Leishmaniases in the European Union and Neighboring Countries

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A questionnaire survey of animal and human health authorities in Europe revealed that leishmaniases are not notifiable in all countries with autochthonous cases. Few countries implement surveillance and control targeting both animal and human infections. Leishmaniases are considered emergent diseases in most countries, and lack of resources is a challenge for control.

Leishmaniases are endemic in humans and animals in part of the European Union (EU) and its neighboring countries. *Leishmania* species in this region are *L. major, L. tropica,* and the *L. donovani* complex species (including *L. infantum* and *L. donovani* sensu stricto). All cause cutaneous leishmaniasis (CL); visceral leishmaniasis (VL) is caused mainly by *L. donovani* complex species. There is evidence that the risk for leishmaniases is increasing in some EU and neighboring countries (1). We conducted a questionnaire survey to gather information on the epidemiologic situation, surveillance, prevention and control measures, and drivers of emergence of animal and human leishmaniases in this region during 2010–2020.

The Study

The survey included an animal leishmaniasis (AniL) questionnaire referring to *L. infantum* infections in domestic or wildlife hosts and a human leishmaniases

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(HumL) questionnaire referring to infections by L. infantum, L. major, L. tropica and L. donovani s.s. (Appendix, https://wwwnc.cdc.gov/EID/article/27/6/21-0239-App1.pdf). The target audience was the national focal points (national institutes or ministries) of the European Centre for Disease Prevention and Control, the World Health Organization, the European Food Safety Authority, and the World Organisation for Animal Health in countries in which leishmaniases are endemic or those with confirmed or suspected presence of sand fly vectors (2). These countries were Albania, Algeria, Armenia, Austria, Azerbaijan, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, Czechia, Egypt, France, Georgia, Germany, Greece, Hungary, Israel, Italy, Jordan, Kosovo, Lebanon, Libya, Liechtenstein, Luxembourg, Malta, Moldova, Montenegro, Morocco, North Macedonia, Palestine, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Tunisia, Turkey, and Ukraine (Figure 1). The questionnaires were administered electronically using the EU survey tool and shared on September 11, 2020 (3). Twenty-seven countries (70%) replied to the AniL questionnaire and 24 countries (60%) to the HumL questionnaires; 19 countries (48%) replied to both (Table 1).

We reviewed the countries' epidemiologic status with regards to autochthonous *Leishmania* spp. infections in animals and humans and clinical forms in humans. The mapping of the countries with autochthonous transmission matches previous published information with few discrepancies. For instance, according to the questionnaire, Bosnia and Herzegovina and Hungary do not have autochthonous canine leishmaniasis cases, although such cases have been described (4,5). Human cases of leishmaniasis due to *L. tropica* were reported in Cyprus and Serbia and due to *L. major* in Georgia; however, none of the literature presents concurring evidence (Table 2).

Animal leishmaniases are notifiable in 17 countries and human leishmaniases in 20 countries (Table 1; Figure 2). In Palestine and Turkey, AniL is not notifiable despite a high prevalence among dogs (*6*,*7*). Similarly,

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Figure 1. Geographic distribution of countries that responded to survey questionnaires about animal and human leishmaniases in Europe, 2020.

in France, neither AniL nor HumL are notifiable although the diseases are endemic in the south (β). Leishmaniases surveillance is not mandatory at the EU level which constitutes a limitation for successful control.

Seven countries conduct AniL surveillance (Table 1), indicative of its low priority among the animal health authorities. The target animal population for surveillance included symptomatic and asymptomatic dogs in Armenia, Cyprus, Italy, Spain, and Ukraine; we also studied wildlife in leishmaniasis foci in Spain. Testing subclinically infected dogs indicated awareness of their role as reservoirs of the parasite (1). Similarly, wild lagomorphs were the main reservoir of *L. infantum* in a HumL outbreak in Madrid in Spain (9). Surveillance of HumL is conducted in 19 countries, including all of those with autochthonous infections except Serbia (Table 1).

Antibody tests, including the immunofluorescence antibody test, ELISA, and the rapid immunochromatography test, are the main surveillance diagnostic methods used, followed by PCR. Antibody tests play a fundamental role in disease surveillance because they are relatively cheap and easy to use (10). However, their sensitivity to detect subclinical infections is lower than that of PCR tests (10), and they do not discriminate naturally infected from vaccinated dogs (11). PCR tests are ideal for epidemiologic studies to estimate *Leishmania* spp. infection prevalence in healthy hosts, but their diagnostic validity depends on the sample used, the DNA sequence target, and the PCR protocol. Standardization of PCR tests in leishmaniasis diagnosis is needed (12).

Of the 7 countries that have ongoing AniL prevention and control programs (Table 1), 5 use topical insecticides for dogs, 5 are diagnosing and treating leishmaniases in dogs, and 2 use canine leishmaniosis vaccines. In all countries, infected dogs may be euthanized on welfare grounds. Lack of funds and treatment costs were considered the most important AniL control challenges. Human leishmaniasis prevention and control activities are implemented in 12 countries (Table 1); for *L. infantum*, actions focused on the use of insecticides on dogs, and for *L. major*, *L. tropica*, and *L. donovani*, the common activity was the use of peridomiciliary and intradomiciliary insecticides. Lack of funds and capacity constraints are considered the main challenges for HumL.

Although zoonotic *L. infantum* strategies are centered on preventing and eliminating infections in dogs, the main parasite reservoir host, we found that insecticides and treatments are not fully effective and are expensive, and so provided to a relatively small proportion of dogs. Leishmaniasis control needs the One Health approach to account for the complexity of its transmission cycle involving humans, domestic animals, wildlife, and sand fly vectors (*13*).

Animal leishmaniases are considered emergent diseases in Cyprus and Jordan and in parts of Algeria,

	Autochth	ionous	Notifi	able		Surveillance			Control	
Country	Animal	Human	Animal	Human	A	Animal Human		Ā	Animal	Human
Albania	NR	VL, CL	NR	Yes		NR	Yes		NR	No
Algeria	Yes	NR	Yes	NR		Yes	NR		Yes	NR
Armenia	Yes	VL	Yes	Yes		Yes	Yes		Yes	Yes
Austria	Not known	No	No	No		No	No		No	No
Azerbaijan	NR	VL, CL	NR	Yes		NR	Yes		NR	Yes
Belgium	No	No	No	No		No	Yes		No	No
Bosnia and	No	NR	Yes	NR		No	NR		No	NR
Herzegovina										
Bulgaria	NR	VL	NR	Yes		NR	Yes		NR	Yes
Croatia	Yes	VL, CL	Yes	Yes		No	Yes		No	Not known
Cyprus	Yes	VL, CL	Yes	Yes		Yes	Yes		No	No
Czechia	Not known	No	Yes	Yes		No	No		No	No
France	Yes	VL, CL	No	No		No	Yes		No	No
Georgia	Yes	VL	Yes	Yes		No	Yes		No	Yes
Germany	Not known	No	No	No		No	No		No	No
Greece	Yes	VL, CL	Yes	Yes		No	Yes		Yes	Yes
Hungary	Not known	NR	No	NR		No	NR		No	NR
Israel	Yes	VL, CL	Yes	Yes		No	Yes		No	Yes
Italy	Yes	VL, CL	Yes	Yes		Yes	Yes		Yes	Yes
Jordan	Yes	NR	Yes	NR		No	NR		No	NR
Libya	NR	VL, CL	NR	Yes		NR	Yes		NR	Yes
Luxemburg	Not known	NR	No	NR		No	NR		No	NR
Malta	NR	VL, CL	NR	Yes		NR	Yes		NR	Yes
Moldova	No	NR	Yes	NR		No	NR		No	NR
Montenegro	No	VL	Yes	Yes		No	Yes		Yes	No
North Macedonia	Yes	NR	Yes	NR		Yes	NR		Yes	NR
Palestine	Yes	NR	No	NR		No	NR		Yes	NR
Romania	Yes	No	No	Yes		No	No		No	Not known
Serbia	Yes	VL, CL	No	No		No	No		No	Yes
Slovenia	Yes	No	Yes	Yes		No	Yes		No	No
Spain	Yes	VL, CL	Regionally	Yes		Yes	Yes		No	Yes
Turkey	Yes	VL, CL	No	Yes		No	Yes		No	Yes
Ukraine	Yes	VL	Regionally	Yes		Yes	Yes		No	No

Table 1. Declared country status of leishmaniases surveillance and control, 2010-2020*

*Data source: questionnaires survey on animal and human leishmaniases to national focal points of the European Centre for Disease Prevention and Control, the World Health Organization, the European Food Safety Authority, and the World Organisation for Animal Health; survey conducted in 2020. CL, cutaneous leishmaniases; NR, no response; VL, visceral leishmaniases.

Armenia, France, Georgia, Jordan, Montenegro, North Macedonia, Romania, Slovenia, Turkey, and Ukraine. The most important AniL emergence risk factor is the lack of control. Human leishmaniases are considered emerging diseases in Cyprus, Libya and Malta and in parts of Albania, Austria, Armenia, Azerbaijan, Georgia, Israel, Italy, Montenegro, and Spain. The main risk factors for HumL emergence are vector expansion for *L. infantum*, and movement of infected persons between countries for *L. major*, *L. tropica*, and *L. donovani*.

In general, the perceived increasing risk for AniL and HumL was in line with the literature. In the EU and its neighborhood, the risks include movement of humans and dogs, increased number of immunosuppressed patients, climate warming, and other environmental changes affecting vector and reservoir host distribution (1,14). Limitations associated with existing surveillance and control programs, along with the fact that leishmaniases are often regarded as a local problem rather than a transnational problem, are deemed major obstacles to overcome to prevent leishmaniases emergence in the EU and its neighborhood.

Conclusions

Leishmaniases are considered widespread, endemic, or emerging infections in the EU and its neighborhood, yet are neglected and underreported because they are low priority at the country and EU level. Our study revealed a clear need to strengthen leishmaniasis prevention and control programs in the EU and its neighborhood. We recommend analysis of leishmaniasis incidence in the region for an objective assessment of disease emergence, and also improvement of prevention and control programs based on a robust surveillance and following a One Health approach.

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Figure 2. Geographic distribution of mandatory notification status for animal (A) and human (B) leishmaniases, 2020.

	Leishmania species						
Country	L. infantum	L. major	L. tropica	L. donovani			
Albania	Yes	No	No	No			
Armenia	Yes	No	No	No			
Austria	No	No	No	No			
Azerbaijan	Yes	Yes	Yes	No			
Belgium	No	No	No	No			
Bulgaria	Yes	No	No	No			
Croatia	Not known	Not known	Not known	Not known			
Cyprus	No	No	Yes	Yes			
Czechia	No	No	No	No			
France	Yes	No	No	No			
Georgia	Yes	Yes	No	No			
Germany	No	No	No	No			
Greece	Yes	No	No	No			
Israel	Yes	Yes	Yes	No			
Italy	Yes	No	No	No			
Libya	Yes	Yes	Yes	Not known			
Malta	Yes	No	No	No			
Montenegro	Yes	Not known	Not known	No			
Romania	No	No	No	No			
Serbia	Yes	Not known	Yes	No			
Slovenia	No	No	No	No			
Spain	Yes	No	No	No			
Turkey	Not known	Not known	Yes	Not known			
Ukraine	No	No	No	No			

Table 2. Declared status of endemicity of *Leishmania* spp.affecting humans, by country

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Leishmaniases in the European Union and Neighboring Countries

Appendix

Shown on the following pages are 2 surveys used to gather information on the epidemiologic situation, surveillance, prevention and control measures, and drivers of emergence of animal and human leishmaniases in Europe during 2010–2020. The first is an animal leishmaniasis questionnaire referring to *Leishmania infantum* infections in domestic or wildlife hosts. The second is a human leishmaniases questionnaire referring to infections by *L. infantum*, *L. major*, *L. tropica*, and *L. donovani* sensu stricto.

ANIMAL LEISHMANIASIS BY LEISHMANIA INFANTUM IN THE EUROPEAN UNION AND ITS NEIGHBOURHOOD

Fields marked with * are mandatory.

A - INTRODUCTION

Dear Participants,

The European Centre for Disease Prevention and Control (ECDC), in collaboration with the European Food Safety Authority (EFSA), the World Health Organization Regional Office for Europe (WHO EURO) and the World Organisation for Animal Health (OIE), initiated the review of the epidemiological situation of human and animal leishmaniasis in the European Union and its neighbourhood.

To collect data on the surveillance, control, diagnosis and treatment of leishmaniasis, we would like you to complete the following questionnaire by 30 September. This will take you approximately 15 minutes. Note that this questionnaire targets the public health authorities and focuses on human leishmaniasis. A complementary questionnaire focusing on animal leishmaniasis will be sent to the animal health authorities in your country.

Based on the responses to this questionnaire and a literature review, a technical report will be prepared. If you want to receive the finalised technical report and have your contribution acknowledged in the technical report, please express this in the first part of the questionnaire.

B - ECDC DATA PRIVACY STATEMENT

* Do you agree with the following ECDC privacy statement? *By agreeing with ECDC privacy statement and answering this questionnaire, you agree that your answers are used in the technical report that will be produced. Note that ECDC may contact you afterwards for clarification.*

Yes

Download

ECDC_Data_Privacy_Statement.pdf

You can only proceed with the questionnaire by accepting ECDC data privacy statement.

C - GENERAL INFORMATION

Name (only visible to ECDC). This information will be treated as strictly confidential.

Email (only visible to ECDC). This information will be treated as strictly confidential.

Affiliation

* Country

- Albania
- Algeria
- Andorra
- Armenia
- O Austria
- Azerbaijan
- Belgium
- Bosnia and Herzegovina
- Bulgaria
- Croatia
- Oprus
- Czechia
- Denmark
- Egypt
- Estonia
- Finland
- France
- Georgia
- Germany
- Greece
- Hungary
- Ireland
- Israel
- Italy
- Jordan
- Kosovo
- Latvia
- Lebanon
- Libya
- Liechtenstein
- Lithuania

- Luxembourg
- Macedonia
- Malta
- Moldova
- Monaco
- Montenegro
- Morocco
- Netherlands
- North Macedonia
- Palestine
- Poland
- Portugal
- Romania
- Serbia
- Slovak Republic
- Slovenia
- Spain
- Sweden
- Switzerland
- Syria
- 🔘 Tunisia
- Turkey
- Okraine

* Do you want to receive a final copy of the technical report (expected early 2021)?

- Yes
- No

* Do you want to have your contribution acknowledged in the technical report that will be prepared? *If yes, please make sure you provide your name and affiliation.*

- Yes
- No

D - SURVEILLANCE OF ANIMAL LEISHMANIASIS

* 1. Have **autochthonous cases of animal** (dog or other domestic or wildlife) **leishmaniasis** been identified in your country **since 2010**?

Animal leishmaniasis in this context refers to a laboratory confirmed infection case by **Leishmania** *infantum*. Other domestic animals include cats, horses, etc. Wildlife include foxes, wolves, rodents, rabbits, hares, etc. Autochthonous cases result from existing natural leishmania transmission in the country.

- Yes
- No
- I don't know

2. Which of the following **clinical presentations** of autochthonous leishmaniasis have been **identified** in animals in your country? You may choose more than one.

- Visceral
- Cutaneous
- I don't know

* 3. Is **animal** (canine or other) leishmaniasis a **mandatory notifiable disease** in your country? *A notifiable disease is required by law to be reported to government authorities.*

- Yes, in the entire country
- Yes, in some regions only
- 🔘 No
- I don't know

Please specify which region(s)

Selecting "No" or "I don't know" skips question 4

4. In which host species is leishmaniasis notification mandatory?

- All species (dogs and other domestic animals and wildlife)
- Dogs and other domestic animals only
- Dogs only
- I don't know

5. Is SURVEILLANCE of animal leishmaniasis implemented in your country?

Surveillance refers to the systematic and continuous collection, management, analysis, interpretation and reporting of infection/disease data to drive health actions.

- Yes
- 🔘 No
- I don't know

Selecting "No" or "I don't know" skips questions from 6 to 11

6. What type of SURVEILLANCE system of animal leishmaniasis is implemented in your country?

- Comprehensive: by all providers of veterinary care, official and private in a particular geographical area
- Sentinel: by only a subset of veterinary care providers should report cases
- I don't know

7. What are the **SURVEILLANCE data providers** for animal leishmaniasis in your country? You may choose more than one.

- Laboratories from the official veterinary services or laboratories accredited by the National Veterinary Authority
- Laboratories from specialised, private companies not acredited by the National Veterinary Authority
- Veterinary practices and veterinary hospitals

OtherI don't know

Please specify:

8. What **type of SURVEILLANCE data** from animal leishmaniasis cases is reported in your country? You may choose more than one.

Please note that the question also applies to non-endemic regions/countries in the event that a case was diagnosed.

🔲 Clinical

Epidemiological

Laboratorial

Other

I don't know

Please specify:

9. In addition to surveillance of clinical cases of leishmaniasis, is **SURVEILLANCE OF ASYMPTOMATIC** (subclinical) INFECTIONS implemented in your country?

Yes

No

I don't know

Selecting "No" or "I don't know" skips question 9

10. What is the **target animal population** on which **SURVEILLANCE** of infection/disease is done? You may select more than one.

- Privately owned dogs (pets, farm, hunting)
- Animal shelter and kennel dogs not privately owned (e.g. police dogs)
- Captured strays and rescued dogs for rehoming
- Wild canids (e.g. foxes)
- Wild lagomorphs (e.g. rabbits)
- Wild rodents
- Other
- I don't know

Please specify:

11. What are the **diagnostic techniques used for SURVEILLANCE**? You may select more than one.

- Serology (antibody detection) by IFAT (indirect immunofluorescence test)
- Serology by ELISA (Enzyme linked immunosorbent assay)
- Serology by DAT (direct agglutination test)
- Serology by rapid immunochromatography (e.g. IDEXX snap test)
- PCR (Polymerase chain reaction) in blood samples
- PCR of skin/tissue samples
- PCR of conjunctival/oral swabs
- Microscopy of biological samples with or without prior culture
- Necropsy and PCR of biological samples
- Other
- I don't know

E - PREVENTION AND CONTROL OF ANIMAL LEISHMANIASIS

12. Following surveillance results, is there a **PREVENTION AND CONTROL PROGRAMME** implemented in your country by **veterinary authorities** against animal leishmaniasis?

Prevention and control actions may include: treatment of infected animals, canine vaccination, culling of infected animals, testing animals coming from endemic areas, use of insecticides and mechanical barriers against sand fly vectors.

- Yes
- No
- I don't know

Selecting "No" or "I don't know" skips questions 13 and 14

Which of the following actions are taken? You may select more than one.

	Yes	No	l don´t know
Treatment of infected dogs	0	0	0
Vaccination of dogs		۲	0
Insecticide use in dogs		0	0
Diagnostic testing of pet dogs	0	0	0
Diagnostic testing of pet dogs travelling from endemic areas (e.g. after holidays)	O	0	0
Collect and test stray/abandoned dogs		۲	0
Collect and test wildlife (foxes, rabbits, etc.)	\odot	0	0
Euthanasia of dogs and other infected animals	0	۲	۲

Other	\bigcirc	۲	0
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13. Do you have national PREVENTION AND CONTROL official guidelines for animal leishmaniasis?

- Yes
- No
- I don't know

Please provide the link where to find these guidelines:

14. Are you aware of **intersectorial ("One Health") collaboration** between animal, human and environmental sectors to **PREVENT AND CONTROL** leishmaniasis in your country?

- Yes
- 🔘 No
- I don't know

Please describe:

15. What are in your opinion the **challenges for the PREVENTION AND CONTROL** of leishmaniasis in animals in your country? Please rate from 0 (not important) to 3 (very important).

	0	1	2	3	l don't know
Lack of legislation from responsible authorities	\odot	\odot	\odot	\odot	\odot
Lack of political willingness/awareness	۲	\odot	\odot	\odot	0
Lack of funding	۲	۲	۲	۲	۲
Collaborative constraints (between stakeholders)	۲	۲	۲	۲	0
Operational capacity constraints (Knowledge, people, equipment)	۲	0	۲	۲	0
Lack of national/international regulation against culling infected/sick dogs/animals	0	0	0	۲	O
Limited availability of diagnostic techniques	۲	0	۲	۲	0

High cost of diagnosis	۲		0		O
Limited availability of treatments	۲	۲	0	۲	O
High cost of treatment	۲	۲	0	۲	O
Limited availability of vaccines	0	۲	0	0	0
Limited availability of insecticides	0	0	0	0	0
No regulatory basis for insecticide use	۲	۲	0	۲	0
Other	0	0	0	0	0

F - DIAGNOSIS AND TREATMENT OF ANIMAL LEISHMANIASIS

16. Are there any official guidelines in your country for animal leishmaniasis DIAGNOSIS?

- Yes
- 🔘 No
- I don't know

Please provide the link where to find these guidelines:

17. Which of the following **LABORATORY TECHNIQUES** are employed in your country for animal leishmaniasis **DIAGNOSIS** by governmental or private laboratories?

Please note that this does not necessarily imply that animal leishmaniosis surveillance is being carried out in your country.

	Yes	No	l don´t know
Serology (antibody detection) by IFAT(indirect immunofluorescence antibody test)	۲	0	0
Serology by ELISA (enzyme-linked immunosorbent assay)	\odot	\odot	0
Serology by DAT (direct agglutination test)	\odot	۲	0
Serology by rapid immunochromatography (e.g. IDEXX snap test)	0	۲	0
PCR (Polymerase chain reaction) of blood samples	0	۲	0

PCR of skin/tissue samples	0	۲	0
Microscopy of biological samples with or without prior culture	0	0	0
Other	0	0	0

18. Are there any guidelines in your country for animal leishmaniasis TREATMENT?

Yes

No

I don't know

Please provide the link where to find these guidelines:

19. What are the DRUGS (medicines) used for animal leishmaniasis treatment in your country?

	Yes	No	l don't know
Meglumine antimoniate (E.g. Glucantime®)	0	0	0
Allopurinol	0	0	0
Miltefosine	0	0	0
Sodium stibogluconate (E.g. Pentostam®)	0	0	0
Aminosidine	0	0	0
Immunomodulatory drugs (e.g. Domperidone)	\odot	\bigcirc	۲
Other	0	0	۲

Please specify

G - DRIVERS OF EMERGENCE OF ANIMAL LEISHMANIASIS

Emergence refers to the establishment of infection/disease in a previously free area or to an increase in incidence of infection/disease in an endemic area. Disease emergence is also considered when the rise in incidence occurs as a result of improved and wider diagnosis.

20. Is animal leishmaniasis emerging in your country?

- Yes, in all the country
- Yes, in some regions
- No
- I don't know

Please specify which region(s)

21. **WHICH** of the following **DRIVERS** do you think that are important in your country? Please rate from 0 (not important) to 3 (very important).

	0	1	2	3
Pet animals travelling to Leishmania endemic areas	\odot	\odot	0	0
Importation of pet animals from Leishmania endemic areas	\odot	\odot	0	0
Immigration of Leishmania infected people	\odot	\odot	\odot	\odot
Sand fly vector expansion into previously-free areas as a result of climate change		0		0
Environmental changes other than climate change, with an impact in vectors and reservoir hosts (e. g. urbanization)	0		0	۲
Insufficient/lack of surveillance at regional/country level	0	\odot	0	0
Insufficient/lack of prevention and control at regional/country level	\odot	\odot	0	0
Other	\odot	\odot	0	0

Please comment:

H - CONCLUDING REMARKS

Please provide any additional information you consider relevant:

HUMAN LEISHMANIASIS IN THE EUROPEAN UNION AND ITS NEIGHBOURHOOD

Fields marked with * are mandatory.

A - INTRODUCTION

Dear Participants,

The European Centre for Disease Prevention and Control (ECDC), in collaboration with the European Food Safety Authority (EFSA), the World Health Organization Regional Office for Europe (WHO EURO) and the World Organisation for Animal Health (OIE), initiated the review of the epidemiological situation of human and animal leishmaniasis in the European Union and its neighbourhood.

To collect data on the **surveillance**, **control**, **diagnosis and treatment of leishmaniasis**, **we would like you to complete the following questionnaire by 30 September**. This will take you approximately 15 minutes. Note that this questionnaire targets the public health authorities and focuses on human leishmaniasis. A complementary questionnaire focusing on animal leishmaniasis will be sent to the animal health authorities in your country.

Based on the responses to this questionnaire and a literature review, a technical report will be prepared. If you want to receive the finalised technical report and have your contribution acknowledged in the technical report, please express this in the first part of the questionnaire.

B - ECDC DATA PRIVACY STATEMENT

* Do you agree with the following ECDC privacy statement? *By agreeing with ECDC privacy statement and answering this questionnaire, you agree that your answers are used in the technical report that will be produced. Note that ECDC may contact you afterwards for clarification.*

Yes

Download:

ECDC_Data_Privacy_Statement.pdf

You can only proceed with the questionnaire by accepting ECDC data privacy statement.

C - GENERAL INFORMATION

Name (only visible to ECDC). This information will be treated as strictly confidential

Email (only visible to ECDC). This information will be treated as strictly confidential

Affiliation

* Country

- Albania
- Algeria
- Andorra
- Armenia
- O Austria
- Azerbaijan
- Belgium
- Bosnia and Herzegovina
- Bulgaria
- Croatia
- Oprus
- Czechia
- Denmark
- Egypt
- Estonia
- Finland
- France
- Georgia
- Germany
- Greece
- Hungary
- Ireland
- Israel
- Italy
- Jordan
- Kosovo
- Latvia
- Lebanon
- Libya
- Liechtenstein
- Lithuania

- Luxembourg
- Macedonia
- Malta
- Moldova
- Monaco
- Montenegro
- Morocco
- Netherlands
- North Macedonia
- Palestine
- Poland
- Portugal
- Romania
- Serbia
- Slovak Republic
- Slovenia
- Spain
- Sweden
- Switzerland
- Syria
- 🔘 Tunisia
- Turkey
- Okraine

* Do you want to receive a final copy of the technical report (expected early 2021)?

- Yes
- No

* Do you want to have your contribution acknowledged in the technical report that will be prepared? *If yes, please make sure you provide your name and affiliation.*

- Yes
- No

D - SURVEILLANCE OF HUMAN LEISHMANIASIS

* 1. Have **autochthonous cases** of human leishmaniasis been **identified in your country** since 2010? A case of human leishmaniasis is a laboratory confirmed infection. Autochthonous cases result from existing natural Leishmania transmission in the country.

- Yes
- No
- I don't know

2. Which of the following clinical presentations of autochthonous leishmaniasis have been identified

in your country? You may choose more than one.

Visceral

- Cutaneous
- Mucocutaneous*
- I don't know

3. Which of the following *Leishmania* species are considered endemic among humans in all or some parts of your country? You may choose more than one

- 3.1 Leishmania infantum (human and canine visceral and cutaneous leishmaniosis)
 - Yes
 - No
 - I don't know

3.2 Leishmania major (human cutaneous leishmaniosis)

- Yes
- No
- I don't know

3.3 Leishmania tropica (human cutaneous leishmaniosis)

- Yes
- No
- I don't know

3.4 Leishmania donovani (human visceral and cutaneous leishmaniosis)

- Yes
- No
- I don't know

4. Is human leishmaniasis a mandatory notifiable disease in your country?

A notifiable disease is required by law to be reported to government authorities.

* 4.1 Visceral

- Yes, in the entire country
- Yes, in some regions only
- No
- I don't know

Please specify which region(s)

* 4.2 Cutaneous

Yes, in the entire country

* Note added after the completion of the questionnaire survey: by mistake the authors included mucocutaneous instead of mucosal leishmaniosis. The specific answers to mucocutaneous were therefore not included in the results presented in the manuscript "Surveillance, prevention and control of leishmaniases in the European Union 4 and its neighborhood".

- Yes, in some regions only
- No
- I don't know

Please specify which region(s)

* 4.3 Mucocutaneous*

- Yes, in the entire country
- Yes, in some regions only
- No
- I don't know

Please specify which region(s)

5. Is SURVEILLANCE of human leishmaniasis implemented in your country?

Surveillance refers to the systematic and continuous collection, management, analysis, interpretation and reporting of infection/disease data to drive health actions.

- Yes
- No
- I don't know

Selecting "No" or "I don't know" skips questions from 6 to 10

What type of SURVEILLANCE system of human leishmaniasis is implemented in your country?

- Comprehensive: All healthcare providers of at least one level of care are reporting their cases, e.g. all hospitals report cases
- Sentinel: Only a subset of healthcare providers report cases
- I don't know

6. What are the **SURVEILLANCE data providers** for human leishmaniasis in your country? You may choose more than one.

- Hospitals
- Local health care centers
- Private physicians
- Laboratories of the Public Health authority or acredited by the Public Health authority
- Laboratories from specialised, private companies not acredited by the Public Health authority
- Other
- I don't know

Please specify:

* Note added after the completion of the questionnaire survey: by mistake the authors included mucocutaneous instead of mucosal leishmaniosis. The specific answers to mucocutaneous were therefore not included in the results presented in the manuscript "Leishmaniases in the European Union and its neighbourhood: Neglected zoonotic diseases with increasing public health risk"

7. What **type of SURVEILLANCE data** from human leishmaniasis cases is reported in your country? You may choose more than one.

Please note that the question also applies to non-endemic countries in the event that a case was diagnosed.

- Clinical
- Epidemiological
- Laboratorial
- Other
- I don't know

Please specify:

8. In addition to surveillance of clinical leishmaniasis, is **SURVEILLANCE OF ASYMPTOMATIC** (subclinical) infections implemented in your country?

- Yes
- No
- I don't know

9. What is the **target human population** on which **SURVEILLANCE** of **ASYMPTOMATIC** leishmaniasis is done? You may select more than one.

- Blood donors
- Organ donors
- Other target risk groups: e.g. HIV+ patients, intravenous drug users, etc.
- Samples of patients admitted to hospital for reasons other than leishmaniosis
- People coming from endemic zones (travellers, migrants)
- Other
- I don't know

Please specify:

10	What	are the	diagnostic	techniques	used for	SURVEILI	ANCE	fhuman	leichmaniacie	infection
10.	vvnai		ulaynostic	leciniques	useu iui	JUNYLILL		i numan	101311111111111111111111111111111111111	IIIIECtion

(clinical and subclinical) in your country? You may select more than one.

- Serology (antibody detection) by IFAT (indirect immunofluorescence test)
- Serology by rapid immunochromatography (e.g. rK39 test)
- Serology by ELISA (Enzyme-linked immunosorbent assay)
- Serology by DAT (direct agglutination test)

Selecting "No" or "I don't know" skips question 9

PCR (Polymerase chain reaction) of blood samples

PCR of skin/tissue samples

Microscopy of biological samples with or without prior culture

Other

I don't know

Please specify:

E - PREVENTION AND CONTROL OF HUMAN LEISHMANIASIS

11. Following surveillance results, is there a **PREVENTION AND CONTROL programme** implemented in your country **by national health authorities** against visceral and cutaneous leishmaniasis? *Prevention and control actions include for example: treatment of animal and human cases, use of insecticides and mechanical barriers against sand fly vectors by people or in the environment, canine vaccination, culling of animal reservoirs, testing people and animals coming from endemic areas (travellers and migrants).*

Yes

No

I don't know

Selecting "No" or "I don't know" skips questions 12 and 13

Which of the following prevention and control actions are taken? You may select more than one.

11.1. For *L. infantum* (human and canine visceral leishmaniasis).

	Yes	No	l don´t know
Treatment of infected people	0	۲	0
Treatment of infected dogs	0	0	0
Vaccination of dogs	0	0	0
Insecticide use in dogs	0	۲	0
Collect and test stray/abandoned dogs	0	۲	0
Collect and test wildlife (foxes, rabbits, etc.)	0	۲	0
Euthanasia of dogs and other infected animals	0	۲	0
Testing people and animals coming from endemic areas (travellers and migrants)	O	O	O
Other	0	0	0

11.2 For *L. major* (cutaneous leishmaniasis in humans).

	Yes	No	l don't know
Treatment of cases	۲	۲	0
Leishmanisation: intradermal inoculation of live Leishmania to produce a self- healing lesion and stimulate immunity against reinfection	O	O	0
Insecticide application in the peridomiciliary environment	0	۲	0
Mechanical barriers for vectors in the peridomiciliary environment		۲	0
Insecticide application in the intradomiciliary environment	0	۲	0
Use of insecticide impregnated bed nets	0	۲	0
Use of insecticide impregnated bed linen		۲	0
Destruction of animal reservoir habitat (e.g. rodent burrows)	0	۲	0
Testing people and animals coming from endemic areas (travellers and migrants)	0	۲	O
Other	0	0	O

Please specify:

11.3 For *L. tropica* (cutaneous leishmaniasis in humans).

	Yes	No	l don't know
Treatment of cases	\odot	۲	\odot
Leishmanisation: intradermal inoculation of live Leishmania to produce a self- healing lesion and stimulate immunity against reinfection	۲	O	0
Insecticide application in the peridomiciliary environment	\odot	0	0
Mechanical barriers for vectors in the peridomiciliary environment	\odot	۲	0
Insecticide application in the intradomiciliary environment	0	0	0
Use of insecticide impregnated bed nets	0	۲	0
Use of insecticide impregnated bed linen	0	۲	O

Destruction of animal reservoir habitat (e.g. rodent burrows)	۲	۲	0
Testing people and animals coming from endemic areas (travellers and migrants)	0	0	0
Other	۲	0	۲

11.4 For *L. donovani* (visceral and cutaneous leishmaniasis in humans).

	Yes	No	l don't know
Treatment of cases	0	۲	0
Leishmanisation: intradermal inoculation of live Leishmania to produce a self- healing lesion and stimulate immunity against reinfection	O	O	0
Insecticide application in the peridomiciliary environment	0	۲	0
Mechanical barriers for vectors in the peridomiciliary environment	0	۲	0
Insecticide application in the intradomiciliary environment	0	۲	0
Use of insecticide impregnated bed nets	\odot	۲	0
Use of insecticide impregnated bed linen	\odot	۲	0
Destruction of animal reservoir habitat (e.g. rodent burrows)		۲	0
Testing people and animals coming from endemic areas (travellers and migrants)	\odot		0
Other	0		0

Please specify:

12. Do you have national **PREVENTION AND CONTROL official guidelines** for human leishmaniasis?

Yes

🔘 No

I don't know

Please provide the link where to find these guidelines:

13. Are you aware of **intersectorial ("One Health") collaboration** between animal, human and environmental sectors to **PREVENT AND CONTROL** leishmaniasis in your country?

- Yes
- No
- I don't know

Please describe:

14. What are the **challenges** for the **PREVENTION AND CONTROL** of leishmaniasis in humans in your country? Please rate from 0 (not important) to 3 (very important).

	0	1	2	3	l don't know
Lack of legislation from responsible authorities	۲	0	۲	۲	0
Lack of political willingness/awareness	۲	0	۲	0	0
Financial constraints	0	0	۲	0	0
Collaborative constraints (between stakeholders)	\odot	0	0	0	O
Operational capacity constraints (knowledge, people, equipment)		0	۲		O
National/EU regulation against culling infected/sick dogs /animals	\odot	0	0	0	©
Limited availability of diagnostic techniques	\odot	۲	\bigcirc	۲	0
High cost of diagnosis	\odot	\odot	0	0	O
Limited availability of treatments	\odot	0	0	0	O
High cost of treatment	\odot	\bigcirc	\odot	0	O
Limited availability of vaccines	\odot	۲	\bigcirc	۲	\odot
Limited availability of rodenticides	\odot	۲	\bigcirc	۲	\odot
No regulatory basis for rodenticide use	\odot	\bigcirc	\odot	0	O
Limited availability of insecticides	\odot	0	0	0	O
No regulatory basis for insecticide use	\odot	0	۲	0	0
Environmental interventions to destroy the habitat of reservoirs	\odot	0		0	0
Other	\odot	\bigcirc	\odot	\bigcirc	0

Please specify:

F - DIAGNOSIS AND TREATMENT OF HUMAN LEISHMANIASIS

15. Are there any official guidelines in your country for human leishmaniasis DIAGNOSIS?

- Yes
- No
- I don't know

Please provide the link where to find these guidelines:

16. Which of the following **LABORATORY TECHNIQUES** are employed in your country for human leishmaniasis **DIAGNOSIS** by governmental or private laboratories?

Please note that this does not necessarily imply that human leishmaniosis surveillance is being carried out in your country.

	Yes	No	l don't know
Serology (antibody detection) by IFAT(indirect immunofluorescence antibody test)	۲	O	0
Serology by ELISA (enzyme-linked immunosorbent assay)	\odot	0	0
Serology by DAT (direct agglutination test)	0	۲	0
Serology by rapid immunochromatography (e.g. rk39 test)		۲	0
PCR (Polymerase chain reaction) in blood samples	0	۲	0
PCR in skin/tissue samples	\odot	0	0
Microscopy of biological samples with or without prior culture	\odot		0
Other	0	۲	0

Please specify:

17. Are there any national guidelines in your country for human leishmaniasis TREATMENT?

- Yes
- No

Please provide the link where to find these guidelines:

18. What are the DRUGS (medicines) used for human leishmaniasis treatment in your country?

	Yes	No	l don't know
Liposomal amphotericin B	0	0	0
Amphotericin B deoxicholate	0	0	0
Sodium stibogluconate (E.g. Pentostam®)	0	\bigcirc	0
Meglumine antimoniate (E.g. Glucantime®)	0	\bigcirc	0
Miltefosine	0	0	0
Other	0	0	0

Please specify

G - DRIVERS OF EMERGENCE OF HUMAN LEISHMANIASIS

Emergence refers to the establishment of infection/disease in a previously free area or to an increase in incidence of infection/disease in an endemic area. Disease emergence is also considered when the rise in incidence occurs as a result of improved and wider diagnosis.

19. Is cutaneous and/or visceral leishmaniasis emerging in your country?

- Yes, in all the country
- Yes, in some regions
- No
- I don't know

Please specify which region(s)

Selecting "No" or "I don't know" skips question 20

20. **WHICH** of the following **DRIVERS** do you think that are important in your country? Please rate from 0 (not important) to 3 (very important) for the *Leishmania* species endemic in your country.

20.1 *L. infantum* (human and canine visceral and cutaneous leishmaniasis)

	0	1	2	3
Infected people and animals coming from endemic areas (travellers and migrants)	O	0	۲	O
Sand fly vector expansion into previously-free areas as a result of climate change	O	O	۲	۲
Environmental changes other than climate change, with an impact in vectors and reservoir hosts (e. g. urbanization, agricultural projects)			0	0
Insufficient/lack of surveillance at regional/country level	۲	۲	۲	۲
Insufficient/lack of prevention and control at regional/country level				
Other	0	\odot	۲	0

Please comment:

20.2 *L. major* (human cutaneous leishmaniasis)

	0	1	2	3
Infected people and animals coming from endemic areas (travellers and migrants)	۲	0	0	۲
Sand fly vector expansion into previously-free areas as a result of climate change	0	0	0	
Human-made environmental changes with an impact in vectors and reservoir hosts (e. g. urbanization, agricultural projects)		0	0	
Insufficient/lack of surveillance at regional/country level	۲	۲	۲	۲
Insufficient/lack of prevention and control at regional/country level	\odot		۲	
Other	\odot	\odot	۲	\odot

Please comment:

20.3 *L. tropica* (human cutaneous leishmaniasis)

	0	1	2	3
Infected people and animals coming from endemic areas (travellers and migrants)		0		

Sand fly vector expansion into previously-free areas as a result of climate change	\odot	\odot	O	\odot
Human-made environmental changes with an impact in vectors and reservoir hosts (e. g. urbanization, agricultural projects)		0	0	0
Insufficient/lack of surveillance at regional/country level	۲	۲	۲	\odot
Insufficient/lack of prevention and control at regional/country level	۲	۲	۲	\odot
Other	\odot	\odot	۲	\odot

Please comment:

20.4 *L. donovani* (human visceral and cutaneous leishmaniasis)

	0	1	2	3
Infected people and animals coming from endemic areas (travellers and migrants)	O	0	0	
Sand fly vector expansion into previously-free areas as a result of climate change	۲	0	۲	0
Human-made environmental changes with an impact in vectors and reservoir hosts (e. g. urbanization, agricultural projects)	۲	0	۲	
Insufficient/lack of surveillance at regional/country level	۲	۲	۲	0
Insufficient/lack of prevention and control at regional/country level	0	\odot	۲	\odot
Other	\odot	\odot	0	\odot

Please comment:

H - CONCLUDING REMARKS

Please provide any additional information you consider relevant: