as factors of interest and potential confounders. Multivariate logistic regression will be used to control potential confounders and to test interaction between different variables. Any factors no longer statistically significant will be removed from the model, producing the final model with both statistically-significant behavioral and socio-demographic models plus the knowledge of prevention score.

### 3. ETHICAL CONSIDERATIONS

All possible ethical issues of privacy and confidentiality will be considered during the process of conducting the study. An oral consent form will be introduced to all of the participants of the study, which will include a description of the study, information about the risks and benefits and the voluntary nature of the research (Appendix 3). Each interview will have a special identifier to ensure confidentiality and only the student investigator will access the information related to the names and identification numbers of the participants. A permission from the administrations of the selected medical institutions will be obtained to conduct the study. The security of the data will be ensured. The data files will be secured with passwords. The hard copies of the completed questionnaires will be archived after the data entry is completed and will be destroyed after the final analysis is conducted. The study team will apply to the Institutional Review Board (IRB) of the American University of Armenia for the review and approval of the study protocol.

#### 4. STUDY LIMITATIONS AND STRENGTH

Recall bias may be a weakness for this study, related to cases remembering exposures better than controls. This is typical for case-control studies. Lack of external generalizability may be a weakness, given that only patients from Yerevan medical institutions will be included in the study, the most severe cases. Findings may not be generalizable to less severe non-hospitalized cases in the Republic of Armenia. Ascertainment diagnosis bias, taking into account that medical records from the institutions are sometimes mistaken, may also be a limitation.

One strength of this study is that those cases with the most severe disease are those where risk factors will be identified in the study- the severe form of disease is most needing information that may lead to future prevention intervention. This study is also the first attempt to widely investigate risk factors for AE and CE in the Republic of Armenia.

#### 5. TIME FRAME FOR THE STUDY

The study will be planned accordingly to effectively manage all the activities necessary for the implementation of the study. The duration of the research will be seven months to ensure that all of the cases and controls are carefully interviewed to minimize bias, as well as to allocate enough time for all the following phases again to minimize possible mistakes and errors that can compromise the results of the study. An estimated four cases per day will be identified and abstracted from the medical records from the medical institutions for the year 2015. A total of 327 interviews will be conducted over a period of two months. Approximately two-and-a-half months are needed for analysis, paper preparation and dissemination. The detailed timeline is presented in Table 4.

## 6. BUDGET

The budget of this study is calculated taking into account the operational and administrative expenses. The overall estimated amount is 2,450,600 AMD required for the implementation of this study.

Salaries of personnel are calculated on the basis of the rates of international and non-governmental organizations operating in the Armenian market. The project coordinator will receive salary and is responsible for all the activities, the management and administration of the study. Detailed justification of the calculated costs is presented in Table 5.

## 7. PROJECT FEASIBILITY

Many factors contribute to the feasibility of this study. The essence of the technical feasibility is that a person who is a public health specialist will conduct the research and she has the necessary skills and knowledge. The statistical software will assist this person in ensuring technical feasibility. The idea of the financial feasibility is that the study is not too expensive, but for its implementation certain amount is needed. As this disease has public health importance, a governmental or non-governmental organization might assist with the project implementation.

The essence of the administrative feasibility is that the project coordinator will have good managerial skills and some work experience, which will make the process of the project go smoothly. The idea of the political feasibility is that as this disease is a human and economic burden on the country, governmental officials should be interested in the implementation of the study and in the development of a control and prevention program of Echinococcosis with certain measures based on the results of the study.

Based on the detailed description of the proposed study and the justification that this disease remains a significant public health problem in the RA tackling this issue is required.

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- Book+series&source=bl&ots=s94z6UIdMJ&sig=pzYWM0CNperPK4RoIhbhNjN3ioQ&hl=hy&sa=X&ved=0CBwQ6AEwAGoVChMIgP\_83unexwIVIsNyCh2UpgGR#v=onepage&
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## TABLES

Table 1. Number of surgeries undertaken in hospitals, 2009-2014

	2009	2010	2011	2012	2013	2014
In RA hospitals	278	310	258	214	223	209
In Yerevan	115	89	90	78	95	95

\* Data by the RA National Statistical Service (RA NSS)

Table 2. Number of persons with Echinococcosis diagnosis who have undergone surgery, 2009-2014

	2009	2010	2011	2012	2013	2014
In RA hospitals	107572	108174	112256	119291	123861	130303
In Yerevan	36503	31118	33269	36504	38902	38901

\* Data by the RA National Statistical Service (RA NSS)

**Table 3. Risk factors**

<p><b>Primary risk factors-behaviors associated with them</b></p>	<ul style="list-style-type: none"> <li>• Ownership of dogs</li> <li>• Dogs left in the garden/outdoors unattended, loose (have a possibility of ingesting animal offal, carrion)</li> <li>• Dogs that kill game</li> <li>• Ownership of cats</li> <li>• Cats that roam outdoors unattended</li> <li>• Number of dogs owned over time</li> <li>• Degree/frequency of contact with housedogs, stray dogs, sheep dogs</li> <li>• Years of coexistence with dogs</li> <li>• Allowing the dog into the house</li> </ul>
<p><b>Confounding risk factors</b></p>	<ul style="list-style-type: none"> <li>• Deworming dogs at infrequent intervals</li> <li>• Occupation- agricultural, pastoral herdsmen, housewives, slaughters, stockbreeders, shepherds, butchers, veterinarians, milkers, sheep shearers, hunters, workers of workshops, fur farmers</li> <li>• Residence in endemic areas</li> <li>• Birthplace population</li> <li>• Farming</li> <li>• Residence in rural area</li> <li>• Summer and fall seasonality</li> <li>• Female sex</li> <li>• Age</li> <li>• Having a family member with CE</li> <li>• Parents as farmers</li> <li>• Ethnicity</li> <li>• Poor hygiene (low sanitary culture)</li> <li>• Hunting in forest</li> <li>• Having contact with foxes</li> <li>• Illegal or uncontrolled slaughter</li> <li>• Sources of drinking water (well water, irrigation water for drinking purposes)</li> <li>• Eating greenery, vegetable, fruits, climate</li> <li>• Low socioeconomic status</li> <li>• Dry and hot Climate</li> <li>• Having a kitchen garden</li> <li>• Collecting and frequent consumption of wild herbs and berries</li> <li>• Illiteracy of the families, etc.</li> </ul>

**Table 4. Activity schedule**

The implementation of the study							
Activities	months						
	1	2	3	4	5	6	7
Preliminary contact with the medical institutions							
Identifying the study population							
Questionnaires printing preparation process							
Data collection							
Data entry and cleaning							
Data analysis							
Final report preparation							

**Table 5. Budget**

<b>Cost type</b>	<b>Payment Type</b>	<b>Number of Units</b>	<b>Amount in AMD</b>	<b>Total in AMD</b>
<b>Operational expenses</b>				
Project coordinator	Fixed monthly salary	7 months	140,000	980,000
Investigator	Per complete interview for data collecting;	330	1,400	462,000
	Per hour for data entry	280	1000	280,000
Telephone expenses	Monthly		20,000	20,000
<i>Total 1,742,000 AMD</i>				
<b>Administrative expenses</b>				
Apartment rent	Overnight whenever needed	Throughout 7 months (45 nights)	10,000	450,000

Office supplies (file, paper, pen, etc.)		1	40,000	40,000
Internet	Per month	7 months	10,000	70,000
Print	Per sheet	9	400	3,600
Miscellaneous		3	15,000	45,000
Transportation	Per km/AMD	1000	100	100,000
				<i>Total 708,600 AMD</i>
<b>Project Total 2,450,600 AMD</b>				

## APPENDICES

### Appendix 1. Questionnaire (English version)

#### A Case-Control Study for Identifying Risk Factors of Echinococcosis in patients from medical institutions of Yerevan, RA

*This study is conducted for gathering information on relation between dog, cat ownership/contact and echinococcosis among patients from medical institutions of Yerevan, RA. The questionnaire is interviewer administered and includes different domains. All the information you provide will be confidential. You may refuse to participate in the study, or in case of agreement you may refuse to answer any specific question or stop the interview anytime.*

1. ID number \_\_\_\_\_
2. Date of interview: \_\_\_\_/\_\_\_\_/\_\_\_\_  
(Day/Month/Year)
3. Start time of the interview  
(Hour)\_\_\_\_\_ (Minutes)\_\_\_\_\_
4. End time of the interview  
(Hour)\_\_\_\_\_ (Minutes)\_\_\_\_\_

The coding for ID Number

Digit 0	Patients (who have undergone surgery) with dog, cat ownership and the diagnosis of echinococcosis (Cases)
Digit 1	Persons with dog, cat ownership and without the diagnosis of echinococcosis (Controls)

#### Screening questions

- 1) Have you ever been diagnosed with echinococcosis?
  - a. Yes- Go to the next question (only if interviewee is a case)
  - b. No- thank participant and finish the interview (only if interviewee is a case)
- 2) Have you undergone surgery for echinococcosis in 2015 for the first time in your life?
  - a. Yes- Go to the next question (only if interviewee is a case)

- b. No- thank participant and finish the interview

**Socio-Demographic Questions**

1. Please mention your birthdate \_\_\_\_/\_\_\_\_/\_\_\_\_  
(Day) (Month) (Year)
2. What is your sex?
  - a. Male
  - b. Female
3. What is your current marital status?
  - a. Married
  - b. Separated
  - c. Divorced
  - d. Widowed
  - e. Single
4. How many people live in your household, *including yourself*? \_\_\_\_\_
5. How many people under 18 years of age live in your household? \_\_\_\_\_
6. What is your position in the household? \_\_\_\_\_
7. Please, mention the highest level of education that you have completed
  - a. School (less than 10 years)
  - b. School (10 years)
  - c. Professional technical education (10-13 years)
  - d. Institute/ University
  - e. Postgraduate
8. Please mention the highest education level in your household \_\_\_\_\_
9. Please mention your current employment status
  - a. Employed
  - b. Self employed
  - c. Unemployed, seeking for employment
  - d. Unemployed (health issue)
  - e. Unemployed, not seeking for employment
  - f. Student
  - g. Other \_\_\_\_\_

10. How many people in your household (*including yourself*) are currently employed? \_\_\_

11. Please mention the average monthly income of your household

- a. Less than 50,000 AMD
- b. From 50,001-100,000 AMD
- c. From 100,001-150,000 AMD
- d. From 150,001-200,000 AMD
- e. More than 200,000 AMD

12. Where were you born? \_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
(country) (region) (village/city)

13. How many years have you lived in your birthplace? \_\_\_\_\_ (specify time range)

14. Have you resided in other places outside of your birthplace and for how long?

- a. Yes \_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_ \_\_\_\_\_  
(country) (region) (village/city) (specify time range)  
\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_ \_\_\_\_\_  
(country) (region) (village/city) (specify time range)  
\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_ \_\_\_\_\_  
(country) (region) (village/city) (specify time range)  
\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_ \_\_\_\_\_  
(country) (region) (village/city) (specify time range)

b. No

15. What type/s of dwelling have you resided in?

- a. Apartment building
- b. Stand-alone house
- d. Farmhouse
- e. Other \_\_\_\_\_

16. What is your ethnic background? \_\_\_\_\_

*For Cases (If Control, skip to question 18)*

**Personal and family history of the disease**

17. What type of echinococcosis (tapeworm) have you been diagnosed with?

- a. Cystic (hydatidosis/hydatid)
- b. Alveolar
- c. Other \_\_\_\_\_
- d. I don't know

18. Have you had a family member/s diagnosed with echinococcosis (tapeworm)?
- Yes \_\_\_\_\_ (specify who)
  - No (**skip to question 26**)
19. Which type of echinococcosis (tapeworm) was/were s/he/them diagnosed with?
- Cystic (hydatidosis/hydatid)
  - Alveolar
  - Other \_\_\_\_\_
  - I don't know
20. When was/were s/he/them diagnosed with it? \_\_\_\_\_ (specify time range)
21. Has/have s/he/they been treated for it?
- Yes
  - No
22. Which type of treatment was used?
- Surgical
  - Chemotherapy
  - Other \_\_\_\_\_
  - I don't know
23. Has the treatment been successful and the person/s declared free of the disease?
- Yes
  - No
  - I don't know
24. Did you undergo through diagnostic procedures after the knowledge about existence of an infected person/s in your household?
- Yes
  - No
25. Did the other members of the household undergo through diagnostic procedures after the knowledge about existence of an infected person/s in the household?
- Yes
  - No
  - I don't know
26. Have you undergone screening through imaging techniques and/or immunodiagnostic tests (ELISA, etc.) and/or biopsy in 2015?
- Yes
  - No

### **Household description**

27. Have you ever owned a dog/s?  
a. Yes \_\_\_\_\_ (specify time range)  
b. No (**skip to question 32**)
28. How was/were the dog/s kept?  
a. Housed  
b. Tethered near the house  
c. Free range
29. Where did the dog/s roam?  
a. In the garden/outdoors unattended (roaming free)  
b. Outside the compound premises  
c. I don't know
30. How did the dog/s leave the house premises?  
a. With a leash  
b. Accompanied loose  
c. I don't know
31. Was/were the dog/s that roamed outside without a leash allowed to enter the dwelling?  
a. Yes  
b. No  
c. I don't know
32. Have you ever owned a cat/s?  
a. Yes \_\_\_\_\_ (specify time range)  
b. No (**skip to question 38**)
33. How was/were the cat/s kept?  
a. Housed  
b. Free range/roam outdoors unattended  
c. I don't know
34. Where did the cat/s roam?  
a. In the garden/outdoors unattended (roaming free)  
b. Outside the compound premises  
c. I don't know

### **Additional questions**

35. How many dogs have you ever owned over time and for how many years? \_\_\_\_\_

36. What was the reason for keeping a dog/s?
- a. Hunting
  - b. As as a watch dog
  - c. As as a companion
  - d. As as a sheep dog
  - e. Other \_\_\_\_\_
37. How many cats have you ever owned over time and for how many years? \_\_\_\_\_
38. Have you had contact with other dog/s?
- a. Always
  - b. Frequently
  - c. Sometimes
  - d. Rarely
  - e. Never (**skip to question 41**)
39. What status did the dog/s have?
- a. Housedog/s
  - b. Outside dog/s
  - b. Stray dog/s
  - c. Sheepdog/s
  - d. Other \_\_\_\_\_
  - e. I don't know
40. Have you been washing your hands after contact with dog/s?
- a. Always
  - b. Frequently
  - c. Sometimes
  - d. Rarely
  - e. Never
41. Have you had contact with other cat/s?
- a. Always
  - b. Frequently
  - c. Sometimes
  - d. Rarely
  - e. Never (**skip to question 43**)
42. Have you been washing your hands after contact with cat/s?
- a. Always
  - b. Frequently
  - c. Sometimes
  - d. Rarely

- e. Never
43. Have you been in contact with the environment that the dog/s, cat/s lived in?
- a. Always
  - b. Frequently
  - c. Sometimes
  - d. Rarely
  - e. Never **(skip to question 45)**
44. Have you been washing your hands after contact with the environment that dog/s, cat/s lived in?
- a. Always
  - b. Frequently
  - c. Sometimes
  - d. Rarely
  - e. Never
45. Was/were there stray dog/s in your neighborhood/community?
- a. Yes
  - b. No
  - c. I don't know
46. Have you ever kept or been in contact with other species of animals?
- a. Cattle \_\_\_\_\_ (specify)
  - b. Sheep \_\_\_\_\_ (specify)
  - c. Goats \_\_\_\_\_ (specify)
  - d. Pigs \_\_\_\_\_ (specify)
  - e. Foxes \_\_\_\_\_ (specify)
  - f. Wolves \_\_\_\_\_ (specify)
  - g. Other \_\_\_\_\_ (specify)
  - h. No **(skip to question 49)**
47. Have you been washing your hands after contact with that/those animal/s?
- a. Always
  - b. Frequently
  - c. Sometimes
  - d. Rarely
  - e. Never
48. Have you received veterinary care for that/those animal/s (for eg. deworming)?
- a. Always
  - b. Frequently
  - c. Sometimes
  - d. Rarely

e. Never

49. Did you live in a dwelling close to open fields, rivers, meadows, forests?

- a. Yes
- b. No

**Working habits**

50. What has your occupation been?

- a. Agricultural worker
- b. Pastoral herdsman
- c. Livestock breeder/rancher (especially sheep)
- d. Shepherd
- e. Rangelander
- f. Slaughterer
- g. Butcher
- h. Tanner
- i. Sheep shearer
- j. Fur farmer
- k. Veterinarian
- l. Housewife
- m. Worker of workshop
- n. Fur trader
- o. Dairy farmer
- p. Hunter
- q. Other \_\_\_\_\_

51. Did anyone from your family have any of the above mentioned occupations?

- a. Yes

\_\_\_\_\_

\_\_\_\_\_ (specify all who had and occupation/s)

- b. No

*If the case or control does not have a dog, cat then skip to question 58*

**Possible transmission factors**

52. Has/have your dog/s received veterinary care when it/they were sick?

- a. Always
- b. Frequently
- c. Sometimes
- d. Rarely

e. Never

53. Have your dog/s been dewormed?

- a. <12 months
- b. > 12 months
- c. No

54. Have you fed your dog/s?

- a. Always
- b. Frequently
- c. Sometimes
- d. Rarely
- e. Never (**skip to question 56**)

55. Have you ever fed your dog/s uncooked offal/carrion?

- a. Yes \_\_\_\_\_ (specify where and time range)
- b. No
- c. I don't remember

56. Has/have your cat/s received veterinary care when they were sick?

- a. Always
- b. Frequently
- c. Sometimes
- d. Rarely
- e. Never (**skip to question 58**)

57. Have your cat/s been dewormed?

- a. <12 months
- b. > 12 months
- c. No

58. Have you ever slaughtered livestock at house premises?

- a. Yes  
\_\_\_\_\_  
\_\_\_\_\_ (specify type/s of livestock and time range)

b. No (**skip to question 64**)

59. Was there a slaughterhouse nearby?

- a. Yes
- b. No
- c. I don't know

60. How did you discard livestock (its offal/carrion) that died on their own?
- a. Buried
  - b. Burned
  - c. Skinned
  - d. Ate
  - e. Sold
  - f. Other \_\_\_\_\_
- h. I don't have livestock
61. Have you been washing your hands after contact with dead livestock (their carrion/offal)? \_\_\_\_\_
62. Did your dog/s have access to dead carcasses (their offal/carrion)?
- a. Yes
  - b. No
  - c. I don't know
63. Were stray dogs fed the offal/carrion/ of dead animals?
- a. Yes
  - b. No
  - c. I don't know
64. Where do your dog/s usually defecate?
- a. In the house
  - b. Within house premises
  - c. Outside of the house premises
  - d. Other \_\_\_\_\_
  - e. I don't know
65. Have you ever cleaned dog defecation?
- a. Yes
  - b. No (**skip to question 67**)
66. Have you been washing your hands after that?
- a. Always
  - b. Frequently
  - c. Sometimes
  - d. Rarely
  - e. Never
67. Have the children in your household been playing with dog/s?
- a. Always
  - b. Frequently

- c. Sometimes
- d. Rarely
- e. Never
- f. I don't know

68. Have the children in your household been playing with cat/s?

- a. Always
- b. Frequently
- c. Sometimes
- d. Rarely
- e. Never

69. Have you hunted in a nature/forest?

- a. Always
- b. Frequently
- c. Sometimes
- d. Rarely
- e. Never

70. Have you ever chewed grass or consumed soil?

- a. Yes
- b. No

71. Have you ever done any of these?

- a. Agricultural work \_\_\_\_\_ (specify how often and time range)
- b. Herd cattle \_\_\_\_\_ (specify how often and time range)
- c. Sheared sheep \_\_\_\_\_ (specify how often and time range)
- d. Traded fur \_\_\_\_\_ (specify how often and time range)
- e. Milked \_\_\_\_\_ (specify how often and time range)
- f. Other \_\_\_\_\_ (specify how often and time range)

72. Have you ever grown leaf or root vegetables?

- a. Yes
- b. No

73. What were the sources of drinking water that you have ever used?

- a. River
- b. Well
- c. Irrigation

- d. Piped
- d. Other \_\_\_\_\_

74. Have you been washing your hands before preparing food or before consuming food?
- a. Always
  - b. Frequently
  - c. Sometimes
  - d. Rarely
  - e. Never

75. Have you been eating unwashed greenery/raw lettuce, vegetables, fruits?
- a. Always
  - b. Frequently
  - c. Sometimes
  - d. Rarely
  - e. Never

76. Have you collected and consumed unwashed wild herbs, wild berries?
- a. Always
  - b. Frequently
  - c. Sometimes
  - d. Rarely
  - e. Never

**Knowledge on echinococcosis transmission**

77. Which possible diseases/conditions that are caused by dogs are you aware of?
- a. Rabies
  - b. Worms
  - c. Dysentery
  - d. Leishmaniasis
  - e. Leptospirosis
  - f. Lyme disease
  - g. Other \_\_\_\_\_

78. Which possible diseases/conditions that are caused by cats are you aware of?
- a. Cat scratch fever
  - b. Worms
  - c. Rabies
  - d. Leptospirosis
  - e. Campylobacteriosis
  - f. Other \_\_\_\_\_

79. Have you ever heard about tapeworm infections in people?

- a. Yes
- b. No

80. Have you met or know anyone who has been diagnosed with echinococcosis (tapeworm) at any hospital in the village/city?

- a. Yes
- b. No

81. How can dogs and cats get infected with echinococcosis? \_\_\_\_\_

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82. How can humans acquire echinococcosis (tapeworm)? \_\_\_\_\_

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83. Can people with echinococcosis infect others?

- a. Yes
- b. No
- c. I don't know

84. Do you think echinococcosis (tapeworm) is a dangerous disease?

- a. Yes
- b. No
- c. I don't know

85. Do you know what you can do to prevent echinococcosis (tapeworm)? \_\_\_\_\_

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**Thank you for your participation**

Հավելված 2. Հարցաշար (հայերեն տարբերակ)

**Դեպք-Ստուգիչ հետազոտություն էխինակոկոզի ռիսկային գործոնները որոշելու**

**համար ՀՀ Երևանի բժշկական հաստատությունների հիվանդների շրջանում**

*Այս հետազոտությունն իրականացվում է շուն, կատու ունենալու/շուն, կատվի հետ շփման և էխինակոկոզի միջև կապի վերաբերյալ ՀՀ Երևանի բժշկական հաստատությունների հիվանդների շրջանում տեղեկություն հավաքելու համար: Հարցաշարը հարցազրույցը վարողի կողմից է անց կացվում և ներառում է տարբեր բնագավառներ: Ձեր տրամադրած ողջ տեղեկությունը կլինի գաղտնի: Դուք կարող եք հրաժարվել մասնակցել հետազոտությանը կամ համաձայնության դեպքում դուք կարող եք հրաժարվել որևէ հատուկ հարցի պատասխանելուց կամ դադարեցնել հարցազրույցը ցանկացած պահի:*

1. ՏԱՐԲԵՐԱԿՄԱՆ համար \_\_\_\_\_
2. Հարցազրույցի ամսաթիվը: \_\_/\_\_\_/\_\_\_\_\_  
(օր/ամիս/տարի)
3. Հարցազրույցի սկիզբը  
(ժամ) \_\_\_\_\_ (րոպե) \_\_\_\_\_
4. Հարցազրույցի ավարտը  
(ժամ) \_\_\_\_\_ (րոպե) \_\_\_\_\_

Կողավորումը տարբերակման համարի (ID) համար

Թիվ 0	Վիրահատության ենթարկված հիվանդներ, ովքեր ունեն շուն, կատու/շփվել են շան, կատվի հետ և ունեն էխինակոկոզ ախտորոշում (Դեպքեր)
Թիվ 1	Անձինք, ովքեր ունեն շուն, կատու և չունեն էխինակոկոզ ախտորոշում (Ստուգիչներ)

**Սկրինինգ հարցեր**

- 1) Դուք երբևէ ախտորոշվե՞լ եք էխինակոկոզով<sup>0</sup>
  - ա. Այո- Անցեք հաջորդ հարցին (միայն եթե հարցվողը դեպք է)
  - բ. Ոչ- շնորհակալություն հայտնեք մասնակցին և ավարտեք հարցազրույցը (միայն եթե հարցվողը դեպք է)

- 2) Դուք ենթարկվե՞լ եք վիրահատության էխինակոկոզի նկատմամբ 2015 թվականին Ձեր կյանքում առաջին անգամ
- ա. Այո- անցնել հաջորդ հարցին (միայն եթե հարցվողը դեպք է)
  - բ. Ոչ- շնորհակալություն հայտնեք հարցվողին և ավարտեք հարցազրույցը

**Սոցիալ-ժողովրդագրական հարցեր**

1. Խնդրում ենք նշել Ձեր ծննդյան ամսաթիվը \_\_\_/\_\_\_/\_\_\_  
(օր) (ամիս) (տարի)
2. Ո՞ր սեռին եք պատկանում
  - ա. Արական
  - բ. Իգական
3. Ո՞րն է Ձեր ներկա ընտանեկան կարգավիճակը
  - ա. Ամուսնացած
  - բ. Բաժանված
  - գ. Ամուսնալուծված
  - դ. Այրի
  - ե. Միայնակ
4. Քանի՞ հոգի է ապրում Ձեր ընտանիքում, *ներառյալ Ձեզ* \_\_\_\_\_
5. Քանի՞ 18 տարեկանից ցածր մարդ է ապրում Ձեր ընտանիքում \_\_\_\_\_
6. Ո՞րն է Ձեր դիրքը ընտանիքում \_\_\_\_\_
7. Խնդրում ենք նշել կրթության ամենաբարձր աստիճանը, որը ստացել եք
  - ա. Թերի միջնակարգ (10 տարուց պակաս)
  - բ. Միջնակարգ (10 տարի)
  - գ. Միջին մասնագիտական (10-13 տարի)
  - դ. Ինստիտուտ/ համալսարան
  - ե. Հետդիպլոմային/ասպիրանտուրա
8. Խնդրում ենք նշել Ձեր ընտանիքում առկա կրթության ամենաբարձր աստիճանը \_\_\_\_\_

9. Խնդրում ենք նշել Ձեր ներկա աշխատանքային կարգավիճակը
- ա. Ձբաղված
  - բ. Ինքնագրադ
  - գ. Չգրադված, աշխատանք փնտրելիս
  - դ. Չգրադված (առողջական խնդիր)
  - ե. Չգրադված, աշխատանք չփնտրելիս
  - զ. Ուսանող
  - է. Այլ \_\_\_\_\_
10. Քանի՞ հոգի է Ձեր ընտանիքում (*ներառյալ Ձեզ*) ներկայում գրադված \_\_\_\_\_
11. Խնդրում ենք նշել Ձեր ընտանիքի ամսական միջին եկամուտը
- ա. 50,000 ՀՀ դրամից պակաս
  - բ. 50,001-ից- 100,000 ՀՀ դրամ
  - գ. 100,001-ից- 150,000 ՀՀ դրամ
  - դ. 150,001-ից- 200,000 ՀՀ դրամ
  - ե. 200,000 ՀՀ դրամից ավել
12. Որտե՞ղ եք ծնվել \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_  
 (երկիր) (մարզ) (գյուղ/քաղաք)
13. Քանի՞ տարի եք բնակվել Ձեր ծննդավայրում \_\_\_\_\_  
 (նշեք ժամանակահատվածը)
14. Դուք բնակվե՞լ եք Ձեր ծննդավայրից դուրս այլ վայրերում և որքա՞ն ժամանակ
- ա. Այո \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_  
 (երկիր) (մարզ) (գյուղ /քաղաք) (նշեք ժամանակահատվածը)
  - \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_  
 (երկիր) (մարզ) (գյուղ/քաղաք) (նշեք ժամանակահատվածը)
  - \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_  
 (երկիր) (մարզ) (գյուղ/քաղաք) (նշեք ժամանակահատվածը)
  - \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_  
 (երկիր) (մարզ) (գյուղ/քաղաք) (նշեք ժամանակահատվածը)
- բ. Ոչ
15. Ի՞նչ տիպի բնակտարածքում եք դուք բնակվել
- ա. Բնակարանային շենք

- բ. Առանձնատուն
- գ. Ֆերմերային տուն
- դ. Այլ \_\_\_\_\_

16. Ի՞նչ է Ձեր էթնիկական պատկանելությունը \_\_\_\_\_

***Դեպքերի համար (Եթե ստուգիչ է, անցեք հարց 18-ին)***

**Հիվանդության անձնական և ընտանեկան պատմություն**

17. Ի՞նչ տիպի էխինակոկոզով եք (ժապավենաձև որդ) դուք ախտորոշվել  
ա. Ցիստիկ (հիդատիդոզ/հիդատիդ)  
բ. Ալվեոլար  
գ. Այլ \_\_\_\_\_  
դ. Չգիտեմ

18. Դուք ունեցե՞լ եք ընտանիքի որևէ անդամ/ներ, ով/ովքեր ախտորոշվել է/են էխինակոկոզով (ժապավենաձև որդ)  
ա. Այո \_\_\_\_\_ (նշեք ով/ովքեր)  
բ. Ոչ (անցեք հարց 26-ին)

19. Ի՞նչ տիպի էխինակոկոզով էր/էին (ժապավենաձև որդ) նա/նրանք ախտորոշվել  
ա. Ցիստիկ (հիդատիդոզ/հիդատիդ)  
բ. Ալվեոլար  
գ. Այլ \_\_\_\_\_  
դ. Չգիտեմ

20. Ե՞րբ էր/էին նա/նրանք ախտորոշվել դրանով \_\_\_\_\_  
(նշեք ժամանակահատվածը)

21. Նա/նրանք ենթարկվե՞լ է/են բուժման դրա նկատմամբ  
ա. Այո  
բ. Ոչ

22. Ի՞նչ տիպի բուժում է կիրառվել  
ա. Վիրահատական

բ. Քիմիաթերապիա

գ. Այլ \_\_\_\_\_

դ. Չգիտեմ

23. Բուժումը հաջող է անցել և անձը/անձինք ճանաչվել է/են հիվանդությունից ազատված

ա. Այո

բ. Ոչ

գ. Չգիտեմ

24. Դուք անցե՞լ եք ախտորոշիչ ընթացակարգերով այն բանից հետո, երբ իմացվել է, որ Ձեր ընտանիքում վարակված անձ/անձինք կա/կան

ա. Այո

բ. Ոչ

25. Ձեր ընտանիքի մյուս անդամները անցե՞լ են ախտորոշիչ ընթացակարգերով այն բանից հետո, երբ իմացվել է, որ Ձեր ընտանիքում վարակված անձ/անձինք կա/կան

ա. Այո

բ. Ոչ

գ. Չգիտեմ

26. Դուք անցե՞լ եք սկրինինգ ախտորոշիչ մեթոդներով և/կամ իմունաախտորոշիչ թեստեր (ԷԼԱՅՁԱ և այլն) և/կամ բիոպսիա 2015 թվականին

### Ընտանիքի նկարագրություն

27. Դուք երբևէ շուն/շներ ունեցե՞լ եք

ա. Այո \_\_\_\_\_ (նշեք ժամանակահատվածը)

բ. Ոչ (անցեք հարց 32-ին)

28. Ինչպե՞ս է/են պահվել շուն/շները?

ա. Տանը

բ. Տան մոտ կապված

գ. Ազատ թափառելով

29. Որտե՞ղ էր/էին շունը/շները թափառում  
 ա. Պարտեզում/դրսում առանց հսկողության (ազատ թափառելով)  
 բ. Տնամերձ տարածքից դուրս  
 գ. Չգիտեմ
30. Ինչպե՞ս է/են շունը/շները լքել տնամերձ տարածքը  
 ա. Վզկապով  
 բ. Ազատ, ուղեկցությամբ  
 գ. Չգիտեմ
31. Առանց վզկապի դրսում թափառած շանը/շներին թույլ տրվո՞ւմ էր մտնել բնակտարածք  
 ա. Այո  
 բ. Ոչ  
 գ. Չգիտեմ
32. Դուք երբևէ կատու ունեցե՞լ էք  
 ա. Այո \_\_\_\_\_ (նշեք ժամանակահատվածը)  
 բ. Ոչ (անցեք հարց 38-ին)
33. Ինչպե՞ս է/են պահվել կատուն/կատուները  
 ա. Տանը  
 բ. Ազատ թափառելով/թափառում էր դրսում առանց հսկողության  
 գ. Չգիտեմ
34. Որտե՞ղ էր/էին կատուն/կատուները թափառում  
 ա. Պարտեզում/դրսում առանց հսկողության (ազատ թափառելով)  
 բ. Տնամերձ տարածքից դուրս  
 գ. Չգիտեմ

**Լրացուցիչ հարցեր**

35. Քանի՞ շուն եք երբևէ ունեցել ժամանակի ընթացքում և քանի՞ տարի եք պահել \_\_\_\_\_
36. Ո՞րն էր շուն/շներ պահելու պատճառը  
 ա. Որսորդության համար  
 բ. Որպես պահապան շուն  
 գ. Որպես ուղեկցող  
 դ. Որպես հովվաշուն

ե. Այլ \_\_\_\_\_

37. Քանի՞ կատու եք երբևէ ունեցել ժամանակի ընթացքում և քանի՞ տարի եք պահել \_\_\_\_\_

38. Դուք ուրիշ շան/շների հետ շփում ունեցե՞լ եք

ա. Միշտ

բ. Հաճախ

գ. Երբեմն

դ. Հազվադեպ

ե. Երբեք (անցեք հարց 41-ին)

39. Ի՞նչ կարգավիճակ ուներ/ուներին շունը/շները

ա. Տնային շուն/շներ

բ. Դրսի շուն/շներ

գ. Թափառող շուն/շներ

դ. Հովվաշուն/շներ

ե. Այլ \_\_\_\_\_

զ. Չգիտեմ

40. Դուք ձեր ձեռքերը լվացե՞լ եք շան/շների հետ շփումից հետո

ա. Միշտ

բ. Հաճախ

գ. Երբեմն

դ. Հազվադեպ

ե. Երբեք

41. Դուք ուրիշ կատվի/կատուների հետ շփում ունեցե՞լ եք

ա. Միշտ

բ. Հաճախ

գ. Երբեմն

դ. Հազվադեպ

ե. Երբեք (անցեք հարց 43-ին)

42. Դուք ձեր ձեռքերը լվացե՞լ եք կատվի/կատուների հետ շփումից հետո

ա. Միշտ

բ. Հաճախ

գ. Երբեմն

- դ. Հազվադեպ
- ե. Երբեք

43. Դուք շփվե՞լ եք այն միջավայրի հետ, որում ապրել է/են շունը/շները, կատու/կատուները

- ա. Միշտ
- բ. Հաճախ
- գ. Երբեմն
- դ. Հազվադեպ
- ե. Երբեք (**անցեք հարց 45-ին**)

44. Դուք ձեր ձեռքերը լվացե՞լ եք այն միջավայրի հետ շփումից հետո, որում ապրել է/են շունը/շները, կատու/կատուները

- ա. Միշտ
- բ. Հաճախ
- գ. Երբեմն
- դ. Հազվադեպ
- ե. Երբեք

45. Թափառող շուն/շներ կայի՞ն ձեր հարևանությամբ/համայնքում

- ա. Այո
- բ. Ոչ
- գ. Չգիտեմ

46. Դուք երբևէ պահե՞լ եք կամ շփման մեջ եղե՞լ եք այլ տիպի կենդանու/կենդանիների հետ

- ա. Խոշոր եղջրավոր կենդանիներ \_\_\_\_\_ (նշեք)
- բ. Ոչխարներ \_\_\_\_\_ (նշեք)
- գ. Այծեր \_\_\_\_\_ (նշեք)
- դ. Խոզեր \_\_\_\_\_ (նշեք)
- ե. Աղվեսներ \_\_\_\_\_ (նշեք)
- զ. Գայլեր \_\_\_\_\_ (նշեք)
- է. Այլ \_\_\_\_\_ (նշեք)
- ը. Ոչ (**անցեք հարց 49-ին**)

47. Դուք ձեր ձեռքերը լվացե՞լ եք այդ կենդանու/կենդանիների հետ շփումից հետո

- ա. Միշտ
- բ. Հաճախ

- գ. Երբեմն
- դ. Հազվադեպ
- ե. Երբեք

48. Դուք ստացե՞լ եք կենդանաբուժական օգնություն այդ կենդանու/կենդանիների համար (օր. ճիճվաթափում)

- ա. Միշտ
- բ. Հաճախ
- գ. Երբեմն
- դ. Հազվադեպ
- ե. Երբեք

49. Դուք բնակվե՞լ եք բաց դաշտերին, գետերին, մարգագետիններին, անտառներին մոտ գտնվող բնակտարածքում

- ա. Այո
- բ. Ոչ

#### Աշխատանքի բնույթը

50. Ո՞րն էր Ձեր զբաղվածությունը

- ա. Գյուղատնտեսական աշխատող
- բ. Կենդանիներ արածեցնող
- գ. Անասնաբույժ (հատկապես ոչխարի)
- դ. Հովիվ
- ե. Բնական արոտավայրում աշխատող
- զ. Սպանդ իրականացնող
- է. Մսագործ
- ը. Մորթեմշակ
- թ. Ոչխար խուզող
- ժ. Մորթատու կենդանիների անասնաբույժ
- ի. Կենդանաբույժ
- լ. Տնային տնտեսուհի
- խ. Արտադրամասի աշխատող
- ծ. Մորթեվաճառ
- կ. Կաթի գծով ֆերմեր
- հ. Որսորդ
- ձ. Այլ \_\_\_\_\_

51. Ձեր ընտանիքից որևէ մեկը վերը նշված զբաղվածություններից ունեցե՞լ է  
ա. Այո

\_\_\_\_\_ (նշեք բոլորին ովքեր ունեցել են և զբաղվածությունը/ները)  
բ. Ոչ

***Եթե դեպքը կամ ստուգիչը շուն, կատու չի ունեցել, հետևաբար անցեք հարց 58-ին***

**Փոխանցման հնարավոր գործոնները**

52. Ձեր շունը/շները ստացե՞լ է/են կենդանաբուժական օգնություն, երբ  
նա/նրանք հիվանդ էր/էին

- ա. Միշտ
- բ. Հաճախ
- գ. Երբեմն
- դ. Հազվադեպ
- ե. Երբեք

53. Ձեր շունը/շները ճիճվաթափվե՞լ է/են

- ա. Մինչև 12 ամիս
- բ. 12 ամսից ավել
- գ. Ոչ

54. Դուք կերակրե՞լ եք Ձեր շանը/շներին

- ա. Միշտ
- բ. Հաճախ
- գ. Երբեմն
- դ. Հազվադեպ
- ե. Երբեք (անցեք հարց 56-ին)

55. Դուք երբևէ կերակրե՞լ եք Ձեր շանը/շներին չմշակված փորոտիքով/լեշով

- ա. Այո \_\_\_\_\_ (նշեք որտեղ և ժամանակահատվածը)
- բ. Ոչ
- գ. Չգիտեմ

56. Ձեր կատուն/կատուները ստացե՞լ է/են կենդանաբուժական օգնություն, երբ նա/նրանք հիվանդ էր/էին

- ա. Միշտ
- բ. Հաճախ
- գ. Երբեմն
- դ. Հազվադեպ
- ե. Երբեք (անցեք հարց 58-ին)

57. Ձեր կատուն/կատուները ճիճվաթափվե՞լ են

- ա. Մինչև 12 ամիս
- բ. 12 ամսից ավել
- գ. Ոչ

58. Դուք երբևէ անասուն մորթե՞լ էք տնամերձ տարածքում

- ա. Այո

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- բ. Ոչ (նշեք անասունի տեսակը/ները և ժամանակահատվածը)

59. Մոտակայքում սպանդանոց կա՞ր

- ա. Այո
- բ. Ոչ
- գ. Չգիտեմ

60. Դուք ինչպե՞ս եք ազատվել ինքն իրեն սատկած անասուններից (նրանց փորոտիքից/լեշից)

- ա. Թաղելով
- բ. Վառելով
- գ. Մաշկազերծելով
- դ. Ուտելով
- ե. Վաճառելով
- զ. Այլ \_\_\_\_\_
- է. Ես անասուններ չունեմ

61. Դուք Ձեր ձեռքերը լվացե՞լ եք սատկած անասունների հետ շփումից հետո (նրանց փորձարկելով/լեշի) \_\_\_\_\_
62. Ձեր շունը/շները առնչվե՞լ է/են սատկած կենդանու դիակների հետ (նրանց փորձարկելով/լեշի)
- ա. Այո
  - բ. Ոչ
  - գ. Չգիտեմ
63. Թափառող շներին կերակրե՞լ են սատկած կենդանու փորձարկելով/լեշով
- ա. Այո
  - բ. Ոչ
  - գ. Չգիտեմ
64. Որտե՞ղ է/են Ձեր շունը/շները սովորաբար արտաթորում
- ա. Տանը
  - բ. Տնամերձ տարածքի ներսում
  - գ. Տնամերձ տարածքից դուրս
  - դ. Այլ \_\_\_\_\_
  - ե. Չգիտեմ
65. Երբևէ մաքրե՞լ եք շան արտաթորանքը
- ա. Այո
  - բ. Ոչ (**անցեք հարց 67-ին**)
66. Դրանից հետո Ձեր ձեռքերը լվացե՞լ եք
- ա. Միշտ
  - բ. Հաճախ
  - գ. Երբեմն
  - դ. Հազվադեպ
  - ե. Երբեք
67. Ձեր ընտանիքի երեխաները խաղացե՞լ են շան/շների հետ
- ա. Միշտ
  - բ. Հաճախ
  - գ. Երբեմն
  - դ. Հազվադեպ

- ե. Երբեք
- զ. Չգիտեմ

68. Ձեր ընտանիքի երեխաները խաղացե՞լ են կատվի/կատունների հետ

- ա. Միշտ
- բ. Հաճախ
- գ. Երբեմն
- դ. Հազվադեպ
- ե. Երբեք
- զ. Չգիտեմ

69. Դուք որսի գնացե՞լ էք բնության մեջ/անտառ

- ա. Միշտ
- բ. Հաճախ
- գ. Երբեմն
- դ. Հազվադեպ
- ե. Երբեք

70. Դուք երբևէ ծամե՞լ էք խոտ կամ հող կերե՞լ էք

- ա. Այո
- բ. Ոչ

71. Դուք երբևէ արե՞լ էք սրանցից որևէ մեկը?

ա. Գյուղատնտեսական աշխատանք \_\_\_\_\_  
(նշեք որքան հաճախ և ժամանակահատվածը)

բ. Անասուն արածեցնել \_\_\_\_\_  
(նշեք որքան հաճախ և ժամանակահատվածը)

գ. Խուզել ոչխար \_\_\_\_\_  
(նշեք որքան հաճախ և ժամանակահատվածը)

դ. Մորթի վաճառել \_\_\_\_\_  
(նշեք որքան հաճախ և ժամանակահատվածը)

ե. Կթել \_\_\_\_\_  
(նշեք որքան հաճախ և ժամանակահատվածը)

զ. Այլ \_\_\_\_\_  
(նշեք որքան հաճախ և ժամանակահատվածը)

72. Դուք երբևէ աճեցրե՞լ եք լայնատերև կանաչեղեն կամ արմատապտուղներ  
 ա. Այո  
 բ. Ոչ
73. Որո՞նք էին խմելու ջրի աղբյուրները, որ երբևէ օգտագործել եք  
 ա. Գետ  
 բ. Զրհոր/ջրամբար  
 գ. Ոռոգման  
 դ. Խողովակաջուր  
 ե. Այլ \_\_\_\_\_
74. Դուք Ձեր ձեռքերը լվացե՞լ եք ուտելիք պատրաստելուց առաջ կամ ուտելիք  
 ընդունելուց առաջ  
 ա. Միշտ  
 բ. Հաճախ  
 գ. Երբեմն  
 դ. Հազվադեպ  
 ե. Երբեք
75. Դուք կերե՞լ եք չլվացված կանաչեղեն/հում լայնատերև կանաչեղեն,  
 բանջարեղեններ, մրգեր  
 ա. Միշտ  
 բ. Հաճախ  
 գ. Երբեմն  
 դ. Հազվադեպ  
 ե. Երբեք
76. Դուք հավաքել և կերե՞լ եք չլվացված վայրի բույսեր, վայրի  
 հատապտուղներ  
 ա. Միշտ  
 բ. Հաճախ  
 գ. Երբեմն  
 դ. Հազվադեպ  
 ե. Երբեք

**Էխինակոկոզի տարածման վերաբերյալ գիտելիքներ**

77. Ո՞ր հնարավոր հիվանդությունների/վիճակների մասին եք տեղյակ, որոնք շների միջոցով են պատճառվում

ա. Կատաղություն

բ. Որդեր

գ. Դիզենտերիա

դ. Լեյշմանիոզ

ե. Լեպտոսպիրոզ

զ. Լայմի հիվանդություն

է. Այլ \_\_\_\_\_

78. Ո՞ր հնարավոր հիվանդությունների/վիճակների մասին եք տեղյակ, որոնք կատուների միջոցով են պատճառվում

ա. Կատվի ճանկոցից առաջացող տենդ

բ. Որդեր

գ. Կատաղություն

դ. Լեպտոսպիրոզ

ե. Կամպիլոբակտերիոզ

զ. Այլ \_\_\_\_\_

79. Երբևէ լսե՞լ եք մարդկանց մոտ ժապավենաձև որդերով պայմանավորված վարակների մասին

ա. Այո

բ. Ոչ

80. Դուք հանդիպե՞լ եք կամ գիտե՞ք որևէ մեկին, ով ախտորոշվել է էխինակոկոզով (ժապավենաձև որդ) գյուղի/քաղաքի հիվանդանոցներից որևէ մեկում

ա. Այո

բ. Ոչ

81. Ինչպե՞ս կարող են շները և կատուները վարակվել էխինակոկոզով (ժապավենաձև որդ) \_\_\_\_\_

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\_\_\_\_\_

82. Ինչպե՞ս կարող են մարդիկ ձեռք բերել էխինակոկոզ (ժապավենաձև որդ) \_\_\_\_\_

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83. Էխինակոկոզով հիվանդ մարդիկ կարո՞ղ են ուրիշներին վարակել

- ա. Այո
- բ. Ոչ
- գ. Չգիտեմ

84. Դուք կարծում եք էխինակոկոզը (ժապավենաձև որդ) վտանգավո՞ր հիվանդություն է

- ա. Այո
- բ. Ոչ
- գ. Չգիտեմ

85. Դուք գիտե՞ք թե ինչ կարող եք անել էխինակոկոզը (ժապավենաձև որդ) կանխարգելելու համար \_\_\_\_\_

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**Շնորհակալություն Ձեր մասնակցության համար:**

### **Appendix 3. Oral Consent form**

#### **Consent form**

Hello, my name is Rubina, I am an alumna of the Master of Public Health program at the American University of Armenia. This study is conducted for collecting information on relation between dog and cat ownership/contact and echinococcosis among patients from medical institutions of Yerevan, Republic of Armenia.

You have been selected to participate in this study along with 326 other people from the Republic of Armenia. The interview will be conducted face-to-face lasting approximately 20 minutes through a questionnaire administered by the interviewer. The information provided by you and the data obtained from the medical institutions are fully confidential and will be used only for the study. Your name, contact information will not appear anywhere and only aggregated results will be presented in the final report/presentation.

Your contact information will be destroyed upon the completion of data collection. Your participation in this study is voluntary. You may refuse to participate in the study. If you decide to participate, you can skip any question you don't want to answer or stop the interview anytime. There is no risk for you associated with participation in the study. You will not get financial benefit from the participation either. Your answers will help us to understand the risk factors related to this disease in Armenia. If you have any question regarding this study you can write to principal investigator of the study Byron Crape by e-mail: [bcrape@gmail.com](mailto:bcrape@gmail.com). If you feel you have not been treated fairly or think you have been hurt by joining the study you should contact Human Subject Protection Administrator of the American university of Armenia Kristina Akopyan (37460) 61 25 61.

Do you agree to participate in this study? Thank you.

If yes, shall we continue?

#### Հավելված 4. Բանավոր իրազեկ համաձայնության ձև

##### **Իրազեկ համաձայնության ձև**

Բարև Ձեզ, իմ անունը Ռուբինա է: Ես Հայաստանի ամերիկյան համալսարանի Հանրային առողջապահության մագիստրատուրայի շրջանավարտ եմ: Այս հետազոտությունն իրականացվում է շուն և կատու ունենալու/շան, կատվի հետ շփման և էխինակոկոզի միջև կապի վերաբերյալ տեղեկություն հավաքելու համար հիվանդների շրջանում Հայաստանի Հանրապետություն, Երևանի բժշկական հաստատություններից:

Դուք ընտրվել եք մասնակցելու այս հետազոտությանը Հայաստանի Հանրապետությունից 326 այլ մարդկանց հետ միասին:

Հարցազրույցը կանցկավի դեմ առ դեմ տևելով մոտավորապես 20 րոպե հարցազրույցը վարողի կողմից անցկացվող հարցաշարի միջոցով: Ձեր կողմից տրամադրված տեղեկությունը և բժշկական հաստատություններից ձեռք բերված տվյալները լիովին գաղտնի են և կօգտագործվեն միայն հետազոտության համար:

Ձեր անունը, կոնտակտային տեղեկությունը չի հայտնվի որևէ տեղ և միայն ընդհանրացված տվյալները կներկայացվեն եզրափակիչ զեկույցում/պրեզենտացիայի մեջ: Ձեր կոնտակտային տեղեկությունը կոչնչացվի տվյալների հավաքագրումից հետո: Ձեր մասնակցությունը այս հետազոտությանը կամավոր է: Դուք կարող եք հրաժարվել մասնակցել հետազոտությանը: Եթե դուք որոշեք մասնակցել, դուք կարող եք բաց թողնել ցանկացած հարց, որին չեք կամենա պատասխանել կամ դադարեցնել հարցազրույցը ցանկացած պահի: Ոչ մի վտանգ չկա Ձեզ համար

հետազոտությանը մասնակցության հետ կապված: Դուք ֆինանսական օգուտ էլ չեք ստանա մասնակցությունից: Ձեր պատասխանները կօգնեն մեզ հասկանալ ռիսկային գործոնները, որոնք կապված են այս հիվանդության հետ

Հայաստանում: Եթե դուք որևէ հարց ունենաք այս հետազոտության հետ կապված դուք կարող եք գրել հետազոտության գլխավոր ուսումնասիրողին Բայրոն Քրեյֆին էլ. փոստով. [bcrappe@gmail.com](mailto:bcrappe@gmail.com): Եթե դուք զգում եք, որ Ձեզ արդարացիորեն չեն վերաբերվել կամ կարծում եք, որ վնասվել եք միանալով հետազոտությանը, դուք պետք է կապվեք Հայաստանի ամերիկյան համալսարանի Մարդկային\_սուբյեկտների\_պաշտպանության կառավարչի՝ Քրիստինա Ակոպյանի հետ (37460) 61 25 61.

Համաձայն եք մասնակցել այս հետազոտությանը: Շնորհակալություն:

Եթե այո, կարո՞ղ ենք շարունակել: