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Towards measles elimination in Italy: Virological surveillance and genotypes trend (2013–2015)

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ABSTRACT

In accordance with the goal of the World Health Organization Regional Office for Europe, the Italian National Measles and Rubella Elimination Plan aimed to interrupt indigenous measles transmission in Italy by the end of 2015. However, from 2013 to 2015, Italy experienced high measles burden with 4902 measles cases (49.3% laboratory-confirmed) reported to the enhanced measles surveillance system (cumulative incidence in the triennium reference period: 2.4/100,000 population). The measles elimination goal was not reached.

Laboratory surveillance of measles circulating genotypes is performed by the Measles and Rubella National Reference Laboratory (NRL) at the Italian National Institute of Health (Istituto Superiore di Sanità – ISS), in Rome. Samples received from 1 January 2013–31 December 2015 were analysed. Those positive for measles genome by molecular tests were sequenced and phylogenetically analysed. Phylogenetic analysis performed by NRL identified that genotypes D4 and D8 were endemic and co-circulated in 2011–2013: study results show that genotype D4 disappeared during 2013. Sporadic cases were associated to genotype B3 during 2011–2013, which became endemic in Italy during 2014 and co-circulated with D8 until 2015. Sporadic cases were found belonging to genotypes D9 and H1 all over the period in exam. Similar trend has been observed in European WHO Region.

1. Introduction

Measles virus (MV), member of the Paramyxoviridae family, is a leading cause of mortality among young children worldwide, with an estimated 134,200 deaths due to measles-related complications in 2015 (WHO, 2017a). Although measles is a highly contagious viral disease, its transmission can be easily prevented by vaccination.

In order to reach measles elimination, a very high coverage of at least 95% for two doses of vaccine is needed (WHO, 2012a). A monovalent measles vaccine was introduced in Italy in 1976. This was replaced in 1993 by the combined measles-mumps-rubella (MMR) vaccine, given as a single dose at 13–15 months of age, but only since 1999, the vaccination with MMR has been included in the national immunization program. Currently, a first dose of MMR vaccine is

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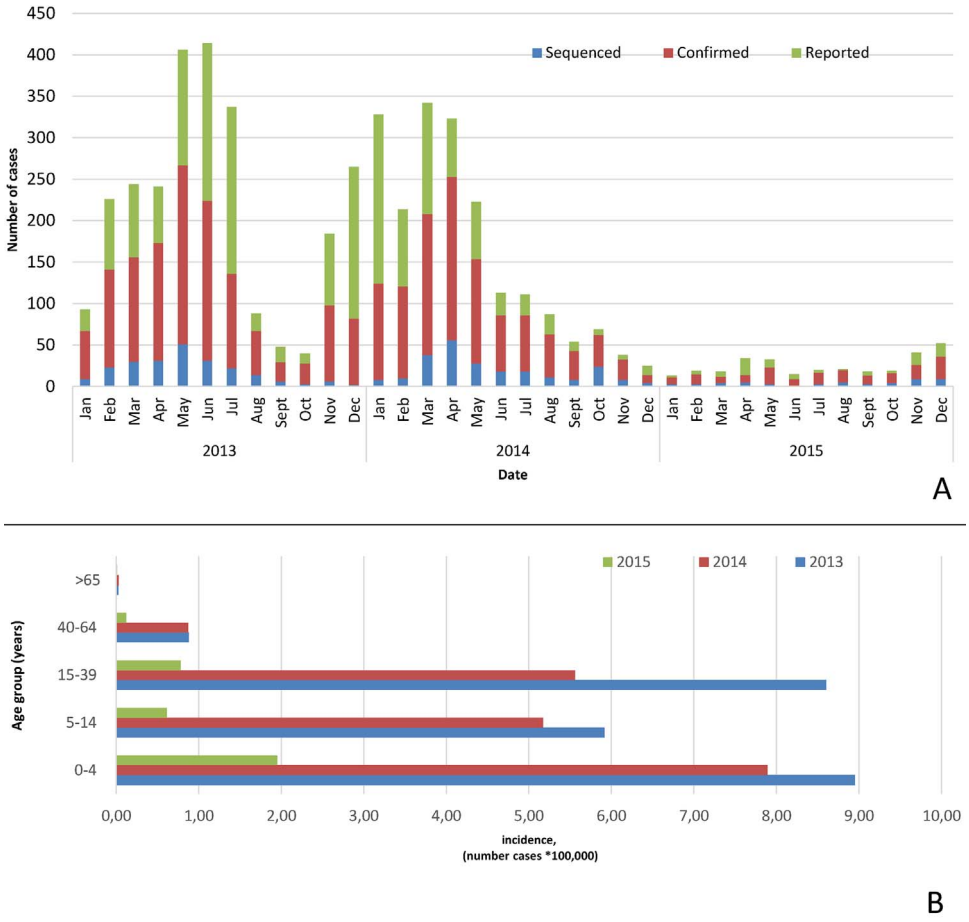

Fig. 1. Measles cases by month of rash onset (A) and incidence by age group (B), Italy, 2013–2015.

recommended at the age of 12–15 months and a second dose at 5–6 years (Filia et al., 2013). National administrative vaccine coverage for the first dose of MMR vaccine in children at two years of age, decreased from 90.4% in 2013–86.7% in 2014 and 85.3 in 2015 due to the economic crisis and a completely discredited health scare linking the MMR jab to autism.

The World Health Organization (WHO) European Regional Committee set 2015 as target date for the elimination of measles (WHO, 2010): regional elimination can be declared after 36 or more months of the absence of endemic measles or rubella in all Member States (Mankertz et al., 2011).

Currently, eliminating measles and rubella is a core goal of the European Vaccine Action Plan 2015–2020.

Based on a country-by-country assessment, during its fifth meeting in 2016, the European Regional Verification Commission for Measles and Rubella Elimination (RVC) concluded that based on reports submitted, at the end of 2015, endemic measles transmission had been interrupted in 37 of the 53 Member States (70%). Twenty- four Member States (45%) provided evidence to demonstrate the elimination of endemic transmission of measles for at least 36 months; further 13 Member States (25%) provided evidence for the interruption of measles transmission for a period of less than 36 months. Fourteen Member States (26%) were considered by the RVC to remain endemic for measles transmission, including Italy (WHO, 2017b).

Fourteen Member States (26%) were considered by the RVC to remain endemic for measles transmission, and 16 (30%) were considered to remain endemic for rubella transmission. Fourteen Member States (26%) were considered to remain endemic for both measles and rubella. WHO's plan to eliminate measles seeks to improve measles surveillance systems throughout the world by WHO Measles and Rubella Laboratory Network (Mulders et al., 2016), in order to detect all clinical measles cases and to investigate thoroughly every single cases and outbreaks. In Italy, the surveillance of measles consists of a case reporting system based on epidemiological investigation on cases clinically consistent with measles supported by laboratory confirmation. Analysis of samples for laboratory confirmation of infection is performed by the National Reference Laboratory (NRL) at the National Institute of Health and by Subnational Reference Laboratories (SRLs) not WHO accredited. The reporting and laboratory surveillance system has been previously described (Magurano et al., 2015).

Virus surveillance and genetic characterization of circulating viruses are important tools for regional and global control efforts. Within the WHO's goal to eliminate the virus, the NRL plays a key role in supporting cases ascertainment in Italy, confirming outbreaks/cases and determining MV circulating genotypes.

This report describes the Italian virological surveillance for measles in the triennium 2013–2015.

2. Material and methods

2.1. Epidemiological data

Since 1934, measles disease has been statutorily notifiable in Italy. In 2007, an enhanced surveillance system was introduced which requires physicians to report all suspected measles cases to the local health authorities within 12 h (Italian Ministry of Health, 2007).

For each suspected case, the local health authorities are required to carry out an epidemiological investigation, to obtain specimens for laboratory confirmation and genotyping, and complete a standard measles notification process on the online database of the National