ZOONOSES MONITORING

European Food Safety Authority

Former Yugoslav Republic of Macedonia, the

TRENDS AND SOURCES OF ZOONOSES AND ZOONOTIC AGENTS IN FOODSTUFFS, ANIMALS AND FEEDINGSTUFFS

including information on foodborne outbreaks,
antimicrobial resistance in zoonotic and indicator bacteria
and some pathogenic microbiological agents

IN 2017

PREFACE

This report is submitted to the European Commission in accordance with Article 9 of Council Directive 2003/99/ EC*. The information has also been forwarded to the European Food Safety Authority (EFSA).

The report contains information on trends and sources of zoonoses and zoonotic agents in Former Yugoslav Republic of Macedonia, the during the year 2017.

The information covers the occurrence of these diseases and agents in animals, foodstuffs and in some cases also in feedingstuffs. In addition the report includes data on antimicrobial resistance in some zoonotic agents and indicator bacteria as well as information on epidemiological investigations of foodborne outbreaks. Complementary data on susceptible animal populations in the country is also given. The information given covers both zoonoses that are important for the public health in the whole European Union as well as zoonoses, which are relevant on the basis of the national epidemiological situation.
The report describes the monitoring systems in place and the prevention and control strategies applied in the country. For some zoonoses this monitoring is based on legal requirements laid down by the European Union legislation, while for the other zoonoses national approaches are applied.

The report presents the results of the examinations carried out in the reporting year. A national evaluation of the epidemiological situation, with special reference to trends and sources of zoonotic infections, is given. Whenever possible, the relevance of findings in foodstuffs and animals to zoonoses cases in humans is evaluated.
The information covered by this report is used in the annual European Union Summary Reports on zoonoses and antimicrobial resistance that are published each year by EFSA.

The national report contains two parts: tables summarising data reported in the Data Collection Framework and the related text forms. The text forms were sent by email as pdf files and they are incorporated at the end of the report.

---

* Directive 2003/ 99/ EC of the European Parliament and of the Council of 12 December 2003 on the monitoring of zoonoses and zoonotic agents, amending Decision 90/ 424/ EEC and repealing Council Directive 92/ 117/ EEC, OJ L 325, 17.11.2003, p. 31

List of Contents

ANIMAL POPULATION TABLES

Table Susceptible animal population

| Animal species | Category of animals | Population | | |
		holding	animal	slaughter animal (heads)
Cattle (bovine animals)	Cattle (bovine animals)	25,044	214,170	10,829
Pigs	Pigs - breeding animals - unspecified - boars		710	
	Pigs - breeding animals - unspecified - piglets		44,881	
	Pigs - breeding animals - unspecified - sows		14,499	
	Pigs - fattening pigs			174,393
	Pigs - fattening pigs - unspecified		42,172	
Sheep and goats	Sheep and goats	9,669	819,771	221,817

DISEASE STATUS TABLES

Table Bovine brucellosis in countries and regions that do not receive Community co-financing for eradication programme

Region	Number of herds with status officially free	Number of infected herds	Total number of animals	Number of herds tested under surveillance	Number of animals tested under surveillance	Total number of herds
Macedonia The Former Yugoslav Republic Of	0	78	203,139	20,395	158,840	22,194

Table Ovine or Caprine brucellosis in countries and regions that do not receive Community co-financing for eradication programme

Region	Number of herds with status officially free	Number of infected herds	Total number of animals	Number of herds tested under surveillance	Number of animals tested under surveillance	Total number of herds
Macedonia The Former Yugoslav Republic Of	0	97	819,771	6,608	412,978	8,246

DISEASE STATUS TABLES

Table Bovine tuberculosis in countries and regions that do not receive Community co-financing for eradication programme

Region	Number of herds with status officially free	Number of infected herds	Total number of animals	Number of animals tested with tuberculin routine testing	Total number of herds
Macedonia The Former Yugoslav Republic Of	0	78	203,139	174,967	22,194

PREVALENCE TABLES

Table Brucella:BRUCELLA in animal

Area of Sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Method	Sampling unit	Total units tested	Total units positive	Zoonoses	N of units positive
Not Available	Cattle (bovine animals) - Farm - Not Available - Not Available - Surveillance - Official sampling - Census	Not Available	animal	158840	348	Brucella abortus	348
	Sheep and goats - Farm - Not Available - Not Available - Surveillance - Official sampling - Census	Not Available	animal	412978	448	Brucella melitensis	448

Table Mycobacterium:MYCOBACTERIUM in animal

Area of Sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Method	Sampling unit	Total units tested	Total units positive	Zoonoses	N of units positive
Not Available	Cattle (bovine animals) - Farm - Not Available - Not Available - Surveillance - Official sampling - Census	Skin test	animal	174967	61	Mycobacterium spp., unspecified	61

FOODBORNE OUTBREAKS TABLES

Foodborne Outbreaks: summarized data

	Outbreak strenght	Strong				Weak			
Causative agent	Food vehicle	N outbreaks	N human cases	N hospitalized	N deaths	N outbreaks	N human cases	N hospitalized	N deaths
Escherichia coli	Tap water, including well water	3	125	3	0				
Salmonella	Meat and meat products	1	46	13	0	1	47	7	0
Staphylococcal enterotoxins	Cheese					1	5	1	0
	Other foods	1	123	0	0				
	Buffet meals	1	6	0	0				
	Unknown					2	51	7	0
Unknown	Tap water, including well water					1	777	2	0
	Unknown					1	17	2	0

Strong Foodborne Outbreaks: detailed data

Causative agent	Other Causative Agent	FBO nat. code	Outbreak type	Food vehicle	More food vehicle info	Nature of evidence	Setting	Place of origin of problem	Origin of food vehicle	Contributory factors	Comment	N outbreaks	N human cases	N hosp.	N deaths
Escherichia coli	Not Available	N_A	General	Tap water, including well water	Water	Descriptive environmental evidence;Detection of causative agent in food vehicle or its component - Symptoms and onset of illness pathognomonic to causative agent	Multiple places of exposure in one country	Water distribution system	Former Yugoslav Republic of Macedonia, the	Water treatment failure	N_A	3	125	3	0
Salmonella	Not Available	N_A	General	Meat and meat products	Burgers	Descriptive environmental evidence;Detection of causative agent in food vehicle or its component - Symptoms and onset of illness pathognomonic to causative agent	Take-away or fast-food outlet	Take-away or fast-food outlet	Former Yugoslav Republic of Macedonia, the	Infected food handler;Inadequate heat treatment	N_A	1	46	13	0
Staphylococcal enterotoxins	Not Available	N_A	General	Other foods	Pasta	Detection of causative agent in food vehicle or its component - Symptoms and onset of illness pathognomonic to causative agent;Analytical epidemiological evidence	Canteen or workplace catering	Canteen or workplace catering	Former Yugoslav Republic of Macedonia, the	Storage time/temperature abuse	N_A	1	123	0	0
				Buffet meals	Rice with chicken	Descriptive environmental evidence;Detection of causative agent in food vehicle or its component - Symptoms and onset of illness pathognomonic to causative agent	Canteen or workplace catering	Canteen or workplace catering	Former Yugoslav Republic of Macedonia, the	Cross-contamination	N_A	1	6	0	0

Weak Foodborne Outbreaks: detailed data

Causative agent	Other Causative Agent	FBO nat. code	Outbreak type	Food vehicle	More food vehicle info	Nature of evidence	Setting	Place of origin of problem	Origin of food vehicle	Contributory factors	Comment	N outbreaks	N human cases	N hosp.	N deaths
Salmonella	Not Available	N_A	General	Meat and meat products	BBQ products	Descriptive environmental evidence;Detection of causative agent in food vehicle or its component - Symptoms and onset of illness pathognomonic to causative agent	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Former Yugoslav Republic of Macedonia, the	Infected food handler	N_A	1	47	7	0
Staphylococcal enterotoxins	Not Available	N_A	General	Cheese	white cheese	Descriptive environmental evidence;Detection of causative agent in food vehicle or its component - Symptoms and onset of illness pathognomonic to causative agent	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Former Yugoslav Republic of Macedonia, the	Unknown;Infected food handler	N_A	1	5	1	0
				Unknown	N_A	Descriptive environmental evidence;Detection of causative agent in food vehicle or its component - Symptoms and onset of illness pathognomonic to causative agent	Canteen or workplace catering	Canteen or workplace catering	Former Yugoslav Republic of Macedonia, the	Unknown	N_A	1	44	0	0
							School or kindergarten	School or kindergarten	Former Yugoslav Republic of Macedonia, the	Unknown	N_A	1	7	7	0
Unknown	Not Available	N_A	General	Tap water, including well water	suspected source was water distribution system, no positive results	Descriptive environmental evidence	Multiple places of exposure in one country	Water source	Former Yugoslav Republic of Macedonia, the	Unknown	N_A	1	777	2	0
				Unknown	N_A	Descriptive environmental evidence	Others	Not Available	Not Available	Not Available	N_A	1	17	2	0

ANTIMICROBIAL RESISTANCE TABLES FOR CAMPYLOBACTER

ANTIMICROBIAL RESISTANCE TABLES FOR SALMONELLA

ANTIMICROBIAL RESISTANCE TABLES FOR INDICATOR ESCHERICHIA COLI

OTHER ANTIMICROBIAL RESISTANCE TABLES

Specific monitoring of ESBL-/AmpC-/carbapenemase-producing bacteria and specific monitoring of carbapenemase-producing bacteria, in the absence of isolate detected

No data returned for this view. This might be because the applied filter excludes all data.

Latest Transmission set

Table Name	Last submitted dataset transmission date
Animal Population	25-Jul-2018
Disease Status	25-Jul-2018
Food Borne Outbreaks	25-Jul-2018
Prevalence	25-Jul-2018

Ss. Cyril and Methodius University Faculty of Veterinary Medicine – Skopje

Faculty of Veterinary Medicine – Skopje has teaching, research and applicative activity in field of veterinary medicine and veterinary public health.

For educational and research activities, the Faculty of Veterinary Medicine-Skopje is organized in scientific and educational unit- Institutes. There are three teaching-scientific organization units in FVM-S. All Institutes of the Faculty are constituted by different departments, laboratories and clinics where the processes of education, research and application are effecting.

Within the Veterinary Institute the following departments are organized:
- Department of farm animals-Internal medicine
- Department of small animal internal medicine and horses
- Department of biology and pathology of fish, bees and wild animals
- Department of veterinary surgery
- Department for infectious diseases and epidemiology
- Department of avian diseases
- Department of parasitology and parasitic diseases
- Department of pathology and forensic medicine
- Department of pathophysiology
- Department of animal hygiene and environmental

Within the Institute of Food, the following departments are organized:
- Department of food safety and veterinary public health
- Department of nutrition of farm animals
- Department of Chemistry
- Department of Pharmacology and Toxicology
- Department of economics and management
- Department of Veterinary Legislation

Within the Institute of Reproduction and Biomedicine the following departments are organized:
- Department of Biochemistry and cell biology
- Department of functional morphology
- Department of animal science
- Department of reproduction

Within the Veterinary Institute the following Centres are organized:
- Zoonosis centre
- Center for side effects and information for veterinary medical products
- Education center for food safety and veterinary public health
- Center for artificial insemination
- Center for animal welfare

Within the Institute for Veterinary following laboratories are included:
- Laboratory for Microbiology
- Laboratory for serology and molecular diagnostics
- Laboratory for parasitology and parasitic diseases
- Laboratory for TSE
- Laboratory for diagnosis fish, bees and hunting wild game diseases
- Laboratory for Pathology and patohystology

Former Yugoslav Republic of Macedonia

- Laboratory for Pathophysiolog
- Laboratory for rabies
- Laboratory for Animal Hygiene and Environmental
- Cabinet for visual diagnostics
- Reception office

Within the Institute for Food following laboratories are included:
- Laboratory for microbiology of food and feed
- Laboratory for quality control of food and feed
- Laboratory for residues and contaminants
- Laboratory for raw milk quality
- Laboratory for Pharmacology and Toxicology

Within the Institute for Reproduction and Biomedicine following laboratories are included:
- Laboratory for production, cryoconservation and control of semen
- Laboratory for assisted reproduction
- Plastination laboratory
- Laboratory for histology and embryology
- Laboratory for Biochemistry and Cell Biology

The all Institutes of the Faculty are constituted by different departments, laboratories and clinics where the processes of education, research and application are effecting.

The capacities of the Veterinary Institute give opportunity for students to learn the fundamental principles of veterinary medicine by the educational process in the clinical departments. This Institute incorporates laboratories for diagnosis of infectious diseases affecting farm animals and humans, being included and regulated by the state policies. Another unit of the veterinary Institute is the University Veterinary Clinic which offers a wide range of diagnostic, surgical and therapeutical prospects.

The Food Institute includes departments focusing on food safety, food quality and veterinary public health issues. The laboratories are specialized in testing food safety and quality for human consumption, using different microbiological, chemical and nutritive analysis methods. They also offer an opportunity for animal food and water analysis.

The Institute for Reproduction and Biomedicine incorporates departments and laboratories which focus on issues regarding animal breeding, reproduction and animal welfare, but also those that study the fundamentals of veterinary medicine by pre-clinical subjects. The laboratory for Semen evaluation, Cryopreservation and Assisted Reproduction performs a wide range of scientific studies in the field of Andrology. Plastination laboratory produce anatomical models which are widely used for the education process. Department for Histology, Embryology as well the laboratories for Clinical Biochemistry are fully engaged in the work process of the University Veterinary Clinic of the Faculty of veterinary medicine in Skopje.

Within the application activities, on the Faculty of veterinary medicine in Skopje (FVMS), well equipped laboratories are functioning. They all fulfill different requirements to external customers. FVMS basic commitment is to increase the quality of service, production and testing, as well as customer satisfaction and national and international legal requirements of competent authorities. Therefore, a priority commitment of the management team of FVMS is the introduction of management systems and quality control.

The system for managing quality requirements according the International Standard MKC EN ISO 9001:2008 in the FVMS was introduced and certified on 02/05/2005 by the international certification body BSI (British Standard Institution – Cert. No. FS 74597), recertified on 26.03.2008, with the final validity till 01.03.2014.

FVMS (Institute for food and Veterinary institute) is accredited by the Institute for Accreditation of R. Macedonia (certificate.no. LT-006), which confirms that the requirements of the

Former Yugoslav Republic of Macedonia

international standard „MKC EN ISO/IEC 17025:2006" in the field of testing food products, beverages, water and examination of animal diseases are fulfilled.

Implementation of international standards „MKC EN ISO/IEC 17025:2006" in the Institute for food and Veterinary institute in the FVMS for our customers means a guarantee for the reliability of results for all samples tested within the same. That is also the guarantee that tests will be conducted in accordance with the latest national and international standards and regulations. FVMS will also maintain a high level of reliability to customers for testing results, and high level of services depending on the customer requirements.

Accredited laboratories of FMVS are proposed to be "National Reference Laboratory" for control of food safety and monitoring of residues, zoonoses and antimicrobial resistance, as provided in Regulation EC/882/2004. In its vision and mission, FVMS unequivocally states that it will be competitive, internationally accredited laboratory that performs routine tests to monitor food safety, animal health and welfare in their varieties in R. Macedonia.

Short description of the institutions and laboratories involved in data collection and reporting

---

Animal population

1. Sources of information and the date(s) (months, years) the information relates to[a]

Source of information is Informative system of Food and Veterinary Agency – Identification and registration system since 2004, starts with bovine.
Information is provided from 30.09.2017.

2. Definitions used for different types of animals, herds, flocks and holdings as well as the production types covered

"Farm animal" shall mean a domestic animal of the bovine species including the species Bubalus bubalis and Bison bison, ovine, caprine, porcine and equidae species.
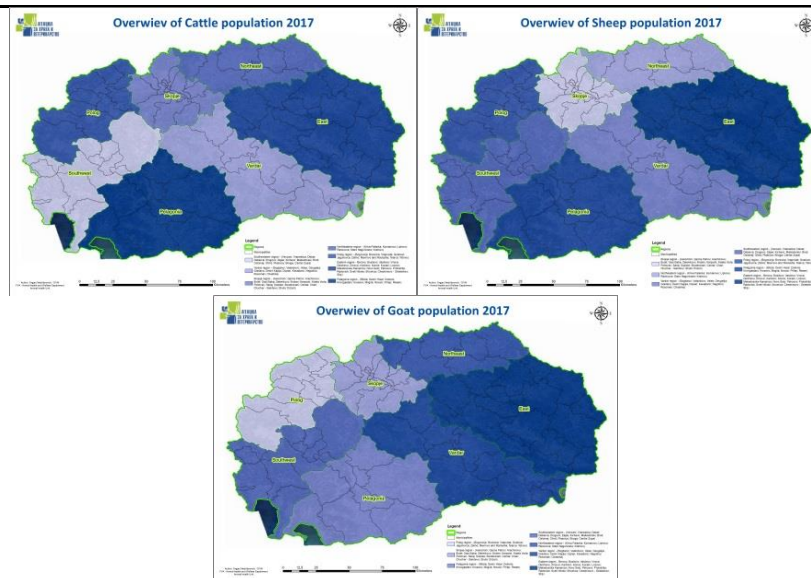
"Other animal" shall mean an animal which is not covered under the term farm animal of the species defined in indent (2) above , but which shall be identified and registered under this law depending on circumstances.

"Holding" shall mean any establishment, construction or, in the case of an open-air farm, any place in which animals covered by this law are held, kept or handled.

3. National changes of the numbers of susceptible population and trends

Decreasing number of bovine population (LSD – 2016)

4. Geographical distribution and size distribution of the herds, flocks and holdings[b]

Former Yugoslav Republic of Macedonia

Overwiev of Cattle population 2017

Overwiev of Sheep population 2017

Overwiev of Goat population 2017

5. Additional information

Write text here please

(a): National identification and registration system(s), source of reported statistics (Eurostat, others)
(b): Link to website with density maps if available, tables with number of herds and flocks according to geographical area

General evaluation Mycobacterium
1. History of the disease and/or infection in the country[a]
Republic of Macedonia is not officially free of bovine tuberculosis according to Directive 64/432/EEC. All regions are not officially free of bovine tuberculosis according to Directive 64/432/EEC In the last several years, the Food and Veterinary Agency implements programs for control and eradication of the disease.
2. Evaluation of status, trends and relevance as a source for humans
The control of tuberculosis is based on Council Directive 64/432/EEC, which is implemented and adapted in National legislation in Program for control and eradication of Bovine Tuberculosis is in place since 2007. All bovine animals older than 6 weeks were tested once a year in the whole country. Animals with suspected tuberculin skin test, are retested after 42 days with comparative tuberculin test.
3. Any recent specific action in the Member State or suggested for the European Union[b]
Write text here please
4. Additional information
Write text here please
* **For each zoonotic agent** (a): Epidemiological evaluation (trends and sources) over time until recent/current situation for the different relevant matrixes (food, feed, animal). If relevant: the official "disease status" to be specified for the whole country and/or specific regions within the country (b): If applicable

General evaluation Brucella
1. History of the disease and/or infection in the country[a]
2. Bovine brucellosis – B. Abortus Republic of Macedonia is not officially free from bovine brucellosis All regions are not officially free of bovine brucellosis according to Directive 64/432/EEC. **3. ovine brucellosis - B. melitensis** Republic of Macedonia is not recognized as country officially free from sheep and goat brucellosis according to Directive 91/68/EEC. Republic of Macedonia has no regions officially free from sheep and goat brucellosis according to Directive 91/68/EEC. In the last several years, the Food and Veterinary Agency implements programs for control and eradication of the disease. Since 2008 eradication program for brucellosis has been systematically implemented when an individual identification of sheep and goats started. After 2008 mass vaccination is started and the country is divided in to three regions. The application of the new strategy resulted with division of the territory of the country into certain number of individual regions i.e. epidemiological units where depending of the widespread of the disease in the country, the prevalence, different measures for control of Brucellosis in sheep and goats apply. After several years of implementation of the program's provisions, in 2010 and 2014 after the conducted analysis of the results, certain corrections were made to the eradication program. In following years, vaccination of replacements animals and test and slaughter of adult animals have been implemented. Serological surveillance was conducted of the vaccinated animals for assessment of the immunity to vaccinated sheep and goats against Brucellosis. In 2016 new programme for control and eradication of brucellosis in small ruminants were implemented and two municipalities (these are municipalities where mass vaccination was carried out in 2008) as a pilot project have been introduced in the scheme for testing of the animals and applying test and slaughter policy. The aim of this program is public and animal health protection and providing pre-requisites for placing on the market of sheep and goats and products thereof, and at same time achievement and maintenance of the status of the holdings of sheep and goats "officially free from Brucellosis in according to Directive 91/68/EEC.
2. Evaluation of status, trends and relevance as a source for humans
1. Bovine brucellosis – B. abortus Regular annual diagnostic tests for Bovine Brucellosis were performed on all cattle older than six months while retest of all positive herds continuously performed during the year. Testing of cattle is done annually according to the national control programme for control and eradication of bovine brucellosis Blood sampling and for isolation of Brucella abortus uterine discharges, aborted foetuses, udder secretions or selected tissues, such as lymph nodes. Methods of sampling is Blood sampling An animal is defined as infected if Brucella spp. has been isolated by culture and identified. A herd is defined as infected if one of its animals is positive by bacteriological examination for Brucellosis.

2. Ovine brucellosis Brucella in small ruminants - B. melitensis

In 2016 new programme for control and eradication of brucellosis in small ruminants were implemented and two municipalities (these are municipalities where mass vaccination was carried out in 2008) as a pilot project have been introduced in the scheme for testing of the animals and applying test and slaughter policy. The aim of this program is public and animal health protection and providing pre-requisites for placing on the market of sheep and goats and products thereof, and at same time achievement and maintenance of the status of the holdings of sheep and goats "officially free from Brucellosis in according to Directive 91/68/EEC. The measures applied under the new program are at the level of the holding

1. Testing and slaughtering of the ovine and caprine animals older than 6 months and
2. Combination of vaccination against brucellosis in ovine and caprine/testing and slaughtering

By applying this strategy
Reduce the further spreading of the brucellosis in sheep and goats
Decrease the absolute number of positive animals
Decrease the number of positive humans. In the last 10 years, the number of humane cases shows a decreasing trend.

Year	No. of infected people
2008	490
2009	287
2010	168
2011	96
2012	82
2013	36
2014	40
2015	22
2016	22
2017	22
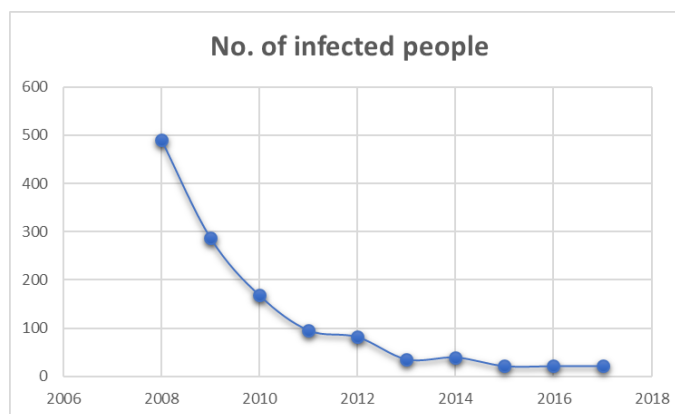
A sheep/goat is defined as infected with brucellosis if positive in too tests, Rose Bengal test as a screening, and Complement Fixation test as confirmation method, Elisa and isolation of Brucella melitensis by culture after slaughter.
Notifications are made according Law of veterinary health and Book of rules for compulsory notification animal diseases.

3. Any recent specific action in the Member State or suggested for the European Union[(b)]

Write text here please

4. Additional information

Write text here please

* **For each zoonotic agent**

(a): Epidemiological evaluation (trends and sources) over time until recent/current situation for the different relevant matrixes (food, feed, animal). If relevant: the official "disease status" to be specified for the whole country and/or specific regions within the country

(b): If applicable

Former Yugoslav Republic of Macedonia

Bovine, Mycobacterium tuberculosis

1. Monitoring/Surveillance/Control programmes system[a]

Frequency of testing depends on:
- the results of tuberculin testing
Testing of cattle is done annually according to the national control and eradication programme
Tuberculin skin testing: single (bovine tuberculin) or comparative (bovine/avian tuberculin). Private Veterinary organization is responsible for single intradermal tuberculin test. Faculty of veterinary medicine Skopje-responsible for comparative intradermal test (re - tuberculinisation) with avian and bovine tuberculin after at least 6 weeks.
A 'bovine' is defined as infected with bovine tuberculosis if the animal is positive by skin testing or if Mycobacterium bovis is isolated by culture or confirmed by laboratory analysis (PCR). A 'holding' is defined as infected if Mycobacterium bovis was isolated from an animal of the holding.
Bovine tuberculosis is considered to be confirmed if:
a) Laboratory examination has confirmed agent from M. tuberculosis complex in tissue material from bovine animal
b) Post mortem examination shows typical pathological changes, and agent from M. tuberculosis complex is confirmed by the laboratory examination
c) Post mortem veterinary control at slaughter line found typical pathological changes, and agent from M. tuberculosis complex is confirmed by the laboratory examination. Mycobacterium tuberculosis complex: Mycobacterium tuberculosis, Mycobacterium bovis, Mycobacterium caprae.

2. Measures in place[b]

National surveillance program by the Competent Authority on mandatory legal base.
In case of positive result, official veterinarian should order measures as follows:
1) The herd is placed under official surveillance.
2) The implementation of the epidemiological examination in order to identify the source, the time and the method of infection and the previous and the further spread of the infection
3) Isolation of all positive animals within the herd.
4) Prohibition of any movement into or out of the herd, unless authorised by the CA, for the purpose of slaughter without delay.
5) Isolation, until the further testing or sending to slaughter.
6) Milk from the infected cows may only be fed to animals on the same farm, after suitable heat treatment.
7) Milk from cows from the infected herd (without prejudice to national provisions concerning foodstuffs) cannot be delivered to a dairy, except to undergo suitable heat treatment
8) Carcasses, half-carcasses, quarters, pieces and offal from infected cattle intended for use as feed for animals are treated in such a way to avoid contamination.
9) All positive animals must be slaughtered as soon as possible, but not later than 30 days after the owner was officially notified about the disease and his obligation.
10) After the slaughter of all positive animals and prior to restocking, general cleaning and disinfection of all herd and equipment should be performed, under official supervision and in accordance with the instructions of the official veterinarian.
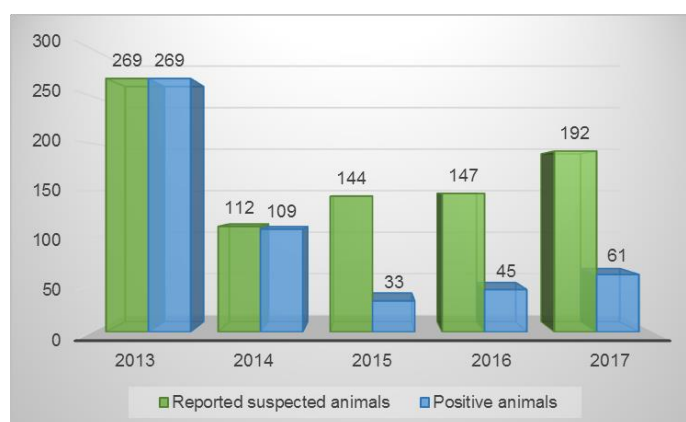
3. Notification system in place to the national competent authority[c]

According Law of veterinary health and Book of rules for compulsory notification animal diseases.

Former Yugoslav Republic of Macedonia

4. Results of investigations and national evaluation of the situation, the trends (d) and sources of infection(e)

Reduce the further spreading of the brucellosis in sheep and goats
Decrease the absolute number of positive animals
Decrease the number of positive humans

Year	Tested animals	Reported suspected animals	Reported suspected animal holding	Positive animals	% of positive animals
2013	167.128	269	184	269	0,002%
2014	180.902	112	71	109	0,061%
2015	187.601	144	52	33	0.01%
2016	188.519	147	81	45	0.001%
2017	174.967	192	78	61*	0,03%

5. Additional information

Write text here please

* **For all combinations of zoonotic agents and matrix (Food, Feed and Animals) for 'Prevalence' and 'Disease Status': one text form reported per each combination of matrix/zoonoses or zoonotic agent**
(a): Sampling scheme (sampling strategy, frequency of the sampling, type of specimen taken, methods of sampling (description of sampling techniques) + testing scheme (case definition, diagnostic/analytical methods used, diagnostic flow (parallel testing, serial testing) to assign and define cases. If programme approved by the EC, please provide link to the specific programme in the Commission`s website.
(b): The control program/strategies in place, including vaccination if relevant. If applicable a description of how eradication measures are/were implemented, measures in case of the positive findings or single cases; any specific action decided in the Member State or suggested for the European Union as a whole on the basis of the recent/current situation, if applicable. If programme approved by the EC, please provide link to the specific programme in the Commission`s website.
(c): Mandatory: Yes/No.
(d): Minimum five years.

Former Yugoslav Republic of Macedonia

(e): Relevance of the findings in animals to findings in foodstuffs and for human cases (as a source of infection).

Bovine, Brucella abortus

1. Monitoring/Surveillance/Control programmes system[a]

Republic of Macedonia is not officially free from bovine brucellosis
All regions are not officially free of bovine brucellosis according to Directive 64/432/EEC.
Regular annual diagnostic tests for Bovine Brucellosis were performed on all cattle older than six months while retest of all positive herds continuously performed during the year.
Testing of cattle is done annually according to the national control programme for control and eradication of bovine brucellosis
Types of specimen taken are: Blood sampling and for isolation of Brucella abortus uterine discharges, aborted foetuses, udder secretions or selected tissues, such as lymph nodes.
An animal is defined as infected if Brucella spp. has been isolated by culture and identified. A herd is defined as infected if one of its animals is positive by bacteriological examination for Brucellosis.
The Veterinary Institute in Faculty of Veterinary Medicine in Skopje is official and national reference laboratory for the diagnosis of bovine brucellosis. The results of laboratory tests entered into the laboratory information system (LABIS). The data are available for the Food and Veterinary Agency.
Official blood tests for bovine brucellosis are:
a) Rose Bengal Test (RBT) as the screening method
b) Complement Fixation Tet (CFT) as confirmation method
c) Competitive ELISA (cELISA) for confirmation purposes
d) Indirect ELISA (iELISA) for confirmation purposes

Vaccination is prohibited.

2. Measures in place[b]

Regular annual diagnostic tests for Bovine Brucellosis were performed on all cattle older than six months. Retesting of all positive herds is implemented during the year.
In case of any suspicion case in the herd, as well as in case of any positive blood test result, the holding is immediately restricted by the decision of official veterinarian.
Measures in case of suspicion or officially confirmed bovine brucellosis are prescribed by the decision on measures for control and eradication of bovine brucellosis
In case of positive result, official veterinarian should order measures as follows:
1) The herd is placed under official surveillance.
2) Isolation of all positive animals within the herd.
3) Prohibition of any movement into or out of the herd, unless authorized by the CA, for the purpose of slaughter without delay.
4) Isolation, until the further testing or sending to slaughter.
5) Milk from the infected cows may only be fed to animals on the same farm, after suitable heat treatment.
6) Milk from cows from the infected herd (without prejudice to national provisions concerning foodstuffs) cannot be delivered to a dairy, except to undergo suitable heat treatment.
7) Carcasses, half-carcasses, quarters, pieces and offal from infected cattle intended for use as feed for animals are treated in such a way to avoid contamination.
8) All positive animals must be slaughtered as soon as possible, but not later than 30 days after the owner was officially notified about the disease and his obligation.

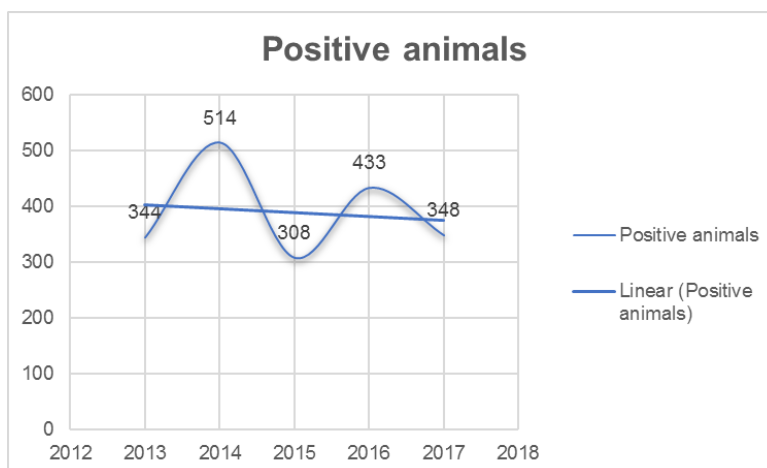Former Yugoslav Republic of Macedonia

9) After the slaughter of all positive animals and prior to restocking, general cleaning and disinfection of all herd and equipment should be performed, under official supervision and in accordance with the instructions of the official veterinarian.

3. Notification system in place to the national competent authority[(c)]

Yes, national legislation: in accordance of Book of rules for compulsory notification of disease and list of notifiable diseases

4. Results of investigations and national evaluation of the situation, the trends [(d)] and sources of infection[(e)]

Year	Tested animals	Positive animals	% of positive herds	Positive herds	Number of slaughtered animals
2013	144.629	344	0,24%	46	247
2014	162.582	514	0,31%	129	544
2015	168.646	308	0,18%	64	270
2016	166.178	433	0,26%	82	262
2017	158.840	348	0,22%	78	342

5. Additional information

Write text here please

* **For all combinations of zoonotic agents and matrix (Food, Feed and Animals) for 'Prevalence' and 'Disease Status': one text form reported per each combination of matrix/zoonoses or zoonotic agent**

(a): Sampling scheme (sampling strategy, frequency of the sampling, type of specimen taken, methods of sampling (description of sampling techniques) + testing scheme (case definition, diagnostic/analytical methods used, diagnostic flow (parallel testing, serial testing) to assign and define cases. If programme approved by the EC, please provide link to the specific programme in the Commission`s website.

(b): The control program/strategies in place, including vaccination if relevant. If applicable a description of how eradication measures are/were implemented, measures in case of the positive findings or single cases; any specific action decided in the Member State or suggested for the European Union as a whole on the basis of the recent/current situation, if

Former Yugoslav Republic of Macedonia

applicable. If programme approved by the EC, please provide link to the specific programme in the Commission`s website.

(c): Mandatory: Yes/No.

(d): Minimum five years.

(e): Relevance of the findings in animals to findings in foodstuffs and for human cases (as a source of infection).

Brucella in small ruminates - Brucella melitensis

1. Monitoring/Surveillance/Control programmes system[(a)]

Republic of Macedonia is not recognized as country officially free from sheep and goat brucellosis according to Directive 91/68/EEC.

Republic of Macedonia has no regions officially free from sheep and goat brucellosis according to provision laid down in Directive 91/68/EEC

In the last several years, the Food and Veterinary Agency implements programs for control and eradication of the disease. The application of the new strategy resulted with division of the territory of the country into certain number of individual regions i.e. epidemiological units where depending of the widespread of the disease in the country, the prevalence, different measures for control of Brucellosis in sheep and goats apply.

1. Testing and slaughtering of the ovine and caprine animals older than 6 months and

2. Combination of vaccination against brucellosis in ovine and caprine/testing and slaughtering

The type of specimen taken is Blood and method of sampling is Blood sampling

A sheep is defined as infected with brucellosis if positive in two tests: iElisa, Rose Bengal test and Complement Fixation test and isolation of Brucella melitensis by culture after test slaughter.

Complement Fixation Test CFTRose Bengal Test RBTIndirect ELISACulture for isolation

2. Measures in place[(b)]

According Program for control and eradication measures for control of Brucellosis in sheep and goats have been implemented on based on the risk assessment and the status of the disease and the prevalence in the country, the following measures have been implemented:

1.   Vaccination of replacement animals at age of 3-6 months with Rev 1 vaccine through the conjunctival route. All the non-vaccinated animals, and all the animals older than 18 months which have been vaccinated up to their six months of age, are serologically tested

2.   Testing and slaughter of adult animals (blood samples are collected from all animals in all flocks older than 6 months during the year).

Measures in case of the positive findings or single cases

1.   The holding shall be placed under official surveillance.

2.   The implementation of the epidemiological examination in order to identify the source, the time and the method of infection and the previous and the further spread of the infection and

3.   It is prohibited to introduce into or to take out from the holding all susceptible animals.

4.   The sheep and goats in cases of which the Brucellosis is officially confirmed sed must be isolated, and the positive animals must be visibly identified.

5.   The animals in case of which the Brucellosis in sheep and goats is officially confirmed, shall be slaughtered under official supervision as soon as possible, and not later than 30 days from the day when the owner of the animal or the responsible person has been informed about the presence of the disease and the obligation for slaughtering according to the programme for eradication.

6.   The milk obtained from the positive animals must be safely disposed or may be used

for nutrition of the animals from the same holding following the appropriate heat treatment. The milk obtained from the positive animals is not used for human consumption. The milk obtained from animals with negative result and the milk obtained from vaccinated animals, according to this programme, may be used for human consumption in accordance with the provisions set out in the veterinary legislation.

7.   Safe disposal of aborted fetuses, still born lambs and kids and placentas.

8.   Daily collection of the manure and litter/bedding and burial thereof or disinfection. The manure and the litter/bedding must not be taken out at least three weeks following their collection.

9.   The hay, the litter/bedding and all the other objects which came into contact with the positive animals, fetuses or placenta must be buried after previous submersion in disinfectant.

10.   The premises and the area in which the animals have been present, must be thoroughly cleaned and disinfected with a disinfectant which is registered for use in the Republic of Macedonia.

11.   The objects which came into contact with the diseased animals must be thoroughly cleaned and disinfected. If this activity is not possible, they must be disposed.

12.   In case of complete depopulation of the holding, the repopulation can take place four weeks following the disinfection.
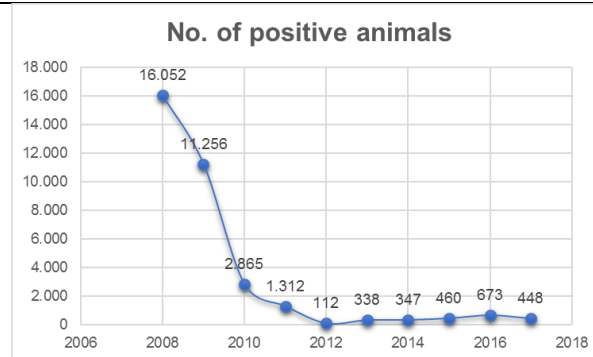
13.   Re-testing of the animals at least 15 and maximum 30 days following the removal of the diseased animals and the disinfection. In case if the animals give negative result, they shall be tested two more times with negative results in such a way that the first testing shall be one month following the last negative result and the second shall be three months later

3. Notification system in place to the national competent authority[c]

Yes, according Law of veterinary health and Book of rules for compulsory notification animal diseases

4. Results of investigations and national evaluation of the situation, the trends [d] and sources of infection[e]

Year	Tested flocks	Positive flocks	% of positive flocks	No. of tested animals	No. of positive animals	% of positive animals
2008	5.820	636	10,93%	626.748	16.052	2,56%
2009	6.522	712	10,92%	653.863	11.256	1,72%
2010	5.312	171	3,22%	422.752	2.865	0,68%
2011	4.545	80	1,76%	362.662	1.312	0,36%
2012	3.889	16	0,41%	296.561	112	0.04%
2013	7.453	42	0,56%	346.947	338	0,10%
2014	7.587	55	0,72%	362.828	347	0,10%
2015	7.375	71	0,96%	371.101	460	0,12%
2016	6.795	129	1,89%	419.061	673	0,16%
2017	6.608	97	1,47%	412.978	448	0.11%

Former Yugoslav Republic of Macedonia

No. of positive animals

16.052
11.256
2.865
1.312
112 338 347 460 673 448

5. Additional information

Write text here please

* **For all combinations of zoonotic agents and matrix (Food, Feed and Animals) for 'Prevalence' and 'Disease Status': one text form reported per each combination of matrix/zoonoses or zoonotic agent**
(a): Sampling scheme (sampling strategy, frequency of the sampling, type of specimen taken, methods of sampling (description of sampling techniques) + testing scheme (case definition, diagnostic/analytical methods used, diagnostic flow (parallel testing, serial testing) to assign and define cases. If programme approved by the EC, please provide link to the specific programme in the Commission`s website.
(b): The control program/strategies in place, including vaccination if relevant. If applicable a description of how eradication measures are/were implemented, measures in case of the positive findings or single cases; any specific action decided in the Member State or suggested for the European Union as a whole on the basis of the recent/current situation, if applicable. If programme approved by the EC, please provide link to the specific programme in the Commission`s website.
(c): Mandatory: Yes/No.
(d): Minimum five years.
(e): Relevance of the findings in animals to findings in foodstuffs and for human cases (as a source of infection).

Former Yugoslav Republic of Macedonia

Food-borne Outbreaks

1. System in place for identification, epidemiological investigations and reporting of food-borne outbreaks

There are several systems for detections of outbreaks (including food borne outbreaks - FBO) in Macedonia:

Case based surveillance is based on the universal system for reporting communicable diseases, where each medical doctor is obliged to report one of the 64 mandatory reported communicable diseases (including diseases or syndromes of food poisoning). National case definitions are fully aligned with ECDC/EU case definitions form 2012.

Laboratories are obliged to report on 40 microbiological agents (including causes for FBO).

Cases detected by physicians are reported to centers for public Health on local and regional level, while national communicable disease surveillance is responsibility of National Institute of Public Health, where the national case-based database is located.

FBO are detected by detecting clusters of reported cases on local/regional level.

In addition, there is syndromic surveillance in place (EWARN – Early Warning and Response System for communicable diseases) were 75% of general practitioners are participating. Reporting is based on weekly aggregated data. The main purpose is to detect clusters of combinable diseases including FBO.

Finally, there is system for 24/7 response, where teams (epidemiologists and laboratory experts) for Centres for Public Health can lunch outbreak investigation upon call from medical doctors for clustering of cases with food poisoning symptoms.

All outbreaks are reported on outbreak reporting forms by Centres for public health to the Ministry of health and to the Institute of Public Health. FBO are reported to the Food and Veterinary Agency as well.

2. Description of the types of outbreaks covered by the reporting

Write text here please

3. National evaluation of the reported outbreaks in the country[a]

In total, 10 food or water borne outbreaks have been reported in the country, with 1197 registered cases, 164 cases were hospitalized and no deaths were reported. Of the reported outbreaks, in five food borne agent were Staphylococcal enterotoxins, Salmonella was implicated in two food borne outbreaks and Escherichia coli in one water borne outbreak.

Three outbreaks were in factories with canteen or workplace catering, with 173 reported cases. All three were associated with food poisoning caused by Staphylococcal enterotoxins, analytical evidence (retrospective cohort study) was available for one, where contaminated pasta was source of the outbreak, in other outbreak implicated food was chicken with rise while for one the contaminated food could not be identified. In all outbreaks staphylococcus was isolated form swabs of food handlers and/or food and work surfaces

Additional two food borne outbreaks caused by Staphylococcal enterotoxins we reported (no contaminated food was found), one in a School with 7 cases and one in a quick food restaurant with 5 reported cases.

Two outbreaks caused by Salmonella with 93 cases of whom 20 hospitalized, meet and meet products were implicated in both outbreaks (restaurant and fast food restaurant).

One outbreak caused by Escherichia coli was due to water treatment failure with 125 reported cases, 3 cases were hospitalized.

Former Yugoslav Republic of Macedonia

For other outbreaks causative agents were not identified.
4. Descriptions of single outbreaks of special interest
Write text here please
5. Control measures or other actions taken to improve the situation
For each identified outbreak control measures were put in place according to the type of the outbreak, according to the law and regulation in the country
6. Any specific action decided in the Member State or suggested for the European Union as a whole on the basis of the recent/current situation
Write text here please
7. Additional information
Write text here please
(a): Trends in numbers of outbreaks and numbers of human cases involved, relevance of the different causative agents, food categories and the agent/food category combinations, relevance of the different type of places of food production and preparation in outbreaks, evaluation of the severity of the human cases.

Former Yugoslav Republic of Macedonia

Institutions and laboratories involved in antimicrobial resistance monitoring and reporting

Write text here please

Short description of the institutions and laboratories involved in data collection and reporting

General Antimicrobial Resistance Evaluation

1. Situation and epidemiological evolution (trends and sources) regarding AMR to critically important antimicrobials[(a)] (CIAs) over time until recent situation

Write text here please

2. Public health relevance of the findings on food-borne AMR in animals and foodstuffs

Write text here please

3. Recent actions taken to control AMR in food producing animals and food

Write text here please

4. Any specific action decided in the Member State or suggestions to the European Union for actions to be taken against food-borne AMR threat

Write text here please

5. Additional information

Write text here please

(a): The CIAs depends on the bacterial species considered and the harmonised set of substances tested within the framework of the harmonised monitoring:
- For *Campylobacter* spp., macrolides (erythromycin) and fluoroquinolones (ciprofloxacin);
- For *Salmonella* and *E. coli*, 3rd and 4th generation cephalosporins (cefotaxime) and fluoroquinolones (ciprofloxacin) and colistin (polymyxin);

General Description of Antimicrobial Resistance Monitoring*; **Please add the matrix and bacterial species**
1. General description of sampling design and strategy[a]
Write text here please
2. Stratification procedure per animal population and food category
Write text here please
3. Randomisation procedure per animal population and food category
Write text here please
4. Analytical method used for detection and confirmation[b]
Write text here please
5. Laboratory methodology used for detection of antimicrobial resistance[C]
Write text here please
6. Results of investigation
Write text here please
7. Additional information
Write text here please
* to be filled in per combination of bacterial species/matrix (a): Method of sampling (description of sampling technique: stage of sampling, type of sample, sampler), Frequency of sampling, Procedure of selection of isolates for susceptibility testing, Method used for collecting data. (b): Analytical method used for detection and confirmation: according to the legislation, the protocols developed by the EURL-AR should be used and reported here. In the case of the voluntary specific monitoring on Carbapenemase-producers, the selective media used (commercial plates, 'in house' media) should be also reported here. In general, any variation with regard to the EURL-AR protocols should be stated here, number of isolates isolated per sample, in particular for *Campylobacter* spp.. (c): Antimicrobials included, Cut-off values

Former Yugoslav Republic of Macedonia