

# Routine primary immunisation using a longer needle resulted in fewer local reactions in infants

Diggle L, Deeks J. Effect of needle length on incidence of local reactions to routine immunisation in infants aged 4 months: randomised controlled trial. *BMJ* 2000 Oct 14;321:931-3.

**QUESTION:** When giving routine immunisations to infants, does needle length affect the incidence of local reactions?

## Design

Randomised (allocation concealed\*), blinded (outcome assessors)\*, controlled trial with follow up to 3 days.

## Setting

8 general practices in Buckinghamshire, UK.

## Participants

119 healthy infants attending routine immunisation clinics. Exclusion criteria were those applicable to children receiving primary immunisations. 92% of infants (58% boys) completed follow up.

## Intervention

58 infants were allocated to receive their third dose of diphtheria, pertussis, and tetanus and *Haemophilus influenzae* type b vaccines (due at 16 wk) given with a 23 gauge, 25 mm (longer) blue hub needle; 61 were allocated to vaccine administration with a 25 gauge, 16 mm (shorter) orange hub needle. Practice nurses were instructed to inject into the anterolateral thigh, stretching the skin taut and inserting the needle at a 90° angle to the skin up to the hub.

## Main outcome measures

Parent recording of redness, swelling, and tenderness at 6 hours and at 1, 2, and 3 days after immunisation.

## Main results

Infants who were vaccinated with the longer needle had lower rates of any local reaction than infants vaccinated with the shorter needle; specifically, infants vaccinated with the longer needle had lower rates of redness and swelling at 6 hours and at 1, 2, and 3 days (table). The groups did not differ for tenderness at any time point.

## Conclusion

Infants who had their 16 week primary immunisation given with a longer needle had lower rates of local redness and swelling for up to 3 days than did those who had immunisations given with a shorter needle.

\*See glossary.

Longer v shorter needle for giving routine immunizations to infants†

Outcomes	Longer needle	Shorter needle	RRR (95% CI)	NNT (CI)
Any local reaction up to 3 days	62%	84%	26% (7 to 43)	5 (3 to 19)
Redness at 6 hours	40%	60%	34% (3 to 56)	5 (3 to 81)
At 1 day	28%	63%	55% (30 to 73)	3 (2 to 7)
At 2 day	9%	39%	76% (43 to 90)	4 (3 to 8)
At 3 day	4%	28%	87% (51 to 96)	5 (3 to 9)
Swelling at 6 hours	23%	58%	61% (35 to 78)	3 (2 to 6)
At 1 day	28%	63%	55% (30 to 73)	3 (2 to 7)
At 2 day	19%	51%	63% (34 to 80)	4 (3 to 7)
At 3 day	13%	40%	67% (33 to 85)	4 (3 to 10)

†Abbreviations defined in glossary; RRR, NNT, and CI calculated from data in article.

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A modified version of  
this abstract also  
appears in  
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## COMMENTARY

Diggle and Deeks report on the reactogenicity of a vaccine that has since been replaced in many countries by newer vaccines that produce only about one third of the local reactions.<sup>1</sup> This fact, however, should not detract from the importance of their observation: to achieve high vaccination rates, acceptance of immunisation still needs to be improved, especially by minimising adverse events.

The choice of an appropriate injection site and the use of needles that are long enough to ensure complete intramuscular vaccine deposition will reduce the number and severity of local reactions.<sup>2</sup> Ultrasonographic data suggest that a needle length of 16 mm is sufficient to reach the middle of the muscle layer and yet short enough to avoid damage to the bone, vessels, and nerves in an infant's thigh.<sup>3</sup> A short needle should be adequate when using the World Health Organisation (WHO) recommended injection technique: skin and soft tissue are left in place when inserting the needle at a right angle to the femur. A longer needle may be required if it is inserted at an angle of 45° in the compressed muscle. Unfortunately, no studies have compared the safety of these needles and injection techniques with respect to damage of deep anatomical structures.

Diggle and Deeks showed that the 25 mm needle was the better choice, even for the WHO injection technique. Manufacturers should consider including longer needles in their vaccine kits. Continued use of the shorter needle may be advisable for premature infants with birthweights < 1500 g who are vaccinated, as recommended, according to their chronological age.

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