preserve renal function. Antibiotic therapy should be initiated on the basis of identification of the pathogen, the child's history of antibiotic use, and the location of the infection. Several antimicrobial drugs are available for treating UTI, but all of them can occasionally be ineffective because of resistance of organisms. Common anti-infective agents used for UTI include the penicillins, sulfonamide (including trimethoprim-sulfamethoxazole), the cephalosporins, and nitrofurantoin.

If anatomic defects such as primary reflux or bladder neck obstruction are present, surgical correction or urinary prophylaxis may be necessary to prevent recurrent infection. The aim of therapy and careful follow-up is to reduce the chance of renal scarring.

Vesicoureteral Reflux

Vesicoureteral reflux (VUR) refers to the retrograde flow of urine from the bladder into the upper urinary tract. **Primary reflux** results from congenitally abnormal insertion of ureters into the bladder; **secondary reflux** occurs as a result of an acquired condition.

Reflux increases the chance for febrile UTI but does not cause it. When bladder pressure is high enough, refluxing urine can fill the ureter and the renal pelvis. The International Reflux Study Group developed a classification system that describes the degree of reflux, ranging from Grade I to V, which is important because higher grades are associated with renal abnormalities and renal damage. Reflux with infection is the most common cause of pyelonephritis in children. These children are usually very symptomatic with high fevers, vomiting, and chills. In most cases, conservative therapy is sufficient with a high rate of spontaneous resolution of VUR over time; 51% at a mean duration of 2 years for all grades of VUR (Estrada, Passerotti, Graham, et al, 2009). Prevention of infection has been the goal with use of continuous antibiotic prophylaxis (CAP) common practice until resolution or correction of VUR. This practice was reviewed in a recent multisite trial and found to be associated with a substantially decreased risk of recurrence of UTI but not of renal scarring, leaving the use of CAP controversial (Hoberman A, Chesney RW, RIVUR Trial Investigators, 2014). Urine cultures are not recommended routinely but should be obtained if there are symptoms or unexplained fever,