

OREGON PUBLIC HEALTH DIVISION • OREGON HEALTH AUTHORITY

MEASLES AND RUBELLA: LEARNING A LESSON THE HARD WAY

In 1941, an astute Australian ophthalmologist noticed an unusual number of infants with cataracts in his practice. He suspected rubella after overhearing two mothers in the waiting room talking about rubella they both contracted during the Australian outbreak of 1940.¹ After several ensuing years of inattention and skepticism, epidemiologists and teratologists confirmed the congenital rubella syndrome (CRS) triad of congenital cataracts, heart disease and deafness.

During the 1964–1966 U.S. pandemic, additional CRS pathology was noted in the brain, lungs, liver, spleen, kidney, bone marrow, bones, and endocrine organs. It is now well known that, particularly during the first 16 weeks of pregnancy, rubella can result in miscarriage, still birth or CRS; during the first ten weeks, transmission from mother to fetus is as high as 90%.¹ The primary purpose of rubella vaccination is the prevention of CRS.

And vaccination has been a stunning public health success: to date during 2013, only six cases of rubella have been reported in the U.S. Measles, too, despite its remarkable contagiousness, is on the brink of elimination: only 132 cases to date this year in the United States. However, while these diseases have nearly vanished from the U.S., other countries have been sorely afflicted. This issue of the *CD Summary* shares trends in vaccine-preventable diseases and immunization strategies from selected developed countries.

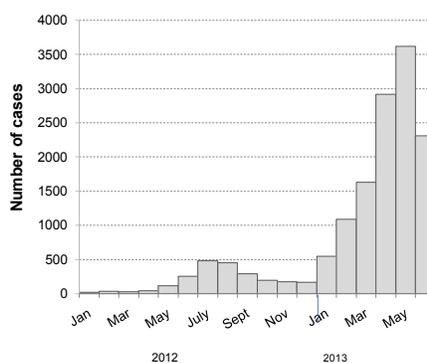
JAPAN

Rubella. In 1976, Japan introduced single-antigen rubella vaccine into its national immunization program, targeting junior high school girls so as to prevent CRS. In 1989, a measles-mumps-rubella (MMR) vaccine was introduced, but this combination vaccine was withdrawn in 1993 after unexpectedly high rates of aseptic meningitis were associated with the mumps component. A major change

occurred in 1994: the requirement of vaccination for school attendance was withdrawn.^{2,3}

Until the early 2000s, rubella was endemic in Japan, with seasonal increases in the spring and summer and epidemics roughly every 5 years. In 2012, the number of rubella cases increased sharply to 2,392, with the rise in cases continuing into 2013. The Japanese National Institute of Infectious Diseases has logged 11,991 cases of rubella during January 1 – July 3, 2013 (Figure 1). Most cases were in males (9,237; 77%); of these 7,944 (86%) were 15–49 years of age. Among the female cases, 2,093 (76%) were 15–49 years of age. Perhaps most concerning is that 10 infants with CRS were reported during October 2012 – May 1, 2013. For cases with known vaccination status, 3,527 (76%) occurred in persons who had NOT received rubella vaccine.

Figure 1. Number of rubella cases by month, Japan, Jan 2012–Jul 2013⁴



The good news: with the introduction of 2 doses of measles and rubella (MR) vaccine into the national vaccination schedule in 2006 for both boys and girls, and a successful catch-up vaccination program, children <15 years of age account for only 5.6% of the cases.

Live, attenuated vaccines, including against rubella, are generally contraindicated during pregnancy. In response to the current outbreak,

Japanese authorities have recommended vaccination for family members of pregnant women and for women who plan to get pregnant.^{3,4}

Measles. During 2007–2008, Japan suffered an outbreak of over 27,000 cases of measles.* In response, Japanese authorities initiated a five-year MR catch-up vaccination program, aiming for immunization coverage of >95% among persons 12–22 years of age in 2013.³ Measles continues at endemic rates in Japan with 228 cases reported in 2012.⁵

EUROPE

Measles. During April 2012 – March 2013, 8,127 cases of measles were reported from 30 European countries. France, Germany, Italy, Romania, Spain and the United Kingdom accounted for 95% of the reported cases. Of the 7,757 cases whose vaccination status was known, 82% were unvaccinated. The highest reported incidence was among infants under one year of age (224.6 cases per million population), followed by children 1–4 years of age (101.1 cases per million population); among the latter, 78% were unvaccinated. Six cases were complicated by acute measles encephalitis.⁶

Rubella. From January–April 2013, 21,283 cases were reported in Poland—the nation’s highest tally since 2007. Most cases (81%) were among 15–29-year old males; among those with known vaccination status, 13,501 (89%) were unvaccinated. In 1989, Poland began to administer monovalent rubella vaccine to 13-year-old girls. In 2004, MMR vaccine was recommended to all children in a two-dose schedule. Susceptibility among adolescent males and young adults keeps the outbreak going, increases the risk of congenital rubella infections, and jeopardizes the World Health Organization (WHO) Regional Office for Europe’s goal of measles elimination by 2015.⁷

UNITED KINGDOM

Measles. More than a decade ago, many British parents declined to give

* *CD Summary*. A Tale of Two Countries 2008; 57(7). See <http://public.health.oregon.gov/DiseasesConditions/CDSummaryNewsletter/Documents/2008/ohd5707.pdf>



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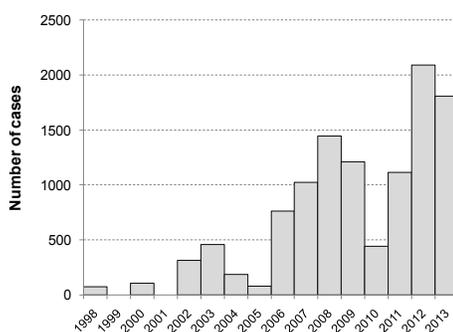
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MMR vaccine to their children following a highly publicized but bogus association with autism. Sadly, but predictably, after endemic transmission was eliminated in 1990s, measles re-emerged; the disease has been on a spree in the U.K. since 2006 (Figure 2), primarily in England and Wales.

Since November 2012, 1,219 cases have been reported throughout Wales. During the first quarter of 2013, 587 cases were reported in England. Most heavily affected have been children 10–14 years of age; 20% of cases in this age group were associated with school outbreaks.

Young people born in the U.K. between 1997 and 2003, who were not vaccinated as toddlers, remain under-vaccinated. To address this, Public Health England has launched a catch-up measles vaccination campaign that aims to immunize at least an estimated 330,000 unvaccinated people in the 10–16-year-old age group. More than 75,000 non-routine vaccinations have been given across Wales during the outbreak, but an estimated 30,000 persons remain unvaccinated.

Figure 2. Measles cases by year, United Kingdom, 1998–2013



Finally recovering from sagging vaccination rates during the late 1990s through early 2000s, England's MMR rate for children reaching their second birthday hit 91% during 2011–2012. Despite increases in recent years, MMR coverage remains a bit below the WHO target of $\geq 95\%$.^{6,8}

ELSEWHERE IN EUROPE

While the outbreak in Wales is now declared to be over, a new measles outbreak was detected in the Netherlands; and outbreaks in Germany are still on-going.⁶

SOUTH AMERICA

In Brazil, Chile, and Argentina, where only adolescent or adult females have been targeted through national immunization campaigns, similarly large outbreaks have occurred among adolescent and adult males, with a concomitant increase in CRS cases.³

NEW OREGON IMMUNIZATION LAW

These outbreaks are sobering reminders of what happens when countries allow their immunization rates to sag. These same diseases remain rare in the U.S., where the blessings of herd immunity have been secured by widespread, consistent vaccination. It is well to know that Oregon leads the nation in parental belief-based exemptions to vaccinations required for school, with 6% of kindergartners recently claiming exemption to one or more required shots — and such exemptions have been climbing steadily for a decade. In some Oregon schools, exemption rates exceed 50%.

To address this and ensure that parents are making an informed decision, a new law[†] will go into effect March 1,

[†] www.leg.state.or.us/13reg/measpdf/sb0100.dir/sb0132.en.pdf

2014 changing the process for parents to claim a non-medical exemption to school/childcare immunization requirements. The new law will require parents choosing a non-medical exemption to discuss the risks and benefit of immunization with a health care practitioner or to watch an online interactive educational video.

Patients and parents may benefit from the knowledge that measles, mumps, and rubella are still out there, potentially serious, and eminently preventable — as the citizens of Japan, the United Kingdom, and many other countries have lately been so intimately reminded.

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