Measles: the legacy of low vaccine coverage

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Measles is among the most infectious diseases of humans. Prior to the introduction of vaccination, virtually every child in the UK caught measles during two-yearly epidemics that each involved up to 700 000 reported cases. The illness presents with fever, coryza, cough and conjunctivitis before progressing to the classic rash after 2–4 days. Complications are more common in the very young and in adults and include otitis media, pneumonia, diarrhoea, keratitis and encephalitis. Although measles still kills around 150 000 children per year worldwide, in industrialised countries, case-fatality ratios are low with around one death for every 2000–5000 reported cases. The infection is most serious for individuals who are immunosuppressed, who may experience diffuse progressive pneumonitis or a delayed form of encephalitis, both associated with a high risk of death. For example, between 1974 and 1984, nearly one-third of deaths in British children in remission from leukaemia were measles related. The WHO aims to achieve measles elimination in at least five WHO regions by 2020, with the elimination target for the European region set at 2015.

In the UK, measles vaccine was first introduced in 1968 for children in the second year of life. Although a single dose of measles vaccine provides between 90 and 95% protection, coverage remained low and measles continued to cause regular epidemics right up until the late 1980s. In 1988, the year that measles-mumps-rubella (MMR) vaccine was introduced, around 86 000 cases and 16 deaths were reported (MMR) vaccine was introduced, around 1988, the year that measles-mumps-rubella and measles continued to cause regular deaths in British children in remission between 1974 and 1984, nearly one-third serious for individuals who are immuno-suppressed, who may experience diffuse progressive pneumonitis or a delayed form of encephalitis, both associated with a high risk of death. For example, between 1974 and 1984, nearly one-third of deaths in British children in remission from leukaemia were measles related. The WHO aims to achieve measles elimination in at least five WHO regions by 2020, with the elimination target for the European region set at 2015.

In 1998, a single research group published a small case series of children with autism and attracted substantial publicity in the mainstream media suggesting a link with MMR. Despite good scientific evidence against such an association, adverse media coverage was sustained over the next few years. Analysis suggested that the coverage was unbalanced and showed disproportionate interest in the potential side effects of MMR. One of the factors contributing to the lack of balance was that the story was largely covered by news journalists rather than health or science correspondents. The impact of the adverse publicity was monitored through surveillance of vaccine coverage and regular survey of parental knowledge and attitudes. By around 2001, safety concerns had reached their peak and showed disproportionate interest in two-year-olds in 2003/04 and in 5-year-olds in 2006/07 (figure 1). These common measles outbreaks were reported in populations with low coverage, most notably the Orthodox Jewish population in London and Irish travelling communities across England. In 2008, historic coverage data were used to estimate the future control of measles; this suggested that most of London was already above the threshold required to sustain measles transmission and that an epidemic of up to 100 000 cases of measles could occur. This led the Chief Medical Office to announce a national catch-up campaign to offer MMR to any individuals under 18 years of age. The impact of this programme on coverage in older children is unclear, but cases of measles declined in late 2009 and remained low in 2010.

By 2010, the attitudinal tracking showed that confidence of parents had increased, with only 8% believing that MMR vaccine posed a greater risk than the diseases it protects. Efforts to increase MMR coverage in preschool children have also been increasingly successful, particularly in the London area. Quarterly data on MMR coverage at 2 and 3 years of age were last published for the quarter October–December 2012. By 24 months, 92.4% of English children had received their first dose of the MMR vaccine and by the age of 5 years, the proportion was 94.1%, the highest level ever recorded. For London, 87.1% of 2-year-olds and 90.9% of 5-year-olds have had at least one dose of vaccine.

Despite this improvement in coverage, measles cases increased in 2011, initially in association with a much larger epidemic in France. Monthly numbers of confirmed cases have remained high ever since, and a total of 1920 cases were confirmed in England in 2012, the highest number since 1994. In April 2013, a large outbreak was reported from Wales, with 693 cases in the Swansea area alone. In England, 1168 cases were confirmed, between January and May 2013 (http://www.hpa.org.uk/hpr/archives/2013/news/ 2813.htm#msls) but the most notable change was a shift in age distribution, with the highest number of cases in 10–14-year-olds. Teenagers were also the focus in Wales, because these cohorts were most affected by the decline in coverage—which reached the lowest level for 2-year-olds in 2003/04 and in 5-year-olds in 2006/07 (figure 1). These children were born between April 2001 and March 2002 and would have started to enter secondary school in September 2012. The most likely reason therefore for the increase in cases in 2013 is that sustained historic low coverage has led to the accumulation of sufficient measles.
susceptibles to allow transmission in the secondary school environment. The higher potential for transmission in secondary schools has also been demonstrated by outbreaks in the north-east and north-west, although younger children in known low coverage groups still feature in other parts of the country.

Paediatricians need to be aware of measles and promptly report cases to the local health protection teams based on Public Health England (PHE) Centres (https://www.gov.uk/government/publications/phe-centre-addresses-and-phone-numbers). When a case of suspected measles is reported and/or notification of suspected measles is reported and/or a vaccination campaign was initiated in October 2013 Vol 98 No 10 753

Figure 1 Coverage of first-dose MMR in England from 1997–98 to 2011–12.

To prevent a similar epidemic in England, the Department of Health, PHE and NHS England have announced an MMR catch-up programme. The primary focus on the programme will be to target unvaccinated children aged 10–16 years with the aim of preventing outbreaks in secondary schools and therefore onward transmission to young infants and other vulnerable groups. The strategy includes raising demand through targeted communications, identification of unvaccinated children through general practice and child health registers, and provision of vaccination in general practice or other settings such as schools. In support of this, the Royal College of Paediatric and Child Health has recently written to members urging them to use every opportunity to promote vaccination with their patients and their families.3

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