

probability of disease increases to 50% for each child. In this instance, the pedigree analysis mimics an autosomal dominant mode of inheritance (*pseudodominance*). In contrast to autosomal dominant disorders, new mutations in recessive alleles are rarely manifest because they usually result in an asymptomatic carrier state.

X-LINKED DISORDERS Males have only one X chromosome; consequently, a daughter always inherits her father's X chromosome in addition to one of her mother's two X chromosomes. A son inherits the Y chromosome from his father and one maternal X chromosome. Thus, the characteristic features of X-linked inheritance are (1) the absence of father-to-son transmission and (2) the fact that all daughters of an affected male are obligate carriers of the mutant allele (**Fig. 466-13C**). The risk of developing disease due to a mutant X-chromosomal gene differs in the two sexes. Because males have only one X chromosome, they are hemizygous for the mutant allele; thus, they are more likely to develop the mutant phenotype, regardless of whether the mutation is dominant or recessive. A female may be either heterozygous or homozygous for the mutant allele, which may be dominant or recessive. The terms *X-linked dominant* and *X-linked recessive* are therefore only applicable to expression of the mutant phenotype in women. In addition, the expression of X-chromosomal genes is influenced by X chromosome inactivation.

Y-LINKED DISORDERS The Y chromosome has a relatively small number of genes. One such gene, the sex-region determining Y factor (*SRY*), which encodes the testis-determining factor (*TDF*), is crucial for normal male development. Normally, there is infrequent exchange of sequences on the Y chromosome with the X chromosome. The *SRY* region is adjacent to the pseudoautosomal region, a chromosomal segment on the X and Y chromosomes with a high degree of homology. A crossing-over event occasionally involves the *SRY* region with the distal tip of the X chromosome during meiosis in the male. Translocations can result in XY females with the Y chromosome lacking the *SRY* gene or XX males harboring