Molina Clinical Policy
Hematopoietic Stem Cell Transplantation for Ewing's Sarcoma: Policy No. 272

Last Approval: 10/12/2022
Next Review Due By: October 2023

DISCLAIMER

This Molina Clinical Policy (MCP) is intended to facilitate the Utilization Management process. Policies are not a supplementation or recommendation for treatment; Providers are solely responsible for the diagnosis, treatment and clinical recommendations for the Member. It expresses Molina's determination as to whether certain services or supplies are medically necessary, experimental, investigational, or cosmetic for purposes of determining appropriateness of payment. The conclusion that a particular service or supply is medically necessary does not constitute a representation or warranty that this service or supply is covered (e.g., will be paid for by Molina) for a particular Member. The Member's benefit plan determines coverage – each benefit plan defines which services are covered, which are excluded, and which are subject to dollar caps or other limits. Members and their Providers will need to consult the Member's benefit plan to determine if there are any exclusion(s) or other benefit limitations applicable to this service or supply. If there is a discrepancy between this policy and a Member's plan of benefits, the benefits plan will govern. In addition, coverage may be mandated by applicable legal requirements of a State, the Federal government or CMS for Medicare and Medicaid Members. CMS's Coverage Database can be found on the CMS website. The coverage directive(s) and criteria from an existing National Coverage Determination (NCD) or Local Coverage Determination (LCD) will supersede the contents of this MCP and provide the directive for all Medicare members. References included were accurate at the time of policy approval and publication.

OVERVIEW

The Ewing's Sarcoma Family of Tumors (ESFT) is the second most common primary malignant bone tumor in children, adolescents and young adults. ESFTs include Ewing tumor of bone (e.g., classic Ewing sarcoma and primitive neuroectodermal tumor or PNET) and extraosseous Ewing (e.g., Ewing sarcoma in a site other than bone). The incidence of ESFT is approximately 3 cases per 1,000,000 persons per year. The incidence among Americans is one per 1,000,000 in the population. The median age of patients is 15 years and >50% of patients are adolescents. The majority of primary sites of bone disease are in the lower extremities followed by the pelvis, chest wall, upper extremity, spine and skull. Primary sites of extraosseous Ewing's are mostly found in the trunk, followed by extremity, head and neck, retroperitoneum and other sites. Approximately 25% of patients will have metastatic disease at diagnosis. Certain adverse prognostic factors place some patients with ESFT into a high-risk category. For example, relapsed or resistant disease or primary tumor site in the axial skeleton (including pelvis, large tumor volume, and the presence of metastatic disease); patients with isolated lung metastases are considered to have better prognosis than patients with metastases to bone and/or bone marrow). Standard treatment of ESFT includes systemic chemotherapy in conjunction with either surgery or radiation (or both for local tumor control). The prognosis for patients with high-risk tumors treated with conventional chemotherapy, radiation and surgery remain poor, with long-term survival rates for patients with metastatic disease less than <35%. Dose-intensive chemotherapy regimens as well as HSCT have been investigated in patients with high-risk ESFT in an effort to improve survival. Classification of Ewing's Sarcoma is based on risk assignment (NCI, 2022):

- **Low-Risk:** localized tumor when there is no spread beyond the primary site or regional lymph node involvement.
- **Intermediate-Risk:** tumor has spread to lungs
- **Advanced-Risk:** tumor has spread beyond to bone, bone marrow and/or other tissue

Stem cell transplantation refers to transplantation of hematopoietic stem cells (HSCs) from a donor into a patient. HSCs are immature cells that can develop into any of the three types of blood cells (red cells, white cells or platelets). HSCs are created in the bone marrow and are found in the bone marrow and peripheral blood; there is also a high concentration of HSCs in umbilical-cord blood. Hematopoietic stem cell transplantation (HSCT) can be autologous (using the patient's own stem cells) or allogeneic (using stem cells from a donor). In allogeneic HSCT, it is preferable for donors to have a human leukocyte antigen (HLA) type that is identical to the recipient. Matching is performed on the basis of variability at three of more loci of the HLA gene (e.g., HLA-A, HLA-B, HLA-DRB1). As HLA variability increases, transplant-related morbidity and mortality (including graft rejection and graft-versus-host disease) also increases. (Holmberg et al., 2021).

COVERAGE POLICY

All transplants require prior authorization from the Corporate Transplant Department. Solid organ transplant requests will be reviewed by the Corporate Senior Medical Director or qualified clinical designee. All other transplants will be reviewed by the Corporate Senior Medical Director or covering Medical Director. If the criteria are met using appropriate NCD and/or LCD guidelines, State regulations, and/or MCP policies the Corporate Senior Medical Director's designee can approve the requested transplant.

Office visits with participating Providers do NOT require prior authorization. Providers should see the Member in office visits as soon as possible and without delay. Failure to see the Member in office visits may be considered a serious quality of care concern.

Pre-Transplant Evaluation

(NCCN, 2022; Holmberg et al., 2021; AMR, 2019; CMS, 2016; Ratko et al., 2012; [1-6] NMDP, n.d.)

Please see *MCP-323 Pre-Transplant Evaluation* for additional criteria and information.

Criteria for transplant evaluation include:

1. History and physical examination; **AND**
2. Psychosocial evaluation and clearance:
   a. No behavioral health disorder by history or psychosocial issues:
      - If history of behavioral health disorder, no severe psychosis or personality disorder;
      - Mood/anxiety disorder must be excluded or treated;
      - Member has understanding of surgical risk and post procedure compliance and follow-up required.

   AND
   b. Adequate family and social support.

AND

3. EKG; **AND**
4. Chest x-ray; **AND**
5. Cardiac clearance in the presence of any of the following:
   a. Chronic smokers; **OR**
   b. Members > 50 years age; **OR**
   c. Those with a clinical or family history of heart disease or diabetes.

AND

6. Pulmonary clearance if evidence of pulmonary artery hypertension (PAH) or chronic pulmonary disease; **AND**
7. Neurological exam and clearance for transplant including **ONE** of the following:
   a. Normal exam by H&P; **OR**
   b. Abnormal neurological exam with positive findings including **ONE** of the following:
      - Lumbar puncture normal cytology; **OR**
      - Lumbar puncture with cytological exam abnormal: CNS disease treated prior to clearance.

AND

8. A Performance Status that includes **ONE** of the following:
   a. Karnofsky score 70-100%; **OR**
   b. Eastern Cooperative Oncology Group (ECOG) Grade 0-2.

AND

9. Lab studies that include:
    a. Complete blood count; kidney profile (blood urea nitrogen, creatinine); electrolytes; calcium; phosphorous; albumin; liver function tests; and coagulation profile (prothrombin time, and partial thromboplastin time);*
    b. Serologic screening for: HIV; Epstein Barr virus (EBV); Hepatitis virus B (HBV); Hepatitis C (HCV); cytomegalovirus (CMV); RPR and/or FTA:*
        - If HIV positive **ALL** of the following must be met:
            i. CD4 count >200 cells/mm-3 for >6 months; **AND**
            ii. HIV-1 RNA undetectable; **AND**
            iii. On stable anti-retroviral therapy >3 months; **AND**
            iv. No other complications from AIDS (e.g., opportunistic infection, including aspergillus, tuberculosis, coccidioides mycosis, resistant fungal infections, Kaposi's sarcoma, or other neoplasm).
        - If abnormal serology, need physician plan to address and/or treatment as indicated.
            i. Antinuclear antibody, smooth muscle antibody, antimitochondrial antibody
            ii. Ceruloplasmin, α1-antitrypsin phenotype
            iii. Alpha-fetoprotein
    c. Urine drug screen (UDS) if Member is current or gives a history of past drug abuse.

AND

10. Colonoscopy (if indicated or if Member is age ≥ 50) with complete workup and treatment of abnormal results as indicated; an initial screening colonoscopy after initial negative screening requires a follow-up colonoscopy every 10 years).*

AND

11. Gynecological examination with Pap smear for women ages ≥ 21 to ≤ 65 years of age or if indicated (not indicated in women who have had a total abdominal hysterectomy [TAH] or a total vaginal hysterectomy [TVH]) within the last three years with complete workup and treatment of abnormal results as indicated.

Within the last 12 months:

1. Dental examination or oral exam showing good dentition and oral care or no abnormality on panorex or plan for treatment of problems pre- or post-transplant; **AND**
2. Mammogram (if indicated or > age 40) with complete workup and treatment of abnormal results as indicated;* **AND**
3. PSA if history of prostate cancer or previously elevated PSA with complete workup and treatment of abnormal results as indicated.*

* Participating Centers of Excellence may waive these criteria.

Criteria for Hematopoietic Autologous Stem Cell transplantation (HSCT) Transplantation

(Holmberg et al., 2022; NCI, 2022; NCCN, 2022; Baldini, 2021; AMR, 2019; Ratko et al., 2012)

Hematopoietic Autologous Stem Cell Transplantation (HSCT) **may be considered medically necessary** and may be authorized for the treatment of Ewing's sarcoma when **ALL** of the following criteria are met:

1. All pre-transplant criteria are met; **AND**

2. Treatment meets **ONE** of the following:
    a. For initial treatment of high-risk Ewing's sarcoma (defined as metastatic disease, unfavorable tumor location [e.g., primary tumor site in the axial skeleton, including pelvis], larger tumor size, or older age of the Member; **OR**
    b. As salvage therapy for recurrent or refractory Ewing's sarcoma (defined as a tumor that does not achieve a complete remission after initial standard-dose chemotherapy).

AND

3. The requesting transplant recipient should not have any of the following absolute contraindications:
   a. Cardiac, pulmonary, and nervous system disease that cannot be corrected and is a prohibitive risk for surgery; **OR**
   b. Malignant neoplasm with a high risk for reoccurrence, non-curable malignancy (excluding localized skin cancer); **OR**
   c. Systemic and/or uncontrolled infection; **OR**
   d. AIDS (CD4 count < 200cells/mm3); **OR**
   e. Unwilling or unable to follow post-transplant regimen:
      - Documented history of non-compliance
      - Inability to follow through with medication adherence or office follow-up

   OR
   f. Chronic illness with one year or less life expectancy; **OR**
   g. Limited, irreversible rehabilitation potential; **OR**
   h. Active untreated substance abuse issues, requires documentation supporting free from addiction for minimally 6 months if previous addiction was present; **OR**
   i. No adequate social/family support.

AND

4. The requesting transplant recipient should be evaluated carefully and potentially treated if any of the relative contraindications below are present. (Irreversible lung disease patients require consultation and clearance by a Pulmonologist prior to consideration of transplantation).
   a. Smoking, documentation supporting free from smoking for 6 months; **OR**
   b. Active peptic ulcer disease; **OR**
   c. Active gastroesophageal reflux disease; **OR**
   d. CVA with long term impairment that is not amendable to rehabilitation or a patient with CVA/transient ischemic attack within past 6 months; **OR**
   e. Obesity with body mass index of >30 kg/m^2 may increase surgical risk; **OR**
   f. Chronic liver disease such as Hepatitis B/C/D, or cirrhosis which increases the risk of death from sepsis and hepatic failure requires consultation by a gastroenterologist or hepatologist; **OR**
   g. Gall bladder disease requires ultrasound of the gall bladder with treatment prior to transplantation.

Criteria for Subsequent Hematopoietic Autologous Stem Cell transplantation (HSCT) Transplantation

Hematopoietic Autologous Stem Cell Transplantation (HSCT) **may be considered medically necessary** and may be authorized after the first prior stem cell transplantation has occurred only one time for members with Ewing's sarcoma who meet **ALL** of the above criteria for transplant and have **ANY** of the following:

1. Primary graft failure indicated by no signs of engraftment* by 42 days after the transplant; **OR**
2. Failure to engraft*; **OR**
3. A suitable allogeneic donor has been identified if applicable (applies to allogeneic only).

*NOTE: Engraftment is defined as the first 3 consecutive days on which the absolute neutrophil count (ANC) exceeds 5 x 10^9/L or > ANC500 at any time after transplantation. ([1] NMDP, n.d.).

For Members with Significant or Daily Marijuana Use

1. Documentation of compliance with a physician prescribed and managed program of abstinence, and a reasonable expectation that the Member will be abstinent from marijuana use during the transplant and immediate post-transplant time period. Daily marijuana use is an absolute contraindication for both transplant and pre-transplant evaluation unless there is a state mandate applicable for medical marijuana use and transplants, and there is documentation of Member compliance with a physician prescribed plan of care for prescribed marijuana use.

2. If the Member's marijuana use is in compliance with a formal, State-based program for managed medical marijuana, the request should include:
   - Documentation of the Plan of Care for medical marijuana (including the medical decision making that supports the use of medical marijuana); **AND**
   - Transplant Provider agreement with the Plan of Care (including agreement to be accountable for managing the Member's use of medical marijuana).

Continuation of Therapy

When extension of a previously approved transplant authorization is requested, review using updated clinical information is appropriate.

1. If Molina Healthcare has authorized prior requests for transplantation **ALL** of the following information is required for medical review:
   a. Presence of no absolute contraindication as listed above; **AND**
   b. History and physical within the last 12 months; **AND**
   c. Kidney profile within the last 12 months; **AND**
   d. Cardiac update if history of cardiac disease within two years (≥ 50 years of age); **AND**
   e. Psychosocial evaluation or update within the last 12 months; **AND**
   f. Per initial and updated history and physical, any other clinically indicated tests and/or scans as determined by transplant center physician or Molina Medical Director.

2. If authorized prior requests for transplantation were obtained from another insurer, **ALL** of the following information is required for medical review:
   a. Authorization letter/documentation from previous insurer; **AND**
   b. Presence of no absolute contraindication as listed above; **AND**
   c. History and physical within the last 12 months; **AND**
   d. Cardiac update if history of cardiac disease within two years (≥ 50 years of age); **AND**
   e. Psychosocial evaluation or update within the last 12 months; **AND**
   f. Per initial and updated history and physical, any other clinically indicated tests and/or scans as determined by transplant center physician or Molina Medical Director.

Limitations and Exclusions

(Holmberg et al., 2022; NCI, 2022; NCCN, 2022; Baldini, 2021; [1-3] NMDP, n.d.)

1. Autologous stem cell transplantation when the above criteria are not met.
2. A second or repeat autologous transplant due to persistent, progressive, or relapsed disease.
3. Allogeneic HSCT.
4. Hematopoietic stem cell collection, storage and freezing for a future unplanned transplant.

DOCUMENTATION REQUIREMENTS. Molina Healthcare reserves the right to require that additional documentation be made available as part of its coverage determination; quality improvement; and fraud; waste and abuse prevention processes. Documentation required may include, but is not limited to, patient records, test results and credentials of the provider ordering or performing a drug or service. Molina Healthcare may deny reimbursement or take additional appropriate action if the documentation provided does not support the initial determination that the drugs or services were medically necessary, not investigational or experimental, and otherwise within the scope of benefits afforded to the member, and/or the documentation demonstrates a pattern of billing or other practice that is inappropriate or excessive.

SUMMARY OF MEDICAL EVIDENCE

The published medical evidence and outcomes for HSCT for Ewing Sarcoma is limited to information from international bone marrow transplant registries and case series from individual institutions comparing treatment outcomes that suggest a survival benefit with the use of high dose chemotherapy followed by autologous HSCT. Several uncontrolled trials demonstrate improved or equivalent survival outcomes with autologous HSCT.

One of the largest studies by Ferrari et al. (2011) reported results of the Italian Sarcoma Group/Scandinavian Sarcoma Group III protocol, a multicenter, multi-country clinical trial involving 300 participants with Ewing family of tumors. At a median follow-up of 64 months, five-year overall survival (OS) and event-free survival (EFS) were 75% and 69%, respectively. Five-year EFS for those treated with high-dose therapy (HDT) were 75% for good responders and 72% for partial responders, and 33% for partial responders who did not receive HDT.

Another large study by Ladenstein et al. (2010) called the EURO-EWING-Intergroup-EE99 R3 trial enrolled 281 patients with primary disseminated metastatic Ewing sarcoma. Patients were treated with six cycles of vincristine, ifosfamide, doxorubicin, and etoposide followed by high-dose therapy and autologous stem cell transplant and after a median follow-up of 3.8 years, event-free survival (EFS) and overall survival (OS) at 3 years for all 281 patients were 27% +/- 3% and 34% +/- 4% respectively. Factors such as the presence and number of bone lesions, primary tumor volume greater than 200 mL, and age older than 14 years, additional pulmonary metastases, and bone marrow involvement were identified as independent prognostic factors.

Ratko et al. (2012) reported on a comparative effectiveness review on the use of HSCT in the pediatric population. The report was published by the Blue Cross and Blue Shield Association Technology Evaluation Center for the Agency for Healthcare Research and Quality (AHRQ). Conclusions for Ewing Sarcoma Family of Tumors (ESFT) indicated the following: Low strength evidence on overall survival suggests no benefit with single HSCT compared to conventional therapy for the treatment of high-risk ESFT. The body of evidence on overall survival with tandem HSCT compared to single HSCT for the treatment of high-risk ESFT and overall survival is insufficient to draw conclusions.

A case series of 33 individuals with recurrent or progressive Ewing sarcoma by McTiernan et al. (2006) reported treatment outcomes of hematopoietic stem cell transplants with different preparatory regimens. Two of the individuals received autologous bone marrow, 1 received autologous bone marrow and stem cells, 29 received autologous peripheral blood stem cells, and 1 received an allogeneic bone marrow transplant due to an unsuccessful autologous harvest. Event-free survival was 42.5% (95% CI, 26-59%) at 2 years and 38.2% at 5 years (95% CI, 21-55%). Although this treatment demonstrated the potential for long-term survival with high-dose therapy (HDT) for recurrent or refractory Ewing sarcoma, it was associated with significant toxicity. One treatment-related death was reported, and 2 participants experienced grade IV infections.

Gardner et al. (2008) reported on 116 individuals with Ewing sarcoma who underwent autologous HSCT (80 [69%] as first-line therapy and 36 [31%] for recurrent disease) between 1989 and 2000. Five-year probabilities of PFS in individuals who received HSCT as first-line therapy were 49% (95% CI, 30-69%) for those with localized disease at diagnosis and 34% (95% CI, 22-47%) for those with metastatic disease at diagnosis. For those with localized disease at diagnosis and recurrent disease, 5-year probability of PFS was 14% (95% CI, 3-30%). It was concluded that PFS rates after autologous HSCT were comparable to rates seen in those with similar disease characteristics treated with conventional therapy.

National and Specialty Organizations

The **National Marrow Donor Program (NMDP)** has published the following guidance: *Disease-Specific HCT Indications and Outcomes Data; Engraftment; HLA Matching; Patient Eligibility for HCT; Transplant Consultation Timing; and Treatment Before Transplant.* ([1-6] NMDP, n.d.).

SUPPLEMENTAL INFORMATION

None.

CODING & BILLING INFORMATION

CPT Codes

CPT	Description
	Collection Codes
38205	Blood-derived hematopoietic progenitor cell harvesting for transplantation, per collection; allogeneic
38206	Blood-derived hematopoietic progenitor cell harvesting for transplantation, per collection; autologous
38230	Bone marrow harvesting for transplantation; allogeneic
38232	Bone marrow harvesting for transplantation; autologous
	Cell Processing Services
38207	Transplant preparation of hematopoietic progenitor cells; cryopreservation and storage
38208	Transplant preparation of hematopoietic progenitor cells; thawing of previously frozen harvest, without washing, per donor
38209	Transplant preparation of hematopoietic progenitor cells; thawing of previously frozen harvest, with washing, per donor
38210	Transplant preparation of hematopoietic progenitor cells; specific cell depletion within harvest, T-cell depletion
38211	Transplant preparation of hematopoietic progenitor cells; tumor cell depletion
38212	Transplant preparation of hematopoietic progenitor cells; red blood cell removal
38213	Transplant preparation of hematopoietic progenitor cells; platelet depletion
38214	Transplant preparation of hematopoietic progenitor cells; plasma (volume) depletion
38215	Transplant preparation of hematopoietic progenitor cells; cell concentration in plasma, mononuclear, or buffy coat layer
	Cell infusion codes
38240	Hematopoietic progenitor cell (HPC); allogeneic transplantation per donor
38241	Hematopoietic progenitor cell (HPC); autologous transplantation
38242	Allogeneic lymphocyte infusions
38243	Hematopoietic progenitor cell (HPC); HPC boost

HCPCS Codes

HCPCS	Description
S2140	Cord blood harvesting for transplantation, allogeneic
S2142	Cord blood derived stem cell transplantation, allogeneic
S2150	Bone marrow or blood-derived stem cells (peripheral or umbilical), allogeneic or autologous, harvesting, transplantation, and related complications; including pheresis and cell preparation/storage; marrow ablative therapy; drugs; supplies; hospitalization with outpatient follow-up; medical/surgical, diagnostic, emergency, and rehabilitative services; and the number of days of pre-and post-transplant care in the global definition

CODING DISCLAIMER. Codes listed in this policy are for reference purposes only and may not be all-inclusive. Deleted codes and codes which are not effective at the time the service is rendered may not be eligible for reimbursement. Listing of a service or device code in this policy does not guarantee coverage. Coverage is determined by the benefit document. Molina adheres to Current Procedural Terminology (CPT®), a registered trademark of the American Medical Association (AMA). All CPT codes and descriptions are copyrighted by the AMA; this information is included for informational purposes only. Providers and facilities are expected to utilize industry standard coding practices for all submissions. When improper billing and coding is not followed, Molina has the right to reject/deny the claim and recover claim payment(s). Due to changing industry practices, Molina reserves the right to revise this policy as needed.

APPROVAL HISTORY

10/12/2022 Policy reviewed, no changes to criteria, included section on marijuana use.
10/13/2021, 9/16/2020, 9/18/2019, 3/8/2018, 6/22/2017 Policy reviewed, no changes to criteria, updated references.
5/3/2016 New policy.

REFERENCES

Government Agencies

1. Centers for Medicare and Medicaid Services (CMS). Medicare coverage database. National coverage determination (NCD) – Stem cell transplantation 110.23. Available from CMS. Effective Date January 27, 2016. Accessed August 15, 2022.
2. Ratko TA, Belinson SE, Brown HM, Noorani HZ, Chopra RD, Marbella A, et al. Hematopoietic stem cell transplantation in the pediatric population [internet]. Rockville (MD): Agency for Healthcare Research and Quality (US); 2012 Feb. Report No.: 12-EHC018-EF. PMID: 22439159. Available from NIH. Accessed August 15, 2022.

National and Specialty Organizations

1. National Cancer Institute (NCI). Ewing sarcoma and undifferentiated small round cell sarcomas of bone and soft tissue treatment (PDQ). Available from NCI. Updated August 4, 2022. Accessed August 15, 2022.
2. National Comprehensive Cancer Network (NCCN). Clinical practice guidelines in oncology: Bone cancer (version 1.2023). Available from NCCN. Updated August 2, 2022. Accessed August 15, 2021. Registration and login required (free).
3. [1] National Marrow Donor Program (NMDP). Disease-specific HCT indications and outcomes data. NMDP. Accessed August 15, 2022.
4. [2] National Marrow Donor Program (NMDP). Engraftment. Available from NMDP. Accessed August 26, 2022.
5. [3] National Marrow Donor Program (NMDP). HLA matching. Available from NMDP. Accessed August 26, 2022.
6. [4] National Marrow Donor Program (NMDP). Patient eligibility for HCT. Available from NMDP. Accessed August 26, 2022.
7. [5] National Marrow Donor Program (NMDP). Transplant consultation timing. Available from NMDP. Accessed August 26, 2022.
8. [6] National Marrow Donor Program (NMDP). Treatment before transplant. Available from NMDP. Accessed August 26, 2022.

Evidence Based Reviews and Publications

1. AMR Peer Review. Policy reviewed on April 18, 2019 by an Advanced Medical Reviews (AMR) practicing, board-certified physician in the areas of Internal Medicine, Oncology, Hematology.
2. Baldini EH. Radiation therapy for Ewing sarcoma family of tumors. Available from UpToDate. Updated October 4, 2021. Accessed August 15, 2022. Registration and login required.
3. Holmberg HJ, Sandmaier BM. Determining eligibility for autologous/allogenic hematopoietic cell transplantation. Available from UpToDate. Updated February 21, 2022. Accessed August 15, 2022. Registration and login required.

Peer Reviewed Publications

1. Ferrari S, Sundby Hall K, Luksch R, Tienghi A, Wiebe T, et al. Nonmetastatic Ewing family tumors: High-dose chemotherapy with stem cell rescue in poor responder patients. Results of the Italian Sarcoma Group/Scandinavian Sarcoma Group III protocol. Ann Oncol. 2011 May;22(5):1221-1227. doi: 10.1093/annonc/mdq573. Accessed August 15, 2022.
2. Gardner SL, Carreras J, Boudreau C, et al. Myeloablative therapy with autologous stem cell rescue for patients with Ewing sarcoma. Bone Marrow Transplant. 2008 May;41(10):867-72. doi: 10.1038/bmt.2008.2. Accessed August 15, 2022.
3. Ladenstein R, Pötschger U, Le Deley MC, et al. Primary disseminated multifocal Ewing sarcoma: Results of the Euro-EWING 99 trial. J Clin Oncol. 2010 Jul 10;28(20):3284-91. doi: 10.1200/JCO.2009.22.9864. Accessed August 15, 2022.
4. McTiernan A, Driver D, Michelagnoli MP, et al. High dose chemotherapy with bone marrow or peripheral stem cell rescue is an effective treatment option for patients with relapsed or progressive Ewing's sarcoma family of tumours. Ann Oncol. 2006 Aug;17(8):1301-5. doi: 10.1093/annonc/mdl108. Accessed August 15, 2022.

Other Peer Reviewed and Professional Organization Publications (used in the development of this policy)

1. DynaMed Plus. Ewing's sarcoma in children. Available from DynaMed. Updated November 30, 2018. Accessed September 7, 2022.
2. Eastern Cooperative Oncology Group (ECOG) Performance Status. Available from ECOG. Accessed August 15, 2022.
3. Loschi S, Dufour C, Oberlin O, et al. Tandem high-dose chemotherapy strategy as first-line treatment of primary disseminated multifocal Ewing sarcomas in children, adolescents and young adults. Bone Marrow Transplant 50 (8): 1083-8, 2015. https://doi.org/10.1038/bmt.2015.118. Accessed August 15, 2022.
4. National Marrow Donor Program (NMDP). HLA matching. Available from NMDP. Accessed August 15, 2022.

APPENDIX

Reserved for State specific information. *Information includes, but is not limited to, State contract language, Medicaid criteria and other mandated criteria.*