



Feidhmeannacht na Seirbhíse Sláinte
Health Service Executive



2006

**EPIDEMIOLOGY OF
MEASLES
IN IRELAND**



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Authorship:

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Epidemiology of measles in Ireland, 2006. Health Protection Surveillance Centre, October 2007.

Further information:

For details on the surveillance and epidemiology of measles in the European Union, please see <http://www.euvac.net/>. For details on the surveillance and epidemiology of measles in the WHO European region, please see <http://data.euro.who.int/CISID/>.

Summary

- There were 83 measles notifications in 2006 giving a crude incidence rate of 2.0 per 100,000 total population

- There were 24 confirmed measles notifications in 2006 giving a crude confirmed incidence rate of 0.6 per 100,000 total population

- Of the 83 measles notifications in 2006 29% (n=24) were classified as confirmed, 66% (n=55) were classified as possible and five percent (n=4) had no case classification assigned

- Of the 83 notifications in 2006 75% (n=62) occurred in children less than three years of age with 35% (n=29) in those aged less than one year

Introduction

Measles is an acute viral infectious disease characterised by high fever, cough, conjunctivitis, runny nose and rash. Complications of measles include otitis media, pneumonia, croup, diarrhoea and encephalitis. Measles results in death in approximately one to two cases per 1,000 population. In Ireland, three deaths were associated with the measles outbreak in 2000 when 1,603 measles cases were notified. Two of these deaths were as a result of pneumonia complicating measles and one was due to post-measles encephalitis.

Measles is highly contagious but can be prevented by vaccination. Measles vaccine in Ireland is currently available as part of the combined measles-mumps-rubella (MMR) vaccine. More than 99% of individuals who receive two MMR doses (provided the first dose is given after their first birthday) develop immunity to measles. Two doses of MMR are required to ensure protection, as two to five percent of children fail to respond to one dose of MMR. In Ireland, vaccination with the first dose of MMR (MMR₁) is recommended at twelve to fifteen months of age and the second dose (MMR₂) at four to five years of age.

Since July 2000 measles is notified weekly to HPSC. HPSC routinely produces a national measles report that is distributed to those involved in measles control and surveillance in Ireland. HPSC also forwards the measles notification data to the EU measles surveillance network EUVAC.NET and to the World Health Organisation (WHO) on a monthly basis.

This report summarises the 2006 measles notification data.

Case Definitions

Case classifications are assigned to measles notifications as per the Case Definitions for Notifiable Diseases.¹ The following case definition is used for measles in Ireland:

Clinical description

Clinical picture compatible with measles i.e. a generalised erythematous rash lasting greater than three days and a temperature greater than 38°C and one or more of the following cough, coryza (rhinitis), Koplik's spots or conjunctivitis.

Laboratory criteria for diagnosis

One of the following:

- Detection of measles IgM antibody in absence of recent vaccination
- Four-fold or higher rise in measles IgG antibody level in absence of recent vaccination
- Detection of measles virus (not vaccine strains) in a clinical specimen.

Case classification

Possible: Clinically compatible cases

Confirmed: A case that is laboratory confirmed or a clinically compatible case which is epidemiologically linked to a confirmed case. A laboratory-confirmed case does not need to meet the clinical case definition.

A measles case is epidemiologically linked if there was exposure to a laboratory confirmed case during the infectious period (four days before to four days after rash onset) and this exposure occurred within the expected incubation period of the case under investigation – 7 to 18 days (mean 14 days) before rash onset.

Materials and Methods

During 2006, for HSE Areas using the Computerised Infectious Disease Reporting (CIDR) system, measles notifications were inputted directly on CIDR at regional level. HPSC can view this data in Business Objects reports (except for data such as patient name and address). For HSE Areas not using CIDR, anonymous notifications were sent to HPSC and these data were inputted on CIDR by HPSC. The majority of figures presented in this report are based on data extracted from the CIDR system on the 21st August 2007. These figures may differ from those published previously, due to ongoing updating of notification data in CIDR.

The Department of Health and Children collated measles data from 1948 to June 2000; July 2000-2006 measles data were collated by HPSC.

Analysis of measles data was carried out using Business Objects and Microsoft Excel. Incidence rates for 2004-2006 were calculated based on population data taken from the 2006 census and incidence rates for 2003 were calculated based on population data taken from the 2002 census.

Results

Incidence

There were 83 measles notifications in 2006, giving a crude incidence rate of 2.0 per 100,000 population. This is a slight decrease compared to 2005 when 93 measles cases (2.2/100,000) were notified. In contrast, there were 330 (7.8/100,000) measles notifications in 2004 and 572 (14.6/100,000) in 2003. The annual number of notifications in 2006 is the lowest since measles was specified as a notifiable disease under the Health Act, 1947 (figure 1).

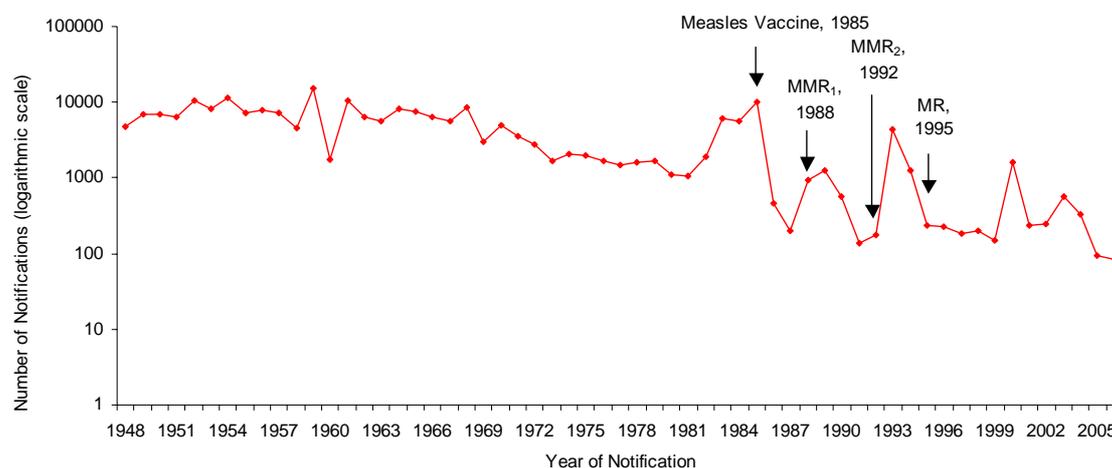


Figure 1. Annual number (logarithmic scale) of measles notifications in Ireland from 1948 to 2006 and year of introduction of measles and MMR vaccine. (A measles and rubella campaign for primary school-age children was conducted in 1995.)

The breakdown of measles cases by HSE Area and the crude incidence rates by HSE Area during 2006 are presented in table 1. The highest number of notifications was in the HSE-Eastern Area with 44 notifications followed by the HSE-Mid-Western, North Eastern and Western Areas with seven notifications each. The highest crude incidence rate in 2006 was in the HSE-Eastern Area (2.9/100,000) followed by the HSE-North Western Area (2.5/100,000).

There were approximately two notifications on average each week during 2006. No outbreaks of measles were notified during 2006.

Table 1. Number of measles notifications and crude incidence rates (CIR) per 100,000 population by HSE Area in 2006

HSE Area	Number	Crude Incidence Rate per 100,000 Population
HSE-Eastern	44	2.9
HSE-Midland	3	1.2
HSE-Mid-Western	7	1.9
HSE-North Eastern	7	1.8
HSE-North Western	6	2.5
HSE-South Eastern	5	1.1
HSE-Southern	4	0.6
HSE-Western	7	1.7
Total	83	2.0

Case classification

Case classification was provided for 95% (n=79) of measles notifications in 2006 (figure 2). Of the 83 notifications in 2006, 29% (n=24) were classified as confirmed, 66% (n=55) as possible while case classification was not provided for five percent (n=4) of the notifications (figure 2). All notifications classified as confirmed were laboratory confirmed.

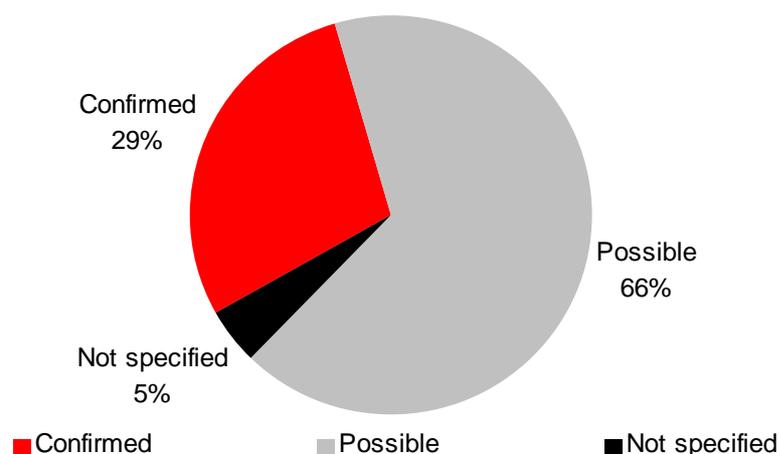


Figure 2. Measles notifications (n=83) in 2006 by case classification

Age and sex distribution

Measles cases were reported in both children and adults in 2006 with cases ranging in age from less than one year to 55 years (age was unknown/not reported for two cases). Seventy-five percent (n=62) of cases occurred in children less than three years of age with 35% (n=29) in those aged less than one year (figure 3). The highest incidence rates in 2006 were in those aged less than one year (47.5/100,000) and 1-2 years (27.2/100,000) followed by those aged 3-4 years (7.5/100,000) (figure 4).

Of the 83 measles notifications, 44 were male, 38 were female, while sex was not reported for one notification.

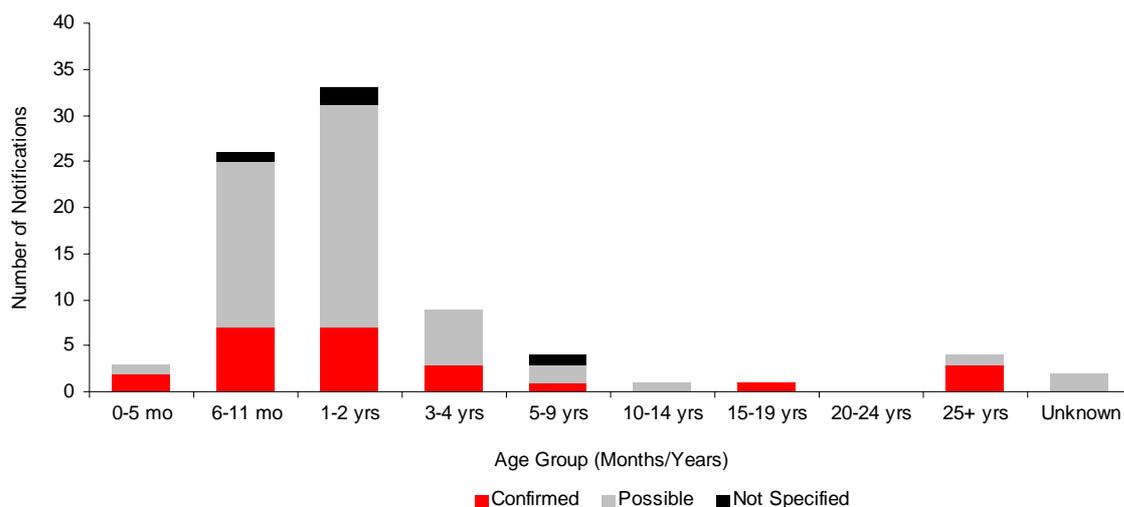


Figure 3. Number of measles notifications in 2006 by age group and case classification

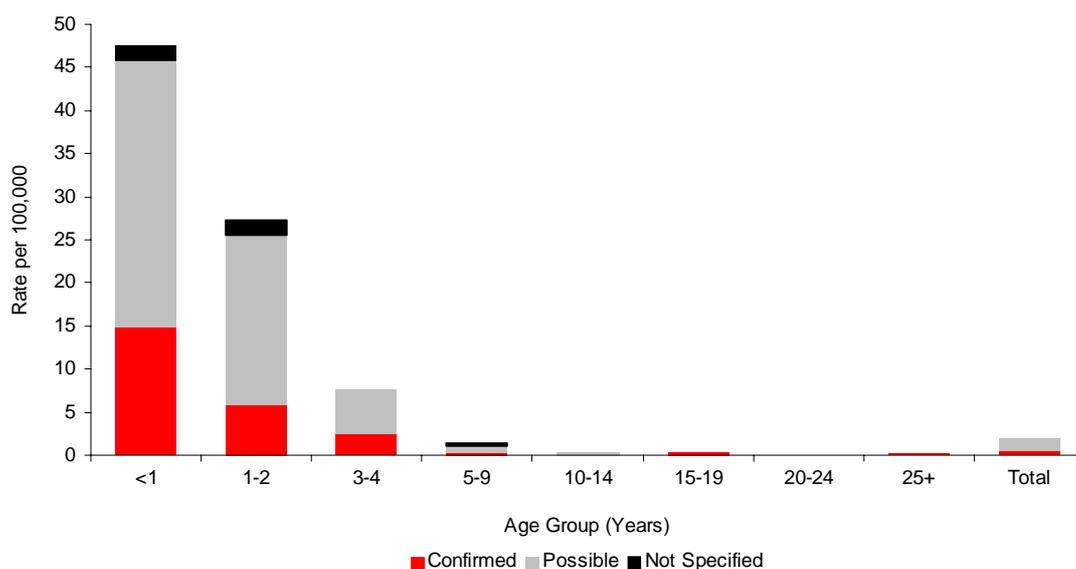


Figure 4. Age specific incidence rate of measles notifications per 100,000 population in 2006 by case classification

Laboratory data

Laboratory results were provided for only 39 (39/83, 47%) of the measles notifications. Twenty-four of these were positive for measles. Twelve tests were negative for measles (the specimen date was not reported for one of these cases) while the results for two cases were inconclusive. For an additional case the laboratory result was negative, however, this may be a false negative result as the serum specimen was taken one day following onset (specimens collected within 72 hours following the appearance of the rash may lead to false negative results). All cases (n=15) that were reported as negative or inconclusive were classified as possible measles cases.

As measles vaccine induces a positive measles IgM response a positive IgM test cannot be used to confirm the diagnosis of measles in individuals who received measles vaccine six to 45 days before rash onset. Of the 24 laboratory positive measles notifications one had received one dose of MMR four months prior to onset, eight were unvaccinated and vaccination status was unknown/unreported for 15.

Vaccination data

Vaccination status was reported for 44 (53%) of the 83 notifications (figure 5). Twenty-nine cases (29/44, 66%) were unvaccinated (figure 5). Four (n=4/29, 14%) of those unvaccinated were between 22 months and eight years of age and therefore were not age appropriately vaccinated (figure 6), assuming there were no contraindications to vaccination.

Eight cases (8/44, 18%) were vaccinated with MMR₁ only (figure 5). One of these cases was aged 14 years and therefore was not age appropriately vaccinated (figure 6). All eight cases vaccinated with MMR₁ were vaccinated greater than one month prior to onset. An additional three cases received at least one dose of MMR (figure 5); these cases were aged between 15 months and three years. The MMR₁ vaccination dates were reported for two of these notifications; both were vaccinated greater than two months prior to onset.

Four cases received MMR₂ (figure 5). The dates of vaccination were only reported for two of these cases; both cases were vaccinated greater than three months prior to onset. None of these cases were reported as laboratory confirmed; therefore, none of these four cases are known to be, or can be, classified as vaccine failures based on the data provided.

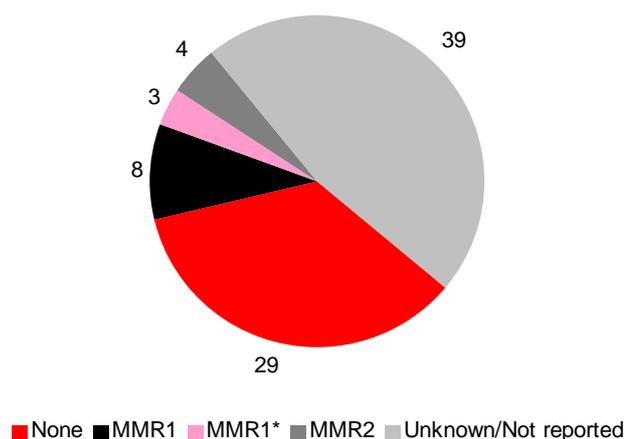


Figure 5. Vaccination status of measles notifications in 2006 (n=83) (MMR₁*= at least one dose of MMR₁, may have had two doses)

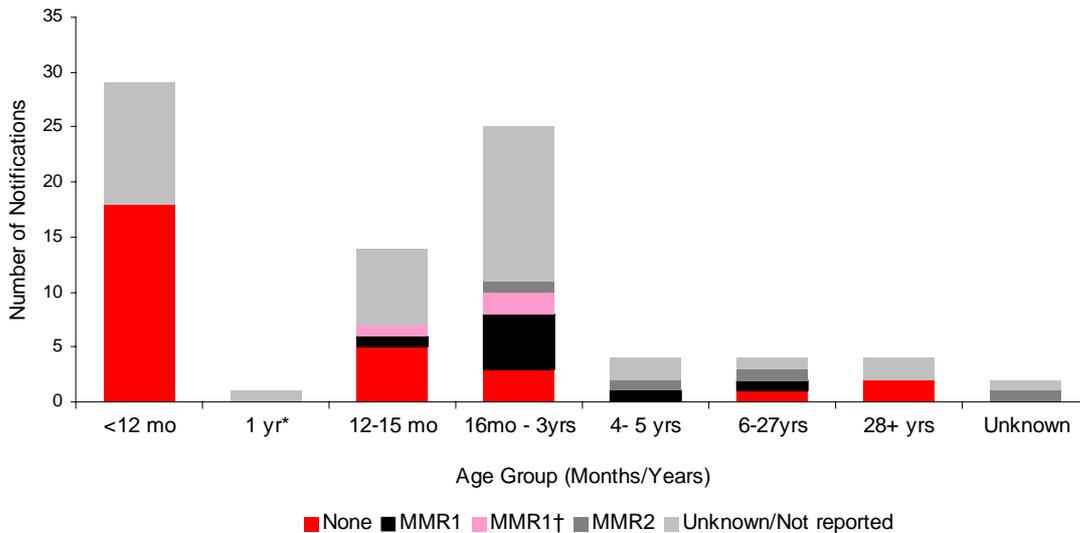


Figure 6. Number of measles notifications ($n=83$) in 2006 by age group and vaccination status. Please note vaccination with MMR_1 is currently recommended at 12-15 months of age and MMR_2 at 4-5 years of age. (*Age reported as one year but age in months or date of birth not reported; $MMR_{1†}$ = at least one dose of MMR_1 , may have had two)

Hospitalisation data & complications of measles

Information on hospitalisation status was available for 37 cases (37/83, 45%). Four cases were hospitalised representing 11% ($n=4/37$) of all cases with known hospitalisation status. The length of hospital stay was only reported for two notifications, with the length of stay ranging from four to five days. The hospitalised cases ranged in age from one to four years. Laboratory results were reported for three of the hospitalised cases, all three were laboratory confirmed.

Of the four hospitalised cases two were unvaccinated (both were aged less than 16 months), one had received one dose of MMR (case was 20 months of age) while the vaccination status was unknown/not reported for one case (case was four years of age).

Information on measles associated complications was reported for 15 (15/83, 18%) notifications. One case, aged three years, was reported to have pneumonia.

Analysis of confirmed cases

There were 24 laboratory confirmed measles notifications in 2006. These cases ranged in age from 5 months to 55 years; the number of confirmed cases by age group is presented in figure 7. Of the 24 laboratory confirmed cases, 10 were male, 13 were female, while sex was not reported for one notification.

Vaccination status was reported for nine (38%) of the 24 confirmed measles notifications (figure 7). Eight were unvaccinated; of these, seven were aged less than 16 months while one case was born prior to the introduction of the measles vaccine in Ireland. One case had received one dose of MMR; this case was aged less than six years (figure 7).

Hospitalisation status was reported for eight of the confirmed cases, three of these were hospitalised. The three hospitalised cases were aged between one and four years. One was unvaccinated, one had received one dose of MMR while the vaccination status was not reported for the third case. Information on complications were reported for three of the 24 confirmed cases, none of the three were reported to have complications.

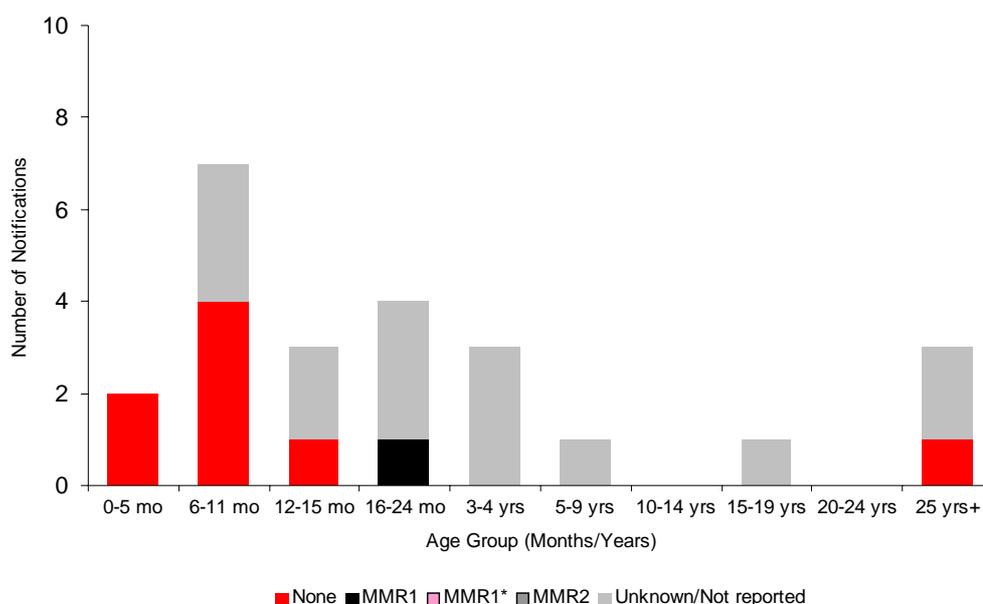


Figure 7. Number of confirmed measles notifications (n=24) in 2006 by age group and vaccination status

Discussion

The WHO has targeted 2010 for eliminating measles and reducing the incidence of congenital rubella infection to less than one case of congenital rubella syndrome per 100,000 live births in the WHO European Region. In order to achieve measles elimination in Ireland it is essential that measles surveillance in Ireland is resourced and strengthened, to ensure all suspected measles cases are notified, laboratory testing on all suspect cases and enhanced surveillance on all laboratory confirmed cases. Measles surveillance is required to detect cases and to understand the reasons for the occurrence of the disease so appropriate and timely control measures can be implemented. Surveillance also detects trends and risk factors thereby guiding and monitoring the effectiveness of control and elimination efforts.

The incompleteness of measles surveillance data in Ireland continues to be a major limitation. In 2006, 53% (n=44) of notified cases either had no specimen sent for laboratory testing or had no laboratory results reported. Sixty-three percent (n=15/24) of confirmed cases in 2006 had no vaccination data reported. As measles surveillance and data quality are improved so to will the ability to control and prevent measles cases thereby aiding elimination of measles in Ireland.

In order to eliminate measles in Ireland it is essential to improve the uptake of MMR. Since the national collation of cohort based immunisation uptake data commenced in Ireland in 1999, MMR₁ uptake in those 24 months of age has never reached the WHO target of 95% required to prevent the spread of measles. In 2006, uptake of MMR₁ in those 24 months of age was 86%. While the uptake of MMR remains below the target of 95% measles cases and measles outbreaks will continue to occur. National uptake of MMR₂ at four to five years of age is unknown and not routinely measured. Ireland needs to have systems in place to measure MMR₂ so that immunisation performance can be measured and appropriate action taken.

In order to achieve measles and rubella elimination in Ireland the Department of Health and Children (DoHC) established the National Measles and Rubella Elimination Committee to advise the Department, and the HSE, on a recommended national action plan for the elimination of these diseases in line with Ireland's commitments as a WHO member state. During 2007 this committee submitted its recommendations to the DoHC, these recommendations include strategies for improving MMR uptake and surveillance of measles and rubella in Ireland. It is expected that these recommendations will be implemented in 2008.

References

1. Case Definitions for Notifiable Diseases. Infectious Diseases (Amendment No. 3) Regulations 2003 (SI No. 707 of 2003). Available at <http://www.hpsc.ie>