

2003; Parker, Schwartz, Todd, et al, 2004; Price, Thompson, Goodson, et al, 2010; Schultz, 2010). The Institute of Medicine (2004), following an in-depth 3-year study, concluded that there was no link between autism and the MMR vaccine or vaccines containing the preservative thimerosal. The influenza vaccine does not contain any additives such as thimerosal.

With inactivated antigens, such as DTaP, side effects are most likely to occur within a few hours or days of administration and are usually limited to local tenderness, erythema, and swelling at the injection site; low-grade fever; and behavioral changes (drowsiness, fretfulness, eating less, prolonged or unusual cry). Local reactions tend to be less severe when a needle of sufficient length to deposit the vaccine in the muscle is used (see [Atraumatic Care](#) box). Rarely, more severe reactions may occur, especially with pertussis and varicella. Reactions to DTaP tend to be more severe if they occurred with a previous immunization.

Atraumatic Care

Immunizations

Needle length is an important factor and must be considered for each individual child; fewer reactions to immunizations are observed when the vaccine is given deep into the muscle rather than into subcutaneous tissue. Contrary to previous belief, deep intramuscular tissue has a better blood supply and fewer pain receptors than adipose tissue, thus providing an optimum site for immunizations with fewer side effects ([Zuckerman, 2000](#)).

- Recommended needle length for newborn to 2 months old is 16 mm ($\frac{5}{8}$ inch).
- Select a needle of adequate length (25 mm [1 inch] in infants) to deposit the antigen deep in the muscle mass.
- Toddlers and older children require a needle length of 16 to 25 mm ($\frac{5}{8}$ to 1 inch) for deltoid, or 25 to 32 mm (1 to 1 $\frac{1}{4}$ inches) for vastus lateralis ([Schechter, Zempsky, Cohen, et al, 2007](#)).