What a difference a vaccine makes

While vaccination has been successful in bringing many diseases under control in Ireland, there is still no room for complacency, writes Siobhan MacDermott

**IMMUNISATION** against infectious disease is considered to be one of the most successful and cost effective public health interventions available. Immmunisation programmes have proven to have a significant beneficial effect on children’s health and therefore the health of the community as a whole. The goal of immunisation is not only to prevent disease but also to eradicate it and therefore protect the whole population.

**Measles**

Measles is a highly contagious acute viral illness. Symptoms occur after an incubation period of six to 19 days. The prodromal (warning signs) period of two to four days typically includes a pyrexia over 38.5°C, cough, cold, malaise and conjunctivitis. Koplik’s spots (white spots on a red background) appear on the buccal mucosa a day or two before the rash develops.

Complications are well documented and include otitis media, pneumonia and post-measles encephalitis. Measles is a notifiable disease that can be potentially fatal.

The introduction of the MMR vaccine in 1988 in Ireland has resulted in a huge reduction in the disease burden of measles, mumps and rubella. However in 1993 an alarming rise in cases of measles, particularly in adolescents and young adults, demonstrated the need for improved coverage in Ireland.

Again in 1999-2000 over 1,600 cases of the disease were reported with three associated deaths.

Increasing public scepticism, fears over MMR vaccine and poor vaccination records were blamed for the fall in vaccination rates. Vaccination rates in Ireland fell to 63%-72% while the international accepted level for controlling measles is 95%.

Several strategies were employed at the time to encourage parents to vaccinate their children, including mandatory vaccination prior to commencing school. In addition increased education and training of healthcare workers involved in immunisation programmes was called for to improve vaccination coverage.

**Pertussis**

Such moves to improve immunisation coverage have led to record high rates of immunisation and record low levels of morbidity from vaccine-preventable diseases apart from pertussis. Pertussis, or whooping cough, is a highly infectious bacterial disease caused by Bordella pertussis. Epidemics follow a cyclical pattern peaking every two to five years.

The disease usually occurs in children under the age of one, starting with a catarrhal stage which is the most infectious period, followed by an irritating cough that develops into paroxysms of coughing. These spasms have a characteristic ‘whoop’ and are usually accompanied by vomiting.

Complications of the disease can be severe and include bronchopneumonia, cerebral hypoxia resulting in seizures and encephalopathy. A steady decline in mortality was accelerated following the introduction of pertussis vaccine (DTP) in 1952 in Ireland.

However in the 1970s, fears that pertussis vaccination induced brain damage caused levels to drop to an alarming 30%.

Since then there has been an overall resurgence in pertussis followed with a shift towards adolescents and young adults. Suggested reasons for the resurgence include:

- Genetic changes in pertussis making vaccines less effective
- Reduced potency of vaccine
- Waning of vaccine immunity
- Increase in reported pertussis due to greater awareness
- Improved diagnostic testing.

The increase in pertussis in the adult population is worrying as those symptomatic adults are a common source of infection for children where the disease is most debilitating. In recent years an adult booster has been suggested with the aim of eliminating the disease from the population.

**Haemophilus influenza type B (Hib)**

Haemophilus influenza type B (Hib) was the most common cause of severe childhood infection in developed countries and responsible for significant morbidity and mortality rates in young children. However, since the introduction of routine vaccination for Hib in Ireland in 1992, a
However, childhood immunisation and therefore the health of the community. The risk of infection is greatest in children under 12 months and particularly at six to 12 months. The majority of cases (95%) occur in children under five years of age. Clinical manifestations include otitis media, epiglottis, septicemia, septic arthritis, cellulitis or osteomyelitis. Meningitis is the most invasive presentation of this disease with the greatest risk of complications in children aged six to 12 months.

Reports of an increased number of Hib cases that emerged in the UK and Ireland in recent years predominantly in fully vaccinated children have caused concern. In July 2005, the National Immunisation Advisory Committee in Ireland (NIAC) recommended that children who had been vaccinated against Hib, should receive a booster vaccine. It made this recommendation after a small number of children developed the disease despite being vaccinated against it. A nationwide campaign offering a Hib booster vaccine to children aged between one and four years followed, commencing last November.

Prevention

Immunisation programmes have long since proven beneficial to children's health and therefore the health of the community. However, childhood immunisation can be a great source of confusion and anxiety to parents and parental education is essential to increase the uptake rates. Research conducted in Ireland in 2001 showed that while immunisation uptake appeared to be better than expected (91%), only two thirds of the parents (67%) felt they made an informed choice about their child’s immunisation. The study also indicated that parents were often unaware of the seriousness of vaccine preventable diseases. Most of the vaccine preventable diseases are so rare now that parents no longer have any experience of them, however, a drop in the uptake will have serious consequences on child health with outbreaks of the diseases.

Parents are often confused about which vaccinations their children have received. Immunisation records do not necessarily have to be computerised to be effective. However paper-based or card systems for vaccination records allow room for error. Whatever system of recording is used, it should allow for a method to measure childhood immunisation status and allow healthcare workers to follow up unvaccinated children. Children’s nurses are in a prime position to educate and advise parents about the benefits and risks of vaccination. The goal is to ensure that parents’ concerns are being addressed and confidence in the immunisation programmes maintained.

Health professionals must ensure that parents/carers have access to current information on vaccination and that they are given sufficient opportunity to discuss any issues or concerns arising. In addition parents should be offered clear information on new vaccines, any side effects and how to treat them. Staff involved in immunisation programmes must be fully equipped with knowledge and safe practice surrounding immunisation.

Vaccination has proved a highly effective way of preventing death and severe disability related to diseases in young children. Improving and maintaining high rates of immunisation should remain a high priority for all healthcare staff.

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References
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6. Papania M, Rodewald L. For better immunisation coverage, measure coverage better. The Lancet 2006; 367(9515)
8. Tohani VK, Boyle G, Moore T. Haemophilus influenzae type b (Hib) vaccination and uptake predictors in Northern Ireland, 1996; 1; 6(3): R52-54

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Transmission</th>
<th>Avoidance of contact</th>
<th>Recommendations for Immunisation</th>
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<tbody>
<tr>
<td>Measles</td>
<td>Erythematos red macular rash appearing behind ears before spreading to face, trunk and limbs</td>
<td>Spread by droplets infection</td>
<td>Infectious five days before to four days after rash appears</td>
<td>MMR at 12-15 months Repeat at school entry (4-5 years) Or 11-12 yrs (if not given at 4-5 years)</td>
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<tr>
<td>Mumps</td>
<td>Swelling of one or more salivary glands usually parotid</td>
<td>Spread by direct or droplet infection</td>
<td>Approx 6 days to 10 days after onset of symptoms Max infectivity 1-2 days before to 5 days after onset of symptoms</td>
<td>MMR at 12-15 months Repeat at school entry (4-5 years) Or 11-12 yrs (if not given at 4-5 years)</td>
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<tr>
<td>Rubella</td>
<td>Mild disease, pyrexia, generalised rash erythematous, maculopapular particularly in cervical region</td>
<td>Spread by direct or droplet infection</td>
<td>Infection in pregnancy can cause congenital defects Infectious one week before to one week after onset of rash</td>
<td>MMR at 12-15 months Repeat at school entry (4-5 years) Or 11-12 yrs (if not given at 4-5 years)</td>
</tr>
<tr>
<td>Haemophilus Influenza type B (Hib)</td>
<td>Clinical manifestations include meninges, otitis media, epiglottis, septicemia, septic arthritis, cellulitis or osteomyelitis</td>
<td>Spread by droplet infection person to person</td>
<td></td>
<td>Hib immunisation given at 2, 4 and 6 months Booster now offered between 1 and 4 years</td>
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<tr>
<td>Pertussis (whooping cough)</td>
<td>Irritating cough that develops into paroxysms of coughing</td>
<td>Close contact droplet infection (respiratory)</td>
<td>7-10 days before cough</td>
<td>Given in DTP vaccination at 2, 4 and 6 months Booster DPT at 4-5 years</td>
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