



RAPID RISK ASSESSMENT

Outbreak of measles in Ukraine and potential for spread in the EU, 2012

13 March 2012

Source, date and content of request

ECDC internal decision, 6 March 2012.

The risk of measles for visitors to Ukraine, particularly during the UEFA European Football Championship, EURO 2012, and the potential spread of infection within the EU.

Main conclusions and recommendations

There is an ongoing measles outbreak in the Ukraine, currently concentrated in the western part of the country bordering on Hungary, Poland and Slovakia. In 2012 to date, over 5 000 cases have been reported and this might be an underestimate of the true numbers. The epidemic is expected to accelerate and spread geographically during the peak transmission season for measles from February to June.

Unvaccinated or non-immune persons visiting the Ukraine are at high risk of contracting measles. The increased concentration and movement of people during mass gathering events such as EURO 2012 will further increase this risk of transmission.

It is important that all EU citizens who have not already been fully vaccinated or have not previously had measles are vaccinated if they intend to visit the Ukraine. The vaccine should be administered according to their national recommendations prior to travel to the Ukraine.

Due to the overall low vaccine coverage in Ukraine, the risk of outbreaks of other vaccine-preventable diseases, including rubella, mumps and diphtheria, and their subsequent spread to the EU is also considered elevated. Travellers should review their vaccination status accordingly. WHO Europe's health travel recommendation for EURO 2012 is to seek medical advice 4-6 weeks prior to travelling.

The risk of contracting measles or other vaccine-preventable diseases is low for those who are fully vaccinated or immune due to past infection.

Consulted experts

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Disease background information

Measles is one of the most infectious viruses for humans and frequently results in widespread outbreaks among unvaccinated individuals. The infectious period starts four days before the onset of the typical rash and lasts until four days afterwards. There is no specific treatment for measles. Complications from measles are common, particularly among young children, and include pneumonia, otitis media, laryngotracheobronchitis, and diarrhoea [1]. Acute encephalitis, which often results in permanent brain damage, occurs in approximately one out of every 1 000 cases [2]. Death, predominantly resulting from respiratory and neurological complications, occurs in one out of every 500 to 5 000 cases, as reported in recent European outbreaks [3–5]. Case fatality is increased in children under five years and immuno-compromised individuals. In addition, subacute sclerosing panencephalitis (SSPE), a rare and fatal degenerative disease of the central nervous system characterised by behavioural and intellectual deterioration and seizures, develops six to eight years after primary infection in 18 out of every 100 000 children infected under the age of one [6].

The only effective preventive measure is vaccination with two doses of measles-containing vaccine, usually administered as a measles-mumps-rubella (MMR) vaccine. National vaccine uptake of at least 95% with two doses of MMR vaccine is considered to be necessary to achieve region-wide elimination [7].

Measles in the EU and EEA/EFTA

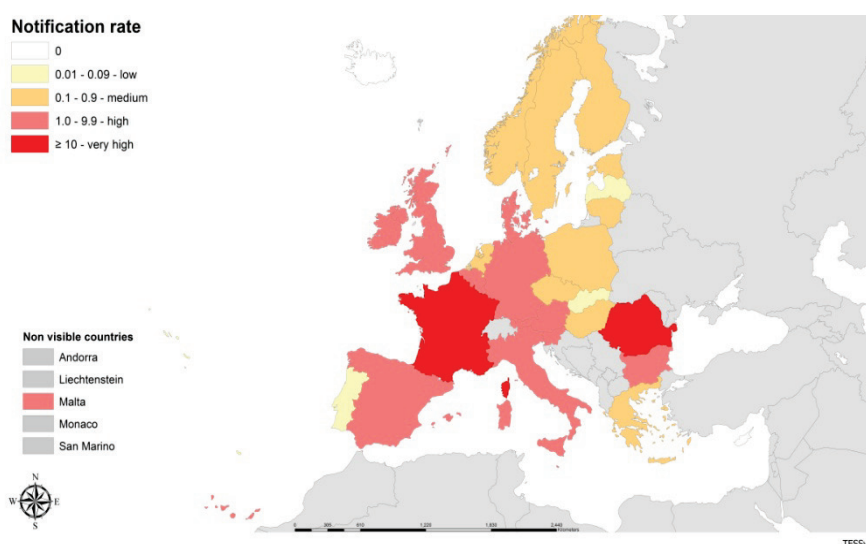
A vaccination uptake of below 95% of the population in several EU Member States has resulted in an accumulation of susceptible individuals. Thus measles has re-emerged in the region. The number of cases in Europe has quadrupled since 2009. Outbreaks have often started in sub-groups of populations with low vaccine uptake and then spread to the general population [8,9].

In 2011, 30 567 cases of measles were reported by the 29 EU and EEA/EFTA countries reporting data to the European Surveillance System (TESSy). Where importation status was known, 96% were infected in their country of residence. Only two countries remained measles free: Iceland and Cyprus [10].

Overall, the EU Member States neighbouring on the Ukraine reported low numbers of measles cases in 2011 and 2010: Poland – 38 cases in 2011 compared to 13 in 2010; Slovakia – two cases in 2011 compared to zero cases in 2010; Hungary – five cases in 2011 compared to zero cases in 2010 [10].

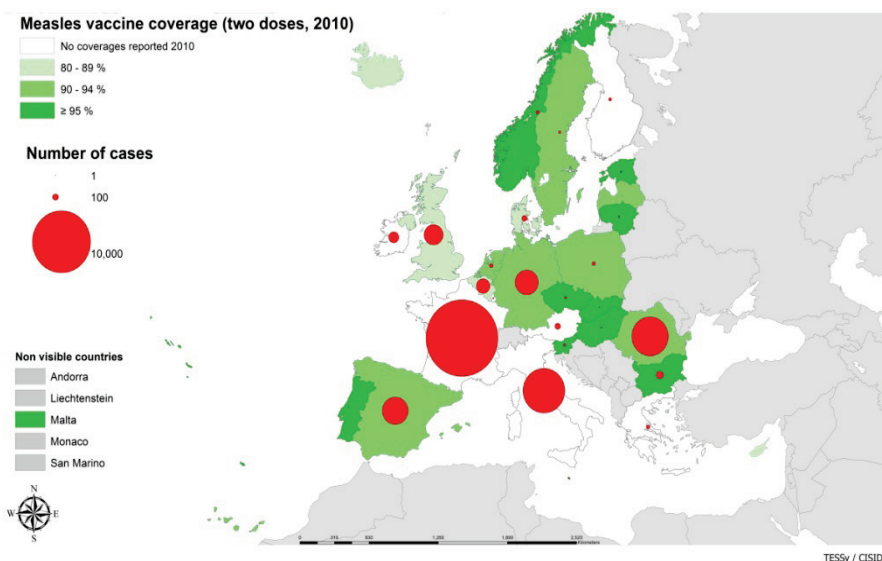
The distribution of measles cases reported in the EU, EEA and EFTA countries reaches an annual peak in spring (highest activity between mid February and mid June) [10].

Figure 1: Distribution of notification rates (cases per 100 000 population) by country, EU and EEA, 2011 (n=30 567)



Source: ECDC TESSy

Figure 2: Distribution of reported measles cases by country, EU and EEA (n=30 567) and two-dose measles vaccine coverage, 2011



Source: ECDC TESSy and WHO CISID

Event background information

Measles situation in Ukraine

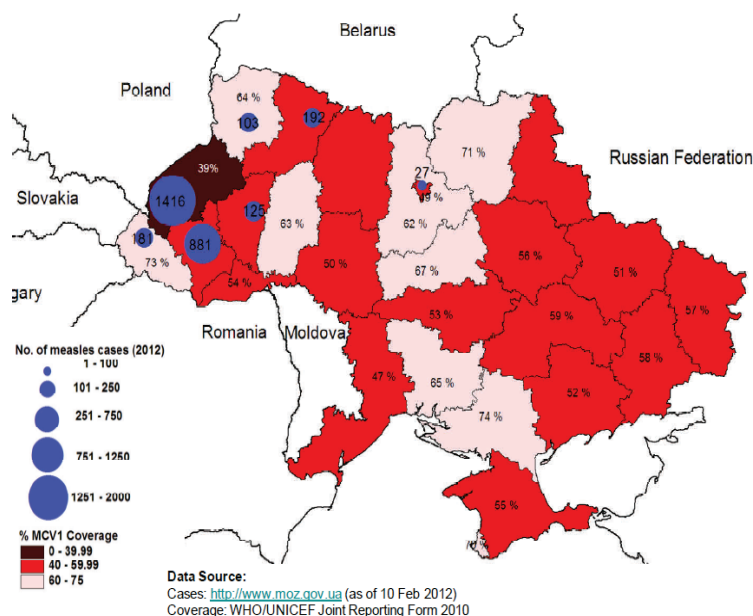
Between 1990 and 2009, the population of Ukraine decreased from 51.8 million to 46 million inhabitants [11] with an estimated number of 472 700 newborns annually [12]. In 2006, Ukraine experienced a large measles outbreak with 44 534 reported cases, despite a reported high vaccine coverage of over 95% for the period 2001–2006 [13].

As of 3 March 2012, the Ministry of Health and the State Sanitary and Epidemiological Service of Ukraine had reported 5 127 cases of measles since the beginning of the year, with 162 cases reported on the last reporting day [14]. At present, the outbreak is mainly affecting the western administrative regions of the country with the highest count in the Lviv (Lvov) region (1 416 cases in 2012, MCV1 coverage <40% (Figure 3) [15]. The implicated genotype is D4, similar to the one circulating in most EU, EEA and EFTA countries.

The Ukrainian government has been experiencing an ongoing shortage of vaccines for routine immunisation since 2010. According to non-official sources, a strong anti-vaccination lobby is active in Ukraine and scepticism in the population towards vaccinations has led to low coverage following a fatal incident and several hospitalisations after MMR vaccination in 2008 [17].

In 2006, the reported vaccination coverage for vaccine-preventable diseases was around 98% but has been declining since then. According to the WHO/UNICEF joint reporting form for 2010, the official national coverage for the first dose of the measles-mumps-rubella (MMR) combined vaccine in Ukraine was 56.1%, and coverage with two doses was 40.7%. Similar low coverage was reported for other vaccines (DTP3 52%, Polio3 58%) [16]. The reported control measures implemented in Ukraine to date focus on slowing transmission through social distancing. An emergency task force has been formed and surveillance has been enhanced to provide individual reporting on a daily basis.

Figure 3: Measles cases in 2012 and coverage of one dose of measles-containing vaccine in 2010 by region, Ukraine



Source: WHO Epidemiologic Brief No. 2012 [16]

European Football Championship

The 14th UEFA European Football Championship (EURO 2012) will be held jointly in Poland and Ukraine from 8 June to 1 July 2012, with hundreds of thousands of football fans from EU countries expected to attend. The 16 countries that have qualified for the final stage of the tournament are the EU countries of Poland, Czech Republic, Denmark, England, France, Germany, Greece, Italy, Netherlands, Portugal, Ireland, Spain and Sweden and the non-EU countries of Ukraine, Russia and Croatia. In Ukraine four stadiums will be used to host the matches: Donetsk, Lviv (Lvov), Kharkiv (Kharkov) and Kyiv (Kiev). Matches held in Ukraine will involve the EU countries of Denmark, Sweden, Germany, Netherlands, England, France and Portugal. Teams reaching the semi-finals and finals may also play matches in Donetsk and Kyiv (Kiev) [18].

ECDC threat assessment for the EU

Risk for visitors to Ukraine

As measles is a highly infectious disease and given the low vaccination coverage rates in Ukraine, it is anticipated that the current outbreak will continue to extend unless immediate and effective control measures, such as additional immunisation activities, are implemented.

Overall, the risk of exposure to and infection with measles for non-immune visitors – i.e. unvaccinated individuals and those who have not had the disease – at this mass-gathering event in Ukraine is considered high.

Those groups most at risk or likely to be unvaccinated:

1. All children who have not yet reached the recommended age for the first dose of measles vaccine. The recommended age varies from 12 to 18 months among the EU Member States. Vaccination schedules across Europe for the second dose also vary but it is typically administered before entering school.
2. Migrants and disadvantaged population groups with poor access to healthcare services.
3. Members of groups and communities which object to vaccination on philosophical and religious grounds, such as anthroposophical and fundamental religious communities.
4. Individuals who cannot be vaccinated because of absolute contra-indications.
5. People who for historical reasons have had limited access to vaccination and/or exposure to infection (i.e. have not developed natural immunity).

With reference to the particular exposure resulting from travel to Ukraine for the UEFA European Football Championship, those most likely to be affected are Groups 5, 4, 3 and to a lesser extent 1 (infants accompanying

their parents). It is possible that there may also be an influx of temporary migrant workers (from countries with low vaccine coverage) entering Ukraine to look for work that may be generated by this major event.

Risk of spread to other countries

The sub-optimal vaccine uptake in many EU countries has led to an increase in the number of susceptible individuals and resulted in frequent and widespread outbreaks all over the European region, with an upsurge of cases reported in 2010 and 2011.

In those EU countries that had eliminated indigenous measles transmission, a significant proportion of imported cases and outbreaks result from travel within Europe. This is a reflection of the large volume of travel within the EU and the sub-optimal vaccine uptake in other EU countries.

The probability for an individual to become infected depends on their own immune status and the likelihood of exposure to the virus. Therefore the risk of contracting measles when visiting Ukraine will vary for individuals from different EU countries.

The risk to a local population of measles spreading if introduced by travellers returning from Ukraine depends on the proportion of susceptible individuals in their home country. The timing of any large outbreak is determined by two factors: the proportion of susceptible individuals and the re-introduction of the measles virus.

Mass gathering events represent a risk for the spread of communicable diseases. It is a well-known fact that pre-travel health advice can have a significant impact: persons travelling to these events can be exposed to infectious diseases such as measles and carry the acquired infections back to their home countries where they infect others. On the other hand, visitors attending such events can bring infections from their home country and expose fellow visitors and nationals [19].

Risk of other vaccine-preventable disease outbreaks in Ukraine

Ukraine has reported low coverage with all vaccines under the routine immunisation programme for several years. Although this risk assessment is limited to measles, it is also appropriate to raise concerns about the risk of outbreaks of other vaccine-preventable diseases including rubella, mumps, poliomyelitis, pertussis and diphtheria in Ukraine. The data available to ECDC does not lend itself to estimating the risk of such outbreaks with any precision, but such a risk will increase over time if supplementary immunisation activities and catch-up campaigns are not implemented.

Conclusions

- The risk of continued measles transmission in Ukraine is high and the epidemic is expected to accelerate over the next few months.
- The risk of transmission for susceptible (non-immune) visitors to Ukraine is high.
- The risk of exposure is likely to be higher for spectators attending the UEFA European Football Championship because of the concentration and mixing of populations, particularly in crowded areas in cities where outbreaks are ongoing.
- Due to concurrent outbreaks in parts of the EU, there is also a risk that measles-infected visitors arriving from affected Member States contribute to the outbreaks in Ukraine.
- Fully vaccinated individuals and those who have previously had measles are at very low risk of acquiring the disease when travelling to Ukraine. Travel advice issued by WHO's Regional Office for Europe [20] in connection with EURO 2012 is to consult a doctor 4-6 weeks prior to travelling.
- This same advice should also apply to other vaccine-preventable diseases, such as rubella, mumps, polio, pertussis and diphtheria, since outbreaks of these may also occur in Ukraine. ECDC currently has no information that there are any reported outbreaks of these diseases in Ukraine.
- The risk of subsequent spread into the EU depends on the proportion of susceptible individuals in the respective country. For some countries the added risk will be high while for others it will be low.
- The risk of importing vaccine-preventable diseases into Ukraine is high, notably for rubella given the outbreak in Romania.

References

1. Heymann, D., Control of Communicable Diseases Manual. 19th ed. Official report by the American Public Health Association. 2008, Washington: American Public Health Association.
2. AAP Red Book: Report of the Committee on Infectious Diseases, American Academy of Pediatrics, 28th edition, 2009.
3. Van Den Hof S, Smit C, Van Steenberghe JE et al., Hospitalizations during a measles epidemic in the Netherlands, 1999 to 2000. *Pediatr Infect Dis J*, 2002. 21(12): 1146-50.
4. McBrien J, Murphy J, Gill D, Cronin M, O'Donovan C, Cafferkey MT. Measles outbreak in Dublin, 2000. *Pediatr Infect Dis J*, 2003. 22(7): 580-4.
5. Muscat M, Bang H, Wohlfart J, Glismann S, Mølbak K et al. Measles in Europe: an epidemiological assessment. *Lancet*, 2009. 373(9661): 383-9.
6. Campbell H, Andrews N, Brown KE, Miller E. Review of the effect of measles vaccination on the epidemiology of SSPE. *Int. J. Epidemiol*, 2007. 36 (6): 1334-1348.
<http://ije.oxfordjournals.org/content/36/6/1334.full>
7. Progress towards eliminating rubella and congenital rubella syndrome in the western hemisphere, 2003-2008. *WHO Wkly Epidemiol Rec*, 2008. 83(44): 395-400.
8. Filia A, Curtale F, Kreidl P, Morosetti G, Nicoletti L, Perrelli F et al. Cluster of measles cases in the Roma/Sinti population, Italy, June-September 2006. *Euro Surveill*. 2006;11(41):pii=3062.
<http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=3062>
9. Cohuet S, Morgan O, Bukasa A, Heathcock R, White J, Brown K. A measles outbreak in the Irish traveller ethnic group after attending a funeral in England, March-June 2007. *Epidemiol Infect*, 2009. 137(12): 1759-65.
10. ECDC - European monthly measles monitoring (EMMO) , Issue 8; 21 February 2012
http://ecdc.europa.eu/en/publications/Publications/SUR_EMMO_European-monthly-measles-monitoring-February-2012.pdf
11. Ukraine – Health system review 2010. *Health Systems in Transition* Vol. 12, No. 8, 2010. Available at: URL:http://www.euro.who.int/_data/assets/pdf_file/0010/140599/e94973.pdf
12. UNICEF – Children in Ukraine. Available at: URL: <http://www.unicef.org/ukraine/children.html>
13. CISID (Centralized Information System for Infectious Diseases) 2006. *WHO Euro*. Available at: URL: <http://data.euro.who.int/cisid/?TabID=284442>
14. Webpage of Ukraine's Ministry of Health [in Ukrainian] (accessed 13 March 2012).
<http://www.moz.gov.ua/ua/portal/>
15. State Sanitary and Epidemiological Service of the Ukraine [in Ukrainian] (accessed 13 March 2012)
<http://www.dsesu.gov.ua>
16. WHO Epidemiological Brief - No. 21(February 2012). Available at: URL:
http://www.euro.who.int/_data/assets/pdf_file/0004/159475/WHO_EPI_Brief_Feb_2012e.pdf
17. Webpage *Vaccines. me* - MMR Vaccine in Ukraine (2008) - Death and 92 Hospitalizations.
<http://www.vaccines.me/articles/bwwbp-mmr-vaccine-in-ukraine-2008---death-and-92-hospitalizations.cfm>
18. UEFA webpage (accessed 13 March 2012) www.uefa.com/uefaeuro2012
19. ECDC – Measles in the European union and a reminder for EU citizens attending mass gatherings
http://ecdc.europa.eu/en/healthtopics/measles/Documents/2011_06_17_measles_update_mass%20gatherings.pdf
20. WHO Health Advice for travellers to Poland and Ukraine for the 2012 UEFA European Football Championship. Available at: URL:
http://www.euro.who.int/_data/assets/pdf_file/0004/158998/Health_Travel_Advice_2012_UEFA_v7.pdf