

# Immunisation for the low birth weight and preterm baby

for Health Professionals...

Preterm infants and other babies with a low birth weight should be immunised according to the recommended schedule at the appropriate chronological age and with the usual vaccine dosage.<sup>1,2</sup> Preterm infants have acquired a lower concentration of transplacental maternal antibodies.<sup>3</sup> This equates to less protection against a range of diseases (than full term infants). Gestational age and birth weight are not limiting factors when deciding whether a clinically stable preterm infant is to be immunised on schedule.<sup>4</sup>

Preterm infants (<37 weeks gestation) and low birth weight infants (<2500g) are at greater risk of morbidity and mortality associated with vaccine preventable diseases. Delaying immunisation leaves infants vulnerable to several serious diseases. The apparent frailty or small size of a baby is sometimes mistakenly considered a reason to give reduced doses of vaccines or to delay vaccinating until they are older. There have been a number of studies evaluating the safety, immunogenicity and efficacy of the childhood vaccines in preterm and low birth weight infants.<sup>1,2,5-8</sup> It is recommended that low birth weight and preterm babies receive on-time, full doses of all routinely recommended childhood vaccines. Although there are some aspects of the infant immune system that are relatively immature, preterm infants are still able to mount a strong response against a wide range of pathogens and vaccines.<sup>3</sup> Studies show preterm and low birth weight infants do not experience vaccine adverse events any more frequently than full term infants.<sup>5,9</sup>

## Definitions

- 'Low birth weight' refers to infants born at <2500 grams.
- 'Very low birth weight' to infants born at <1500g.
- 'Extremely low birth weight' to infants born at <1000g.
- 'Preterm birth' or 'preterm infant' refers to an infant born prior to 37 weeks gestation as calculated from the last menstrual period (LMP).<sup>10</sup>
- 'Full term' or 'term' infants are infants born on or after 37 weeks gestation from the LMP.

## Hepatitis B

Infants of hepatitis B carrier mothers.

Unimmunised infants of carrier mothers infected at birth have up to a 90% risk of becoming a hepatitis B carrier, with subsequent lifelong risk of liver cancer and cirrhosis. Some studies have suggested that immunologic response to hepatitis B vaccine is improved if the infant is more than 2000g at the time of administration.<sup>1,11,12</sup> However, preterm infants born to mothers who carry the hepatitis B virus, regardless of their birth weight, need to receive both hepatitis B vaccine and hepatitis B immunoglobulin (HBIG) within 12 hours of birth.<sup>4</sup> Subsequent doses of hepatitis B vaccine should continue at the recommended chronological ages.

In New Zealand, a blood test for serology is recommended at five months of age for all infants of carrier mothers to test for evidence of protection.<sup>6</sup>

## Diphtheria, tetanus, pertussis, polio, Hib and hepatitis B

Infants of non-carrier hepatitis B mothers.

For medically stable preterm infants, hepatitis B component vaccine should be given at the appropriate chronological age regardless of their birth weight.<sup>1</sup> Studies confirm that the chronological age of the medically stable preterm infant at the time of the first dose of hepatitis B vaccine is the best predictor of successful seroconversion regardless of birth weight or gestational age at birth.<sup>4</sup> By six weeks of age, all preterm infants regardless of initial birth weight or gestational age, are likely to respond as adequately as older and larger infants.<sup>11-13</sup> The DTaP-IPV-HBV/Hib vaccine is generally well tolerated in preterm infants.<sup>2</sup> Preterm birth is associated with increased risk of complications and death from pertussis in infancy.<sup>4</sup> Infants should receive the usual scheduled vaccine doses for their chronological age.<sup>1,9</sup> It is important to protect these infants as early as possible, as New Zealand continues to experience high rates of this disease. A series of studies indicate that acellular pertussis vaccines are immunogenic and efficacious in preterm infants.<sup>5,8</sup> Safety of these vaccines in low birth weight and preterm babies is comparable to that in full term infants.<sup>5,7,9,10</sup>

Apnoea after whole cell pertussis vaccine has occasionally been reported in extremely low birth weight infants (<1000g), or those born at less than 31 weeks gestation.<sup>5</sup>

Apnoea has not been observed after acellular pertussis vaccines<sup>5</sup>, which is now routinely used in New Zealand. However, observation of extremely low birth weight infants (<1000g) should be considered for up to 72 hours after immunisation until further data can confirm a pattern of safety.<sup>14</sup> Recent data suggests that very low birth weight infants (<1500g) have the ability to mount antibody response to the Hib component of the combination vaccine.<sup>2</sup>

## Tuberculosis (BCG)

BCG vaccination is administered soon after birth to infants who meet the criteria. (Refer to the New Zealand Immunisation Handbook 2006 under topic heading 'Tuberculosis' for more information.) Eligible preterm infants who meet the criteria should be considered for BCG.<sup>6</sup>

## Influenza

All preterm infants are at higher risk of complications from influenza virus infection and should be offered influenza vaccine from six months of age and onwards.<sup>1</sup> All infants (and children under nine years of age) receiving influenza vaccine for the first time will require two doses of vaccine administered one month apart.<sup>4</sup>

## Invasive pneumococcal disease

Pneumococcal vaccine is well tolerated and has a good safety profile.<sup>15</sup> All preterm and all low birth weight babies are considered to be at increased risk for invasive pneumococcal disease and are therefore recommended to follow the New Zealand Immunisation Schedule for appropriate doses of pneumococcal vaccine.<sup>1</sup> Preterm infants have similar rates of local reactions and fever as term infants.<sup>7</sup> Mild reactions such as redness and swelling (>3cm) after the third dose were observed more commonly in low birth weight infants than normal birth weight infants.<sup>8</sup>

## Rotavirus

Recent data suggest that preterm infants are at increased risk for hospitalisation from rotavirus during the first one to two years of life.<sup>11</sup> In clinical trials, rotavirus vaccine appeared to be generally well tolerated in preterm infants, although in comparison with term infants, a relatively small number of preterm infants have been evaluated.<sup>16</sup>

The benefits of rotavirus vaccination of preterm infants outweigh the risks of adverse events and preterm infants should be vaccinated according to the same schedule as full term infants.<sup>16</sup>

However, the following conditions should be met:

- the infant's chronological age is at least six weeks,
- the infant is clinically stable,
- due to theoretical potential for horizontal transmission of virus because this is a live vaccine<sup>11,16</sup> the vaccine should be administered at the time of discharge or when possible after discharge from the neonatal intensive care unit or hospital.<sup>16</sup>

Provided these conditions are met, rotavirus vaccine may be given at any time before, concurrently, or following the administration of any blood transfusion or blood product, including antibody-containing product.<sup>16</sup>

## Summary

Premature and low birth weight infants are at greater risk for mortality and morbidity from vaccine preventable diseases. Preterm infants respond safely and effectively to vaccination. Preterm infants and other babies with a low birth weight should be immunised according to the recommended schedule at the appropriate chronological age (not their gestational age) and with the usual vaccine dosage.

## Other considerations

Live vaccines must be delayed in infants who have received a blood transfusion or blood product, with the exception of rotavirus vaccine.<sup>16</sup> The time delay will vary depending upon the treatment. Live vaccines that may be given during the first year of life include: BCG, rotavirus and varicella vaccines and MMR on some occasions.

## Injection administration

In very small infants the use of needles with lengths of 5/8 inch or less given intramuscularly to deep anterolateral thigh are the most appropriate to ensure effective and safe administration.<sup>1</sup>

## References and further reading

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