

SURVEILLANCE REPORT

Congenital toxoplasmosis

Annual Epidemiological Report for 2021

Key facts

- In 2021, 150 confirmed cases of congenital toxoplasmosis were reported in the EU/EEA.
- France accounted for 78% of all the confirmed cases due to its active screening of pregnant women.
- The overall notification rate in the EU/EEA was 5.51 cases per 100 000 live births.
- The number of reported cases and the notification rate of congenital toxoplasmosis in the EU/EEA slightly increased in 2021.

Introduction

Toxoplasmosis is an infection caused by the parasite *Toxoplasma gondii*. Cats are the definitive hosts of the parasite and play an important role in the spread of the disease. Infected cats can shed toxoplasma oocysts in faeces and contaminate the environment. Humans and other animals can become infected either by ingesting the oocysts (by direct contact with cats, or through food and water contaminated by cat faeces). The infection results in the formation of infectious tissue cysts in various tissues of the body. Humans can also get an infection by eating poorly cooked meat containing cysts. Toxoplasmosis is not passed from person-to-person, but pregnant women, even without symptoms, may transmit the infection to the foetus. Pregnancy-associated infection can result in abortion, stillbirth, perinatal death (due to disseminated toxoplasmosis), or congenital infection with severe health problems including brain damage (hydrocephalus or microcephaly), blindness, and deafness.

Methods

This report is based on data for 2021 retrieved from The European Surveillance System (TESSy) on 6 February 2024. TESSy is a system for the collection, analysis and dissemination of data on communicable diseases.

For a detailed description of the methods used to produce this report, please refer to the 'Methods' chapter in the 'Introduction to the Annual Epidemiological Report' [1].

An overview of the national surveillance systems is available online [2].

A subset of the data used for this report is available through ECDC's online 'Surveillance Atlas of Infectious Diseases' [3].

In 2021, data for congenital toxoplasmosis were reported by 21 European Union/European Economic Area (EU/EEA) countries. Portugal reported for the first time in 2021. Denmark, Liechtenstein, Italy, the Netherlands, Norway, and Sweden do not have surveillance systems for toxoplasmosis.

Suggested citation: European Centre for Disease Prevention and Control. Congenital toxoplasmosis. In: ECDC. Annual Epidemiological Report for 2021. Stockholm: ECDC; 2024.

Stockholm, April 2024

© European Centre for Disease Prevention and Control, 2023. Reproduction is authorised, provided the source is acknowledged.

Surveillance in Spain did not cover the entire country or provide an estimation of the population covered by surveillance. Therefore, no notification rate was calculated. All the reporting Member States used the EU case definition from 2008, 2012, or 2018 (the case definition remained the same), except two which used other (not specified) case definitions. All the countries reported case-based data except Bulgaria, which reported aggregated data.

Six countries (Austria, Belgium, France, Greece, Slovakia, and Slovenia) have an active surveillance of congenital cases with compulsory screening of pregnant women (Table 1). However, Austria, Belgium, and Greece do not report their data to ECDC. Four countries (Bulgaria, Czechia, Germany, and Hungary) have voluntary screening. Nine countries have no screening policies and/or surveillance of congenital toxoplasmosis in pregnant women, but four of these countries (Estonia, Iceland, Ireland, and Malta) report their data to ECDC (Tables 1 and 2).

France regularly reports the highest number of cases of congenital toxoplasmosis, most likely due to its sensitive surveillance system, which includes the screening of pregnant women, follow-up of individuals testing negative in order to detect infection during pregnancy, and laboratory confirmation of any cases of congenital toxoplasmosis detected during the process, including asymptomatic cases.

In addition to TESSy reporting, information from event-based surveillance for congenital toxoplasmosis clusters or outbreaks with a potential EU dimension was collected through the work of the Epidemic Intelligence Information System for Food- and Waterborne Diseases (EPIS-FWD). In the summer of 2021, the new [EpiPulse – the European surveillance portal for infectious diseases](#) replaced EPIS-FWD.

Table 1. Overview of screening policies for pregnant women to detect congenital toxoplasmosis (ECDC survey, 2016)

| Country | No screening | Compulsory screening | Voluntary screening | Report to TESSy | Comments |
|----------------|--------------|----------------------|---------------------|------------------|---|
| Austria | | x | | No | Since 1974, serological screening of pregnant women starting in the first trimester has been implemented. There is monthly follow-up of seronegative women during pregnancy. |
| Belgium | | x | | No | Serological screening of pregnant women starting in the first trimester is implemented. There is no consensus on the follow-up of seronegative women during pregnancy. |
| Bulgaria | | | x | Yes | |
| Czechia | | | x | Yes | Serological screening is only offered in certain regions and gynaecological outpatient wards. The screening is not covered by statutory health insurance. |
| Denmark | x | | | No | Surveillance and serological screening of pregnant women was active from 1999 to 2007. |
| Estonia | x | | | Yes | |
| France | | x | | Yes | Serological screening of pregnant women starting in the first trimester is implemented. There is follow-up of seronegative women during pregnancy. |
| Germany | | | x | Yes | The screening is not covered by statutory health insurance. |
| Greece | | x | | No | Congenital toxoplasmosis is under surveillance through the mandatory notification form (but not toxoplasmosis in general). Screening is performed during pregnancy through serological and ultrasound testing, and if there are such indications and compatible symptoms in the foetus. |
| Hungary | | | x | Yes | |
| Iceland | x | | | Yes | Suspected cases are tested on an individual basis. |
| Ireland | x | | | Yes | Testing for <i>Toxoplasma gondii</i> is requested if there are clinical indications (e.g. a woman is symptomatic) for investigation of late miscarriage, or if there are ultrasound findings consistent with congenital toxoplasmosis. |
| Malta | x | | | No | |
| Netherlands | x | | | No | |
| Norway | x | | | No | |
| Slovakia | | x | | Yes | Serological screening of pregnant women starting in the first trimester is implemented. There is follow-up of seronegative women during pregnancy. |
| Slovenia | | x | | Yes | |
| Sweden | x | | | No | Suspected cases or women at high risk of infection are tested on an individual basis. |
| United Kingdom | x | | | Yes (until 2020) | No data were reported for 2020–2021 by the United Kingdom due to its withdrawal from the EU on 31 January 2020. |

Epidemiology

For 2021, 21 EU/EEA countries reported 150 cases of toxoplasmosis, all of which were classified as confirmed. France accounted for 78% of all cases. Fourteen countries reported zero cases. The number of notifications per 100 000 live births was 5.51 cases in the EU/EEA, with the highest rate in France (15.84), followed by Poland and Czechia (3.92 and 3.58 cases per 100 000 live births, respectively) (Table 2, Figure 1). Out of 128 cases with known outcome, three were reported to have died, accounting for an EU/EEA case fatality rate of 2.0%.

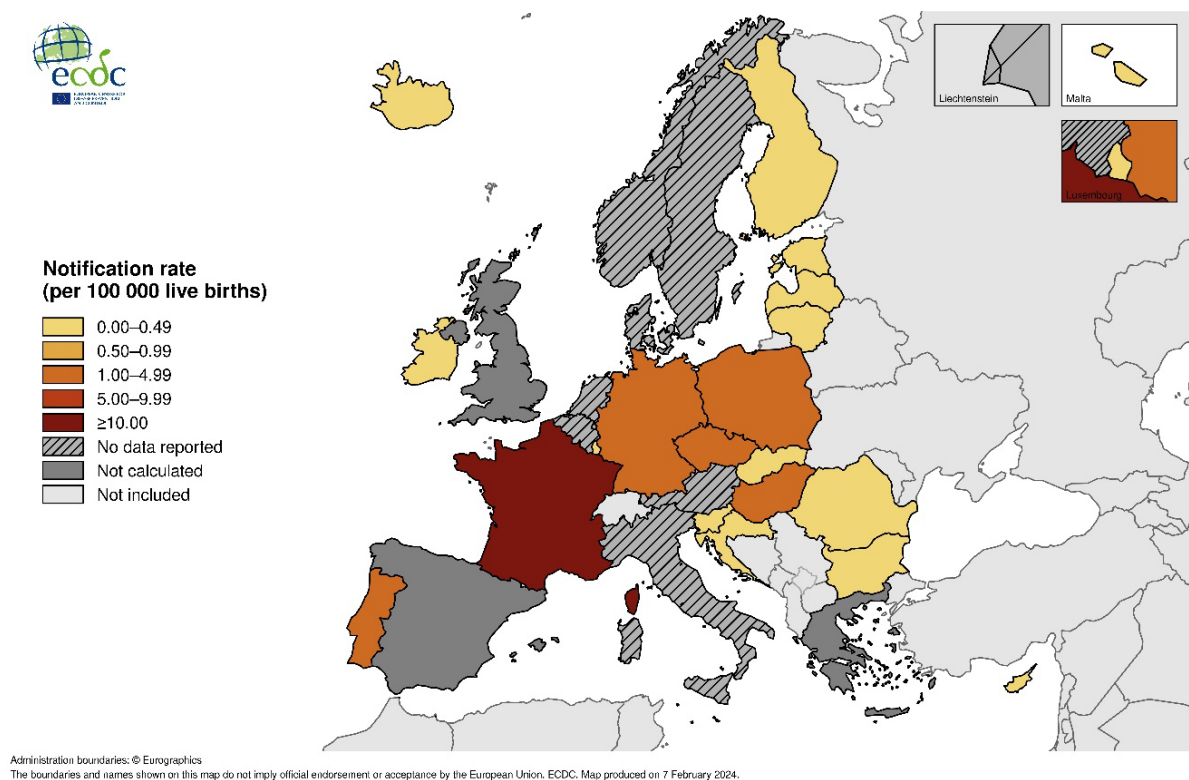
Table 2. Confirmed congenital toxoplasmosis cases and rates per 100 000 population by country and year, EU/EEA, 2017–2021

| Country | 2017 | | 2018 | | 2019 | | 2020 | | 2021 | |
|------------------------------|------------|-------------|------------|-------------|------------|-------------|------------|-------------|------------|-------------|
| | Number | Rate | Number | Rate | Number | Rate | Number | Rate | Number | Rate |
| Austria | NDR | NRC | NDR | NRC | NDR | NRC | NDR | NRC | NDR | NRC |
| Belgium | NDR | NRC | NDR | NRC | NDR | NRC | NDR | NRC | NDR | NRC |
| Bulgaria | 2 | 3.13 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 |
| Croatia | 0 | 0.00 | 1 | 2.71 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 |
| Cyprus | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 |
| Czechia | 2 | 1.75 | 0 | 0.00 | 1 | 0.89 | 0 | 0.00 | 4 | 3.58 |
| Denmark | NDR | NRC | NDR | NRC | NDR | NRC | NDR | NRC | NDR | NRC |
| Estonia | 0 | 0.00 | 1 | 6.96 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 |
| Finland | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 |
| France | 153 | 19.87 | 151 | 19.89 | 134 | 17.77 | 110 | 14.95 | 117 | 15.84 |
| Germany | 8 | 1.02 | 18 | 2.29 | 17 | 2.18 | 14 | 1.81 | 11 | 1.38 |
| Greece | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | NDR | NRC | NDR | NRC |
| Hungary | 0 | 0.00 | 0 | 0.00 | 1 | 1.07 | 0 | 0.00 | 1 | 1.06 |
| Iceland | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 |
| Ireland | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 |
| Italy | NDR | NRC | NDR | NRC | NDR | NRC | NDR | NRC | NDR | NRC |
| Latvia | 0 | 0.00 | 0 | 0.00 | 1 | 5.32 | 0 | 0.00 | 0 | 0.00 |
| Liechtenstein | NDR | NRC | NDR | NRC | NDR | NRC | NDR | NRC | NDR | NRC |
| Lithuania | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 |
| Luxembourg | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 |
| Malta | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 |
| Netherlands | NDR | NRC | NDR | NRC | NDR | NRC | NDR | NRC | NDR | NRC |
| Norway | NDR | NRC | NDR | NRC | NDR | NRC | NDR | NRC | NDR | NRC |
| Poland | 18 | 4.48 | 25 | 6.44 | 14 | 3.73 | 9 | 2.53 | 13 | 3.92 |
| Portugal | NDR | NRC | NDR | NRC | NDR | NRC | NDR | NRC | 2 | 2.51 |
| Romania | 0 | 0.00 | 1 | 0.48 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 |
| Slovakia | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 |
| Slovenia | 2 | 9.88 | 2 | 10.21 | 1 | 5.17 | 0 | 0.00 | 0 | 0.00 |
| Spain | 3 | NRC | 2 | NRC | 0 | NRC | 0 | NRC | 2 | NRC |
| Sweden | NDR | NRC | NDR | NRC | NDR | NRC | NDR | NRC | NDR | NRC |
| EU/EEA (30 countries) | 188 | 6.51 | 201 | 7.08 | 169 | 6.12 | 133 | 5.08 | 150 | 5.51 |
| United Kingdom | 7 | 0.93 | 7 | 0.96 | 7 | 0.98 | NDR | NRC | NA | NA |
| EU/EEA (31 countries) | 195 | 5.34 | 208 | 5.82 | 176 | 5.07 | 133 | 5.08 | NA | NA |

Source: country reports; NDR: no data reported; NRC: no rate calculated; NA: not applicable.

No data from 2020 onwards were reported by the United Kingdom, due to its withdrawal from the EU on 31 January 2020.

Figure 1. Number of confirmed cases of congenital toxoplasmosis per 100 000 live births by country, EU/EEA, 2021

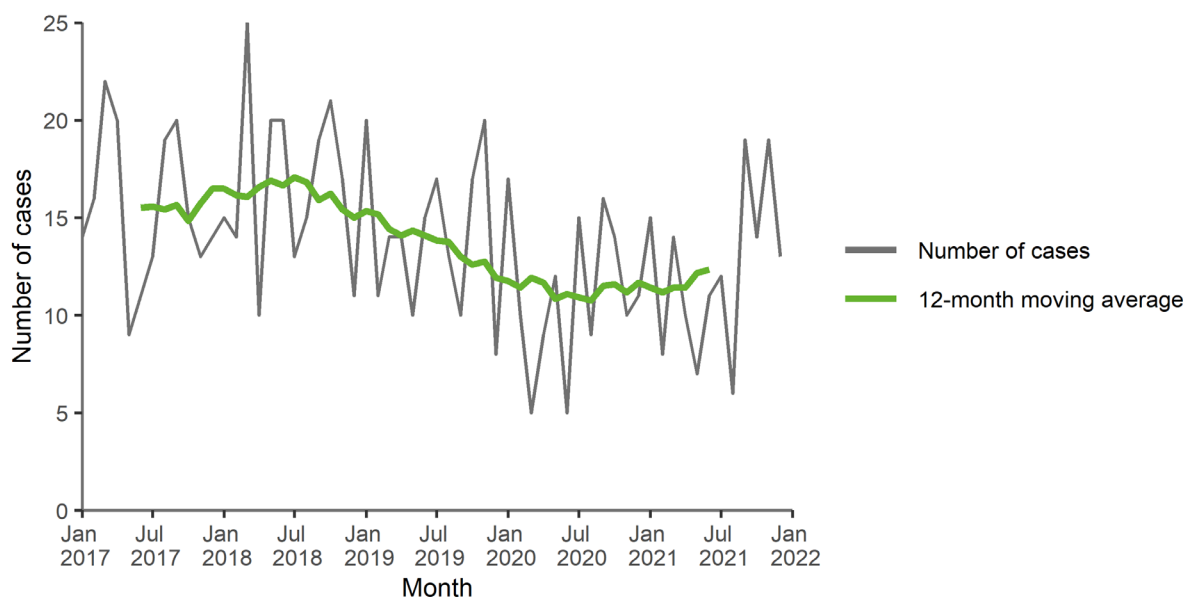


Source: country reports

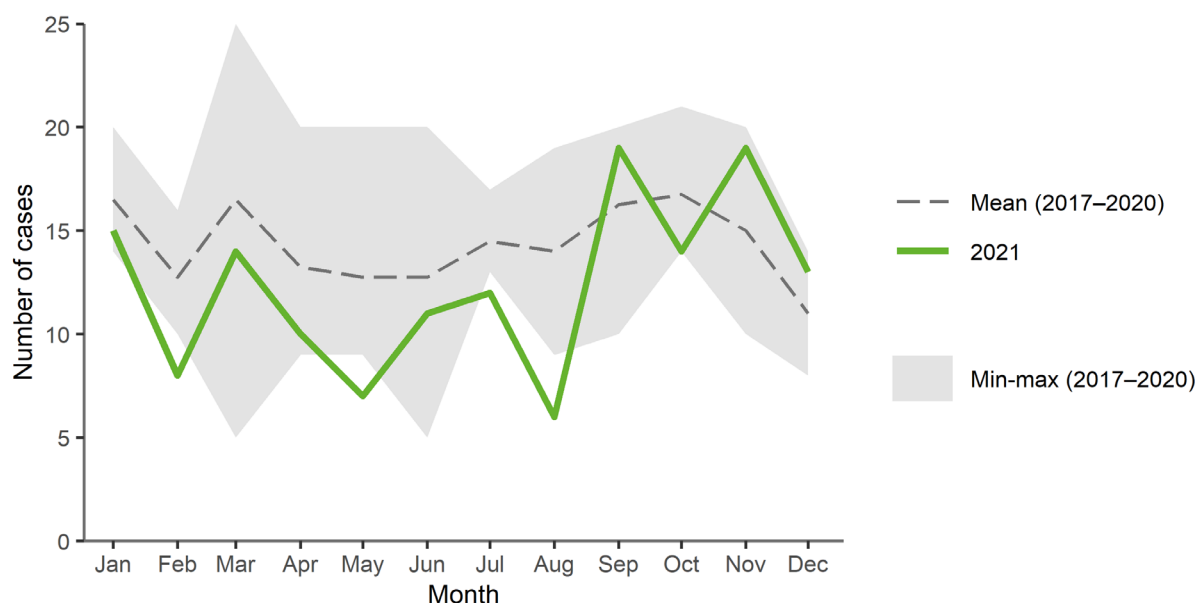
The number of cases of congenital toxoplasmosis at the EU/EEA level decreased from 2017 to 2020 but increased slightly in 2021 (Table 2, Figure 2).

The reported cases of congenital toxoplasmosis fluctuated over the years with no discernible seasonality. In 2021, cases peaked in September and November (Figure 3).

Figure 2. Confirmed congenital toxoplasmosis cases by month, EU/EEA, 2017–2021



Source: country reports from Cyprus, Czechia, Estonia, Finland, France, Germany, Hungary, Iceland, Ireland, Latvia, Lithuania, Luxembourg, Malta, Poland, Romania, Slovakia, Slovenia, and Spain.

Figure 3. Confirmed congenital toxoplasmosis cases by month, EU/EEA, 2021 and 2017–2020

Source: country reports from Cyprus, Czechia, Estonia, Finland, France, Germany, Hungary, Iceland, Ireland, Latvia, Lithuania, Luxembourg, Malta, Poland, Romania, Slovakia, Slovenia, and Spain.

Outbreaks and other threats

No threats of congenital toxoplasmosis were reported through EpiPulse in 2021.

Discussion

Cases of congenital toxoplasmosis in the EU/EEA increased slightly in 2021 after the decrease from 2017 to 2020. This was mainly due to the increased number of cases reported by France, which accounted for the majority (78%) of all the reported cases during that period [3]. In addition, Portugal reported cases first time in 2021 and Czechia reported the highest number of cases since the beginning of the congenital toxoplasmosis surveillance started in 2007. Two countries (Poland and Spain) reported slight increases following the decrease during the pandemic years. The comparatively high number of cases reported by France can be explained by the sensitive surveillance system in place and the rigorous screening programme, which includes active screening of pregnant women, with follow-up of the individuals who are seronegative, combined with the laboratory reporting of cases of congenital toxoplasmosis detected during screening [4].

Despite the slight increase of cases in 2021, the number of reported cases was among the lowest reported by France in the last decade. A notable decrease in the reported cases of congenital toxoplasmosis in France occurred in 2016 (there were 195 cases in 2016, as compared to 246 cases in 2015 – a decrease of 21%) and continued in subsequent years, with the lowest rate in 2020 [3]. Between 2019 and 2020, the number of reported cases in France decreased by almost 20%, suggesting an additional effect of the COVID-19 pandemic. Decreased seroprevalence in pregnant women in France and a decreased number of seroconversions during pregnancy have been reported from 1995 to 2016, with further estimated decreases by 2020 [5]. This might reflect a true decrease of infections in France which explains the decreasing number of reported congenital cases. The decrease in seroprevalence has been largely attributed to a reduced exposure to contaminated meat due to better animal husbandry practices, as well as changes in methods of food storage and preparation [5].

As a result of the varying set up in the surveillance of congenital toxoplasmosis and the absence of reporting or zero reporting of cases from 23 EU/EEA countries, the actual prevalence of the disease in the EU/EEA cannot be estimated and limits an assessment of the burden of this form of the disease. If disability-adjusted life years (DALY) are taken as a measure of the burden of disease, congenital toxoplasmosis at 2.42 DALYs per case is at the same level as hepatitis B and invasive pneumococcal infection in the EU/EEA [6]. This could reflect discussions about the cost-effectiveness of screening pregnant women in preventing or reducing the impact of congenital toxoplasmosis. The cost benefits of prenatal screening programmes have been debated because of the low prevalence of congenital toxoplasmosis in the EU/EEA and uncertainty about the effectiveness of prenatal treatment [7]. A retrospective study of Austria's national prenatal screening programme concluded that from 1992 to 2008, it had saved societal costs of more than EUR 15 million per year and EUR 258 million in 17 years [8]. A

recent study concluded that the maternal screening for toxoplasmosis in France is cost-saving and would have saved the country EUR 148 million in 2020 in addition to reducing or eliminating the devastating physical and emotional suffering caused by *T. gondii* [9].

Even without symptoms, pregnant woman can transmit the toxoplasma parasite to the foetus, which can result in abortion, still-birth, perinatal death, or congenital toxoplasmosis infection with severe health problems affecting, for example, the eyes and brain of infants. Foetuses infected before birth often show no symptoms at birth but can develop them later in life with potential mental disability due to brain damage, vision loss, and deafness. Infection in individuals with impaired immunity tends to severely affect the central nervous system, but other organs can also be affected. Such patients can require prolonged (sometimes life-long) therapy. Undercooked meat, especially pork, lamb, and wild game meat, and soil contaminated with cat faeces on raw fruits and vegetables are the major sources of food-borne transmission for humans. Food-borne transmissions can be prevented by production practices that reduce *T. gondii* in meat, adequate cooking of meat, washing of raw fruits and vegetables, prevention of cross-contamination in the kitchen, and measures that decrease the spread of viable oocysts into the environment [10].

Public health implications

Toxoplasmosis in pregnant women can result in congenital toxoplasmosis and severe outcomes in infected foetuses. The burden of this form of the disease in the EU/EEA cannot be assessed due to large differences between national surveillance systems, screening programmes, and follow-up procedures of pregnant women. Regardless of national strategies for surveillance, it is important to reinforce options for the prevention of congenital toxoplasmosis. Pregnant women should receive information about the risks of exposure to *T. gondii* and about necessary preventive measures.

References

1. European Centre for Disease Prevention and Control (ECDC). Introduction to the Annual Epidemiological Report. Stockholm: ECDC; 2020. Available at: <http://ecdc.europa.eu/annual-epidemiological-reports/methods>
2. European Centre for Disease Prevention and Control (ECDC). Surveillance systems overview for 2021. Stockholm: ECDC; 2022. Available at: [Surveillance systems overview for 2021 \(europa.eu\)](#)
3. European Centre for Disease Prevention and Control (ECDC). Surveillance Atlas of Infectious Diseases. Stockholm: ECDC; 2021. Available at: <http://atlas.ecdc.europa.eu/public/index.aspx?Dataset=27&HealthTopic=52>
4. Peyron F, L'ollivier C, Mandelbrot L, Wallon M, Piarroux R, Kieffer F, et al. Maternal and Congenital Toxoplasmosis: Diagnosis and Treatment Recommendations of a French Multidisciplinary Working Group. *Pathogens*. 2019 Feb 18;8(1):24. Available at: <https://www.mdpi.com/2076-0817/8/1/24>
5. Robinson E, de Valk H, Villena I, Le Strat Y, Tourdjman M. National perinatal survey demonstrates a decreasing seroprevalence of *Toxoplasma gondii* infection among pregnant women in France, 1995 to 2016: impact for screening policy. *Euro Surveill*. 2021 Feb;26(5):1900710. Available at: <https://www.eurosurveillance.org/content/10.2807/1560-7917.ES.2021.26.5.1900710>
6. Cassini A, Colzani E, Pini A, Mangen MJ, Plass D, McDonald SA, et al. Impact of infectious diseases on population health using incidence-based disability-adjusted life years (DALYs): results from the Burden of Communicable Diseases in Europe study, European Union and European Economic Area countries, 2009 to 2013. *Euro Surveill*. 2018 Apr;23(16):17-00454. Available at: <https://www.eurosurveillance.org/content/10.2807/1560-7917.ES.2018.23.16.17-00454>
7. The SYROCOT (Systematic Review on Congenital Toxoplasmosis) study group – Thiébaud R, Leproust S, Chêne G, Gilbert R. Effectiveness of prenatal treatment for congenital toxoplasmosis: a meta-analysis of individual patients data. *Lancet*. 2007 Jan 13;369(9556):115-22. Available at: <https://www.sciencedirect.com/science/article/pii/S0140673607600725?via%3Dihub>
8. Prusa AR, Kasper DC, Sawers L, Walter E, Hayde M, Stillwaggon E. Congenital toxoplasmosis in Austria: Prenatal screening for prevention is cost-saving. *PLoS Negl Trop Dis*. 2017 Jul;11(7):e0005648. Available at: <https://journals.plos.org/plosntds/article?id=10.1371/journal.pntd.0005648>
9. Sawers L, Wallon M, Mandelbrot L, Villena I, Stillwaggon E, Kieffer F. Prevention of congenital toxoplasmosis in France using prenatal screening: A decision-analytic economic model. *PLoS One*. 2022 Nov 4;17(11):e0273781. doi: 10.1371/journal.pone.0273781. PMID: 36331943; PMCID: PMC9635746.
10. United States Centers for Disease Control and Prevention (US CDC). Parasites – Toxoplasmosis (*Toxoplasma* infection). Atlanta: US CDC. Available at: <https://www.cdc.gov/parasites/toxoplasmosis/index.html>