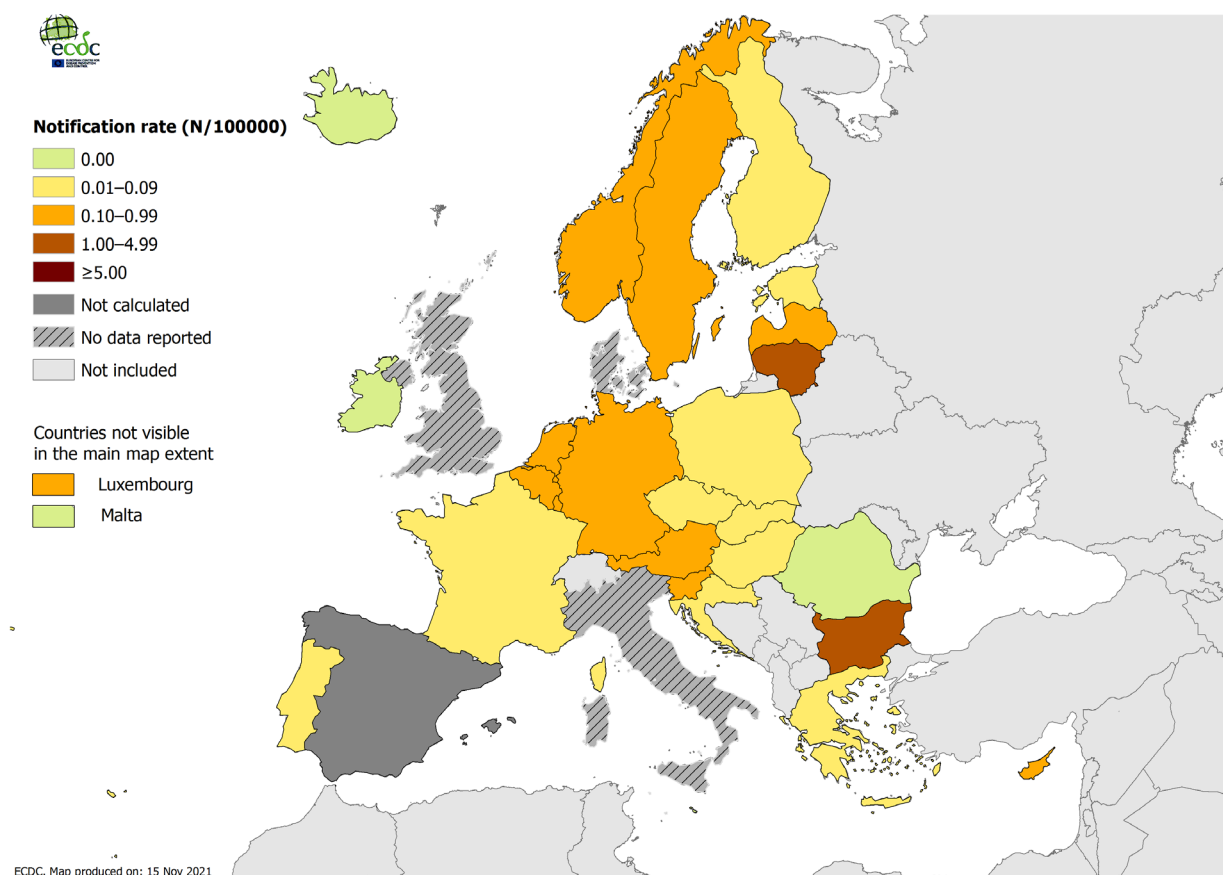


Country	2016		2017		2018		2019		2020			
	Number	Rate	Number	Rate	Number	Rate	Number	Rate	Confirmed cases	Rate	ASR	Reported cases
Italy	ND	NR	ND	NR	ND	NR	ND	NR	ND	NR	NR	ND
Latvia	11	0.56	6	0.31	10	0.52	6	0.31	2	0.10	0.08	2
Liechtenstein	ND	NR	ND	NR	ND	NR	ND	NR	ND	NR	NR	ND
Lithuania	26	0.90	53	1.86	50	1.78	81	2.90	37	1.32	-	37
Luxembourg	0	0.00	2	0.34	0	0.00	1	0.16	3	0.48	0.48	3
Malta	1	0.22	0	0.00	0	0.00	0	0.00	0	0.00	0.00	0
Netherlands	33	0.19	38	0.22	42	0.24	48	0.28	48	0.28	0.27	48
Norway	3	0.06	6	0.11	7	0.13	7	0.13	6	0.11	0.11	6
Poland	64	0.17	75	0.20	51	0.13	70	0.18	18	0.05	0.05	18
Portugal	2	0.02	2	0.02	9	0.09	5	0.05	1	0.01	0.01	1
Romania	13	0.07	14	0.07	4	0.02	1	0.01	0	0.00	0.00	0
Slovakia	4	0.07	7	0.13	10	0.18	11	0.20	3	0.05	0.05	3
Slovenia	3	0.15	7	0.34	6	0.29	6	0.29	3	0.14	0.15	3
Spain	87	0.19	83	0.18	68	0.15	34	0.07	8	-	-	8
Sweden	27	0.27	34	0.34	29	0.29	26	0.25	23	0.22	0.23	23
United Kingdom	ND	NR	4	0.01	ND	NR	3	0.00	ND	NR	NR	ND
EU-EEA	847	0.22	857	0.19	822	0.21	775	0.17	529	0.15	0.14	624

ND: no data reported, NR: no rate calculated, ASR: age-standardised rate

For 2020, Spain did not receive data from all its regions due to the COVID-19 pandemic. Denmark and Italy have no surveillance system for echinococcosis. Data were not collected from the UK in 2020, as the country left the EU on 31 January 2020. Data were not reported by Liechtenstein (for all years) or the UK (in 2016 and 2018); the reasons for this are unclear.

Figure 1. Distribution of confirmed echinococcosis cases per 100 000 population by country, EU/EEA, 2020



Sources: Country reports from Austria, Belgium, Bulgaria, Croatia, Czechia, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, and Sweden.

The male-to-female ratio was 1:1. The notification rate in males was highest among people aged ≥ 65 years, while in females among people aged 25–44 years (Figure 2).

Most echinococcosis cases (74%) were reported without importation status. Of cases with known status ($n=138$), 65% were reported to have been infected outside of the reporting country in 2020. Four of the 13 countries (Czechia, Estonia, Hungary, and Portugal) reporting information on importation status in 2020 notified all *Echinococcus* spp. infections as being domestically acquired. The highest proportions of imported cases were reported by Sweden (74%) and Norway (50%).

Discussion

Cases of both alveolar echinococcosis caused by *E. multilocularis* and cystic echinococcosis caused by *E. granulosus sensu lato (s.l.)* are listed with the common name 'echinococcosis' in the EU case definition, thus not distinguishing between these two diseases. Despite this, most countries reported *Echinococcus* species information between 2008 and 2020. Additionally, since 2019 (2018 data), it has also been possible to report clinical presentation data, which help differentiate the two forms of the disease, to ECDC's TESSy database. Since the beginning of the surveillance of human echinococcosis in the EU in 2007, cystic echinococcosis has been more frequently reported than alveolar echinococcosis; this is consistent with the data reported in the scientific literature for Europe.

The EU notification rate of confirmed human echinococcosis cases decreased in 2020 compared to the previous four years. There was no apparent impact of the COVID-19 pandemic on the reported case numbers in 2020. In addition, the withdrawal of the UK from the EU is likely to have had a negligible impact on the surveillance data for echinococcosis in 2020; the UK only marginally contributed to seven (0.21%) of the 3 301 confirmed cases reported between 2016 and 2020.

In a small number of countries, an increase in case notification rates has been observed in the recent years. This may be due to intensified surveillance and/or improved notification systems for echinococcosis. The increased awareness of the disease among clinicians and influx of migrants (people from endemic countries) may have also influenced the number of diagnosed cases in some countries [7].

The distribution of the two forms of disease varies in different parts of the EU/EEA. *E. multilocularis* is endemic in the fox population in central Europe [6,8] and human cases of alveolar echinococcosis are principally reported by these countries, with most cases considered to be infected within the reporting country. In contrast, *E. granulosus s.l.* is mainly prevalent in intermediate hosts (e.g. sheep) in southern and south-eastern Europe and is an important public health issue in many countries in the Balkan region [6,9], while in northern and western Europe most cases are considered imported. In accordance with Regulation (EU) 2018/772, surveillance of *E. multilocularis* focuses mainly on red foxes as definitive hosts; in 2019, *E. multilocularis* infections were primarily detected in foxes in Czechia, France, Germany, and Switzerland [6]. The surveillance of *E. multilocularis* in foxes is considered important to assess the prevalence of the disease in Europe. Indeed, the geographical distribution of *E. multilocularis* appears to have widened in recent decades [10]. The exact reasons for this are unclear, but may be linked to the growth in the European fox population [10], or due to the expansion of fox habitats into urban areas [12] or may reflect an increased surveillance effort [6]. However, the lack of baseline data and standardised detection methods make it difficult to explain the geographical expansion of *E. multilocularis* in Europe [6]. Although Regulation (EU) 2018/772 is in force for *E. multilocularis*, no specific EU Regulation is in place for detecting *E. granulosus s.l.* in animals, so surveillance for the latter parasite depends on national regulations. In 2020, *E. granulosus s.l.* infections in animals were mainly detected in sheep in Spain, Greece, and Italy.

Distinction between infection with *E. granulosus s.l.* and *E. multilocularis* is important because the two diseases require different clinical management and strategies for control. It is also important to note that the true prevalence of these diseases is difficult to estimate because of the long incubation period (in both alveolar echinococcosis and cystic echinococcosis), the high proportion of asymptomatic or paucisymptomatic carriers who never seek medical attention (cystic echinococcosis), and the underreporting/misdiagnosis of cases (alveolar echinococcosis and cystic echinococcosis), factors that contribute to the neglected status of these diseases [13]. For these reasons, the data reported by countries on the number of people with echinococcosis are considered the 'tip of the iceberg' of the true prevalence of echinococcosis in Europe. The hidden (undetected and unreported) proportion of echinococcosis cases includes asymptomatic carriers of cystic echinococcosis and misdiagnosed cases of alveolar echinococcosis [14]. Indeed, a recent cross-sectional ultrasound-based survey, conducted in Romania and Bulgaria, estimated approximately 45 000 human cystic echinococcosis infections in rural areas of these two endemic European countries [15].

An attempt to collect harmonised clinical data in the EU on a voluntary basis is currently being undertaken by the European Register of Cystic Echinococcosis (ERCE) [16, 17]; <http://www.heracles-fp7.eu/erce.html> and in the past with the European (Alveolar) Echinococcosis Registry (EurEchinoReg) [14].

Public health implications

Reporting of echinococcosis cases should include species information and preferably data collected at the NUTS-2 or NUTS-3 level. This would allow for a more complete monitoring of cases, foster a better understanding of the epidemiology of these diseases, improve monitoring of spatial and temporal trends, and ultimately enable the design and evaluation of targeted prevention and control actions.

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