medications that they administer to children, as well as the expected actions, possible side effects, and signs of toxicity. Unlike with adult medications, there are few standardized pediatric dosage ranges, and with a few exceptions, drugs are prepared and packaged in average adult-dosage strengths.

Factors related to growth and maturation significantly alter an individual's capacity to metabolize and excrete drugs. Immaturity or defects in any of the important processes of absorption, distribution, biotransformation, or excretion can significantly alter the effects of a drug. Newborn and premature infants with immature enzyme systems in the liver (where most drugs are broken down and detoxified), lower plasma concentrations of protein for binding with drugs, and immaturely functioning kidneys (where most drugs are excreted) are particularly vulnerable to the harmful effects of drugs. Beyond the newborn period, many drugs are metabolized more rapidly by the liver, necessitating larger doses or more frequent administration. This is particularly important in pain control, when the dosage of analgesics may need to be increased or the interval between doses decreased.

Various formulas involving age, weight, and **body surface area (BSA)** as the basis for calculations have been devised to determine children's drug dosages. Because the administration of medication is a nursing responsibility, nurses need to have not only knowledge of drug action and patient responses but also resources for estimating safe dosages for children. Children's dosages are most often expressed in units of measure per body weight (mg/kg). Some medications, such as chemotherapy, are more precisely dosed using BSA. The ratio of BSA to weight varies inversely with length; therefore, an infant who is shorter and weighs less than an older child or adult has relatively more BSA than would be expected from the weight. BSA is based on the **West nomogram** and is easily determined using conversion programs widely available on the Internet.

Checking Dosage

Administering the correct dosage of a drug is a shared responsibility between the practitioner who orders the drug and the nurse who carries out that order. Children react with unexpected severity to some drugs, and ill children may be especially sensitive