

metabolize drugs more rapidly than adults and show great variability in drug elimination and side effects ([Oakes, 2011](#)). Younger children may require higher doses of opioids to achieve the same analgesic effect. Therefore the therapeutic effect and duration of analgesia vary. Children's dosages are usually calculated according to body weight, except in children with a weight greater than 50 kg (110 pounds), where the weight formula may exceed the average adult dose. In this case, the adult dose is used.

A reasonable starting dose of an opioid for infants younger than 6 months old who are not mechanically ventilated is one fourth to one third of the recommended starting dose for older children. The infant is monitored closely for signs of pain relief and respiratory depression. The dose is titrated to effect. Because tolerance can develop rapidly, large doses may be needed for continued severe pain. If pain relief is inadequate, the initial dose is increased (usually by 25% to 50% if pain is moderate, or by 50% to 100% if pain is severe) to provide greater analgesic effectiveness. Decreasing the interval between doses may also provide more continuous pain relief.

A major difference between opioids and nonopioids is that nonopioids have a **ceiling effect**, which means that doses higher than the recommended dose will not produce greater pain relief. Opioids do not have a ceiling effect other than that imposed by side effects; therefore, larger dosages can be safely given for increasing severity of pain.

Parenteral and oral dosages of opioids are not the same. Because of the first-pass effect, an oral opioid is rapidly absorbed from the gastrointestinal tract and is partially metabolized in the liver before reaching the central circulation. Therefore oral dosages must be larger to compensate for the partial loss of analgesic potency to achieve an equal analgesic effect. Conversion factors ([Table 5-10](#)) for selected opioids must be used when a change is made from intravenous (IV) (preferred) or intramuscular (IM) to oral. Immediate conversion from IM or IV to the suggested equianalgesic oral dose may result in a substantial error. For example, the dose may be significantly more or less than what the child requires. Small changes ensure small errors.