et al, 2013). Other gram-negative organisms associated with UTI include *Proteus mirabilis, Pseudomonas aeruginosa, Klebsiella,* and *Enterobacter.* Gram-positive bacterial pathogens include *Enterococcus, Staphylococcus saprophyticus,* and, rarely, *Staphylococcus aureus.* Viruses and fungi are uncommon causes of UTI in children. Most uropathogens originate in the gastrointestinal tract, migrate to the periurethral area, and ascend to the bladder. A number of factors contribute to the development of UTI, including anatomic, physical, and chemical conditions or properties of the host's urinary tract.

Anatomic and Physical Factors

The structure of the lower urinary tract has traditionally been thought to account for the increased incidence of bacteriuria in females. The short urethra, which measures about 2 cm (0.75 inch) in young girls and 4 cm (1.6 inches) in mature women, provides a ready pathway for invasion of organisms. In addition, the closure of the urethra at the end of micturition may return contaminated bacteria to the bladder. The longer male urethra (as long as 20 cm [8 inches] in an adult) and the antibacterial properties of prostatic secretions inhibit the entry and growth of pathogens. The importance of the length of the urethra in the pathogenesis of UTI has been questioned because of the high incidence of UTI in male neonates. The presence or absence of the foreskin has been shown to be a significant factor, with prevalence of UTI in infant males younger than 3 months old being 2.4% in circumcised and 20.1% in uncircumcised males (Shaikh, Morone, Bost, et al, 2008). The presence of a foreskin is associated with a preputial colonization of uropathic bacteria that can ascend the urethra easily (Balat, Karakok, Guler, et al, 2008). Virulence factors are important in the pathogenesis; and these, coupled with the propensity of bacteria to adhere to the female periurethral mucosa may explain the increased incidence of UTI in females.

Nursing Tip

Considerable evidence shows significant reductions in the risk of urinary tract infection (UTI) in the first year of life in circumcised male infants. Current evidence indicates the health benefits of