



## Routine Varicella Vaccination?

### Introduction

In the 2006 edition of the New Zealand Immunisation Handbook<sup>1</sup> it is stated that varicella vaccine has not been added to the immunisation schedule because of “the costs, and the undesirability of adding another injection or immunisation visit to the schedule.” It is further stated, “When a tetravalent MMRV vaccine becomes available this recommendation could change”. Two MMRV vaccines are close to being considered for licensure; the time for considering change is coming.

Chickenpox, familiar to us all, is usually a mild and somewhat inconvenient illness of childhood with a characteristic rash. It can be a severe illness, however, with pneumonia, ataxia, encephalitis and super-infection with group A streptococci complicating it, resulting in hospitalisation and occasionally death. In those who are immune compromised severe illness is more likely, although most hospitalisations are healthy people. The illness generally increases in severity with increasing age.

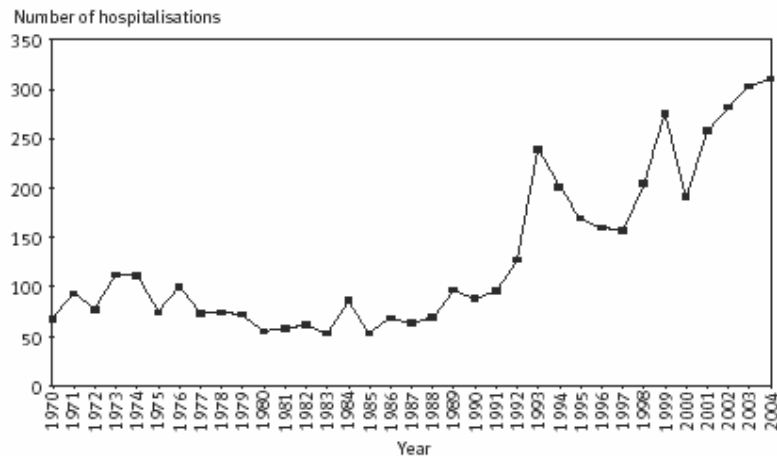
Shingles or herpes zoster occurs when the virus, latent in the dorsal root ganglion, reactivates resulting in a painful, unilateral, dermatomal, vesicular rash usually resolving in 2 - 4 weeks. In some individuals the pain persists for several months as post herpetic neuralgia. It has been estimated that 15% of individuals develop herpes zoster over their lifetime with a sharp increase in incidence beginning around 50 years<sup>2</sup>.

### Epidemiology of varicella

In temperate countries such as New Zealand, 90% of the population has been infected by the varicella virus by age 14 and almost everyone (97%) by the age of 40<sup>1</sup>. The average age of infection is seven years with 8-9% of the population being infected annually throughout childhood.

There has been a steady increase in hospitalisation for varicella in New Zealand from approximately 50 per annum in 1970 to approximately 300 in 2004.

Figure 17.1: Hospitalisations for varicella, 1970–2004



Approximately one death a year is attributed to varicella in New Zealand<sup>1</sup>, similar to rates seen in Australia and the USA<sup>3,4</sup>.

### Vaccination

The purpose of varicella vaccination is to reduce the incidence of chickenpox, in particular severe illness and death. Reducing its incidence will lead to less time off school and work.

Two varicella vaccines are licensed in New Zealand, both highly effective in preventing disease, particularly more severe disease<sup>5-7</sup>. Both are well tolerated with adverse events being mild and self-limiting. Around 15% develop mild tenderness at the injection site, 14% develop a mild fever and 5% develop a papulo-vesicular rash 7-21 days following vaccination.

To obtain licensure for an MMRV vaccine, a company would have to present data demonstrating that the efficacy and safety profile of that vaccine is similar to the response to MMR and varicella vaccines administered separately.

### Experience in the USA

Varicella vaccination has been in widespread use in the USA since 1995 resulting in a substantial decline in chickenpox incidence and hospitalisation and death caused by it<sup>4</sup>. For example, with vaccine coverage around 75%, the incidence of varicella in four states declined by 67 - 82% in 2001 compared to the incidence in 1990-94<sup>8</sup>.

In outbreak studies, although breakthrough varicella occurs and the vaccine does not fully protect against all varicella, it does offer a high level of protection against severe varicella. For example, in an outbreak in vaccinated children in an elementary school in Nebraska vaccine efficacy, calculated by comparing incidence in vaccinated and unvaccinated students with no history of clinical varicella, was 81% for varicella of any severity and 93% for moderate to severe disease<sup>9</sup>.

In a ten year follow up of ~ 2,000 healthy children aged 12 months to 12 years with no history of varicella who were randomised to receive one or two doses of varicella vaccine most cases of varicella which occurred after vaccination were mild; < 50 lesions. No complications were reported and no individual had > 300 lesions. Based on historic data from susceptible unvaccinated children estimated efficacy against

any varicella of one dose was 94.4% and two doses 98.3%. Measurable serum antibody persisted for 9 years in all subjects<sup>10</sup>.

### **Zoster**

There is a theoretical risk that zoster incidence could rise temporarily after universal varicella vaccination because of a lack of boosting of immunity from regular contact with VZV<sup>11 - 13</sup>. An increase in incidence of zoster in the USA following the introduction of childhood varicella vaccination has not been seen to date, despite a significant decrease in chickenpox, but it is probably too early to be confident that it will not occur<sup>14</sup>.

A vaccine against Zoster has recently been licensed in the USA – it is based on Merck varicella vaccine but has a much higher titre. In the population studied of 38,546 adults aged 60 years or older, randomised to receive a single dose of vaccine or placebo, it caused a 51.3% reduction in the incidence of Zoster over the approximately 3 years of the study. Further, it resulted in a reduction of the burden of illness due to herpes zoster by 61.1% and incidence of post herpetic neuralgia by 66.5%. The vaccine was well tolerated but it did cause injection site reactions<sup>15</sup>.

### **Cost effectiveness**

Scuffham et al<sup>16</sup> assessed the cost effectiveness of a single dose of varicella vaccine administered to the birth cohort of New Zealand children at 15 months of age over a 30 year period. They assessed that for every health dollar spent the return would be 0.67 cents in health care cost and \$2.79 in societal costs, mainly in work-loss averted.

### **Other Countries**

Much of the experience with varicella vaccination comes from the USA. Some other countries have recommended universal vaccination, notably Australia where from November 2005 varicella vaccination will be funded for use in all susceptible children at 18 months and 10 -13 years<sup>3</sup>.

### **Conclusion**

A strong case can be made for the introduction of varicella vaccine to the childhood immunisation schedule, most likely as a single dose of MMRV at 15 months. Efficacy, safety and cost effectiveness data support this. There are several other vaccine candidates for inclusion in the schedule, however, and the case for varicella vaccine will have to be considered alongside those for pneumococcal conjugate, rotavirus and HPV vaccines. A catch up strategy, offering vaccine to susceptible children at ages 4 and 11 years, merits consideration.

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