

POLICY: Neurology – Gene Therapy – Lenmeldy Utilization Management Medical Policy

- Lenmeldy™ (atidarsagene autotemcel intravenous infusion – Orchard)

EFFECTIVE DATE: 8/15/2024

LAST REVISION DATE: 05/21/2025

COVERAGE CRITERIA FOR: All UCare Plans

OVERVIEW

Lenmeldy, an autologous hematopoietic stem cell (HSC)-based gene therapy, is indicated for the treatment of pre-symptomatic late infantile (PSLI), pre-symptomatic early juvenile (PSEJ), or early symptomatic early juvenile (ESEJ) metachromatic leukodystrophy (MLD) in children.¹

Lenmeldy is given as a one-time (per lifetime) single dose by intravenous infusion.¹ The minimum recommended dose of Lenmeldy is based on the MLD disease subtype and is 4.2×10^6 cluster of differentiation 34+ (CD34+) cells/kg, 9×10^6 CD34+ cells/kg, and 6.6×10^6 CD34+ cells/kg for patients with PSLI, PSEJ, and ESEJ MLD, respectively; the maximum recommended dose for all disease subtypes is 30×10^6 CD34+ cells/kg. The entire treatment process involves several steps. The child's own HSCs are used to prepare Lenmeldy which are collected via mobilization and apheresis procedures. This process takes one or more cycles to collect an adequate amount of stem cells to manufacture Lenmeldy. Prior to receipt of Lenmeldy, chemotherapy (with busulfan) is given to prepare the bone marrow to accept the modified cells. Following completion of myeloablative conditioning, a minimum of 24 hours of washout must occur before infusion of Lenmeldy. Before collection of cells for manufacturing, it is recommended to screen children for the following: hepatitis B virus, hepatitis C virus, human T-lymphotropic virus 1 and 2, human immunodeficiency virus 1 and 2, cytomegalovirus, and mycoplasma infection. The gene therapy is transduced with a lentiviral vector encoding the human arylsulfatase A (ARSA) gene. Functional copies of the ARSA gene are added into the child's own HSCs. The safety and effectiveness of Lenmeldy have been established in children with PSLI, PSEJ, and ESEJ MLD. The safety and efficacy of Lenmeldy have not yet been established in children with the late juvenile form of the disease.

Disease Overview

MLD is a rare, inherited, autosomal recessive, neurodegenerative lysosomal storage disease caused by deficiency of ARSA, due to mutations in the ARSA gene.²⁻⁵ MLD is estimated to impact one in every 40,000 individuals in the US.⁴ Reduced ARSA activity in patients with MLD (usually 0% to less than or equal to 13%) results in accumulation of sulfatides in the central nervous system and peripheral nervous system, leading to progressive demyelination, neuroinflammation, and neurodegeneration.² These events lead to progressive motor and cognitive deterioration. Sulfatides also accumulate in visceral organs, such as the gallbladder and kidneys, and cause a host of systemic manifestations as well. The clinical spectrum of MLD is broad and heterogeneous.^{2,3} Defined clinical forms are commonly described mainly on the basis of age at first symptom onset as follows: late-infantile (≤ 30 months of age [50% to 60% of patients]), juvenile (subdivided into early juvenile [30 months to < 7 years of age] and late juvenile [7 to 16 years of age] {20% to 40% of patients}), and adult (≥ 17 years of age [10% to 20% of patients]), with earlier age at onset or the presence of motor symptoms as initial disease manifestations associated with a more severe and rapid disease course.²⁻⁴ Patients with MLD gradually lose the ability to move, talk, swallow, eat, and see. Early mortality is noted.

Clinical Efficacy

The efficacy of Lenmeldy was evaluated in 39 children that involved two single-arm, open-label clinical trials, as well as a European Union (EU) expanded access program.^{1,5} The data involved 20 children with PSLI, 7 children with PSEJ, and 10 children with ESEJ MLD.¹ Biochemical and molecular diagnosis of MLD was required which included ARSA activity below the normal range and the presence of two disease-causing ARSA alleles. A 24-hour urine collection was required to show elevated sulfatide levels in selected patients. The main efficacy outcomes with Lenmeldy involved motor and neurocognitive function, as evaluated by gross motor function classification for metachromatic leukodystrophy (GMFC-MLD) levels and standard scores on age-appropriate neurocognitive tests, respectively. Comparisons with Lenmeldy were made with an external untreated natural history cohort of children with late juvenile (n = 28) and early juvenile (n = 21) MLD; data were collected retrospectively and prospectively.¹ The primary endpoint was severe motor impairment-free survival, defined as the interval from birth to the first occurrence of loss of locomotion and loss of sitting without support (GMFC-MLD Level ≥ 5) or death.^{1,5} The GMFC-MLD scale evaluated gross motor function in those with MLD and ranges from Level 0 (normal function) to Level 6 (loss of all gross motor function).⁵ GMFC-MLD levels are described in Table 1.^{5,6}

Table 1. GMFC-MLD Levels.^{5,6}

| Level | Description |
|---------|--|
| Level 0 | Walking without support with quality of performance that is normal for age. |
| Level 1 | Walking without support but with reduced quality of performance (i.e., instability when standing or walking). |
| Level 2 | Walking with support. Walking without support is not possible (fewer than five steps) |
| Level 3 | Sitting without support and locomotion such as crawling or rolling. Walking with or without support is not possible. |
| Level 4 | Either sitting without support but no locomotion OR sitting without support not possible but locomotion such as crawling or rolling. |
| Level 5 | No locomotion nor sitting without support but head control is possible. |
| Level 6 | Loss of any locomotion as well as loss of any head and trunk control. |

GMFC-MLD – Gross motor function classification for metachromatic leukodystrophy.

The key published study with Lenmeldy, which involves most patients previously detailed, showed that after a median follow-up of 6.76 years, there was a significantly lower risk of severe motor impairment (GMFC-MLD level ≥ 5) or death compared with no treatment among patients with PSLI, PSEJ, and ESEJ MLD.⁵ The percentage of patients surviving without severe cognitive impairment was also much higher for patients given Lenmeldy compared with those not receiving this gene therapy.

Guidelines

A consensus guideline for the monitoring and management of MLD in the US was published in 2024.² The diagnosis of MLD should include both genetic and biochemical testing (enzyme activity and sulfatide levels). In early-onset MLD, including late infantile and early juvenile subtypes, gene therapy (Lenmeldy) should be considered for presymptomatic patients where available. In late-onset MLD, including late juvenile and adult subtypes, HSC transplant (allogeneic) should be considered for patients with no or minimal disease involvement.

POLICY STATEMENT

Prior Authorization is recommended for prescription benefit coverage of Lenmeldy. Approval is recommended for those who meet the **Criteria** and **Dosing** for the listed indication. Because of the specialized skills required for evaluation and diagnosis of patients treated with Lenmeldy as well as the specialized training required for administration of Lenmeldy, approval requires Lenmeldy to be prescribed by a physician who specializes in the condition being treated. All approvals are provided for one-time (per lifetime) as a single dose. The approval duration is 1 year to allow for an adequate timeframe to prepare

and administer one dose of therapy. If claims history is available, verification is required for certain criteria as noted by **[verification in claims history required]**. For the dosing criteria, verification of the appropriate weight-based dosing is required by a Medical Director as noted by **[verification required]**. All reviews (approvals and denials) will be forwarded to the Medical Director for evaluation. Some clients have elected Embarc Benefit Protection. For these clients, the Medical Director will coordinate with EviCore to ensure the Embarc Benefit Protection portion of the review has been completed. If the Embarc Benefit Protection portion of the review has not been completed, the Medical Director will route to Embarc@eviCore.com prior to completing the review.

Documentation: Documentation is required for use of Lenmeldy as noted in the criteria as **[documentation required]**. Documentation may include, but is not limited to, chart notes, laboratory results, medical test results, claims records, prescription receipts, and/or other information.

Automation: None.

RECOMMENDED AUTHORIZATION CRITERIA

Coverage of Lenmeldy is recommended in those who meet the following criteria:

FDA-Approved Indication

1. **Metachromatic Leukodystrophy.** Approve a one-time (per lifetime) single dose if the patient meets ALL of the following (A, B, C, D, E, F, G, H, I, J, and K):
 - A) Patient meets ONE of the following (i, ii, or iii):
 - i. Patient has presymptomatic late infantile (PSLI) metachromatic leukodystrophy (MLD) and meets ALL of the following (a, b, and c):
 - a) Patient has an arylsulfatase A (ARSA) genotype consistent with presymptomatic late infantile MLD **[documentation required]**; AND
 - b) The disease onset was at \leq 30 months of age; AND
 - c) According to the prescribing physician, the patient is presymptomatic; OR

Note: Presymptomatic status is defined as the absence of neurological signs and symptoms of MLD. However, presymptomatic children are allowed to have abnormal reflexes or abnormalities on brain magnetic resonance imaging and/or nerve conduction tests not associated with functional impairment (e.g., no tremor, no peripheral ataxia).
 - ii. Patient has presymptomatic early juvenile (PSEJ) metachromatic leukodystrophy (MLD) and meets ALL of the following (a, b, and c):
 - a) Patient has an arylsulfatase A (ARSA) genotype consistent with presymptomatic early juvenile MLD **[documentation required]**; AND
 - b) The disease onset was between > 30 months and < 7 years of age; AND
 - c) According to the prescribing physician, the patient is presymptomatic; OR

Note: Presymptomatic status is defined as the absence of neurological signs and symptoms of MLD or physical examination findings limited to abnormal reflexes and/or clonus. However, presymptomatic children were allowed to have abnormal reflexes or abnormalities on brain magnetic resonance imaging and/or nerve conduction tests not associated with functional impairment (e.g., no tremor, no peripheral ataxia).
 - iii. Patient has early symptomatic early juvenile (ESEJ) metachromatic leukodystrophy (MLD) and meets ALL of the following (a, b, and c):
 - a) Patient has an arylsulfatase A (ARSA) genotype consistent with early symptomatic early juvenile MLD **[documentation required]**; AND
 - b) The disease onset was between > 30 months and < 7 years of age; AND

- c) The patient has early symptomatic status by meeting BOTH of the following [(1) and (2)]:
 - (1) Patient is walking independently as defined as being at gross motor function classification for metachromatic leukodystrophy [GMFC-MLD] Level 0 (with or without ataxia) or GMFC-MLD Level 1; AND
 - (2) Patient has an intelligence quotient ≥ 85 ; AND
- B) Patient has not received Lenmeldy in the past **[verification in claims history required]**; AND
Note: If no claim for Lenmeldy is present (or if claims history is not available), the prescribing physician confirms that the patient has not previously received Lenmeldy.
- C) Patient has low arylsulfatase A (ARSA) activity indicative of metachromatic leukodystrophy (MLD) **[documentation required]**; AND
Note: Normal laboratory reference range for ARSA activity in the peripheral blood mononuclear cells is 31 to 198 nmol/mg/hour. In patients with MLD, ARSA activity is 0% to less than or equal to 13%.
- D) Patient has elevated sulfatide levels above the normal laboratory reference range as evaluated by 24-hour urine collection **[documentation required]**; AND
- E) According to the prescribing physician, a hematopoietic stem cell transplantation is appropriate for the patient; AND
- F) According to the prescribing physician, patient will have discontinued from anti-retrovirals (prophylactic for human immunodeficiency virus) for at least 1 month prior to mobilization; AND
Note: Examples of anti-retrovirals include abacavir, emtricitabine, lamivudine, and zidovudine.
- G) According to the prescribing physician, patient meets ALL of the following (i, ii, and iii):
 - i. Patient will undergo mobilization, apheresis, and myeloablative conditioning; AND
 - ii. A granulocyte-colony stimulating factor product with or without a hematopoietic stem cell mobilizer will be utilized for mobilization; AND
Note: Filgrastim products are examples of a granulocyte-colony stimulating factor therapy and Mozobil (plerixafor subcutaneous injection) is an example of a hematopoietic stem cell mobilizer.
 - iii. Busulfan will be used for myeloablative conditioning; AND
- H) Patient screening is negative for ALL of the following (i, ii, iii, iv, v, and vi):
 - i. Human immunodeficiency virus (HIV)-1 and HIV-2 **[documentation required]**; AND
 - ii. Hepatitis B virus **[documentation required]**; AND
 - iii. Hepatitis C virus **[documentation required]**; AND
 - iv. Human T-lymphotrophic virus (HTLV)-1 and HTLV-2 **[documentation required]**; AND
 - v. Cytomegalovirus **[documentation required]**; AND
 - vi. Mycoplasma **[documentation required]**; AND
- I) The medication is prescribed by a hematologist, a neurologist, a medical geneticist physician, or a stem cell transplant specialist physician; AND
- J) Current patient body weight has been obtained within the past 30 days **[documentation required]**; AND
- K) If criteria A through J are met, approve one dose of Lenmeldy by intravenous infusion to provide a one-time (per lifetime) single dose within the following dosing ranges according to ONE of the following metachromatic leukodystrophy (MLD) disease types (i, ii, or iii):
 - i. Presymptomatic late infantile MLD, the minimum recommended dose is 4.2×10^6 CD34+ cells/kg of body weight up to a maximum recommended dose of 30×10^6 CD34+ cells/kg of body weight **[verification required]**; OR
 - ii. Presymptomatic early juvenile MLD, the minimum recommended dose is 9×10^6 CD34+ cells/kg of body weight up to a maximum recommended dose of 30×10^6 CD34+ cells/kg of body weight **[verification required]**; OR

iii. Early symptomatic early juvenile MLD, the minimum recommended dose is 6.6×10^6 CD34+ cells/kg of body weight up to a maximum recommended dose of 30×10^6 CD34+ cells/kg of body weight **[verification required]**.

Dosing. The recommended dose of Lenmeldy is one dose given by intravenous infusion to provide a one-time (per lifetime) single dose within the following dosing ranges according to ONE of the following metachromatic leukodystrophy (MLD) disease types (A, B, or C):

A) Presymptomatic late infantile MLD, the minimum recommended dose is 4.2×10^6 CD34+ cells/kg of body weight up to a maximum recommended dose of 30×10^6 CD34+ cells/kg of body weight **[verification required]**; OR

B) Presymptomatic early juvenile MLD, the minimum recommended dose is 9×10^6 CD34+ cells/kg of body weight up to a maximum recommended dose of 30×10^6 CD34+ cells/kg of body weight **[verification required]**; OR

C) Early symptomatic early juvenile MLD, the minimum recommended dose is 6.6×10^6 CD34+ cells/kg of body weight up to a maximum recommended dose of 30×10^6 CD34+ cells/kg of body weight **[verification required]**.

CONDITIONS NOT RECOMMENDED FOR APPROVAL

Coverage of Lenmeldy is not recommended in the following situations:

- 1. Late Juvenile Form of Metachromatic Leukodystrophy.** The safety and efficacy have not yet been established in children with the late juvenile form of the disease.¹
- 2. Adult Form of Metachromatic Leukodystrophy.** The safety and efficacy have not yet been established in patients with the adult form of the disease.
- 3. Gross Motor Function Classification for Metachromatic Leukodystrophy (GMFC-MLD) > Level 1.** These patients were not included in the clinical studies.⁵
- 4. Prior Allogeneic Hematopoietic Stem Cell Transplantation in the Past 6 Months or Evidence of Residual Donor Cells.**
Note: Prescribing physician must confirm that the patient has not received a prior allogeneic hematopoietic stem cell transplantation in the past 6 months.
Prior allogeneic hematopoietic stem cell transplant within the past 6 months prevented participation, as well as evidence of residual donor cells in those who had undergone allogeneic hematopoietic stem cell transplantation.
- 5. Prior Receipt of Gene Therapy.** Lenmeldy has not been studied in a patient who has received prior gene therapy.
- 6. Coverage is not recommended for circumstances not listed in the Recommended Authorization Criteria.** Criteria will be updated as new published data are available.

REFERENCES

1. Lenmeldy™ intravenous infusion [prescribing information]. Boston, MA: Orchard; March 2024.
2. Adang LA, Bonkowsky JL, Boelens JJ, et al. Consensus guidelines for the monitoring and management of metachromatic leukodystrophy in the United States. *Cytotherapy*. 2024;26(7):739-748.

3. Gomez-Ospina N. Arylsulfatase A Deficiency. 2006 May 30 [Updated 2024 Apr 25]. In: Adam MP, Feldman J, Mirzaa GM, et al., editors. GeneReviews® [Internet]. Seattle (WA): University of Washington, Seattle; 1993-2025. Available at: https://www.ncbi.nlm.nih.gov/books/NBK1130/pdf/Bookshelf_NBK1130.pdf. Accessed on May 19, 2025.
4. FDA News Release. FDA approved first gene therapy for children with metachromatic leukodystrophy. March 18, 2024. Available at: <https://www.fda.gov/news-events/press-announcements/fda-approves-first-gene-therapy-children-metachromatic-leukodystrophy>. Accessed on May 19, 2025.
5. Fumagalli F, Calbi V, Gallo V, et al. Long-term effects of atidarsagene autotemcel for metachromatic leukodystrophy. *N Engl J Med.* 2025;392(16):1609-1620.
6. Kehrer C, Blumenstock G, Raabe C, Krägeloh-Mann I. Development and reliability of a classification system for gross motor function in children with metachromatic leukodystrophy. *Dev Med Child Neurol.* 2011;53(2):156-160.

HISTORY

| Type of Revision | Summary of Changes | Review Date |
|------------------|---|-------------|
| New Policy | -- | 05/15/2024 |
| UCare P&T Review | Policy reviewed and approved by UCare P&T committee. Annual review process | 09/16/2024 |
| Annual Revision | Metachromatic Leukodystrophy: The following requirement was added, “according to the prescribing physician, the patient will have discontinued from anti-retrovirals (prophylactic for human immunodeficiency virus [HIV]) for at least 1 month prior to mobilization”. A Note was added that examples of anti-retrovirals include abacavir, emtricitabine, lamivudine, and zidovudine. The qualifier “Prior to collection of cells for manufacturing” as well as the word “cellular” was removed from the requirement regarding screening for certain viruses and the word “Patient” was added. The criterion now reads: “Patient screening is negative for ALL of the following...”. Regarding dosing, the phrase “of body weight” was added after the cited dosing which is in units of cells/kg. The phrase “the past” was added before the criterion regarding body weight which now states that “Current patient body weight has been obtained within the past 30 days”. | 05/21/2025 |
| UCare P&T Review | Policy reviewed and approved by UCare P&T committee. Annual review process | 09/15/2025 |