caused by involvement in the nonprimary site, usually the lymph nodes, bone marrow, skeletal system, or liver. Because of the frequency of invasiveness, the prognosis for neuroblastoma is generally poor.

The child's age and the stage of the disease (Box 25-4) at diagnosis are important prognostic factors. Survival is inversely correlated with age. If all stages are grouped together, the survival rates are approximately 80% for children younger than 1 year old and less than 50% for children older than 1 year old (Brodeur, Hogarty, Bagatell, et al, 2016). This marked difference in survival rates by age is partly accounted for by the larger proportion of very young children with stage I, II, or IV-S disease and the absence of the MYC-*N* gene amplification.

Box 25-4

Staging of Neuroblastoma

Stage I: Localized tumor that is confined to the area of origin capable of complete gross excision; representative ipsilateral lymph nodes negative for tumor microscopically (nodes that are attached to and removed with the primary tumor may be positive)

Stage II-A: Unilateral tumor with incomplete gross resection; representative ipsilateral nonadherent lymph nodes and contralateral lymph nodes negative for tumor microscopically

Stage II-B: Unilateral tumor with or without complete gross excision, with ipsilateral nonadherent lymph nodes positive for tumor; enlarged contralateral lymph nodes must be negative microscopically

Stage III: Tumor infiltrating across the midline, with or without regional lymph node involvement; or localized unilateral tumor with contralateral regional lymph node involvement; or midline tumor with bilateral lymph node involvement

Stage IV: Dissemination of tumor to distant lymph nodes, bone, bone marrow, liver, skin, and/or other organs