## 10.3. Incidence of measles (P-5)

### *10.3.1. Documentation sheet*

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| **Description** | Incidence of measles per million inhabitants |
| **Calculation** | Number of cases of measles notified in a given year, divided by the population |
| **Rationale** | Measles is a highly communicable diseases caused by the measles virus; complications are frequent (30%), and very severe complications occur in 4 on 1000 cases in developed countries (death or encephalopathy with permanent brain damages).[1] The European countries have committed to eliminate measles, as proposed by the WHO Regional Office for Europe.[2,3] The target is to reach an incidence rate lower than 1 per million inhabitants.[3] |
| **Primary data source** | Sciensano, Service "Epidemiology of Infectious Diseases"[4] |
| **Source of results** | For Belgium: Sciensano, Service "Epidemiology of Infectious Diseases"<br>For EU: ECDC publishes yearly data based on TESSy inputs from each member state. These data are available via https://atlas.ecdc.europa.eu/public/index.aspx and are reused for international comparison purposes by OECD and WHO. |
| **Technical definitions** | Case definition: cases are defined by the EU as "possible" (clinical only), "probable" (clinical and an epidemiological link with a confirmed case) or "confirmed" (clinical and laboratory).[5] All 3 categories of cases are pooled and reported together for the computation of incidence. From 2003 to 2009, cases were reported through a network of paediatricians, PediSurv, at Sciensano. Mandatory notification in Belgium has only started in June 2009. Since 2010 cases are reported by several sources to Sciensano:<br>• national reference centre for measles, mumps and rubella [https://nrchm.wiv-isp.be/fr/centres_ref_labo/measles_et_rubellavirus/default.aspx]<br>• sentinel laboratories [https://epidemio.wiv-isp.be/ID/Surveillance/Pages/sentinelLabs.aspx]<br>• mandatory notification in the three regions<br>• network of paediatricians Pedisurv [https://www.wiv-isp.be/pedisurv/f_index.htm]<br>The records are pooled based on an identifying key to avoid duplicates.[4]<br>When reporting to WHO on the country's status related to the elimination process, incidence is calculated using only the non-imported cases of measles. |
| **International comparability** | Availability: yes, data are published by ECDC, OECD and WHO<br>Standardisation: the data sources and the exhaustiveness of the coverage differ between the countries. Caution is required when interpreting the data because of the diversity of the surveillance systems. |
| **Limitation** | Although the cases are reported by several sources to Sciensano, some cases can remain undiagnosed (under-ascertainment), and some may be diagnosed but not reported to one of the used sources (underreporting). This may result in an underestimation of the incidence. |
| **Dimensions** | Quality, Effectiveness of preventive care |
| **Related indicators** | Measles vaccination |

### 10.3.2. Results

**Background:** In the pre-vaccine era, measles was endemic in Belgium as in all European countries, and most children got infected. Regular outbreaks occurred at 2–5 year intervals in most populations. Immunisation against measles has completely changed the epidemiology of the disease: in Europe, the incidence has fallen dramatically over the past 30 years, and measles is no longer endemic in some European countries; however, limited outbreaks remain common in countries where subgroups of the population have low levels of immunity. The European countries have committed to eliminate measles, as proposed by the WHO Regional Office for Europe.[2,3] The target is to reach an incidence lower than 1 per million inhabitants.[3] Achieving this target is consistent with progress towards measles elimination but does not define measles elimination or confirm that it has been achieved.

In Belgium, vaccination against measles has been introduced in the vaccination schedule in 1985 (single dose) and 1995 (2 doses). The Superior Health Council has published a recommendation to reach a 95% coverage for each dose of the measles vaccination.[6]

From 1982 to 1999 measles surveillance was conducted through a sentinel network of general practitioners. In 2003, systematic surveillance of measles incidence was set up through a set of several sources, including a sentinel network of paediatricians (see technical definitions).

#### *10.3.2.1. Belgium*

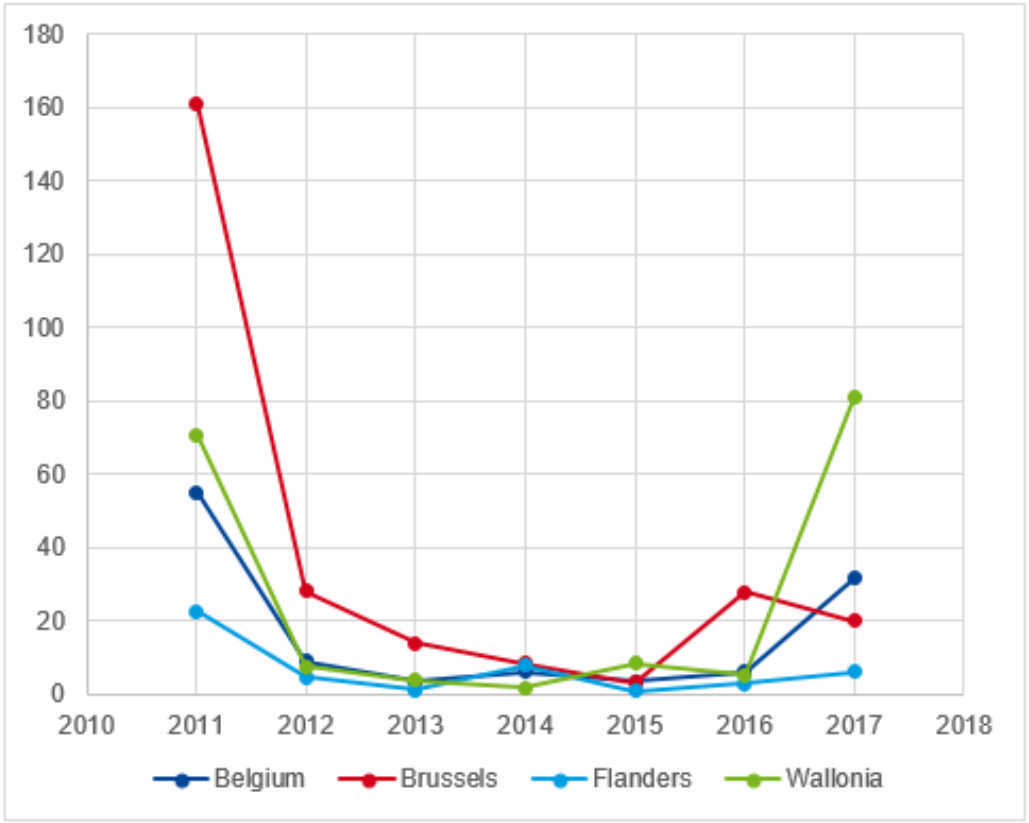
In 2016: the estimated measles incidence was 6.3 per million inhabitants for Belgium as a whole. The incidence was highest in Brussels (27.8 per million), followed by Wallonia (5.3) and Flanders (2.9). Several small outbreaks occurred in Belgium, in all three regions, but particularly in Brussels. Nosocomial transmission played an important role in the spread of measles in Brussels and Wallonia.

In 2017: Belgium faced a new epidemic of measles, resulting in a notification rate of 31.6 cases per million. The epidemic started end December 2016, peaked in March 2017, and faded out in May 2017. The epidemic remained limited to the Walloon Region. The 2016 index case was a Belgian resident who had travelled to Romania during the incubation period and this case was probably imported.[7]

**Time trends:**

The rate fluctuated between 1 and 9 per million between 2003 and 2010, afterwards, an epidemic occurred in 2011, resulting in a notification rate of 55 cases per million. Figure 1 shows the evolution of the notification rate in Belgium and by region since the epidemic of 2011. After the measles outbreaks in 2011, the estimated incidence of measles decreased again significantly, fluctuating, for the whole of Belgium, between 3 and 6 cases per million inhabitants. The elimination threshold was reached in Flanders in 2015, with 0.9 cases per million inhabitants; afterwards, the incidence in Flanders increased again. In 2017, another outbreak occurred, resulting in a notification rate of 31.6 cases per million for the whole of Belgium. The incidence was highest in Wallonia (80.8 per million), followed by Brussels (20.1) and Flanders (6.3).

**Figure 147 – Measles notification rate (per million) in Belgium since the 2011 epidemic, by region (2011-2017)**




*Source: Annual reports on vaccine-preventable infectious diseases in children. Sciensano, Service "Epidemiology of Infectious Diseases". https://epidemio.wiv-isp.be/ID/Pages/Publications.aspx*

### *10.3.2.2.International comparisons*

Figure 148 shows the notification rate by EU-country in 2017[8]. In this year, the EU/EEA experienced a resurgence of measles with several outbreaks and 37 fatalities. With a notification rate of 31.6 cases per million (higher than the EU-15 average), Belgium was one of the most affected countries, after Romania (283.8 per million), Greece (89.7 per million) and Italy (84.0 per million). Conversely, seven countries reported an incidence that meets the WHO-target (lower than 1 per million).

Figure 3 shows the evolution of the notification rate by country since 2008 (OECD Health Data 2018). We see that the measles virus is circulating at low level in Europe, with regular outbreaks occurring in some countries, and moving to other countries form one year to another.

**Figure 148 – Measles notification rate (cases per million) in 2017, by country (ECDC measles monitoring)**

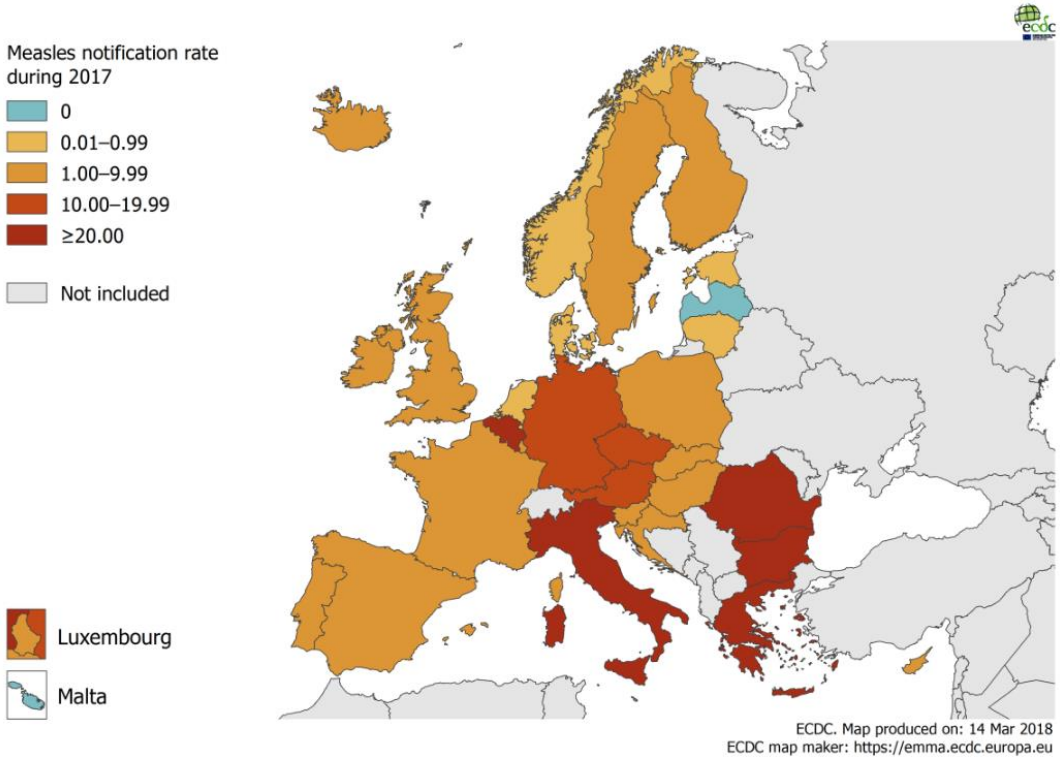
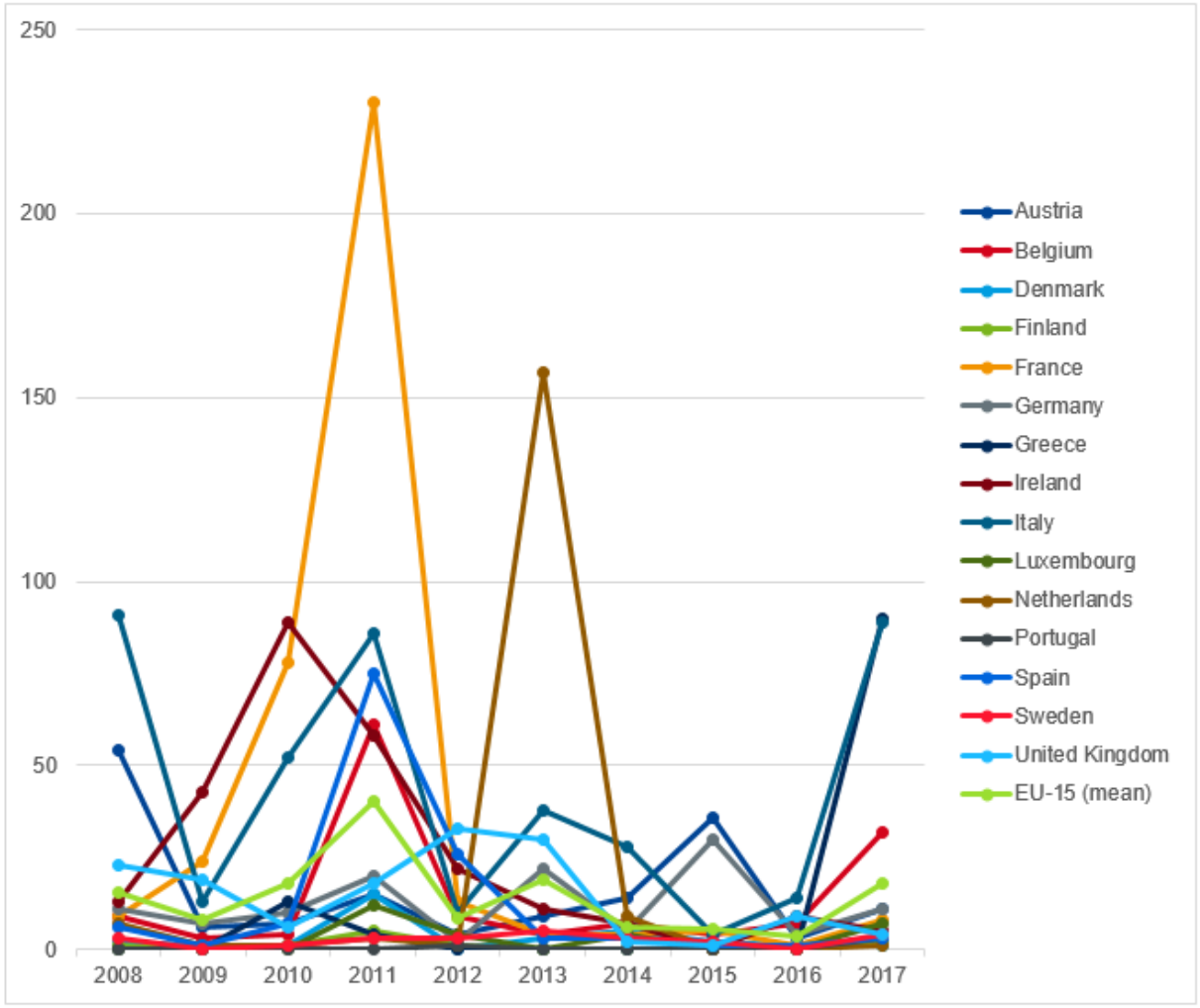


**Figure 149 – Measles notification rate (cases per million), EU-15 comparison, 2008-2017**



### *10.3.2.3.Discussion and interpretation*

The WHO target (incidence rate lower than 1 per million) has only been achieved in the Flemish Region in 2015. The persistence of epidemics, despite good vaccination coverage for the first dose (>95% in Flanders and Wallonia, and 94% in Brussels) is probably due to some clusters of unvaccinated or incompletely vaccinated people. Those clusters are among people who refuse the vaccination or in children too young to be vaccinated, but also among people who were not covered at the beginning of the vaccination program. Control is further hampered by hospital-acquired cases and nosocomial transmission. Moreover, the coverage rate for the second dose is not optimal, in none of the Belgian regions.

**Key points**

- **Measles elimination remains a challenge at EU as well as at Belgian level**
- **The incidence rate of measles in Belgium has ranged between 1 and 9 per million since the beginning of the follow up (2003), except during the epidemic years (2011 and 2017).**
- **Across all years considered, the incidence has generally been the highest in Brussels; and has been higher in Wallonia than in Flanders. The 2017 outbreak on the other hand mainly affected Wallonia.**
- **Despite a good vaccination coverage for the first dose, outbreaks are persisting, even in Flanders, probably due to clusters of unvaccinated or incompletely vaccinated people. It therefore remains important to detect these clusters and to target vaccination towards them.**
- **To reach the target of measles elimination a sufficient level of coverage for the first and second vaccination dose should be reached (95%), which is not yet the case for Belgium, especially not for the 2nd dose.**

**References**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[12] European Centre for Disease Prevention and Control. Measles and rubella surveillance – 2017. Stockholm: ECDC; 2018. https://ecdc.europa.eu/sites/portal/files/documents/Measles-and-Rubella-Surveillance-2017.pdf