MEDICAL POLICY

POLICY TITLE	HEMATOPOIETIC CELL TRANSPLANTATION FOR SOLID TUMORS OF CHILDHOOD
POLICY NUMBER	MP 9.054

Effective Date:	6/1/2023

I. POLICY

Autologous hematopoietic cell transplantation may be considered **medically necessary** for:

- initial treatment of high-risk neuroblastoma,
- recurrent or refractory neuroblastoma,
- initial treatment of high-risk Ewing sarcoma
- recurrent or refractory Ewing sarcoma
- metastatic retinoblastoma
- recurrent osteosarcoma with bone-only metastases
- recurrent high-risk and very high-risk Wilms tumor

Tandem autologous hematopoietic cell transplantation may be considered **medically necessary** for high-risk neuroblastoma.

Autologous hematopoietic cell transplantation is considered **investigational** as initial treatment of low- or intermediate-risk neuroblastoma, initial treatment of low- or intermediate-risk Ewing sarcoma, and for other solid tumors of childhood including, but not limited, to the following as there is insufficient evidence to support a general conclusion concerning the health outcomes or benefits associated with this procedure:

- rhabdomyosarcoma
- Wilms tumor (other than the indication listed above)
- osteosarcoma (other than the indication listed above)
- retinoblastoma without metastasis.

The following are considered **investigational**:

- Tandem autologous hematopoietic cell transplantation for the treatment of all other types of pediatric solid tumors except high-risk neuroblastoma, as noted above.
- Allogeneic (myeloablative or nonmyeloablative) hematopoietic cell transplantation for treatment of pediatric solid tumors.

- Salvage allogeneic hematopoietic cell transplantation for pediatric solid tumors that relapse after autologous transplant or fail to respond.

There is insufficient evidence to support a general conclusion concerning the health outcomes or benefits associated with these procedures.

The National Comprehensive Cancer Network (NCCN) is a nonprofit alliance of cancer centers throughout the United States. NCCN develops the Clinical Practice Guidelines in Oncology which are recommendations aimed to help health care professionals diagnose, treat and manage patients with cancer. The National Cancer Institute's PDQ (Physician Data Query) is NCI's comprehensive source of cancer information, which includes evidence-based summaries on topics that cover adult and pediatric cancer treatment. These guidelines evolve continuously as new treatments and diagnostics emerge, and may be used by Capital Blue Cross when determining medical necessity according to this policy.

Policy Guidelines

This policy addresses peripheral neuroblastoma; those arising from the peripheral nervous system (i.e., neuroblastoma, ganglioneuroblastoma, ganglioneuroma).

Hematopoietic cell transplantation refers to any source of stem cells, i.e., autologous, allogeneic, syngeneic, or umbilical cord blood.

Relapse is defined as tumor recurrence after a prior complete response.

Primary refractory disease is defined as a tumor that does not achieve a complete remission after initial standard-dose chemotherapy.

Cross-references:
MP 9.039 Hematopoietic Cell Transplantation for Chronic Myeloid Leukemia
MP 9.042 Hematopoietic Cell Transplantation for Non-Hodgkin Lymphomas
MP 9.048 Hematopoietic Cell Transplantation for Miscellaneous Solid Tumors in Adults
MP 9.050 Hematopoietic Cell Transplantation for CNS Embryonal Tumors and Ependymoma
MP 9.055 Allogeneic Hematopoietic Cell Transplantation for Genetic Diseases and Acquired Anemias

II. PRODUCT VARIATIONS

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This policy is only applicable to certain programs and products administered by Capital Blue Cross and subject to benefit variations as discussed in Section VI. Please see additional information below.

III. DESCRIPTION/BACKGROUND

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SOLID TUMORS OF CHILDHOOD

Solid tumors of childhood arise from mesodermal, ectodermal, and endodermal cells of origin. Some common solid tumors of childhood are neuroblastoma, Ewing sarcoma/Ewing sarcoma family of tumors (ESFT), Wilms tumor, rhabdomyosarcoma (RMS), osteosarcoma, and retinoblastoma.

General Treatment

The prognosis for pediatric solid tumors has improved more recently, mostly due to the application of multiagent chemotherapy and improvements in local control therapy (including aggressive surgery and advancements in radiotherapy). However, patients with metastatic, refractory, or recurrent disease continue to have poor prognoses, and these “high-risk” patients are candidates for more aggressive therapy, including autologous hematopoietic cell transplantation (HCT), to improve event-free survival and overall survival.

Descriptions of pediatric-onset solid tumors addressed herein are as follows.

Peripheral Neuroblastoma

Neuroblastoma is the most common extracranial solid tumor of childhood, with approximately 90% of cases presenting in children younger than 5 years of age. These tumors originate where sympathetic nervous system tissue is present, within the adrenal medulla or paraspinal sympathetic ganglia, but have diverse clinical behavior depending on a variety of risk factors.

Patients with neuroblastoma are stratified into prognostic risk groups (low, intermediate, high) that determine treatment plans. Risk variables include age at diagnosis, clinical stage of disease, tumor histology, and certain molecular characteristics, including the presence of the *MYCN* oncogene. Tumor histology is categorized as favorable or unfavorable, according to the degree of tumor differentiation, the proportion of tumor stromal component, and index of cellular proliferation. It is well-established that *MYCN* amplification is associated with rapid tumor progression and a poor prognosis, even in the setting of other coexisting favorable factors. Loss of heterozygosity (LOH) at chromosome arms 1p and 11q frequently occurs in neuroblastoma. Although 1p LOH is associated with *MYCN* amplification, 11q is usually found in tumors without this abnormality. Some recent studies have shown that 1p LOH and unbalanced 11q LOH are strongly associated with outcome in patients with neuroblastoma, and both are independently predictive of worse progression-free survival in patients with low- and intermediate-risk disease. Although the use of these LOH markers in assigning treatment in patients is evolving, they may prove useful to stratify treatment.

Treatment
In general, most patients with the low-stage disease have excellent outcomes with minimal therapy; and with International Neuroblastoma Staging System stage-1 disease, most patients can be treated by surgery alone. Most infants, even with disseminated disease, have favorable outcomes with chemotherapy and surgery.

For intermediate-risk disease, moderately intensive multiagent chemotherapy is the mainstay of therapy. Surgery is needed to obtain a diagnosis, and the extent of resection necessary to obtain an optimal outcome is not established.[10] Patients at high-risk have historically had very low (<15%) long-term overall survival. Current therapy for high-risk disease typically includes an aggressive multimodal approach with chemotherapy, surgical resection, and radiotherapy.

Treatment of recurrent disease is determined by the risk group at diagnosis and the extent of disease and age of the patient at recurrence.

Ewing Sarcoma Family of Tumors
ESFT encompasses a group of tumors that share some degree of neuroglial differentiation and a characteristic underlying molecular pathogenesis (chromosomal translocation). The translocation usually involves chromosome 22 and results in fusion of the *EWS* gene with one of the members of the ETS (E26 transformation-specific) family of transcription factors, either FLI1 (90%-95%) or ERG (5%-10%). These fusion products function as oncogenic aberrant transcription factors. Detection of these fusions is considered to be specific for the ESFT and helps further validate diagnosis. Included in ESFT are “classic” Ewing sarcoma of bone, extraosseous Ewing, peripheral primitive neuroectodermal tumor, and Askin tumors (chest wall).

Most commonly diagnosed in adolescence, ESFT can be found in bone (most commonly) or soft tissue; however, the spectrum of ESFT has also been described in various organ systems. Ewing is the second most common primary malignant bone tumor. The most common primary sites are the pelvic bones, the long bones of the lower extremities, and the bones of the chest wall.

Treatment
Current therapy for Ewing sarcoma typically includes induction chemotherapy, followed by local control with surgery and/or radiotherapy (dependent on tumor size and location), followed by adjuvant chemotherapy. Multiagent chemotherapy, surgery, and radiotherapy have improved progression-free survival rates in patients with the localized disease to 60% to 70%. The presence of metastatic disease is the most unfavorable prognostic feature, and the outcome for patients presenting with metastatic disease is poor, with 20% to 30% progression-free survival. Other adverse prognostic factors that may categorize a patient as having “high-risk” Ewing are tumor location (e.g., patients with pelvic primaries have worse outcomes), larger tumor size, and older age of the patient. However, “high-risk” Ewing has not always been consistently defined in the literature.

Rhabdomyosarcoma
Rhabdomyosarcoma (RMS), the most common soft tissue sarcoma of childhood, shows skeletal muscle differentiation. The most common primary sites are the head and neck (e.g., parameningeal, orbital, pharyngeal), genitourinary tract, and extremities.

Treatment

Specific treatment is based on tumor location, resection, and node status, and may involve surgery, radiotherapy, and chemotherapy. Five-year survival rates for RMS increased between 1975 and 2010 from 53% to 67% in children younger than 15 years and from 30% to 51% in 15- to 19-year-olds.

Approximately 15% of children present with metastatic disease, and despite the introduction of new drugs and intensified treatment, the 5-year survival is 20% to 30% for this “high-risk” group. Similarly, postrelapse mortality is very high. The prognosis of metastatic disease is affected by tumor histology, age at diagnosis, the site of metastatic disease, and the number of metastatic sites.

Wilms Tumor
Wilms tumor is the most common primary malignant renal tumor of childhood. In the United States.

Treatment
In the United States, National Wilms Tumor Study and Children’s Oncology Group protocols are based on primary resection for unilateral tumors, followed by escalating levels of chemotherapy and radiotherapy depending on tumor stage and other prognostic factors. Tumor histology, tumor stage, molecular and genetic markers (e.g., LOH at chromosome 16q), and age (>2 years) are all associated with increased risks of recurrence and death. Wilms tumors are highly sensitive to chemotherapy and radiotherapy, and current cure rates exceed 85%. Between 10% and 15% of patients with favorable histology and 50% of patients with anaplastic tumors, experience tumor progression or relapse.

Similar risk-adapted strategies are being tested for the 15% of patients who experience a relapse. Success rates after relapse range from 25% to 45%. For patients with adverse prognostic factors (histologically anaplastic tumors, relapse <6 to 12 months after nephrectomy, second or subsequent relapse, relapse within the radiation field, bone or brain metastases), the event-free survival rate is less than 15%.

Osteosarcoma
Osteosarcoma is a primary malignant bone tumor and the most common bone cancer in children and adolescents; it is characterized by infiltration of bone or osteoid by the tumor cells. Peak incidence occurs around puberty, most commonly in long bones such as the femur or humerus. Osteosarcomas are characterized by variants in the *TP53* tumor suppressor gene.

The prognosis of osteosarcoma has greatly improved, with 5-year survival rates increasing between 1975 and 2010 from 40% to 76% in children younger than 15 years and from 56% to 66% in 15- to 19-year- olds. Prognostic factors for patients with localized disease include site

and size of the primary tumor, the presence of metastases at the time of diagnosis, resection adequacy, and tumor response to neoadjuvant chemotherapy.

Treatment
For patients with recurrent osteosarcoma, the most important prognostic factor is surgical resectability. There is a 5-year survival rate of 20% to 45% in patients who had a complete resection of metastatic pulmonary tumors and a 20% survival rate for patients with metastatic tumors at other sites.

Retinoblastoma

Retinoblastoma is the most common primary tumor of the eye in children. It may occur as a heritable (25%-30%) or nonheritable (70%-75%) tumor. Cases may be unilateral or bilateral, with bilateral tumors almost always being the heritable type.

Treatment
Treatment options depend on the extent of disease. Retinoblastoma is usually confined to the eye, and with current therapy has a high cure rate. However, once disease spreads beyond the eye, survival rates drop significantly; 5-year disease-free survival is reported to be less than 10% in those with the extraocular disease, and stage 4B disease (i.e., disease metastatic to the central nervous system) has been lethal in virtually all cases reported.

The strategy for nonmetastatic disease depends on the disease extent but may include focal therapies (e.g., laser photocoagulation, cryotherapy, plaque radiotherapy), intravitreal chemotherapy, intra-arterial chemotherapy, systemic chemotherapy, enucleation, or a combination. For metastatic disease, intensive multimodal therapy with high-dose chemotherapy, with or without radiotherapy, is standard care.

Hematopoietic Cell Transplantation
HCT is a procedure in which hematopoietic stem cells are infused to restore bone marrow function in cancer patients who receive bone-marrow-toxic doses of drugs, with or without whole body radiotherapy. Hematopoietic stem cells may be obtained from the transplant recipient (autologous HCT) or a donor (allogeneic HCT). They can be harvested from bone marrow, peripheral blood, or umbilical cord blood shortly after delivery of neonates. Although cord blood is an allogeneic source, the stem cells in it are antigenically “naive” and thus are associated with a lower incidence of rejection or graft-versus-host disease.

Immunologic compatibility between infused hematopoietic stem cells and the recipient is not an issue in autologous HCT. However, immunologic compatibility between donor and patient is critical for achieving a good outcome of allogeneic HCT. Compatibility is established by typing of human leukocyte antigens using cellular, serologic, or molecular techniques. Human leukocyte antigens refers to the tissue type expressed at class I and class II loci on chromosome 6. Depending on the disease being treated, an acceptable donor (except umbilical cord blood) will match the patient at all or most human leukocyte antigens loci.

Cord blood is discussed in detail in MP-9.001 Placental Umbilical Cord Blood as a Source of Stem Cells.

REGULATORY STATUS
The U.S. Food and Drug Administration regulates human cells and tissues intended for implantation, transplantation, or infusion through the Center for Biologics Evaluation and Research, under Code of Federal Regulation, title 21, parts 1270 and 1271.

IV. RATIONALE

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SUMMARY OF EVIDENCE

For individuals who have high-risk or relapsed peripheral neuroblastoma who receive single or tandem autologous HCT, the evidence includes randomized controlled trials, systematic reviews of those trials, and observational studies. The relevant outcomes are overall survival (OS), disease-specific survival (DSS), and treatment-related mortality (TRM) and morbidity. In the pooled analysis, patients with high-risk neuroblastoma treated with first-line therapy with single autologous HCT with myeloablative conditioning had significantly improved event-free survival (EFS) compared with standard therapy. Similarly, well-designed randomized trials comparing tandem autologous HCT with conventional therapy showed improvements in EFS for children with high-risk neuroblastoma. The evidence is sufficient to determine that the technology results in a meaningful improvement in the net health outcome.

For individuals who have high-risk Ewing sarcoma who receive single or tandem autologous HCT, the evidence includes single-arm studies. The relevant outcomes are OS, DSS, and TRM and morbidity. Although early nonrandomized studies were promising, more recent prospective nonrandomized study results have been inconsistent regarding whether HCT extends survival compared with typical conventional therapy. An RCT comparing consolidation with HDC plus autologous HCT to standard chemotherapy plus whole lung irradiation in patients with Ewing sarcoma with pulmonary and/or pleural metastases did not find a significant improvement in EFS in the group that received HCT. The evidence is insufficient to determine the effects of the technology on health outcomes.

Clinical input obtained in 2011 supported the use of single autologous HCT for high-risk Ewing sarcoma, and it is supported by national guidelines from the American Society for Blood and Marrow Transplantation. Also, the use of single autologous HCT is supported by national guidelines for recurrent or refractory Ewing sarcoma. Therefore, autologous HCT may be considered medically necessary for these indications.

For individuals who have rhabdomyosarcoma who receive single autologous HCT, the evidence includes nonrandomized comparative studies and case series. The relevant outcomes are OS, DSF, and TRM and morbidity. Available studies have not demonstrated improvements in OS or EFS with autologous HCT. Additional research is needed to demonstrate a benefit with autologous HCT for pediatric rhabdomyosarcoma. The evidence is insufficient to determine the effects of the technology on health outcomes.

For individuals who have Wilms tumor who receive single autologous HCT, the evidence includes a retrospective analysis, meta-analysis of case series, and case reports. The relevant outcomes are OS, DSS, and TRM and morbidity. Overall four-year survival rates were similar between patients receiving HCT and receiving chemotherapy. There was a trend suggesting that patients with lung-only stage 3 or 4 relapse might benefit from autologous HCT. However, the overall body of evidence is limited. The evidence is insufficient to determine the effects of the technology on health outcomes.

Clinical input obtained in 2017 does not support whether the following indication provides a clinically meaningful improvement in the net health outcome or is consistent with generally accepted medical practice:

- Use of autologous HCT for children with advanced-stage Wilms tumor.

The National Cancer Institute's PDQ (Physician Data Query) is NCI's comprehensive source of cancer information, which includes evidence-based summaries on topics that cover adult and pediatric cancer treatment. Input from their guidelines supports the use of autologous HCT for children with recurrent high-risk and very high-risk Wilms tumor. Therefore, autologous HCT may be considered medically necessary for these indications.

For individuals who have osteosarcoma who receive single autologous HCT, the evidence includes case reports, case series, and a prospective single-arm study. The relevant outcomes are OS, DSF, and TRM and morbidity. An interim analysis of the prospective single-arm study showed that patients receiving autologous HCT were experiencing lower EFS rates than historical controls, resulting in all patients being enrolled in the standard of care chemotherapy. The evidence is insufficient to determine the effects of the technology on health outcomes.

Clinical input obtained in 2017 does not support whether the following indication provides a clinically meaningful improvement in the net health outcome or is consistent with generally accepted medical practice:

- Use of autologous HCT for children with osteosarcoma.

The National Cancer Institute's PDQ (Physician Data Query) is NCI's comprehensive source of cancer information, which includes evidence-based summaries on topics that cover adult and pediatric cancer treatment. Input from their guidelines supports the use of autologous HCT for children with recurrent osteosarcoma with bone-only metastases. Therefore, autologous HCT may be considered medically necessary for this indication.

For individuals who have localized retinoblastoma who receive single autologous HCT, the evidence includes no studies. The relevant outcomes are OS, DSS, and TRM and morbidity. The evidence is insufficient to determine the effects of the technology on health outcomes.

For individuals who have metastatic retinoblastoma who receive single autologous HCT, the evidence includes small case series and case reports and a systematic review and meta-analysis. The relevant outcomes are OS, DSS, and TRM and morbidity. Results from the limited data have suggested that autologous HCT may prolong disease-free survival, particularly in patients without central nervous system involvement (stage 4A). Given the poor prognosis for this indication with conventional therapies, the incremental improvement with autologous HCT might be considered a significant benefit. However, the overall body of evidence is limited. The evidence is insufficient to determine the effects of the technology on health outcomes.

Clinical input obtained in 2017 supports that the following indication provides a clinically meaningful improvement in net health outcome and is consistent with generally accepted medical practice:

- Use of autologous HCT for children with metastatic retinoblastoma.

Thus, the above indication may be considered medically necessary considering the suggestive evidence and clinical input support.

V. DEFINITIONS

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NA

VI. BENEFIT VARIATIONS

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The existence of this medical policy does not mean that this service is a covered benefit under the member's health benefit plan. Benefit determinations should be based in all cases on the applicable health benefit plan language. Medical policies do not constitute a description of benefits. A member's health benefit plan governs which services are covered, which are excluded, which are subject to benefit limits and which require preauthorization. There are different benefit plan designs in each product administered by Capital Blue Cross. Members and providers should consult the member's health benefit plan for information or contact Capital Blue Cross for benefit information.

VII. DISCLAIMER

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Capital Blue Cross's medical policies are developed to assist in administering a member's benefits, do not constitute medical advice and are subject to change. Treating providers are solely responsible for medical advice and treatment of members. Members should discuss any medical policy related to their coverage or condition with their provider and consult their benefit information to determine if the service is covered. If there is a discrepancy between this medical policy and a member's benefit information, the benefit information will govern. If a provider or a

member has a question concerning the application of this medical policy to a specific member's plan of benefits, please contact Capital Blue Cross' Provider Services or Member Services. Capital Blue Cross considers the information contained in this medical policy to be proprietary and it may only be disseminated as permitted by law.

VIII. CODING INFORMATION

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Note: This list of codes may not be all-inclusive, and codes are subject to change at any time. The identification of a code in this section does not denote coverage as coverage is determined by the terms of member benefit information. In addition, not all covered services are eligible for separate reimbursement.

Allogeneic hematopoietic cell transplantation is considered **investigational** for treatment of pediatric solid tumors**; therefore, not covered:**

Procedure Codes							
38205	38230	38240	38242	S2142			

Covered when medically necessary:

Procedure Codes							
38204	38206	38208	38209	38210	38211	38212	38213
38214	38215	38232	38241	S2150			

ICD-10-CM Diagnosis Code	Description
C40.01	Malignant neoplasm of scapula and long bones of right upper limb
C40.02	Malignant neoplasm of scapula and long bones of left upper limb
C40.11	Malignant neoplasm of short bones of right upper limb
C40.12	Malignant neoplasm of short bones of left upper limb
C40.21	Malignant neoplasm of long bones of right lower limb
C40.22	Malignant neoplasm of long bones of left lower limb
C40.31	Malignant neoplasm of short bones of right lower limb
C40.32	Malignant neoplasm of short bones of left lower limb
C40.80	Malignant neoplasm of overlapping sites of bone and articular cartilage of unspecified limb
C40.81	Malignant neoplasm of overlapping sites of bone and articular cartilage of right limb
C40.82	Malignant neoplasm of overlapping sites of bone and articular cartilage of left limb

ICD-10-CM Diagnosis Code	Description
C40.90	Malignant neoplasm of unspecified bones and articular cartilage of unspecified limb
C40.91	Malignant neoplasm of unspecified bones and articular cartilage of right limb
C40.92	Malignant neoplasm of unspecified bones and articular cartilage of left limb
C41.0	Malignant neoplasm of bones of skull and face
C41.1	Malignant neoplasm of mandible
C41.2	Malignant neoplasm of vertebral column
C41.3	Malignant neoplasm of ribs, sternum, and clavicle
C41.4	Malignant neoplasm of pelvic bones, sacrum, and coccyx
C41.9	Malignant neoplasm of bone and articular cartilage, unspecified
C64.1	Malignant neoplasm of right kidney, except renal pelvis
C64.2	Malignant neoplasm of left kidney, except renal pelvis
C64.9	Malignant neoplasm of unspecified kidney, except renal pelvis
C69.21	Malignant neoplasm of right retina
C69.22	Malignant neoplasm of left retina
C74.00	Malignant neoplasm of cortex of unspecified adrenal gland
C74.01	Malignant neoplasm of cortex of right adrenal gland
C74.02	Malignant neoplasm of cortex of left adrenal gland
C74.10	Malignant neoplasm of medulla of unspecified adrenal gland
C74.11	Malignant neoplasm of medulla of right adrenal gland
C74.12	Malignant neoplasm of medulla of left adrenal gland
C74.90	Malignant neoplasm of unspecified part of unspecified adrenal gland
C74.91	Malignant neoplasm of unspecified part of right adrenal gland
C74.92	Malignant neoplasm of unspecified part of left adrenal gland

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X. POLICY HISTORY

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MP 9.054	**CAC 5/20/14** Minor. Information on HSCT for Solid Tumors of Childhood was extracted from MP 9.037 Autologous and Allogeneic Stem Cell

POLICY TITLE	HEMATOPOIETIC CELL TRANSPLANTATION FOR SOLID TUMORS OF CHILDHOOD
POLICY NUMBER	MP 9.054

	Transplantation (which was retired) and this new separate policy created. No change to policy statements. References updated. Policy guidelines and Rationale section added. Policy coded.
	CAC 6/2/15 Consensus. No change to policy statements. References and rationale updated. Codes reviewed.
	CAC 5/31/16 Consensus. No change to policy statements. References and rationale reviewed. Coding reviewed.
	Admin update 1/1/17: Product variation section reformatted.
	CAC 7/25/17 Minor review. Changed "hematopoietic stem cell transplantation" to "hematopoietic cell transplantation" per NCCN terminology change. "Metastatic retinoblastoma" added to first medically necessary statement. In first investigational statement, "retinoblastoma" changed to "retinoblastoma without metastases." Coding Reviewed.
	1/1/18 Admin Update: Medicare variations removed from Commercial Policies.
	4/9/18 Consensus review. No change to policy statements. Background and references updated. Rationale condensed to include summary of evidence only.
	2/26/19 Consensus review. No change to the policy statements. References and rationale updated. Unspecified dx codes added into policy. **06/13/19** Code review. No changes all codes appropriate to the policy.
	02/28/2020 Consensus review. No changes to coding or policy statements.
	02/26/2021 Minor review. Added 2 indications as MN. •Recurrent osteosarcoma with bone-only metastases •recurrent high-risk and very high-risk Wilms tumor; Deleted duplicate sentence in policy statement re: Tandem autologous hematopoietic cell transplantation; Added NCCN statement; added cross-references; took out duplicate paragraph in Summary of Evidence; added the following ICD-10 codes: C64.1-C64.9; updated references.
	5/3/2021: Added expanded NCCN statement as it was approved at 4/27/2021 CAC.
	2/16/2022 Consensus review. No change in policy statement. References updated.
	3/2/2023 Consensus review. No change to policy statements. References and rationale updated. Coding reviewed.

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