Improving our strategy to prevent and control measles outbreaks

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Like many countries in the Western world, New Zealand has been facing regular outbreaks of measles infection with increasing incidence. The Institute of Environmental Science and Research (ESR) reports that for the 12 months ending September 2014 there were 285 notifications of measles over the last 12 months (2013) giving a rate of 6.4 cases per 100,000 population, a statistically significant increase.¹ The ESR Report from 2012 states that 55% of measles cases were in children under 3 years of age, which matched the fact that 55% of confirmed cases had received 0–1 dose of MMR vaccine.²

The Immunisation Sub-Committee of the Pharmacology and Therapeutics Advisory Committee (PTAC), at its meeting of 23 April 2013, recommended that the issue of the timing of the measles vaccine be revisited if new data became available to demonstrate long-term efficacy. We present below new evidence within the context of existing data and consider its implications for measles outbreak policy changes in New Zealand.

Those at highest risk of measles infection are infants under 12 months of age. However, the current Immunisation Schedule gives the first dose of MMR vaccine at 15 months of age and a booster dose at 4 years of age.

A 2015 analysis to determine the optimal age of measles immunisation, published in the BMJ, has concluded:

An early two dose schedule at 4–5 months and 9 months of age would have been better in terms of reducing child mortality.³

This is in line with the current policy of the French High Council for Public Health from 2013, which recommends infants 6–11 months are vaccinated with measles where they are contacts of measles cases.⁴ The usual MMR vaccination in these cases would remain unchanged.

The Pan American Health Organization (PAHO) has eliminated measles in South America by applying a measles ‘catch-up’ campaign for children >9 months of age.⁵

The Edmonston-Zagreb (EZ) strain of measles vaccine is the only measles vaccine strain proven to be effective for infants from the age of 4.5 months⁶ and to be effective during an outbreak.⁷ The authors of the outbreak immunisation study recommended the following policy implications of their research:

In situations where control of outbreaks is needed, the Edmonston-Zagreb vaccine could be used to immunise young household contacts who may have some maternal antibodies but not enough to prevent them from becoming infected when exposed at home and to transmit the virus.⁷

There is some evidence that in infants aged 4–6 months of age the EZ strain is significantly more effective than the Schwartz strain in terms of seroconversion (62% versus 35%),⁸ although this study used both subcutaneous and the less effective intranasal formulations. There was no difference in survival demonstrated at 5-year follow-up.⁹ The NEJM reported the results of vaccination of 1,061 6-month old infants randomly assigned to either EZ or Schwartz strains of measles vaccine.¹⁰ The seroconversion rate in 6-month-old infants for standard dose EZ vaccine 18 weeks after vaccination was 92% compared with 66% for Schwartz vaccine.

A 2013 study published in JAMA Paediatrics found that if the first dose of MMR
vaccine was given at 12–24 months of age there was a significant 2-fold increase in the risk of febrile seizure compared to infants who received the measles vaccine only. The study also reported that infants 12–13 months of age receiving the measles vaccine had roughly half the rate of febrile seizures as the older children in the 19–23 month age group. Thus, the risk of febrile seizures is significantly reduced with a single measles vaccine given at a younger age group of infants by as much as 4-fold. For this reason alone, a single measles vaccine for infants 4.5 months and 9 months is a preferred option during an outbreak compared with MMR vaccine booster.

The EZ measles vaccine is produced from human diploid cells and can therefore be given safely to infants and children who are potentially allergic to chicken proteins. The EZ measles vaccine produced by the Institute of Immunology in Zagreb (IMZ) has GMP Certification from the Croatian Regulator (HALMED) which is a Competent Authority recognised by the EMA. New Zealand has a Mutual Recognition Agreement with the European Community which recognises conformity testing by Competent Authorities.

We submit that measles outbreaks in New Zealand can be better prevented and controlled by including in the National Immunisation Schedule:

• Single EZ measles vaccination to infants 4.5 months and 9 months of age with MMR vaccinations remaining unchanged at 15 months and 4 years
• Single EZ measles vaccination to contacts of measles cases where outbreaks occur, including infants as young as 4.5 months of age.

New Zealand has the opportunity to effectively eliminate measles, as South America, has by implementing the above strategy. The global elimination of measles remains an overdue stated WHO objective.

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