

Measles, 2003

Key Points

- **There was increased measles activity in 2003**
- **The crude incidence rate of measles per 100,000 population in 2003 was 14.6 compared to 6.2 in 2002**
- **Ireland has a high measles incidence rate compared to many other developed countries**
- **Ireland needs to develop and implement a measles elimination plan to meet the WHO target of 2010 as the year for achieving measles elimination in the WHO European Region**

Introduction

Measles is an acute viral infectious disease. The onset of illness is characterised by high fever, cough, coryza (runny nose) and conjunctivitis. Approximately two to four days after onset of illness a rash appears and usually lasts four to seven days. Complications of measles can occur and include pneumonia, otitis media and encephalitis. Measles results in death in approximately one to two cases per 1000 population. In Ireland three measles deaths were reported during 2000. Two of these deaths were as a result of pneumonia complicating measles and one was due to post-measles encephalitis.

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

Measles is a notifiable disease in Ireland and since 2000 is notified weekly to NDSC. During 2003 measles notifications more than doubled compared to annual figures for 2001 and 2002.

Materials and methods

Measles data, obtained through the weekly infectious disease

Table 1. Numbers of measles notifications and crude incidence rates (CIR) per 100,000 population by health board in 2002 and 2003

Health board	2002		2003	
	Number	CIR	Number	CIR
ERHA	105	7.5	363	25.9
MHB	18	8.0	123	54.6
MWHB	10	2.9	24	7.1
NEHB	41	11.9	15	4.3
NWHB	1	0.5	1	0.5
SEHB	14	3.3	6	1.4
SHB	18	3.1	5	0.9
WHB	36	9.5	35	9.2
Total	243	6.2	572	14.6

Table 2. Number of measles notifications and rate per 100,000 population by age group in 2002 and 2003

Age group (years)	2002		2003	
	Number	Rate	Number	Rate
<1	67	123.0	109	200.0
1-2	85	76.1	207	185.3
3-4	27	24.2	61	54.7
5-9	30	11.4	107	40.5
10-14	21	7.4	60	21.0
15-19	5	1.6	6	1.9
20-24	4	1.2	13	4.0
25+	3	0.1	0	0.0
Unknown	1	-	9	-
Total	243	6.2	572	14.6

notification system, for 2003 are presented in this report. A dataset, including identification number, date of birth, age, sex, date of onset, date of notification/week of notification, Community Care Area and county, is routinely collected through the weekly notification system for each case. In addition, for a number of measles cases in 2003, enhanced details such as information on vaccination status, laboratory results and hospitalisation status were reported.

Analysis of measles data was carried out using Microsoft Access and Excel. Incidence rates were calculated based on population data taken from the 2002 census.

Results

Incidence

A total of 572 measles cases were notified during 2003 in Ireland, giving a crude incidence rate of 14.6 per 100,000 population. This rate is more than double the crude incidence rate of 6.2 per 100,000 population in 2002. The breakdown of measles cases by health board and the crude incidence rates by health board during 2002 and 2003 are presented in table 1. In 2003, the highest numbers of cases were notified in the ERHA (n=363, 63%) and the MHB (n=123, 22%) followed by the WHB (n=35, 6%). Compared to 2002 there was a 6.8 fold increase in measles notifications in the MHB and a 3.5 fold increase in notifications in the ERHA. The highest crude incidence rate in 2003 was in the MHB (54.6/100,000) followed by the ERHA (25.9/100,000) and the WHB (9.2/100,000).

Sex and age distribution

A breakdown of measles cases by age group and the age specific incidence rates of measles cases per 100,000 population in 2002 and 2003 are presented in table 2. Measles cases were reported in both children and adults in 2003. The highest number of cases (n=207, 36%) in 2003 was in the age group 1-2 years while the highest incidence rates were in the age groups <1 year (200.0/100,000) and 1-2 years (185.3/100,000). Compared to 2002, the largest increase was seen in the age group five to nine years. Of the 572 measles notifications, 283 were male, 282 were female while sex was not reported for seven cases.

Seasonality

Measles cases by week of notification are shown in figure 1. An increase in measles notifications commenced in late November 2002 (Week 48 2002) peaking in the last week of January 2003 (Week 5 2003) with 45 cases reported nationally. It was late July (Week 31 2003) before weekly measles notifications had dropped to five cases or fewer for two consecutive weeks. From late November to late July (Weeks 48 2002-31 2003) 563 measles cases were notified. The majority of these cases were notified in the ERHA (n=355, 63%) and MHB (n=127, 23%) followed by the WHB (n=34, 6%).

Laboratory data

Laboratory results were provided to NDSC for 114 (114/572, 20%) measles notifications. Of these 114 cases, 111 were reported as laboratory positive while three were negative for measles. In addition, 69 (69/572, 12%) measles notifications



Figure 1. Number of measles cases notified by week, month and year

had specimens sent for laboratory testing but the results were not reported to NDSC.

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 111 laboratory positive measles cases reported 29 had received at least one dose of vaccine (table 3). The date of vaccination in relation to onset of disease was not provided for 21 of these cases. Of the remaining eight cases, six were vaccinated (MMR₁) six years or greater prior to onset while two were vaccinated just preceding onset (indicating that these two cases were already incubating measles at the time of vaccination).

Saliva specimens for laboratory testing should be taken between one and five weeks following the appearance of the rash. Of the three laboratory negative measles cases, two had saliva specimens sent for laboratory testing. One of these negative saliva specimens was taken on the day of rash onset and, therefore, may be a false negative result. For the second negative saliva specimen the specimen was taken at an appropriate time (nearly one month after onset of rash).

Vaccination data

Of the 300 cases where vaccination status was known, 61% (182/300) were unvaccinated; 82% (149/182) of those unvaccinated were aged greater than or equal to one year and therefore, were potentially eligible for vaccination with MMR₁ (assuming there were no contraindications to vaccination).

Fifteen percent (45/300) of cases were vaccinated with MMR₁

only. Fifty-eight percent (26/45) of these cases were aged greater than five years and therefore were not age appropriately vaccinated. Sixteen of the cases vaccinated with MMR₁ were known to have received the vaccine less than 18 days prior to onset suggesting the possibility they were already incubating measles at the time of vaccination. For six cases the date of vaccination in relation to disease onset was not reported. An additional 66 cases were known to have received at least one dose of MMR, however, cases may have received two doses.

Seven cases received MMR₂, however, it is important to note that none of these cases were reported as laboratory confirmed (table 3). Of the seven cases who received MMR₂, five received MMR₂ less than or equal to 14 days prior to onset of illness while the vaccination date was not reported for one case. Therefore, none of these seven cases are known to be or can be classified as vaccine failures based on the data provided.

Hospitalisation data and complications of measles

Information on hospitalisation status was available for 120 notifications (120/572, 21%). Twelve cases were hospitalised representing 10% (12/120) of all cases with known hospitalisation status (table 4). The hospitalised cases were aged between 10 months and 22 years (mean age, 8 years; median age, 4 years). Seven of the hospitalised cases were unvaccinated, six of these were aged greater than 12 months and, therefore, were potentially eligible for vaccination. Three had received MMR₁ only (2 of these received MMR₁ less than 18 days prior to onset of illness), one of these was aged greater than five years and therefore was not age

Table 3. Laboratory result and vaccination status of measles notifications in Ireland during 2003

Vaccination status	Laboratory Result			Total
	Positive	Negative	Not tested/unknown	
MMR ^{1*}	29†	0	82	111‡
MMR ^{2§}	0	1	6	7§
Nil	54	0	128	182
Not Reported	28	2	242	272
Total	111	3	458	572

*66 cases known to have at least one dose of MMR, cases may have received two doses

†21 cases date of vaccination in relation to disease onset not provided, 2 cases vaccinated just preceding onset

‡68 cases date of vaccination in relation to disease onset not provided, 19 cases were known to be vaccinated < 18 days prior to onset

§5 cases known to be vaccinated ≤ 14 days prior to onset, 1 case vaccination date not provided

|| 1 possible false negative as saliva specimen taken on day of rash onset

Table 4. Number of measles cases notified in Ireland by age group and hospitalisation status during 2003

Age group (years)	Hospitalisation status			Total
	Hospitalised	Not hospitalised	Not reported	
<1	1	14	94	109
1-2	5	27	175	207
3-4	0	13	48	61
5-9	3	30	74	107
10-14	0	22	38	60
15-19	0	1	5	6
20-24	3	1	9	13
25+	0	0	0	0
Unknown	0	0	9	9
Total	12	108	452	572

appropriately vaccinated. Vaccination status was not provided for two cases. Laboratory results were reported to NDSC for seven of the hospitalised cases, all seven cases were laboratory confirmed.

Information on measles complications was reported for 10% (57/572) of cases. Six cases were reported to have a lower respiratory tract infection while ear infection was reported as a complication for two cases. No deaths were reported among the 572 measles notifications.

Discussion

In Ireland, despite the dramatic reduction in measles cases following the introduction of a measles vaccine in 1985 and MMR in 1988, measles continues to be a problem with recurrent outbreaks. Measles outbreaks occurred in 1993 and 2000 with 4328 and 1603 cases notified, respectively. Measles activity increased again in 2003 with a total of 572 measles cases notified, representing an increase of 135% compared to 2002. Since the national collation of cohort based immunisation uptake data commenced in Ireland in Quarter 1 1999, MMR₁ uptake at 24 months has never reached the WHO target of 95%.¹ While the uptake of MMR remains below the target of 95% required to prevent the spread of measles outbreaks will continue to occur.

Ireland has a high incidence of measles compared to a number of other European countries. In 2002, the incidence of measles in Ireland ranked us seventh highest among 42 regions reporting to WHO Europe.² The incidence of measles in Ireland increased in 2003 compared to 2002. In Quarter 1 2003 the incidence of measles in Ireland was the highest

compared to 40 regions reporting to WHO Europe.³

Many countries, including Australia, USA and some European countries, have implemented measles control strategies with the aim of eliminating measles. The plan to eliminate measles in Australia began in 1998 with the Measles Control Campaign. In Australia, 31 confirmed measles cases were reported during 2002 giving an incidence rate of 0.2 cases per 100,000 population, the lowest annual rate for Australia since national surveillance began in 1991.⁴ In the USA measles cases have declined since 1993, following elimination efforts, with a record low of 44 confirmed measles cases in 2002.⁵ Finland has succeeded in eliminating measles while other European countries have reported incidence rates of less than 0.1/100,000 indicating they are nearing elimination.^{6,7}

The WHO has targeted 2010 for measles elimination in the WHO European Region. In order to interrupt indigenous measles transmission by 2010 and achieve measles elimination Ireland needs to establish a national plan for elimination with particular emphasis on improving MMR uptake rates. Strengthening of measles surveillance in Ireland is also important, as surveillance is a critical component in the control and elimination of measles. Measles surveillance is required to detect cases and to understand the reasons for the occurrence of the disease so that 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. One of the limitations of measles surveillance data provided to NDSC in 2003 was despite receiving enhanced data on a number of cases this data was often incomplete. For example, for a

number of cases, where vaccination status was provided, the date of vaccination in relation to disease onset was not reported making interpretation of the vaccination data difficult. Incomplete surveillance data poses problems during analysis and interpretation. As measles surveillance and data quality are improved so to will the ability to control and prevent measles cases thereby aiding elimination.

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