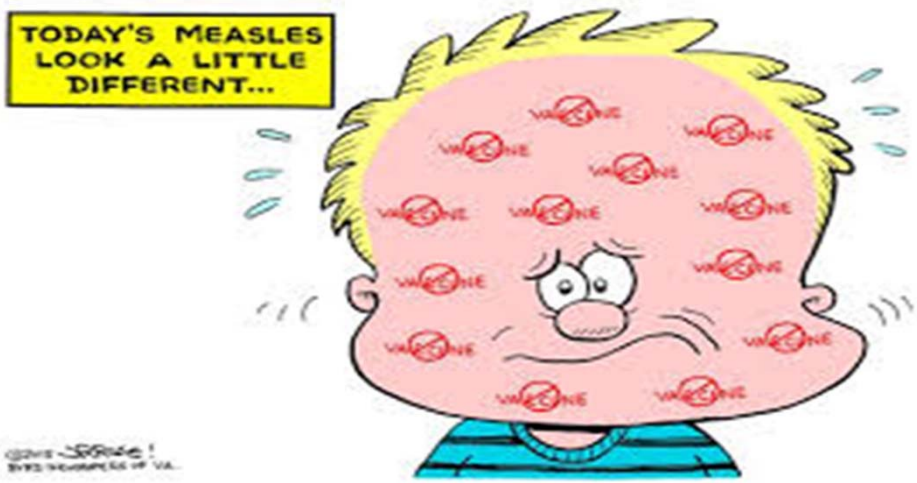
New challenges in control measles outbreaks (in Dublin *mostly*) in the era of measles elimination



Dr Mary Ward,
Specialist in Public Health Medicine,
Department of Public Health East

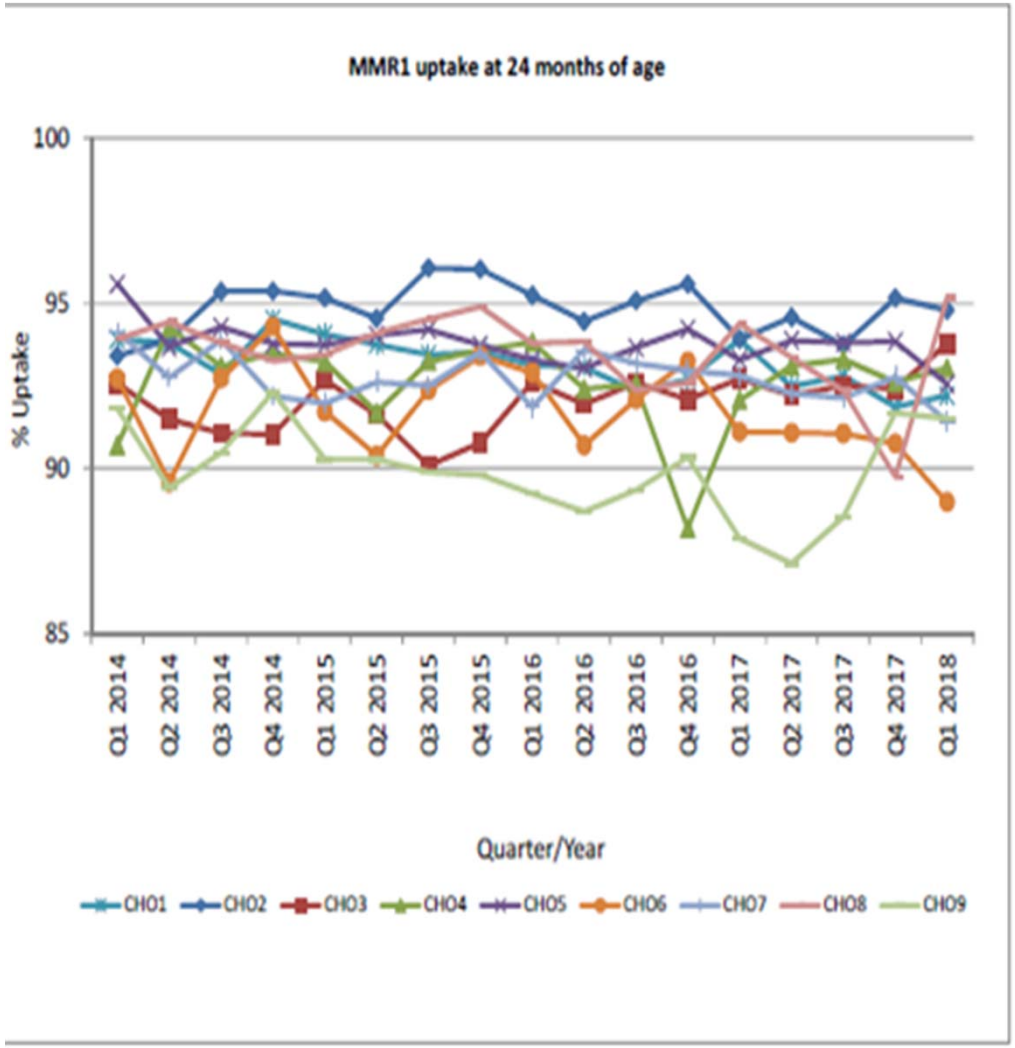
Presentation

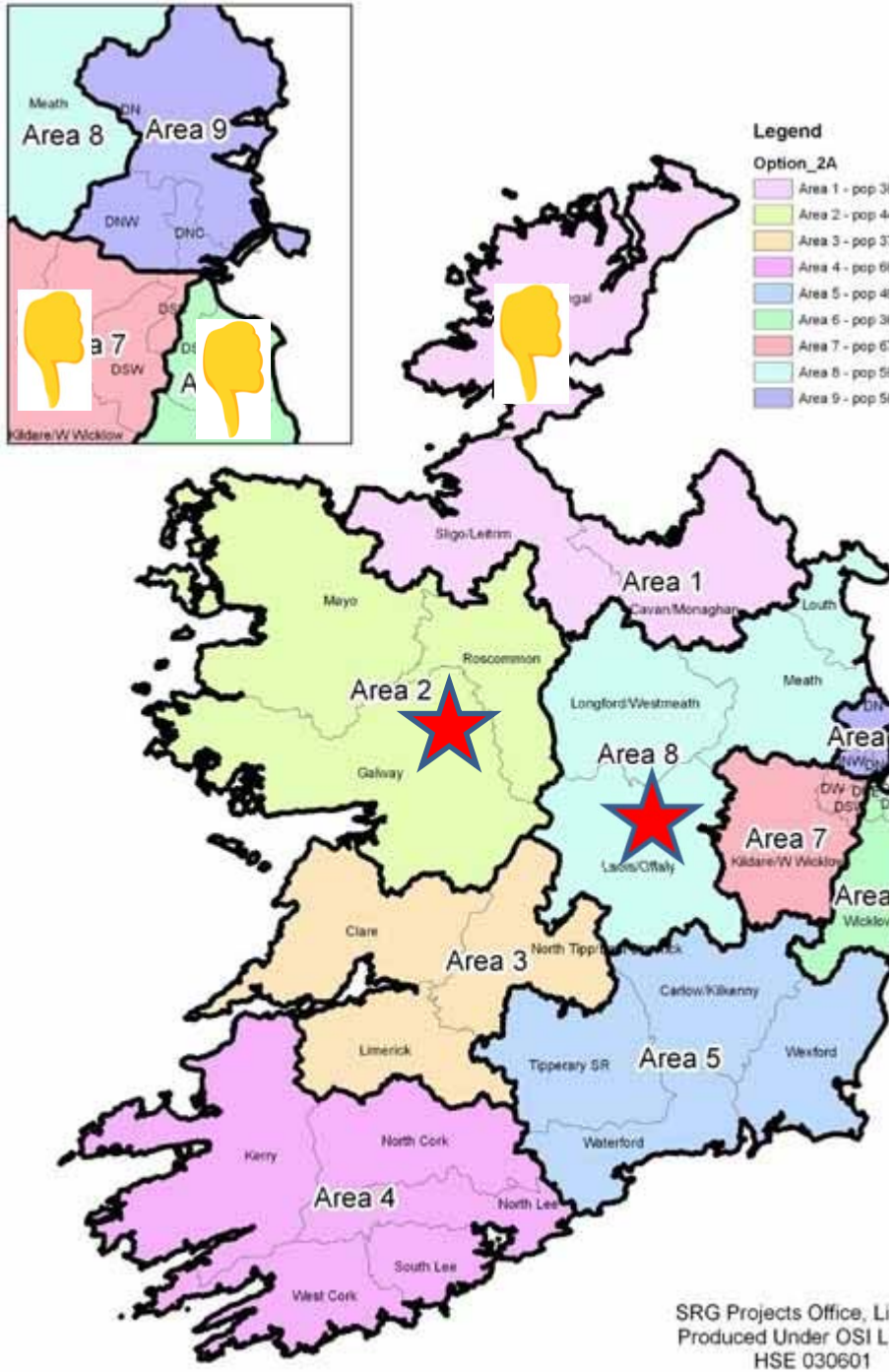
Measles outbreak 2000-2019.

Why are we seeing outbreaks

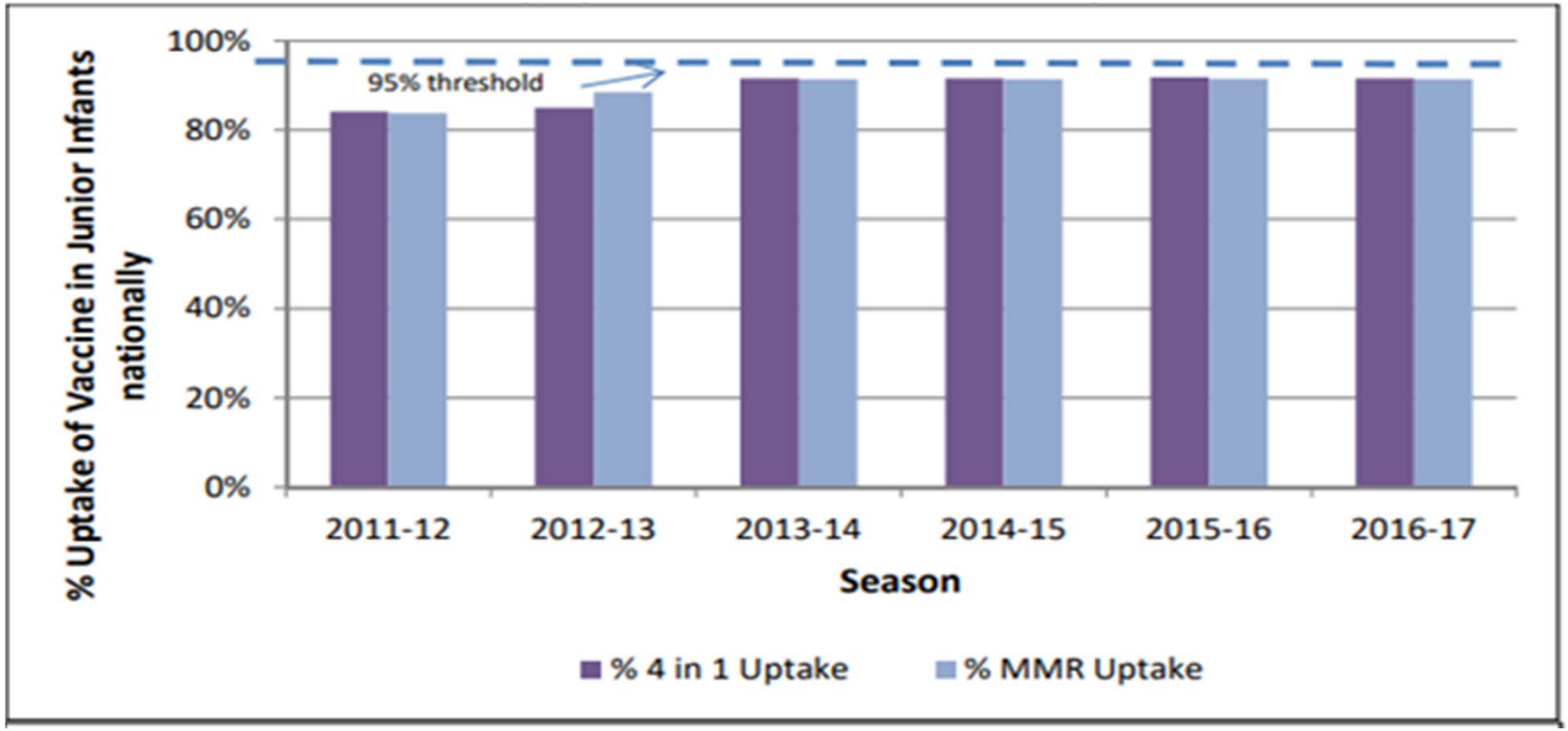
What we are doing and ?can we do better

MMR1 uptake by CHO at 24 months





Uptake of MMR2 (junior infants)



HPSC. Immunisation uptake statistics for junior infants.

Measles

- Highly infectious viral disease
- Symptoms : cough, coryca, conjunctivits, fever and rash (koplik's spots)
- 9 out of 10 susceptible persons with contact to an infective individual will develop measles
- Incubation period typically 10-12 days (range 7-21 days)
- Complications occur in 30%.

Measles is a serious disease

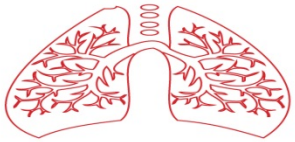
Measles is not a harmless childhood disease. It is a highly contagious viral disease that spreads easily among unvaccinated people. Symptoms usually appear 10 to 12 days after infection, initially resembling a cold, with a runny nose, cough and a slight fever. The eyes become red and sensitive to light. As the illness progresses, and usually on the third to seventh day, the temperature may reach 39–41 °C, and a red rash appears that lasts four to seven days.

Approximately 30 % of reported cases have one or more complications, especially among children under five years of age and adults over 20. Measles can be more severe in people with weakened immune systems.

Complications from measles infection

7 to 9 out of 100 children develop **ear infection**, which can result in hearing loss.

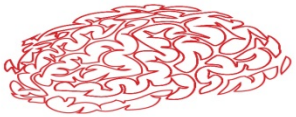
8 out of 100 patients report **diarrhoea**.



1 to 6 out of every 100 patients suffer from **pneumonia**. This is the most common cause of death from measles in young children.

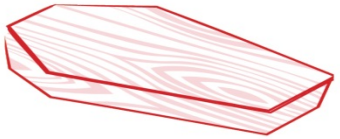
1 in every 1 000 patients develop acute encephalitis **(swelling of the brain)**. This can lead to convulsions and leave a child deaf or with mental disability.

Eye disorders, such as destruction of the cornea (outer layer of eyeball) may lead to blindness. This condition affects, in particular, malnourished children and is linked to vitamin A deficiency.



A rare but **fatal brain complication** known as subacute sclerosing panencephalitis (SSPE), can occur several years after measles.

1 out of 4 people who get measles will need **hospitalization**.



Up to 1 in 1 000 measles patients **die** as a result of the disease.

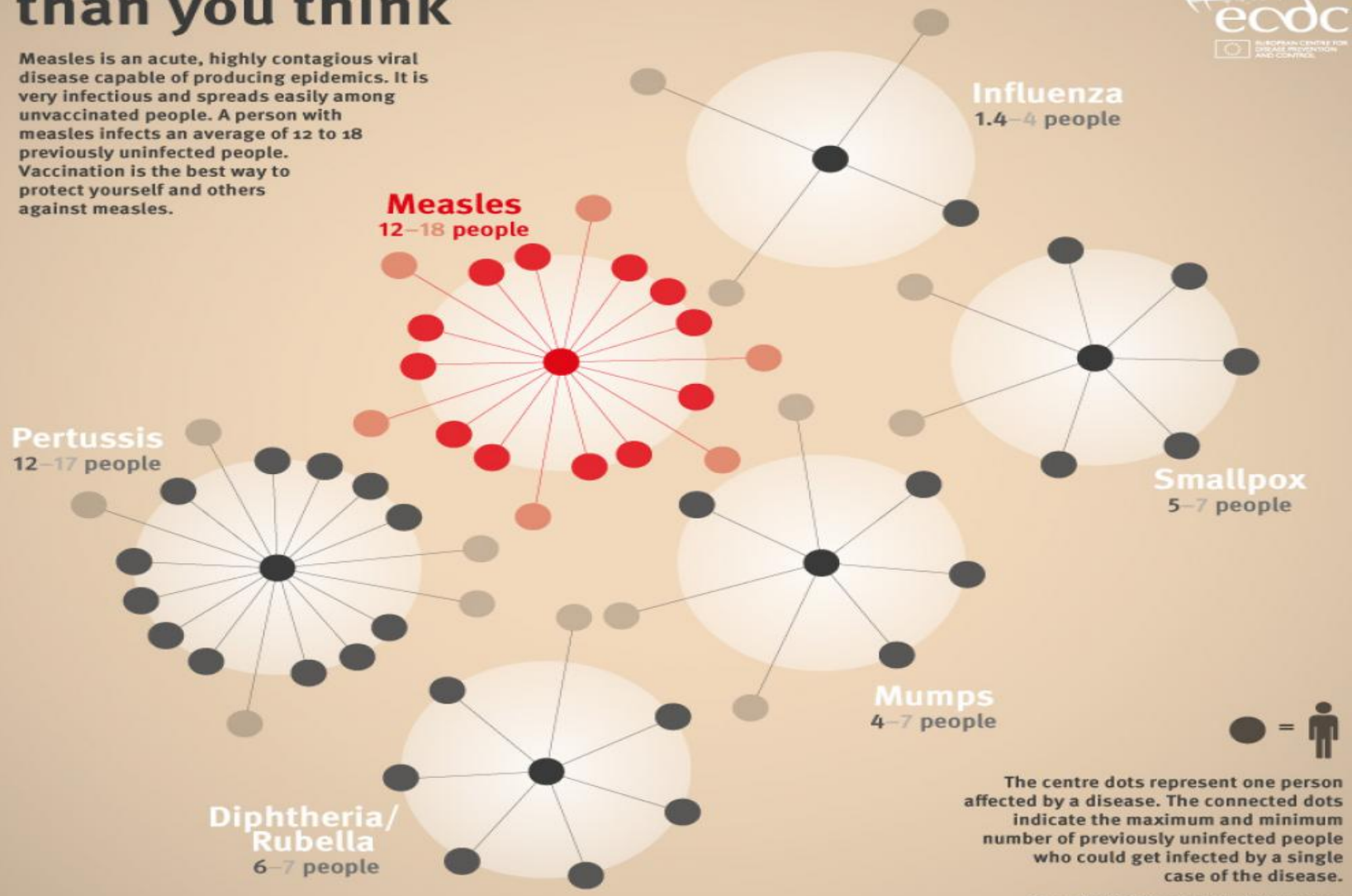
Source: ECDC. Measles and rubella elimination: Communicating the importance of vaccination. Stockholm: ECDC; 2014. Available at: ecdc.europa.eu/en/publications/Publications/Measles-rubella-elimination-communicating-importance-vaccination.pdf

www.ecdc.europa.eu

Measles vaccination protects you and your family. By vaccinating against measles you contribute to a healthy community.

Measles is more contagious than you think

Measles is an acute, highly contagious viral disease capable of producing epidemics. It is very infectious and spreads easily among unvaccinated people. A person with measles infects an average of 12 to 18 previously uninfected people. Vaccination is the best way to protect yourself and others against measles.



The centre dots represent one person affected by a disease. The connected dots indicate the maximum and minimum number of previously uninfected people who could get infected by a single case of the disease.

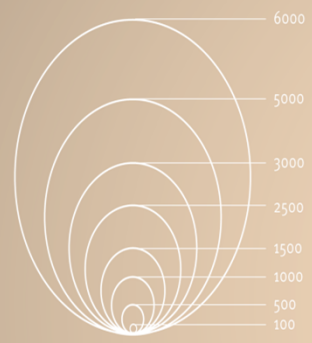
Source: Plotkin S, Orenstein W, Offit P. Vaccines. Fifth Edition, 2008, Elsevier Inc.

Measles affects all age groups

Measles is an acute, highly contagious disease capable of creating epidemics. It can be contracted at any age. Vaccination is the best way to protect yourself and others against measles, regardless of age. Check your vaccination status.

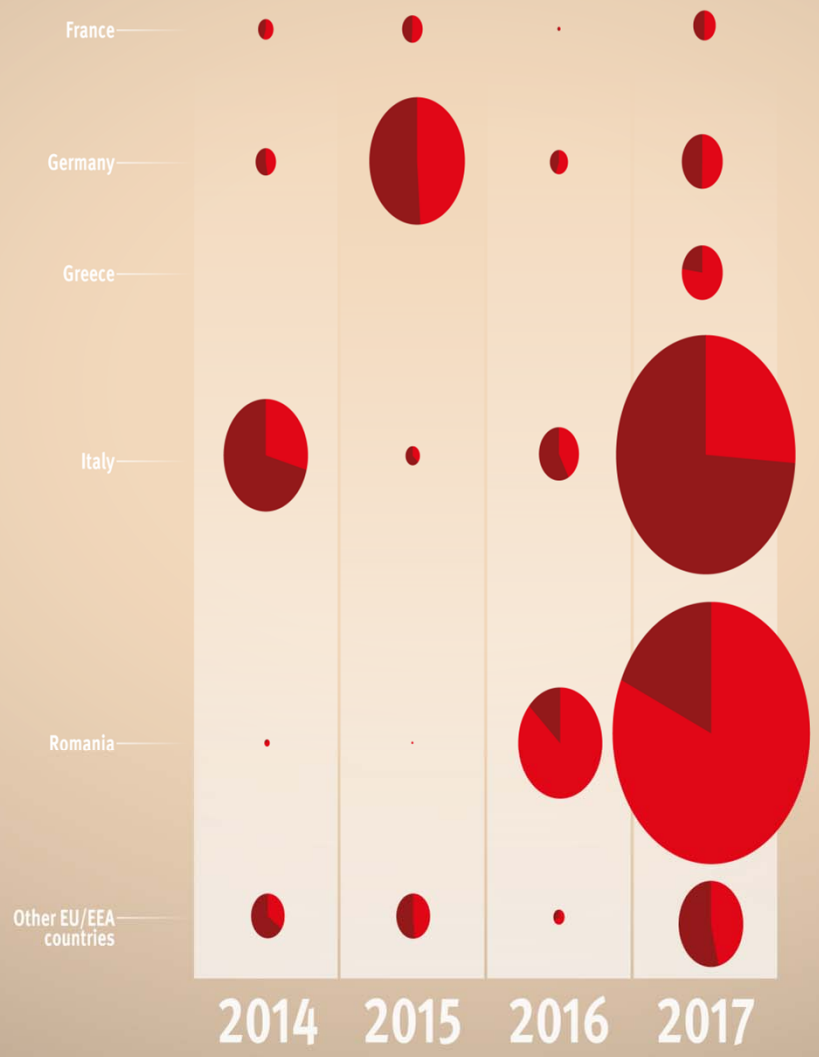
ecdc
EUROPEAN CENTRE FOR DISEASE PREVENTION AND CONTROL

Number of reported measles cases

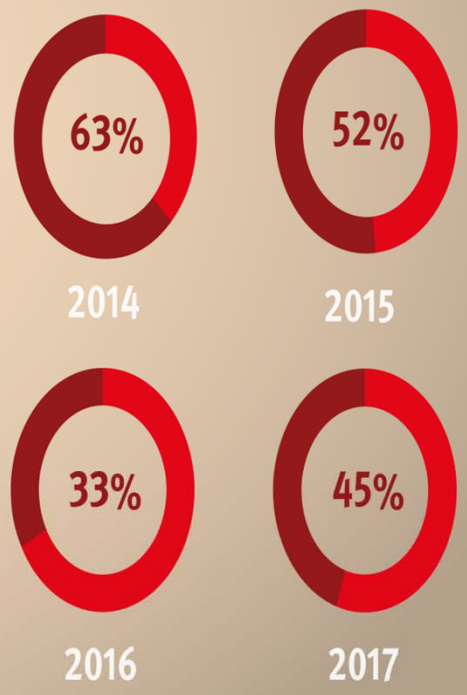


Age: 0–14 years
Age: above 14 years

Data extracted from The European Surveillance System (TESSy), ECDC, Stockholm, 2018. Countries which are represented reported the majority of cases in the period 2014-2017.



Proportion of measles cases above 14 years of age, 2014-2017, EU/EEA countries



Measles Notifications and Years of Vaccination Changes, 1948-2016

Number of notifications

16000
14000
12000
10000
8000
6000
4000
2000
0

Measles vaccine, introduced in 1985

MMR_1 introduced in 1988

MMR_2 introduced in 1992

MR campaign1995

MMR campaigns* 2009,2012-2014

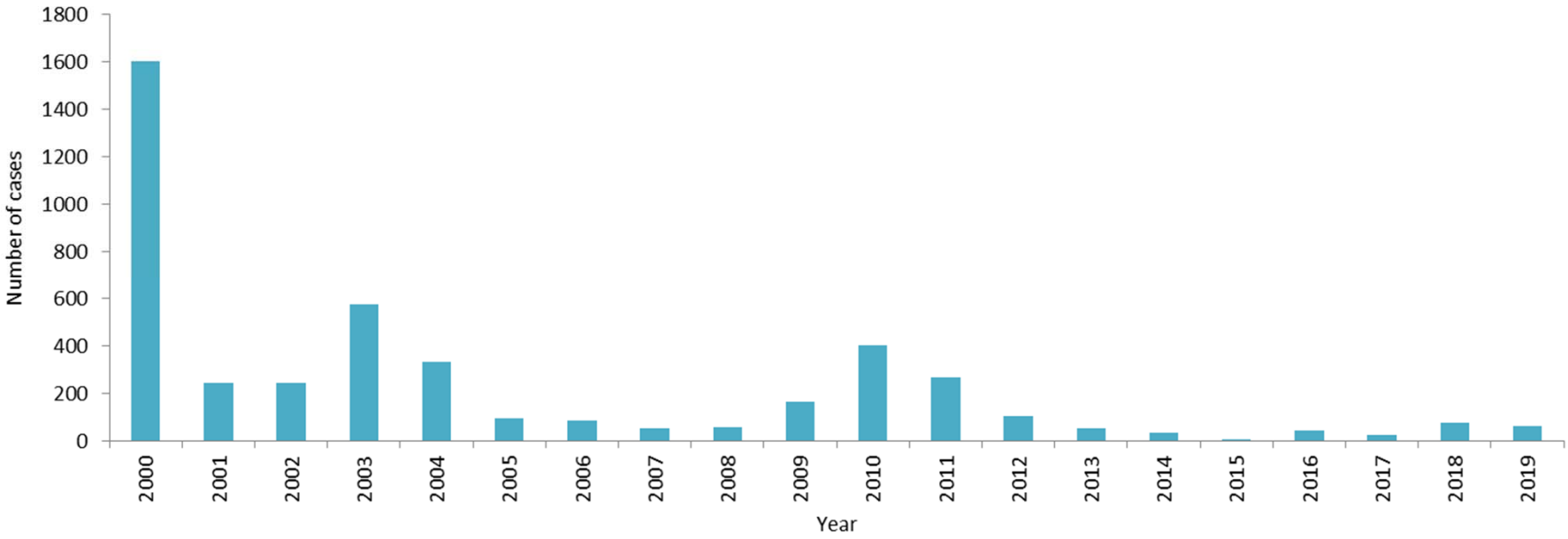
1948 1950 1952 1954 1956 1958 1960 1962 1964 1966 1968 1970 1972 1974 1976 1978 1980 1982 1984 1986 1988 1990 1992 1994 1996 1998 2000 2002 2004 2006 2008 2010 2012 2014

Year

*MMR vaccination campaign started in April 2009 for students in 4th, 5th and 6th year of second level schools
*MMR catch-up campaign 2012-2014

*MMR vaccination campaign started in April 2009 for students in 4th, 5th and 6th year of second level schools
*MMR catch-up campaign 2012-2014

Measles cases 2000-2019.



https://www.thejournal.ie/readme/doctor-john-fitzsimons-measles-vaccine-4212638-Sep2018/

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Tags # CHILDREN # ILLNESS # MEASLES # OPINION # VACCINATION # VACCINE

'Three children died as a result of measles that year. I remember their eyes'

Consultant paediatrician John Fitzsimons writes about his experiences with measles, and why it's important to vaccinate.

Sep 2nd 2018, 7:31 PM 25,309 Views 74 Comments Share 921 Tweet Email 1

John Fitzsimons

I HAD MEASLES when I was seven. There was no MMR vaccine available in Ireland at that time.

I was lucky, I wasn't that sick and I don't remember much of the experience. 20 years later, I had my second experience of measles and I won't forget it.

It was January 2000 and I was working as a junior doctor in the Emergency Department at the Children's University Hospital, Temple Street.

Every day for the first few months of the year, a steady stream of misery arrived; babies, toddlers and older children, covered in a rash, feverish, coughing, some struggling for breath – but what I remember most was their eyes.

Measles causes a painful conjunctivitis, a red discharging inflammation of the eyes. That year at least 1,600 people contracted measles and hundreds of children attended Temple St with the disease.

'I remember their eyes'

More than 100 children needed to be admitted to hospital and one in 10 of them needed to go the intensive care unit (ICU). Three children died as a result of measles that y
of them, I knew their families. I remember their eyes.

Eighteen years later we are in the midst of another measles outbreak in Euro

Pediatr Infect Dis J, 2003;22:580–4

Measles outbreak in Dublin, 2000

JACQUELINE MCBRIEN, MICGP, MRCPI, JOHN MURPHY, FRCPI, DENIS GILL, FRCP
CATHERINE O'DONOVAN, RGN, RSCN AND MARY T. CAFFERKEY, MD

Background. An outbreak of measles occurred in Ireland between December 1999 and July 2000. The majority of cases were in north Dublin, the catchment area of The Children's University Hospital (TCUH).

Methods. Details of all of the 111 children attend- iagnosis of measles be- July 2000 were prospec- atabase. Charts were

caused by paramyxovir important cause of va counts for approximat each year. Monovalen months of age was ad childhood immunizatio 1985. Measles-mumps- single measles vaccine dose of MMR was rec

THE IRISH TIMES Mon, May 13, 2019 Dublin 17°

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The march of measles

DR MURIS HOUSTON

The news that measles has taken hold in the Dublin area since the beginning of the year is worrying for parents. Public health specialists had warned of the likelihood of a serious disease outbreak ever since measles vaccination rates began to drop. Nevertheless, it is still a shock to discover that an infectious disease which we should be well on the way to eradicating has resulted in 17 admissions to Temple Street Hospital.

So what went wrong? Very simply, the vaccination rate for measles dropped below the percentage needed to keep a "lid" on the disease. The Eastern Health Board is reporting average vaccination rates of 74 per cent. The target rate for an effective immunisation programme is 95 per cent. In addition, the average rate masks a much lower figure in some socially disadvantaged areas of Dublin. It is in these areas that the present outbreak has its genesis and it is from here that we are likely to see the near epidemic spread to other parts of the country.

Measles is a highly infectious viral disease. As an airborne microbe, it is spread by coughing and sneezing. Once the child is exposed to infection, it r she has any symptoms. Typically, it starts with

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Van Graan: Munster did their best to keep Jones and Flannery

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Measles epidemic confirmed with 1,221 cases

Padraig O'Morain

A measles epidemic is under way, with 1,221 cases notified during the first six months of this year, compared to 73 cases for the same period last year. There is evidence that it is spreading from Dublin to other parts of the State, the National Disease Surveillance Centre has warned.

The epidemic has claimed the lives of two children in north Dublin and cases are running at their highest level since 1993.

To combat the epidemic, health boards are to launch a vaccination campaign for schoolchildren in the autumn.

Measles is a contagious infection which can, in some cases, lead to pneumonia, swelling of the brain and death.

Editor's Choice

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Measles outbreak in Dublin, 2000

JACQUELINE MCBRIEN, MICGP, MRCPI, JOHN MURPHY, FRCPI, DENIS GILL, FRCP, MARY CRONIN, FPPMI,
CATHERINE O'DONOVAN, RGN, RSCN AND MARY T. CAFFERKEY, MD

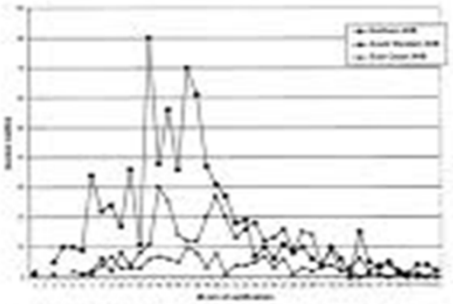
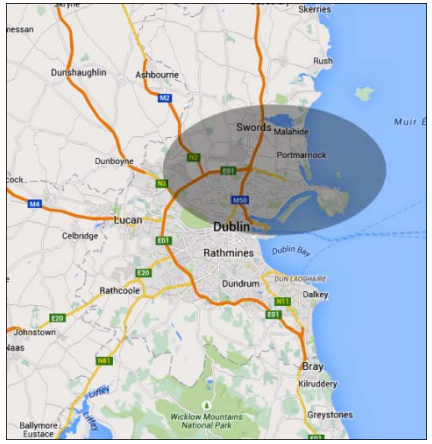


FIG. 2. Clinical notifications of measles by week in the immediate catchment of the Children's University Hospital, Northern Area Health Board (CHNE) and adjacent Health Board areas, January 1 to October 28, 1999. NDSC data.

Measles outbreak in Dublin, 2000.



National uptake rate 79%
North Dublin <70%

1407 cases

- 355 TSCUH
  - Dehydration, Pneumonia, Tracheitis
  - Five admitted to ICU
    - No vaccinated child admitted to ICU
- 111 admitted
  - Median age 14/12
    - 26 had pre-exisiting conditions
    - Three died

Temple Street
CHILDREN'S UNIVERSITY HOSPITAL

Use of a geographic information system to map cases of measles in real-time during an outbreak in Dublin, Ireland, 2011

G Fitzpatrick (gabriel.fitzpatrick@hse.ie)[1], M Ward[1], O Ennis[1], H Johnson[2], S Cotter[3], M J Carr[4], B O'Riordan[4], A Waters[4], J Hassan[4], J Connell[4], W Hall[4], A Clarke[1], H Murphy[1], M Fitzgerald[1]

1. Department of Public Health, Health Service Executive (HSE) East, Dr Steeven's Hospital, Dublin, Ireland
2. Health Intelligence Ireland (HII), Dr Steeven's Hospital, Dublin, Ireland
3. Health Protection Surveillance Centre (HPSC), Dublin, Ireland
4. National Virus Reference Laboratory, University College Dublin, Belfield, Dublin, Ireland

Citation style for this article:
Fitzpatrick G, Ward M, Ennis O, Johnson H, Cotter S, Carr MJ, O'Riordan B, Waters A, Hassan J, Connell J, Hall W, Clarke A, Murphy H, Fitzgerald M. Use of a geographic information system to map cases of measles in real-time during an outbreak in Dublin, Ireland, 2011. Euro Surveill. 2012;17(49):pii=20330. Available online: http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=20330

Article submitted on 4 April 2012 / published on 6 December 2012

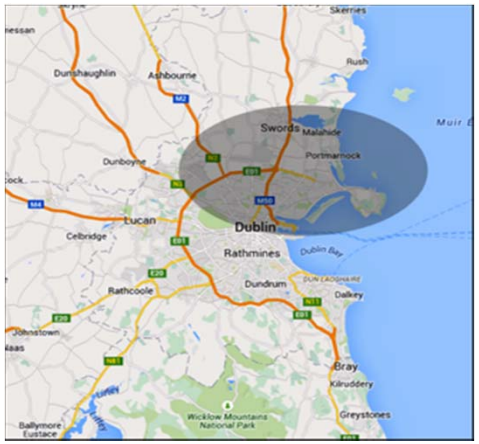
In 2011, there was a large measles outbreak in Dublin. Nationally 285 cases were notified to the end of December 2011, and 250 (88%) were located in the Dublin region. After the first case was notified in week 6, numbers gradually increased, with 25 notified in June and a peak of 53 cases in August. Following public health intervention including a measles-mumps-rubella (MMR) vaccination campaign, no cases were reported in the Dublin region in December 2011. Most cases (82%) were children aged between 6 months and 14 years, and 46 cases (18%) were under 12 months-old. This is the first outbreak in Dublin to utilise a geographic information system for plotting measles cases on a digital map in real time. This approach, in combination with the analysis of case notifications, assisted the department of public health in demon-

age of 12 months from their family doctor. The second dose of MMR vaccine (MMR2) is given at the age of 4–5 years generally through the school-based vaccination programme [1].

Although the number of measles cases in Ireland has decreased substantially since the introduction of the MMR vaccine [2], there have still been a number of significant measles outbreaks in Ireland [3]. In 2010, a total of 426 measles cases were notified nationally. These cases clustered among certain population groups, including members of the Irish Traveller and Roma communities and children whose parents object to vaccination on philosophical or religious grounds [4].

The World Health Organization (WHO) recognises

Measles outbreak in Dublin, 2011.



National uptake rate 90%
North Dublin (CCA7)<75%

285 cases

250 North Dublin

Dehydration, Pneumonia, seizures

No reported admissions to ICU

24 hospitalisations

92% school going (<19 years)

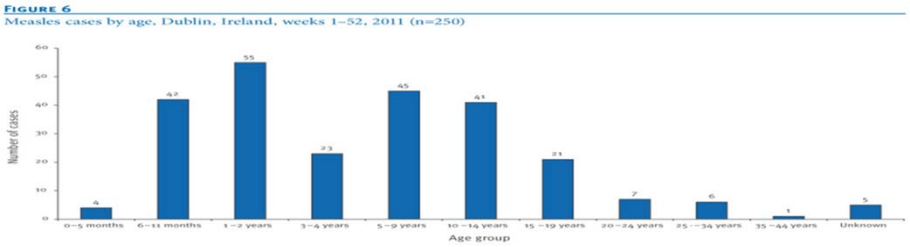
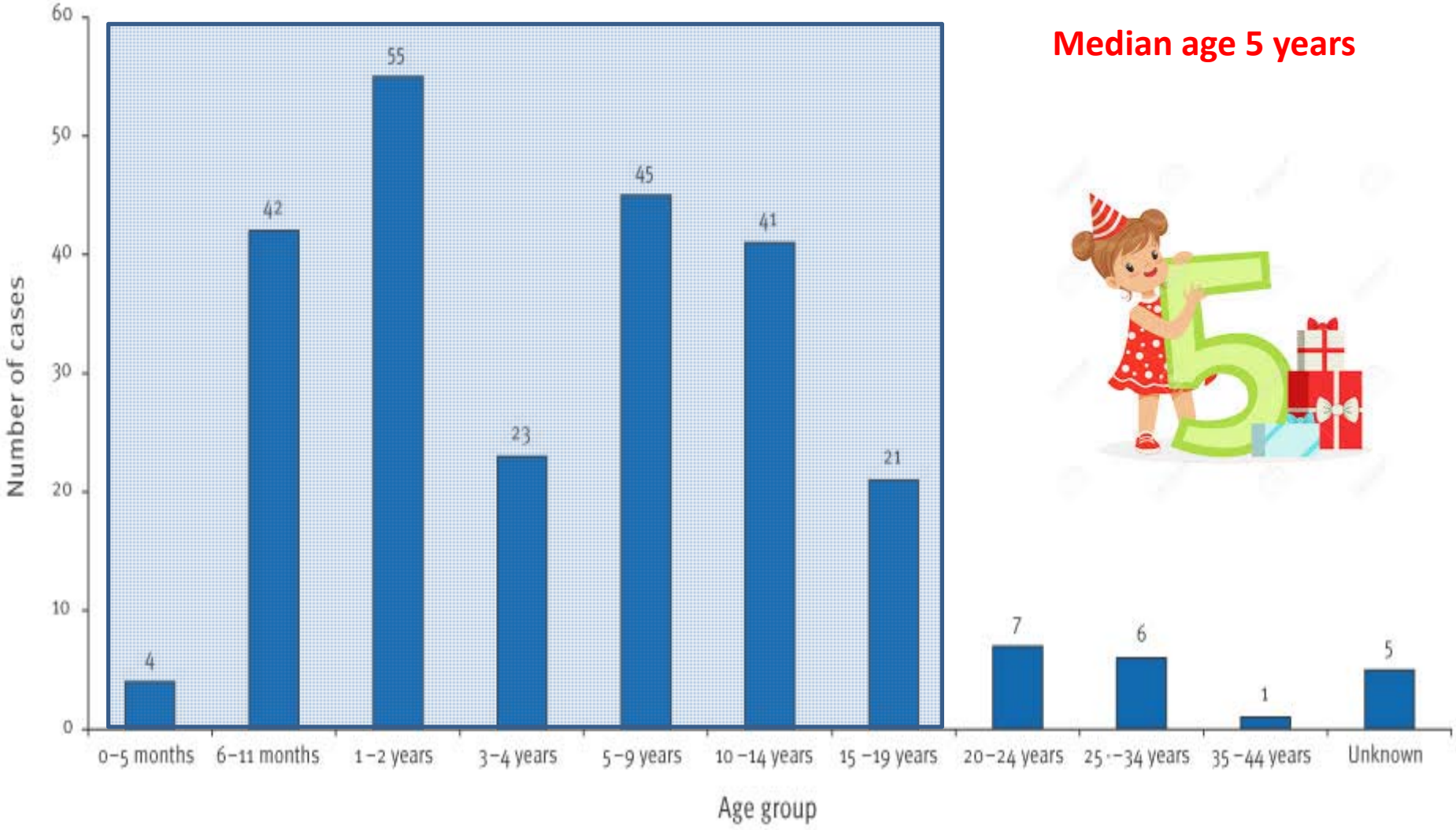


FIGURE 6

Measles cases by age, Dublin, Ireland, weeks 1–52, 2011 (n=250)



Median age 5 years

eurosurv-23-31-2.pdf

w.eurosurveillance.org/docserver/fulltext/eurosurveillance/23/31/eurosurv-23-31-2.pdf?expires=1557847109&id=id&accname=gu

1 / 9

SURVEILLANCE AND OUTBREAK REPORT

A national measles outbreak in Ireland linked to a single imported case, April to September, 2016

Peter Barrett[1], Suzanne Cotter[2], Fiona Ryan[1], Jeff Connell[3], Anthony Cronin[1], Mary Ward[4], Rose Fitzgerald[5], Catherine Lynch[6], Tony Margiotta[7], on behalf of the Outbreak Control Team[8]

1. Department of Public Health HSE South, St. Finbarr's Hospital, Cork, Ireland
2. Health Protection Surveillance Centre, Dublin, Ireland
3. National Virus Reference Laboratory, University College Dublin, Dublin, Ireland
4. Department of Public Health HSE East, Dr. Steevens' Hospital, Dublin, Ireland
5. Department of Public Health HSE Mid-West, Limerick, Ireland
6. Department of Public Health HSE South-East, Kilkenny, Ireland
7. Department of Public Health, HSE North-East, Navan, Co. Meath, Ireland
8. The members of the Outbreak Control Team are acknowledged at the end of the article

Correspondence: Peter Barrett (peterbarrett1@hotmail.com)

Hungary

Romania

Citation style for this article:
Barrett Peter, Cotter Suzanne, Ryan Fiona, Connell Jeff, Cronin Anthony, Ward Mary, Fitzgerald Rose, Lynch Catherine, Margiotta Tony, on behalf of the Outbreak Control Team. A national measles outbreak in Ireland linked to a single imported case, April to September, 2016. Euro Surveill. 2018;23(31):pii=1700655. https://doi.org/10.2807/1560-7917.ES.2018.23.31.1700655

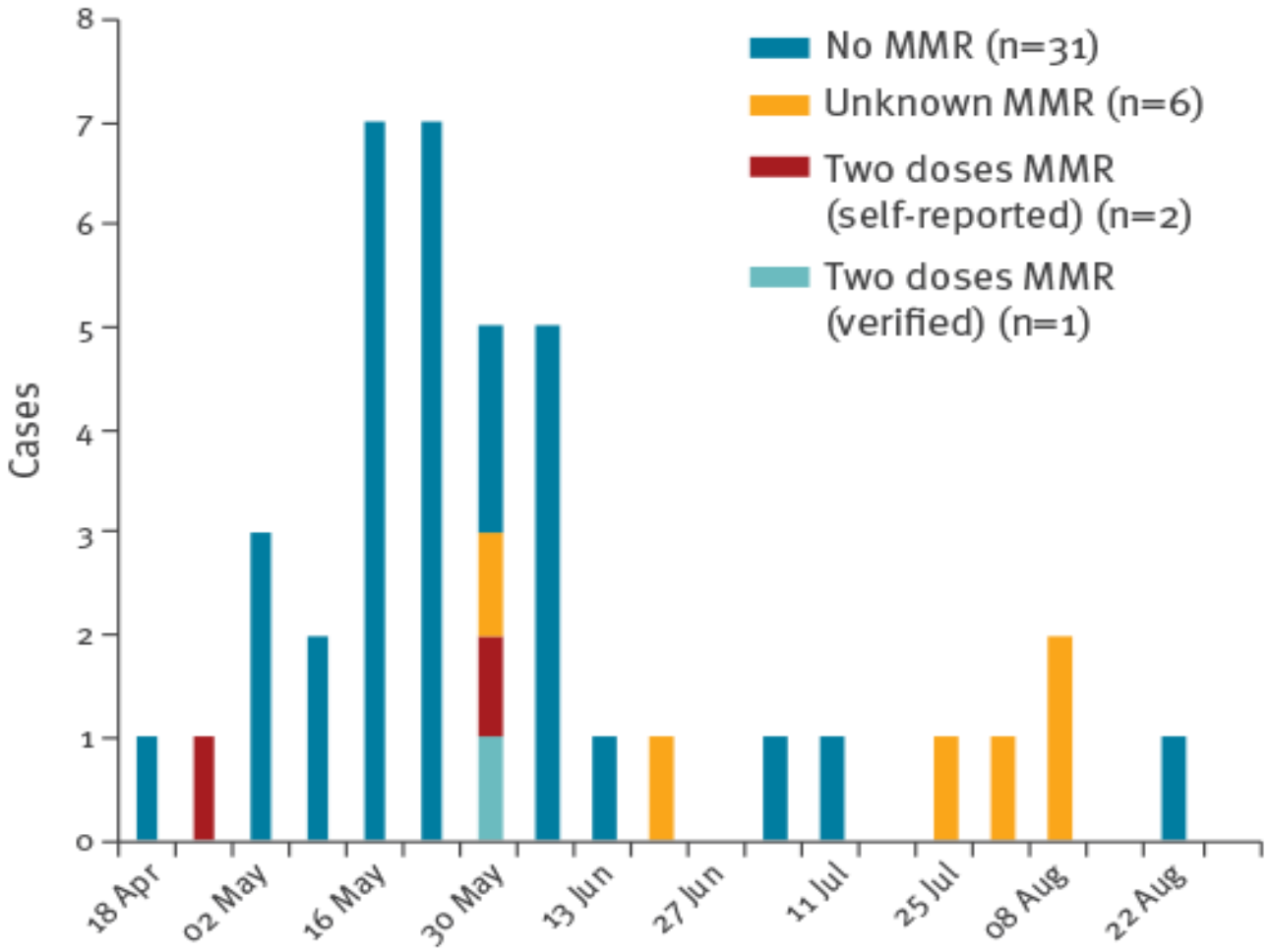
Article submitted on 19 Sep 2017 / accepted on 28 Mar 2018 / published on 02 Aug 2018

40 cases, 10 Nosocomial, 4 international flights.

Endemic measles transmission was interrupted for the first time in Ireland in 2015. In May 2016, a case of measles was confirmed in an adult who had travelled from Hungary to Ireland (index case). Cases subsequently arose in five of the eight public health regions around the country. There were 40 confirmed cases

It is increasingly recognised that one of the greatest risks posed to countries approaching measles elimination is importation of infectious cases. On 9 May 2016, a confirmed case of measles was reported to the regional Department of Public Health in Dublin, in an adult who had returned from Hungary 3 weeks

National Measles outbreak linked to imported case 2016.



Median age 8

19 hospitalised

Measles Outbreak July 2018

Irish Mirror

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News › Irish News › Measles

HSE issues warning as four new cases of measles identified in Dublin

Two adults and two children have been diagnosed with measles after a previous outbreak in July

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Low vaccination rates raise fear for measles elimination status

Low vaccination rates raise fear for measles elimination status

Ireland may lose its status of having eliminated measles because of low vaccination levels in the Dublin region. The World Health Organisation (WHO) said it was great...

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HSE warn of further measles outbreak in Dublin among adults and children

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The HSE has been notified this week of four me
two children.

Irish News | World News | Local Papers | Environment | Weather

Thursday 27 September 2018

News Health

HSE issues warning as four more measles cases identified this week

www.thejournal.ie/measles-dublin-2-4161541-Aug2018/

Tags # FAMILY # CONTAGIOUS # DUBLIN # HEALTH # HSE # MEASLES # MMR

Warning issued as four cases of measles are reported in Dublin

Two adults and two children were affected

Aug 2nd 2018, 4:53 PM 51,363 Views 70 Comments Share 558 Tweet Email 1

THE HSE HAS issued a public warning after four cases of measles were reported in Dublin.

A previous alert was issued on 20 July in relation to two other cases of measles.

The HSE was notified this week that four people in Dublin developed the condition.

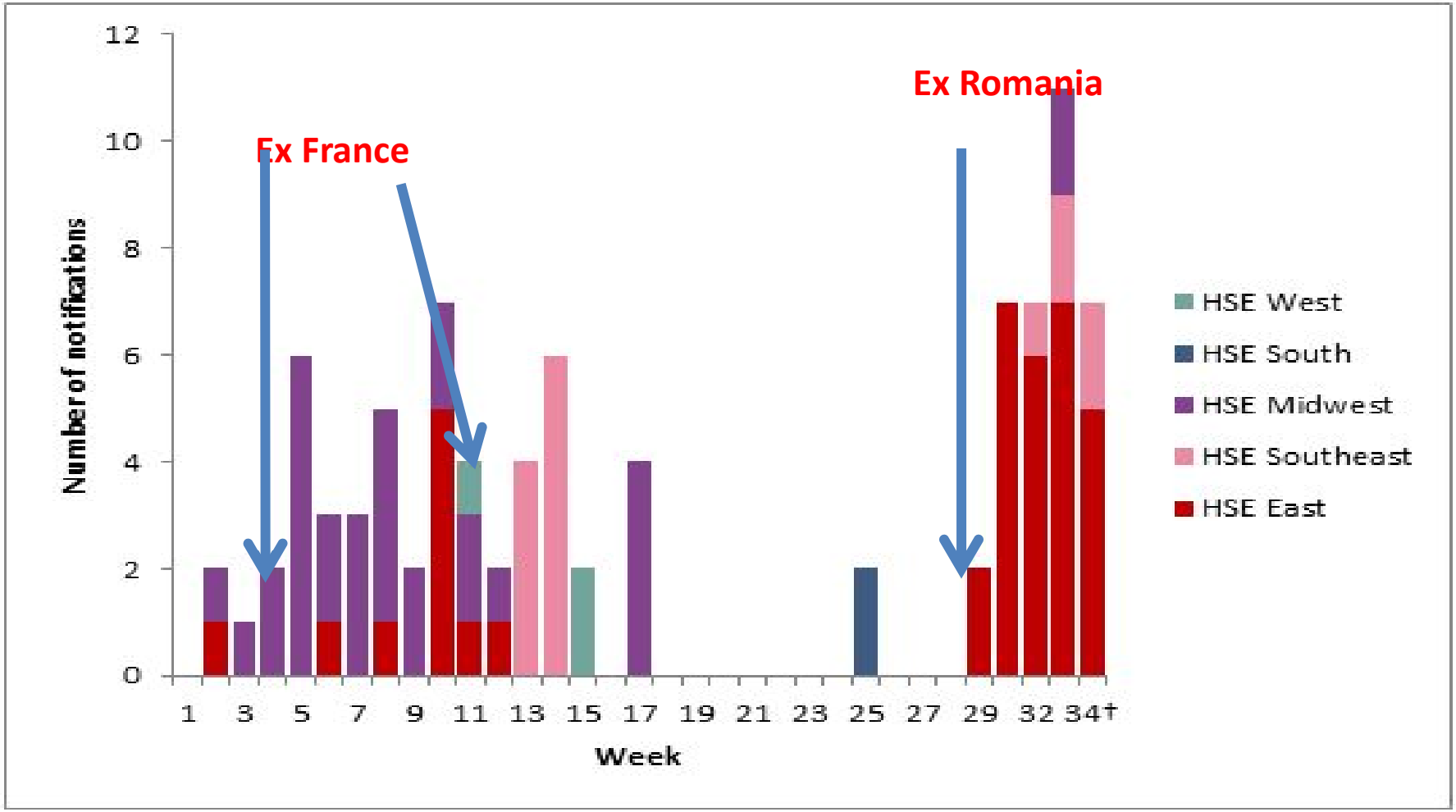
The two adults and two children are likely to have developed measles from contact with one of the two earlier cases at hospitals in Dublin.

Measles rash

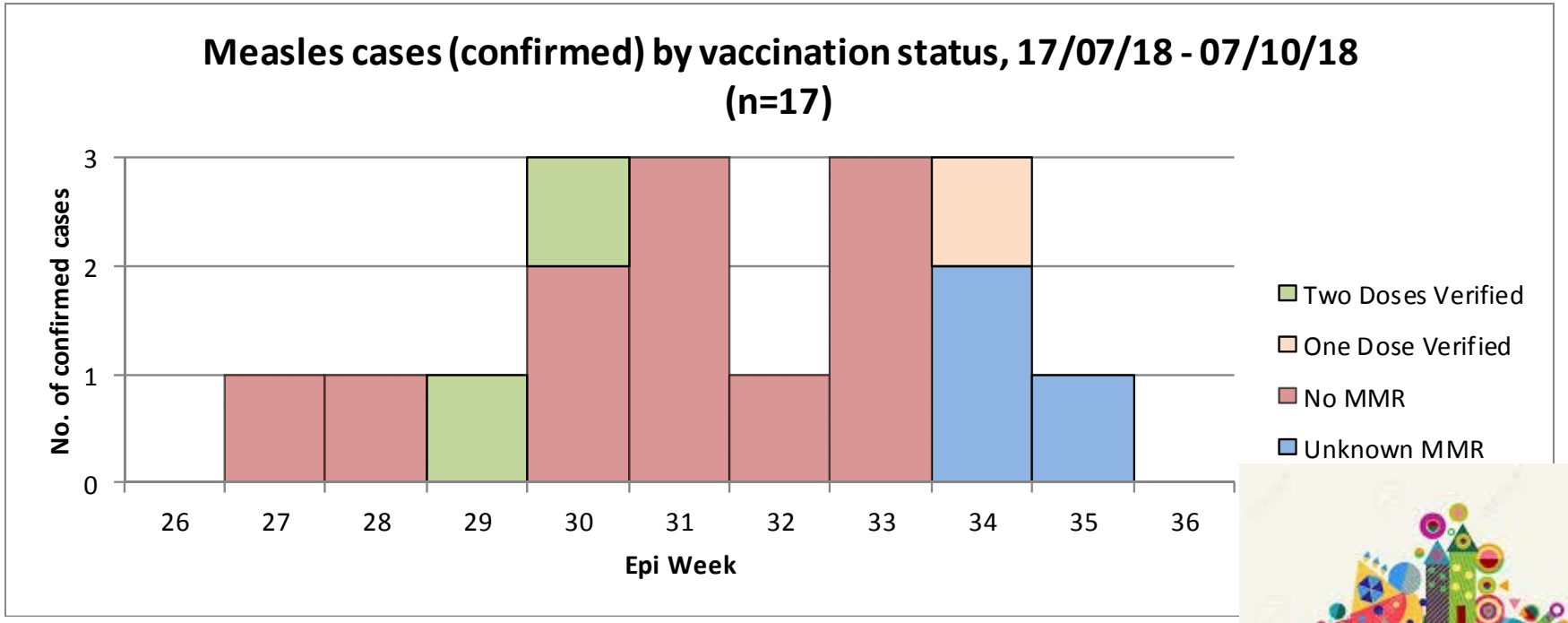
Image: Shutterstock/phichet chayabin

Dr Helena Murray, Specialist in Public Health Medicine, said: "Measles can be a serious illness and is highly infectious. The best protection is to be fully vaccinated with two doses of MMR (Measles, Mumps, and Rubella) vaccine."

Measles notifications by HSE area, weeks 1-34, 2018
7 discrete outbreaks (n=66)

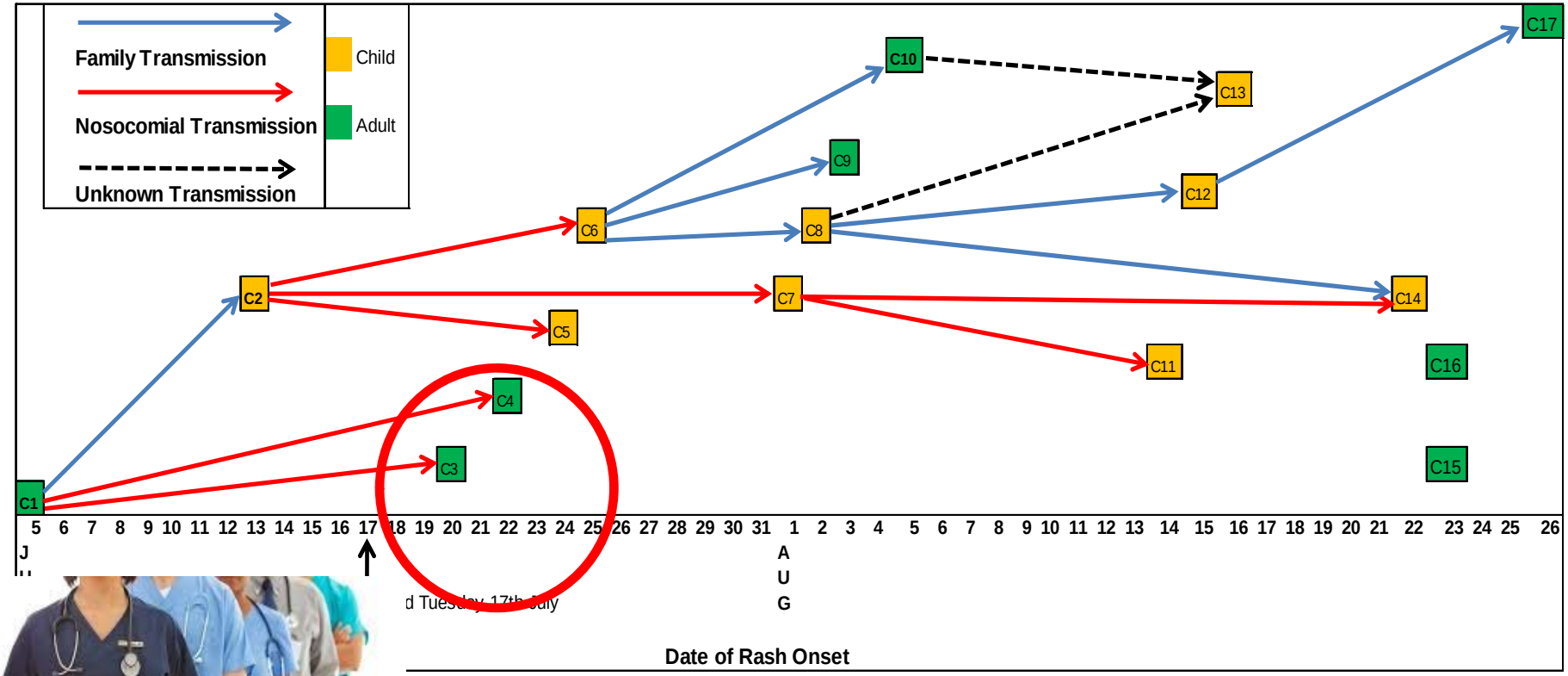


Epidemiological Curve



8/17 were adults median age 16years

Transmission Pathways

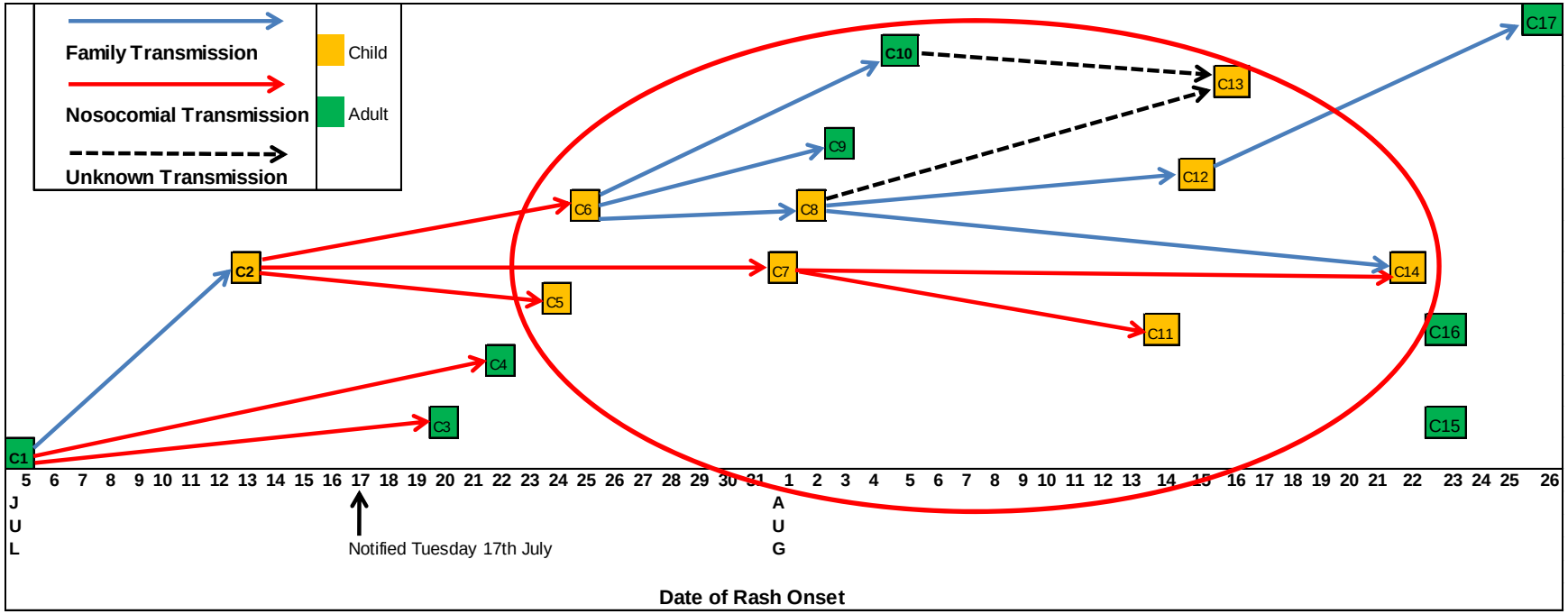


7/17 Nosocomial transmission

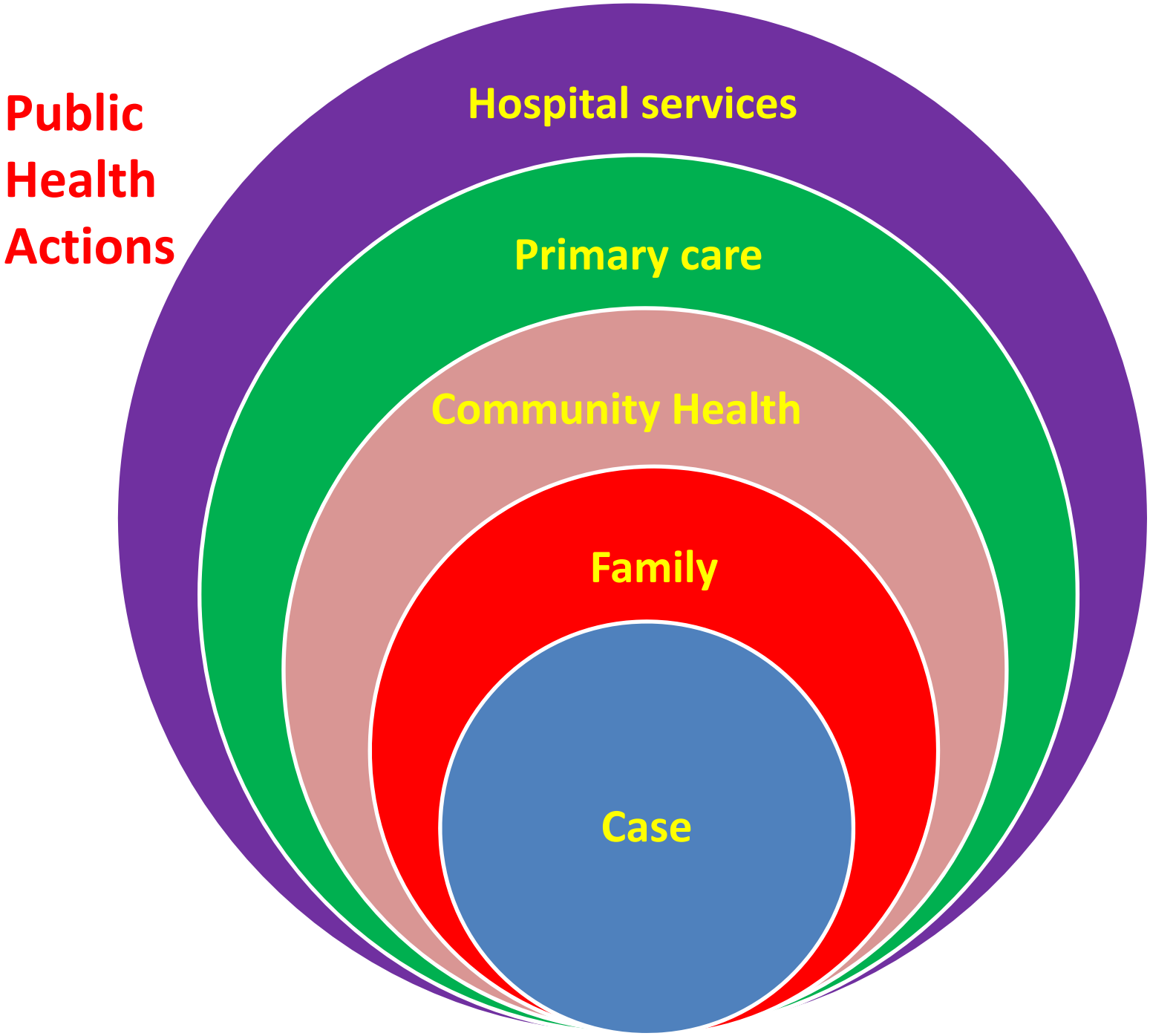
Index Case

- 6 year old child
- Attended ED on 3 occasions with
  - Rash/Fever/Cough/Coryza/Conjunctivitis
- Isolated and admitted on 3rd attendance
  - Confirmed Measles

Vulnerable Unvaccinated Populations



Confirmed & probable measles cases HSE-E from week 4 - week 15 to 14/05/2019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Primary care
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Case

Cases

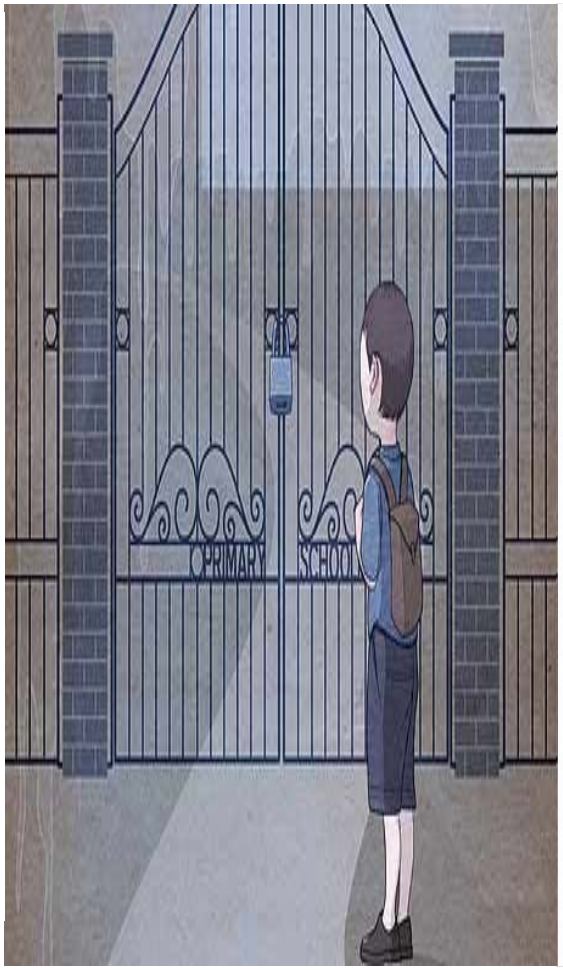
Adults

Presentations

Family

Family illness

Exclusion from school & childcare



"While we realize it's difficult having a sick child at home, Mrs. Mote, we believe you sent Philip back a little soon."

Primary care

Case management: isolation, MMR & HNIG to vulnerable contacts

Community Health

School: timely re-arranging vaccination schedule in affected areas.

Member of OCT.

New challenges in measles control

OLD	NEW
Vulnerable unvaccinated populations	
	Nosocomial transmission to patients & healthcare workers.
	Delayed recognition of measles facilitating nosocomial transmission
	Unusual clinical presentations in adults
	Post exposure prophylaxis vulnerable contacts < 9 months
	Travel associated cases (Europe and US)
	Social media and antivaxers

Nosocomial Transmission to healthcare workers.

(NIAC Dec 2017)

All health care workers, both clinical and non-clinical, who have direct patient contact should be immune to measles.

- work requires face to face contact with patients, or
- normal work location is in a clinical area such as a ward, ED or OPD , or
- -work frequently requires them to attend clinical areas.

written documentation of vaccination with 2 doses of MMR vaccine at least 1 month apart

- **or**

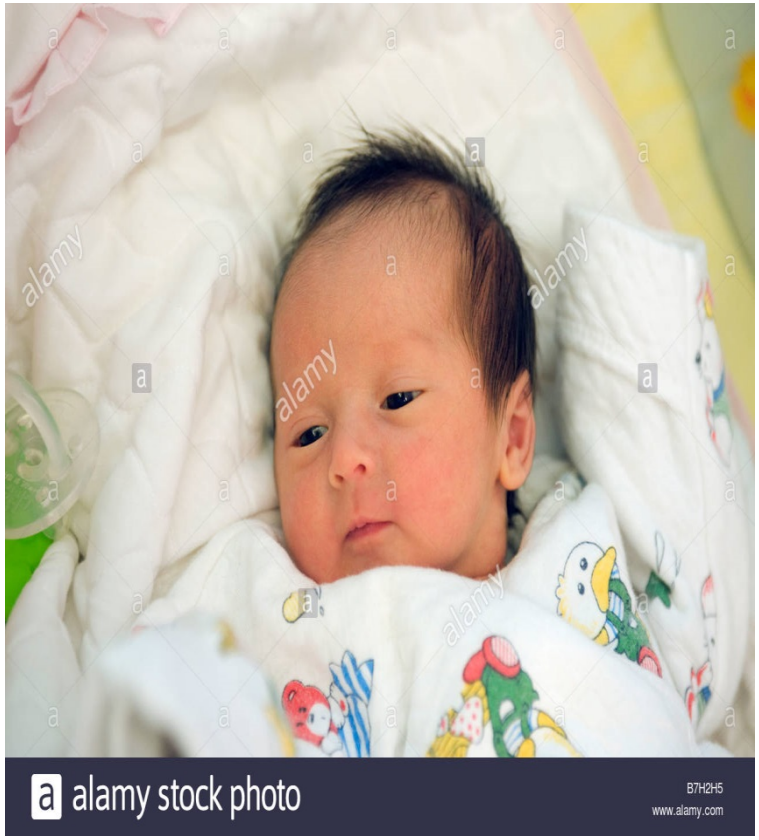
serological evidence of prior measles exposure (from an Irish National Accreditation Board (INAB)accredited laboratory.

Delayed recognition of measles facilitating nosocomial transmission.

Unusual clinical presentations in adults

- Communication to GPs, hospital consultants (including ED, Micro, paeds and adult physicians).
- Developed guidelines with D-doc on suspect measles.
- Highlight on HPSC/NIO website.
- Interviews on national and local media.
- Clinicians part OCT.
- Hospital infection control teams

Post exposure prophylaxis to vulnerable contacts < 9 months



Exposed infants *aged <9 months*

Administer a single dose of HNIG.

Ideally this should be administered within 72 hours of exposure; however, it may be administered up to 6 days post exposure.

Travel associated cases (Europe and US)

Pre-travel measles vaccination for those travelling to countries or regions where measles is endemic or where outbreaks are occurring:

Infants 6 months to ≤11 months of age should receive one dose of MMR vaccine.

ii. Children 12 months of age and older

- **a)** *If unvaccinated* should receive two doses of MMR vaccine separated by ≥28 days. To ensure protection, the second dose should be given ≥2 weeks prior to travel.

Teenagers and adults without evidence of immunity to measles should get two doses of MMR vaccine separated by ≥28 days.

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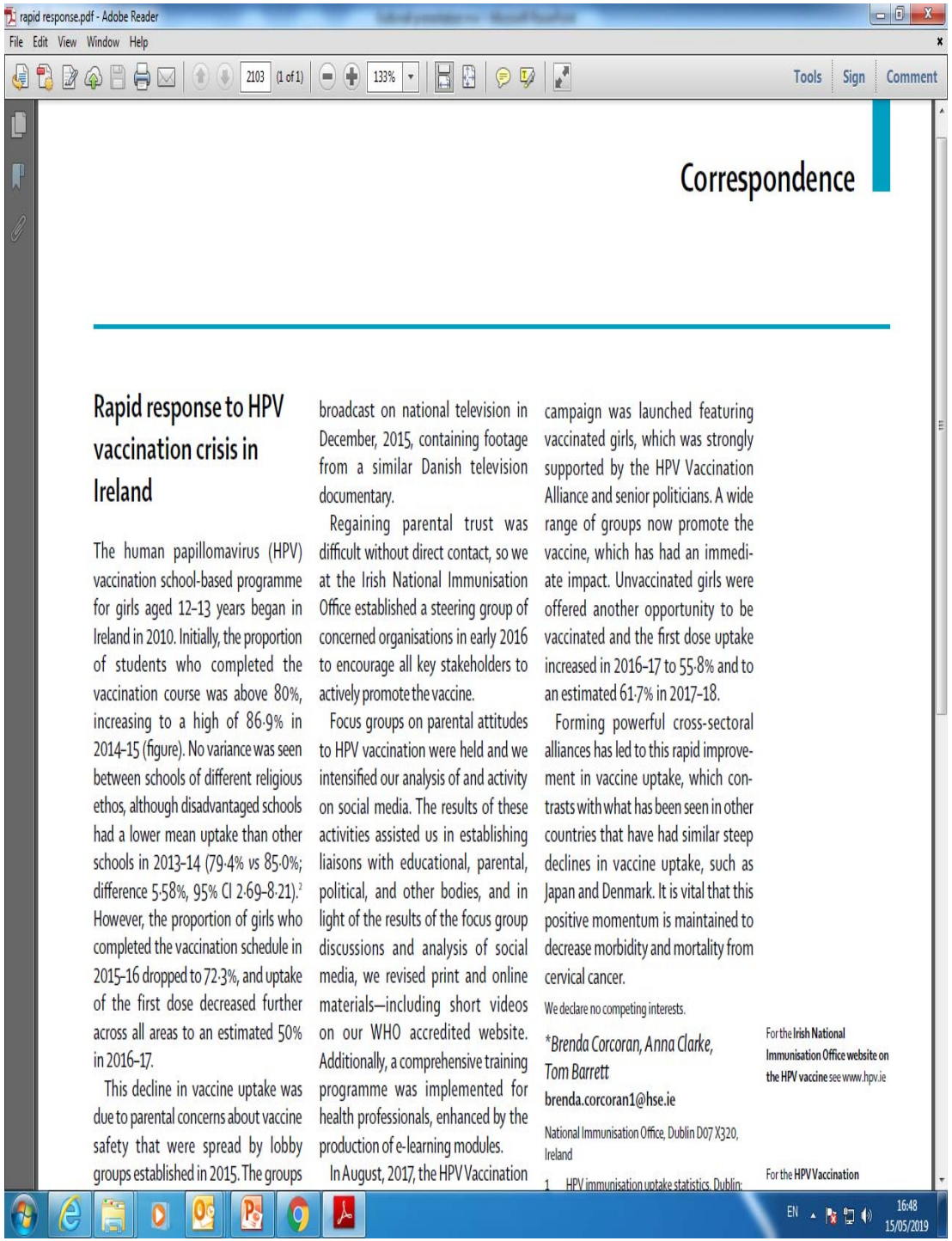
Social media and antivaxxers

Communication department used geo-targeted social media messages (Outbreak 2018).

Health workers, **especially those in communities**, remain the most trusted advisor and influencer of vaccination decisions, and they must be supported to provide trusted, credible information on vaccines (WHO 2019).

What works?

- Vaccine coalition/ alliances
- Understanding parental attitudes
- Social media
- Training health professionals
- Media campaign, videos
- Peer led education
- High level political support
- Extra opportunity to get vaccine



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Rapid response to HPV vaccination crisis in Ireland

The human papillomavirus (HPV) vaccination school-based programme for girls aged 12–13 years began in Ireland in 2010. Initially, the proportion of students who completed the vaccination course was above 80%, increasing to a high of 86·9% in 2014–15 (figure). No variance was seen between schools of different religious ethos, although disadvantaged schools had a lower mean uptake than other schools in 2013–14 (79·4% vs 85·0%; difference 5·58%, 95% CI 2·69–8·21).[2] However, the proportion of girls who completed the vaccination schedule in 2015–16 dropped to 72·3%, and uptake of the first dose decreased further across all areas to an estimated 50% in 2016–17.

This decline in vaccine uptake was due to parental concerns about vaccine safety that were spread by lobby groups established in 2015. The groups broadcast on national television in December, 2015, containing footage from a similar Danish television documentary.

Regaining parental trust was difficult without direct contact, so we at the Irish National Immunisation Office established a steering group of concerned organisations in early 2016 to encourage all key stakeholders to actively promote the vaccine.

Focus groups on parental attitudes to HPV vaccination were held and we intensified our analysis of and activity on social media. The results of these activities assisted us in establishing liaisons with educational, parental, political, and other bodies, and in light of the results of the focus group discussions and analysis of social media, we revised print and online materials—including short videos on our WHO accredited website. Additionally, a comprehensive training programme was implemented for health professionals, enhanced by the production of e-learning modules.

In August, 2017, the HPV Vaccination campaign was launched featuring vaccinated girls, which was strongly supported by the HPV Vaccination Alliance and senior politicians. A wide range of groups now promote the vaccine, which has had an immediate impact. Unvaccinated girls were offered another opportunity to be vaccinated and the first dose uptake increased in 2016–17 to 55·8% and to an estimated 61·7% in 2017–18.

Forming powerful cross-sectoral alliances has led to this rapid improvement in vaccine uptake, which contrasts with what has been seen in other countries that have had similar steep declines in vaccine uptake, such as Japan and Denmark. It is vital that this positive momentum is maintained to decrease morbidity and mortality from cervical cancer.

We declare no competing interests.

*Brenda Corcoran, Anna Clarke, Tom Barrett
brenda.corcoran1@hse.ie

National Immunisation Office, Dublin D07 X320, Ireland

For the **Irish National Immunisation Office website on the HPV vaccine** see www.hpv.ie

1 HPV immunisation uptake statistics. Dublin:

For the **HPV Vaccination**

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