



Feidhmeannacht na Seirbhíse Sláinte  
Health Service Executive



# 2006

## EPIDEMIOLOGY OF MUMPS IN IRELAND



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### **Further information:**

For further information on mumps in Ireland, please see:  
<http://www.ndsc.ie/hpsc/A-Z/VaccinePreventable/Mumps/>

For details on the surveillance and epidemiology of mumps in the European Union, please see <http://www.euvac.net/>

## Summary

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There were 426 mumps notifications in 2006 giving a crude incidence rate of 10.0 per 100,000 total population.

The number of mumps notifications declined markedly in 2006 compared to 2005 when 1,080 (25.5/100,000) mumps cases were notified.

Of the 426 mumps notifications in 2006 49% (n=209) were classified as confirmed, 11% (n=45) as probable and 38% (n=161) as possible. Case classification was not provided for 3% (n=11) of notifications.

Over half of the notifications (n=236) were born prior to 1988 (aged greater than 17 years) when mumps vaccine was first introduced into Ireland. Forty percent (n=171) of notifications were born between 1984 and 1991 (aged approximately 14 to 22 years).

Of the 426 mumps notifications 61% (n=258) were male and 39% (n=168) were female.

## Introduction

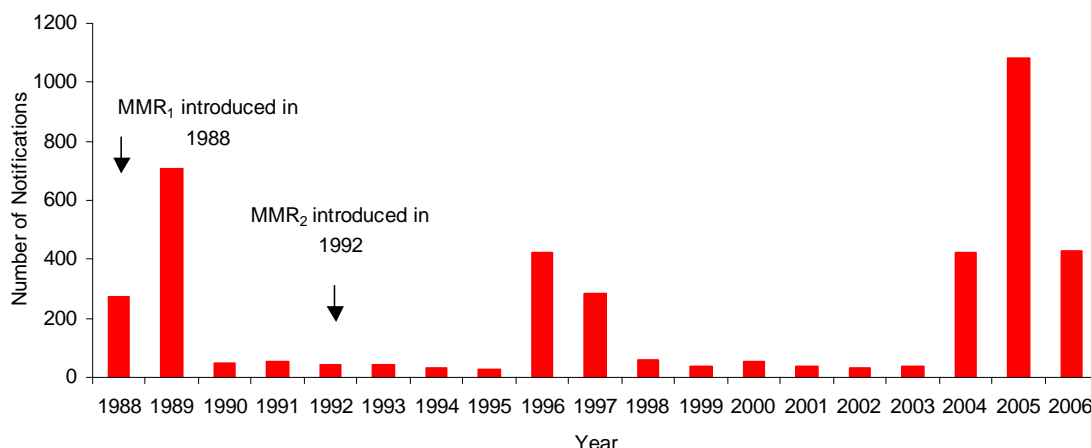
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Mumps is an acute viral infectious disease characterised by fever and swelling of one or more salivary glands, most commonly the parotid gland. Mumps infection can present with other symptoms such as meningitis or pancreatitis. Mumps infection after puberty may also cause inflammation of the ovaries, testicles or breast tissue. More serious problems include encephalitis and deafness, but these are rare.

Mumps virus is spread from person to person through airborne transmission, by droplet spread, such as from coughs and sneezes, and through kissing or other direct contact with saliva of an infected person.

Mumps infection can be prevented by vaccination. Mumps vaccine in Ireland is available as part of the combined measles-mumps-rubella (MMR) vaccine. Vaccination with the first dose of MMR is recommended at twelve to fifteen months and the second dose at four to five years. Mumps vaccine was first offered in Ireland in 1988, with the introduction of the MMR vaccine. In 1992, a second dose of MMR was recommended for children aged 10 to 14 years. As a result of mumps outbreaks in 1996/1997, that predominantly affected primary school children, the age of the second dose was lowered to four to five years.

In Ireland, mumps became a notifiable disease in 1988. Between 1988 and 2003, only clinicians were required to notify mumps cases. Since January 2004, laboratories are also required to notify cases identified.<sup>1</sup> Between 1988 and 2003 two mumps outbreaks occurred, the first in 1989 with 709 notifications, and the second during 1996/1997 with 707 notifications (figure 1). The number of mumps cases notified during the inter-epidemic period was low, with approximately 40 cases notified annually.



**Figure 1.** Number of mumps notifications by year and year of introduction of MMR vaccine in Ireland

A mumps outbreak started in November 2004 and continued into 2005 with 422 cases notified in 2004 and 1,080 cases in 2005. The outbreak was predominantly in those born before 1988, particularly those born between 1983 and 1986, who were not scheduled to receive two MMR doses during childhood as MMR was first introduced in 1988.<sup>2</sup> An outbreak control team was convened in November 2004 and control measures implemented. As outbreaks were reported in a number of third level colleges all new entrants, in autumn 2005, were recommended MMR vaccine (if not previously vaccinated with two doses).

## Case Definitions

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

### Clinical description

Clinical picture compatible with mumps, i.e. acute onset of unilateral or bilateral tender, self-limiting swelling of the parotid or other salivary gland, lasting >2 days, and without other apparent cause.

### Laboratory criteria for diagnosis

One of the following:

- Detection of mumps IgM antibody
- Demonstration of specific mumps antibody response in absence of recent vaccination
- Isolation of mumps virus (not vaccine strains) from clinical specimen
- Detection of mumps nucleic acid

### Case classification

Possible: A case that meets the clinical case definition

Probable: A case that meets the clinical case definition and is epidemiologically linked\* to a confirmed case

Confirmed: A case that is laboratory confirmed.

\*A “case with an epidemiological link” is a case that has either been exposed to a confirmed case, or has had the same exposure as a confirmed case.

## Materials and Methods

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During 2006, for HSE Areas using the Computerised Infectious Disease Reporting (CIDR) system, mumps notifications were inputted directly on CIDR at regional level. HPSC can view the majority of this data using 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 staff. The majority of figures presented in this summary are based on data extracted from the CIDR system on 22nd August 2007. These figures may differ from those published previously due to ongoing updating of notification data on CIDR. Laboratory data, data on complications, hospitalisation and vaccination and where the case most likely acquired mumps were taken from both CIDR and the Microsoft Access enhanced mumps database at HPSC.

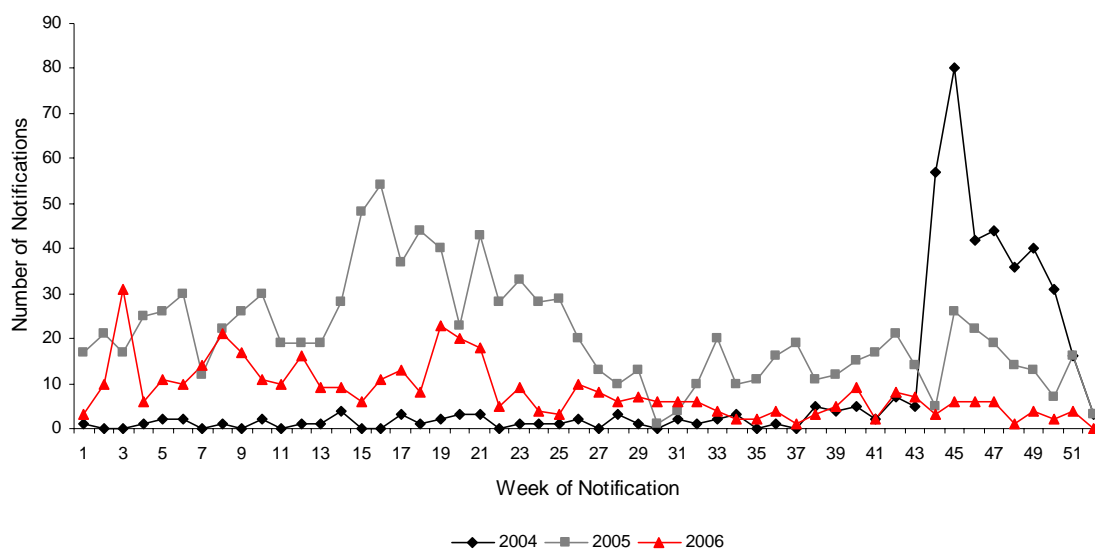
Analysis of mumps data was carried out using Business Objects and Microsoft Excel. Incidence rates for 2004 to 2006 were calculated based on population data taken from the 2006 census while incidence rates for 2003 were calculated based on population data taken from the 2002 census.



## Results

### **Incidence**

A national mumps outbreak that began in Ireland in November 2004 and continued throughout 2005 waned in the later half of 2006 (figure 2). There were a total of 426 (10.0/100,000) mumps notifications during 2006 with an average of approximately five notifications each week from June to December 2006. In comparison, there were 422 (10.0/100,000) mumps notifications during 2004 and 1,080 (25.5/100,000) in 2005 with an average of 23 mumps notifications each week from early November 2004 to the end of 2005. However, the number of notifications in 2006 was still a ten-fold increase compared to 2003 when there were a total of 40 (1.0/100,000) mumps notifications (figure 1).



**Figure 2.** Number of mumps notifications by week and year, 2004-2006

All HSE Areas reported fewer cases in 2006 compared to 2005 but more cases compared to 2003 (table 1). In 2006, the highest number of notifications was in the HSE-Eastern Area (n=158, 37%) followed by the HSE-Western Area (n=67, 16%). The highest crude incidence rates were in the HSE-North Western and Western Areas during 2006 (table 1).

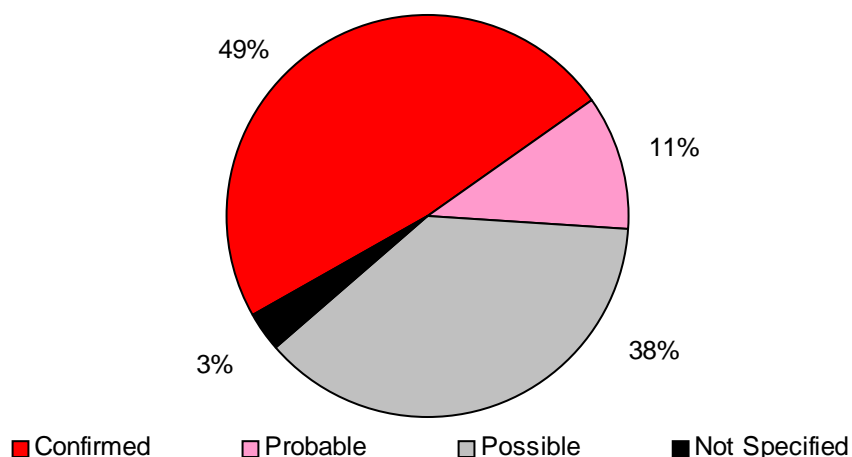
**Table 1.** Number of mumps notifications and crude incidence rate per 100,000 population (CIR) by HSE Area and year from 2003-2006

HSE Area	2003		2004		2005		2006	
	Number	CIR	Number	CIR	Number	CIR	Number	CIR
HSE-Eastern	20	1.4	96	6.4	225	15.0	158	10.5
HSE-Midland	4	1.8	108	42.9	55	21.9	26	10.3
HSE-Mid-Western	1	0.3	14	3.9	104	28.8	25	6.9
HSE-North Eastern	4	1.2	13	3.3	82	20.8	48	12.2
HSE-North Western	0	0.0	111	46.8	171	72.1	52	21.9
HSE-South Eastern	4	0.9	9	2.0	29	6.3	20	4.3
HSE-Southern	5	0.9	16	2.6	125	20.1	30	4.8
HSE-Western	2	0.5	55	13.3	289	69.8	67	16.2
<b>Total</b>	<b>40</b>	<b>1.0</b>	<b>422</b>	<b>10.0</b>	<b>1080</b>	<b>25.5</b>	<b>426</b>	<b>10.0</b>

Five localised outbreaks of mumps were notified during 2006. All five were notified during January to March of 2006. The outbreak location was reported as a school for two outbreaks (with five and nine cases reported ill in each outbreak), a community (with 15 ill), a private house (with two ill) and a workplace (with two ill).

### **Case Classification**

In 2006, of the 426 mumps notifications 209 (49%) were classified as confirmed, 45 (11%) as probable and 161 (38%) as possible (figure 3). Case classification was not provided for 11 (3%) notifications.



**Figure 3.** Case classification of mumps notifications in 2006 (n=426)

### **Age and sex distribution**

In 2006, the cases ranged in age from less than one year to 77 years (mean age 21 years, median age 19 years); age was not reported for two notifications. A breakdown of mumps notifications by age group and the age specific incidence rates per 100,000 population from 2003 to 2006 are presented in table 2. In 2006 there were fewer cases in all age groups less than 55 years of age compared to 2005 but more cases in all age groups compared to 2003 (table 2). The majority (73%, n=311/426) of cases in 2006 were aged between 10 and 34 years (table 2) with 41% (n=175/426) aged between 14 and 21 years.

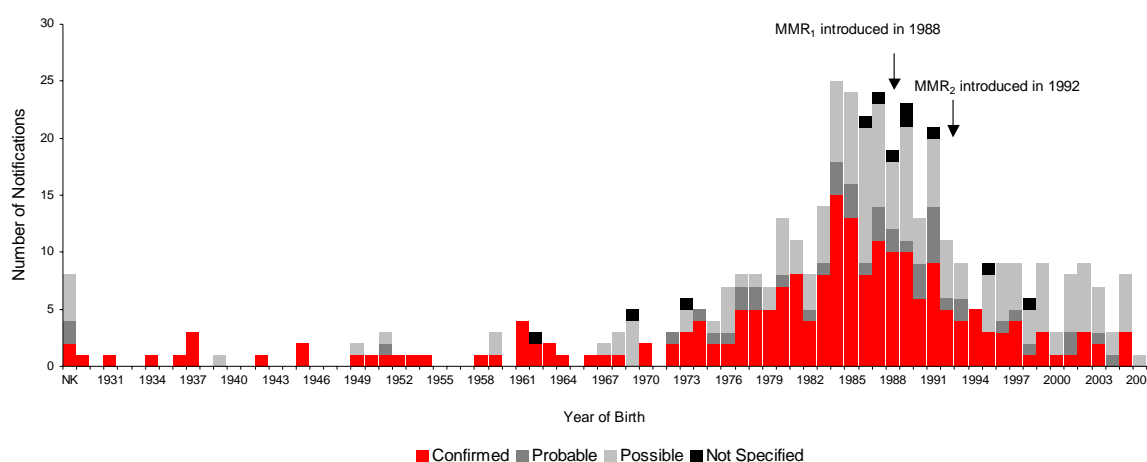
Mumps notifications in 2006 by year of birth and case classification are shown in figure 4. Over half of the notifications (55%, n=236/426) were born prior to 1988 (aged greater than 17 years) when mumps vaccine was first introduced into Ireland. Forty percent of cases (n=171/426) were born between 1984 and 1991 (aged approximately 14-22 years) with half (50%, n=82/171) of these laboratory confirmed. There were 24 (6%, n=24/426) mumps notifications in

2006 in those born before 1960 (aged  $\geq 46$  years), 18 (75%,  $n=18/24$ ) of these were laboratory confirmed.

Of the 426 mumps notifications 258 (61%) were male and 168 (39%) were female.

**Table 2.** Number of mumps notifications by age group and the age specific incidence rate per 100,000 population (ASIR) by year from 2003-2006

Age Group (Years)	2003		2004		2005		2006	
	Number	ASIR	Number	ASIR	Number	ASIR	Number	ASIR
0-4	11	4.0	23	7.6	49	16.2	33	10.9
5-9	8	3.0	8	2.8	86	29.8	33	11.4
10-14	3	1.1	24	8.8	108	39.4	58	21.2
15-19	6	1.9	115	39.6	323	111.3	99	34.1
20-24	3	0.9	129	37.7	300	87.6	90	26.3
25-34	4	0.6	45	6.2	135	18.7	64	8.9
35-44	1	0.2	17	2.7	32	5.1	20	3.2
45-54	1	0.2	7	1.3	22	4.2	11	2.1
55-64	0	0.0	4	1.0	8	2.0	8	2.0
65+	1	0.2	2	0.4	5	1.1	8	1.7
Unknown	2	-	48	-	12	-	2	-
<b>Total</b>	<b>40</b>	<b>1.0</b>	<b>422</b>	<b>10.0</b>	<b>1080</b>	<b>25.5</b>	<b>426</b>	<b>10.0</b>



**Figure 4.** Number of mumps notifications in 2006 by case classification, year of birth and year of introduction of MMR in Ireland ( $n=398$ , date of birth not reported for eight of the 426 notifications)

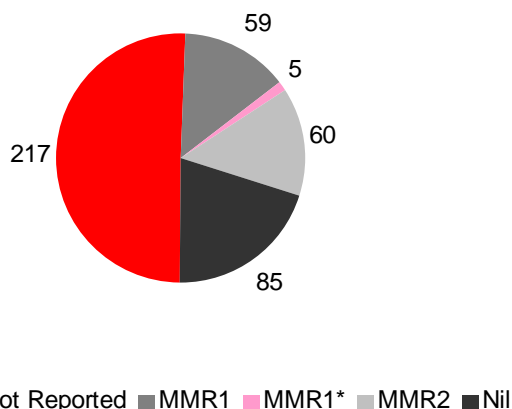
### **Laboratory data**

Laboratory results were provided for 242 (242/426, 57%) mumps notifications, 209 (n=209/242, 86%) of which were positive for mumps. The laboratory tests of four cases were inconclusive. For 29 cases the laboratory tests were negative for mumps, however, nine of these may be false negative results as the specimens were taken less than four days following onset (saliva specimens taken less than seven days following onset or serum specimens taken less than four days following onset may lead to false negative results). Ten of the cases that were laboratory negative for mumps had either no specimen date or no onset date reported. All cases that were reported as laboratory negative or inconclusive were classified as possible or probable mumps cases.

### **Vaccination data**

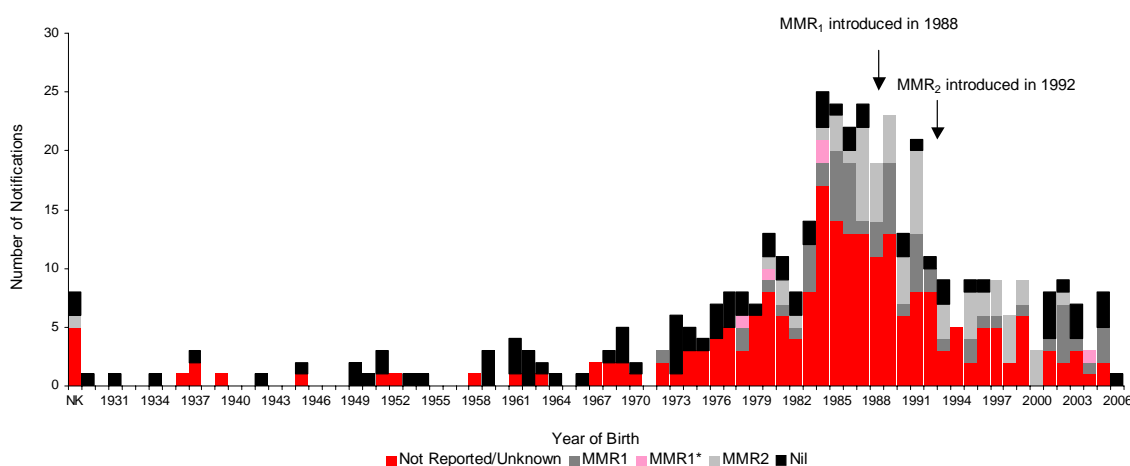
The number of mumps notifications by vaccination status is shown in figure 5. Vaccination status was only known/reported for 209 (49%) of the 426 notifications. Of the 209 mumps notifications 85 (41%) were unvaccinated, 59 (28%) had one dose of the measles-mumps-rubella vaccine (MMR<sub>1</sub>) and 60 (29%) were reported to have received two doses (MMR<sub>2</sub>). An additional five cases (2%) had at least one dose of MMR. Of the 60 cases reported to have received MMR<sub>2</sub> only 14 (n=14/60, 23%) were reported as laboratory confirmed.

For a large proportion of the cases the vaccination status was not confirmed, as the dates of vaccination or vaccination batch numbers were not reported. Of the cases reported to have received one dose of MMR (or at least one dose of MMR) 55% (n=35/64) had the MMR<sub>1</sub> vaccination date reported and only 25% (n=16/64) had the MMR batch number reported. Both vaccination dates were reported for 38% (n=23/60) of cases vaccinated with MMR<sub>2</sub> and only 12% (n=7/60) had both MMR batch numbers reported.



**Figure 5.** Vaccination status of mumps notifications in 2006 (n=426)  
(MMR<sub>1</sub>\*= reported as vaccinated but number of doses not reported)

The number of notifications by year of birth and vaccination status is shown in figure 6. As mentioned previously 40% (n=171/426) of notifications in 2006 were born between 1984 and 1991. Of these 19% (n=33/171) had MMR<sub>2</sub>, 19% (n=32/171) had MMR<sub>1</sub> (or at least MMR<sub>1</sub>), six percent (n=11/171) were unvaccinated while the vaccination status was unknown/not reported for 56% (n=95/171).



**Figure 6.** Number of mumps notifications in 2006 by year of birth and vaccination status (n=398, date of birth not reported for eight of the 426 notifications)  
(MMR<sub>1</sub>\*= reported as vaccinated but number of doses not reported)

### ***Hospitalisation data and complications of mumps***

Information on hospitalisation status was available for 218 notifications. Thirty-two cases were hospitalised, representing 15 percent of all cases with known hospitalisation status. Duration of hospital stay was reported for 18 of the hospitalised cases. The duration of hospital stay ranged from one to 13 days (mean 4 days, median 3 days).

Reported complications of mumps included orchitis (20%, n=18/91), meningitis (4%, n=6/149), mastitis (1.6%, n=2/127), oophoritis (1.6%, n=1/61), pancreatitis (0.8%, n=1/123) and deafness (0.7%, n=1/145). No cases of encephalitis due to mumps were reported (n=0/147).

### ***Where case most likely acquired mumps***

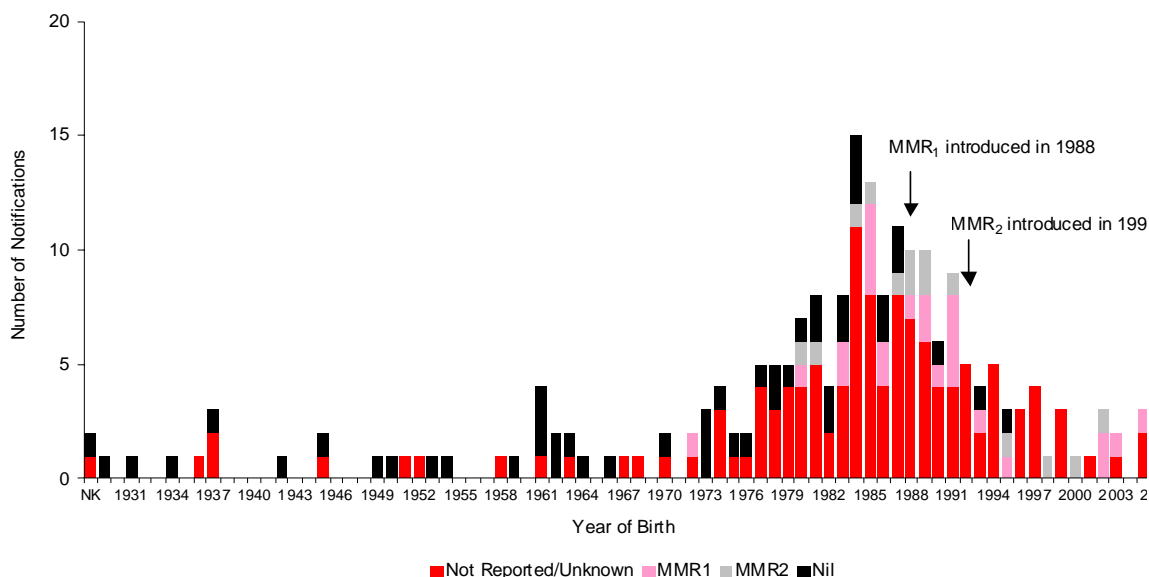
Where the case most likely acquired mumps was reported for 87 notifications; for 53% (n=46) secondary school or college/university was reported as the place the infection was most likely acquired.

### ***Analysis of confirmed cases***

There were 209 confirmed mumps notifications in 2006. The confirmed cases ranged in age from one to 77 years (age was not reported for one notification) with a mean age of 24 years and a median age of 21 years. The number of confirmed mumps notifications by age group and the age specific incidence rates per 100,000 population are presented in table 3. In 2006, the majority of cases (75%, n=156/209) were aged between 10 and 34 years with approximately 40% (n=80/209) aged between 14 and 21 years. Confirmed mumps notifications in 2006 by year of birth are shown in figure 7; 40% (n=82/209) of cases were born between 1984 and 1991 (aged 14-22 years). Of the 209 confirmed cases nearly two thirds were male (64%, n=134/209).

**Table 3.** Number of confirmed mumps notifications by age group and the age specific incidence rate per 100,000 population (ASIR) by year from 2004-2006

Age Group (Years)	2004		2005		2006	
	Number	ASIR	Number	ASIR	Number	ASIR
0-4	5	1.7	6	2.0	9	3.0
5-9	3	1.0	25	8.7	11	3.8
10-14	5	1.8	28	10.2	25	9.1
15-19	21	7.2	121	41.7	44	15.2
20-24	39	11.4	133	38.8	50	14.6
25-34	13	1.8	76	10.5	37	5.1
35-44	3	0.5	19	3.0	11	1.8
45-54	3	0.6	16	3.1	9	1.7
55-64	0	0.0	2	0.5	5	1.2
65+	0	0.0	3	0.6	7	1.5
Unknown	2	-	0	-	1	-
<b>Total</b>	<b>94</b>	<b>2.2</b>	<b>429</b>	<b>10.1</b>	<b>209</b>	<b>4.9</b>



**Figure 7.** Number of confirmed mumps notifications in 2006 by year of birth and vaccination status



Vaccination status was reported for 86 (41%) of the 209 confirmed measles notifications. Forty-eight (n=48/86, 56%) were unvaccinated; of these cases 44 (n=44/86, 51%) were born prior to the introduction of the MMR vaccine in Ireland in 1988 (figure 6).

Twenty-four cases (n=24/86, 28%) had received one dose of MMR; these cases ranged in age from one to 33 years. Ten (10/24, 23%) of these cases were born prior to 1988. Of the 24 cases that had received MMR<sub>1</sub> only 10 (42%) had the vaccination date and batch number reported. One of these was vaccinated only 16 days prior to onset suggesting the possibility they may have been incubating mumps at the time of vaccination.

Fourteen cases (n=14/86, 16%) were reported to have received MMR<sub>2</sub>; both vaccination dates and batch numbers were reported for only three of these cases.

Hospitalisation status was reported for 108 of the confirmed cases, 27 of these were hospitalised representing 25% of cases with known hospitalisation status. Reported complications of mumps included orchitis (28%, n=13/47), meningitis (7%, n=5/72), oophoritis (3.4%, n=1/29), mastitis (3.0%, n=2/60) and pancreatitis (1.7%, n=1/58). No cases of encephalitis (n=0/70) due to mumps or deafness (n=0/70) were reported.

Where the case most likely acquired mumps was reported for 42 notifications; for two thirds of these (n=28/42, 67%) secondary school or college/university was reported as the place the infection was most likely acquired.

## Discussion

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Mumps vaccination was first included in the childhood immunisation schedule in 1988, with the introduction of the MMR vaccine, the same year that mumps became a notifiable disease. In 1992, a second dose of MMR was recommended for both boys and girls aged 10-14 years. In 1999, the age of the second dose was lowered to four to five years. Since the national collation of quarterly MMR immunisation uptake statistics commenced in 1999 uptake of MMR<sub>1</sub> in those 24 months of age has ranged between 69% (Quarter 4 2001) and 86% (Quarters 1-4 2006), well below the target uptake of 95% required to prevent outbreaks of these diseases.

A national mumps outbreak commenced in Ireland in November 2004. There were 422 mumps cases notified in 2004 and 1080 in 2005 compared to 40 cases in 2003. The outbreak was predominantly among those born before 1988 (prior to the introduction of MMR in Ireland) and, in particular, in those born between 1983 and 1986; many of this group were in third level education and were associated with outbreaks in colleges and universities.<sup>2</sup> To prevent ongoing transmission of mumps virus and ensure high levels of immunity among college students all new entrants (less than 25 years of age) to third level colleges since 2005 were recommended vaccination with two doses of MMR prior to commencing the academic year. Uptake of MMR amongst this population is unknown.

In 2006, the number of mumps notifications (n=426) declined compared to 2005 (n=1,080). However, the number of notifications in 2006 is still a ten-fold increase compared to 2003. Half of the cases in 2006 were born prior to 1988 while 40% of cases were born between 1984 and 1991 (aged approximately 14 to 22 years).

Of the 209 confirmed mumps cases in 2006 vaccination status was reported for 86 notifications. Over half (n=48/86, 56%) of these were unvaccinated with half (n=44/86, 51%) of these cases born prior to 1988. Of the 209

confirmed mumps cases 24 cases had received one dose of MMR (10 of these were born prior to 1988) and 14 were reported to have received two doses. Of the 38 cases vaccinated with either one or two doses of MMR only 13 had complete vaccination dates and batch numbers reported.

Cases in vaccinated patients may be explained by the effectiveness of the mumps vaccine. In studies in the USA mumps vaccination was shown to be between 78% and 91% effective.<sup>3</sup> Another study suggested the effectiveness of one dose could be as low as 64% and 88% for two doses.<sup>4</sup>

The mumps outbreak during 2004-2006 may in part be attributed to an unvaccinated population who were too old to have been routinely scheduled for two doses of MMR during childhood, the incomplete effectiveness of the vaccine against mumps and low MMR vaccination coverage among birth cohorts that should have been vaccinated.

Since 2004 a number of other countries have also reported resurgence in mumps including Austria, Canada, Spain, the United States of America and the United Kingdom.<sup>5, 6,7,8,9</sup> A large proportion of these cases were also in older teenagers and young adults.

As mentioned previously a number of the mumps cases in Ireland were reported to have received one or two doses of MMR vaccine, however, for a large proportion of these cases the vaccination status was not confirmed as the vaccination dates and batch numbers etc. were not reported. This was often due to lack of immunisation records or difficulty accessing immunisation records. Accurate vaccination status is vital to determine the efficacy of the vaccine and to inform vaccination policy. This emphasises the importance, and need, for a national vaccination registry in Ireland. A national registry would also be useful so that uptake of MMR<sub>2</sub> in Ireland could be monitored at a national level. Currently, some of the regional systems cannot provide this data in a format required for analysis. A registry would have a positive impact

on maximising immunisation uptake in Ireland and the control of infectious diseases such as mumps.

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