Sentara Health Plans

Medicaid

# Genetic Testing - Cardioneurovascular and Developmental Diagnosis, Medical 34C

**Table of Content**



| | |
|---|---|
| Effective Date | 2/2009 |
| Next Review Date | 5/2025 |
| Coverage Policy | Medical 34C |
| Version | 2 |

**All requests for authorization for the services described by this medical policy will be reviewed per Early and Periodic Screening, Diagnostic and Treatment (EPSDT) guidelines. These services may be authorized under individual consideration for Medicaid members under the age of 21-years if the services are judged to by medically necessary to correct or ameliorate the member's condition. Department of Medical Assistance Services (DMAS), Supplement B - EPSDT (Early and Periodic Screening, Diagnosis and Treatment) Manual.*.**

## Purpose:

This policy addresses genetic testing for cardio-, neuro-, vascular and developmental diagnosis.

## Description & Definitions:

**Autosomal recessive:** A genetic condition that appears only in individuals who have received two copies of an autosomal gene, one copy from each parent. The gene is on an autosome, a nonsex chromosome. The parents are carriers who have only one copy of the gene and do not exhibit the trait because the gene is recessive to its normal counterpart gene

**X-linked recessive inheritance** - hereditary pattern in which a recessive gene on the X chromosome results in the manifestation of characteristics in male offspring and a carrier state in female offspring.

## Criteria:

**Genetic Testing** is considered medically necessary for the prevention, diagnosis and treatment of patients who meet **ALL** of the following:

- There must be **1 or more** of the following:
  - There is sufficient Published Scientific Evidence or 3rd party Consensus in the Medical Community that the results of the specific genetic Testing improves clinical outcomes
  - There is an approved mutation specific treatment available
- The genetic disorder is associated with a potentially significant disability or has a lethal natural history
- The results of the genetic test could impact the medical management of the individual
- After completion of a thorough history, physical examination, pedigree analysis, genetic counseling, relevant diagnostic and biochemical tests (if any), the patient meets criteria for **1 or more** of the following approved tests:
  - **Cerebral autosomal dominant arteriopathy with subcortical infarcts and leukoencephalopathy (CADASIL)** DNA testing for **1 or more** of the following indications **if ordered by a geneticist:**

- Symptomatic individual younger than 60 years of age with a family history consistent with an autosomal dominant pattern of inheritance of this condition
- Pre-symptomatic individuals younger than 60 years of age with a family history consistent with an autosomal dominant pattern of inheritance and a known mutation in an affected member of the family

- **Cystic Fibrosis** for Carrier Testing for **1 or more** of the following**:**
  - Common mutations included in CPT codes **81221** (familial variants) or **81220** (common variants) are covered without precertification.
  - **Extended CFTR mutation panels** (**Code 81222 and 81224**) are approved for patients meeting **1 or more** of the following:
    - Individuals with reproductive partners with cystic fibrosis or congenital absence of the vas deferens and no identified mutation with standard gene sequencing
    - Individuals with a family history of cystic fibrosis with no identified mutation on basic/standard gene sequencing
    - Individuals with elevated or indeterminate sweat chloride levels where from zero to up to 2 mutations have been identified by basic/standard gene sequencing
- **Fragile X syndrome** testing for FMR1 **(81243 and/or 81244)** is covered on request.
- **Long QT Genetic Testing** (KCNQ1, KCNH2, SCN5A, KCNE1, KCNE2, KCNJ2, CACNA1C, CAV3, SCN4B, AKAP, SNTA1, and ANK2 genes) for **1 or more** of the following:
  - For individual with a prolonged QT interval on resting electrocardiogram (a corrected QT interval (QTc) of 450 msec without an identifiable external cause for QTc prolongation (such as heart failure, bradycardia, electrolyte imbalances, certain medications and other medical conditions)
  - Individual with first-degree relatives (siblings, parents, offspring) with a known or suspected LQT mutation, or long QT syndrome.
- **Muscular Dystrophy** genetic testing may be indicated when the appropriate clinical situation is present, as indicated by **1 or more** of the following:
  - The individual has unexplained progressive muscle weakness, abnormal gait, or other clinical findings consistent with muscular dystrophy or spinal muscular atrophy. These findings may also include abnormal laboratory findings (e.g., elevated creatine kinase serum (CK)), or a positive family history
  - The individual has a confirmed diagnosis of muscular dystrophy and genetic testing is required to establish the disease-causing mutation
  - Test is **1 or more** of the following:
    - Congenital Muscular Dystrophy panel including **ANY** of the following: (ACTA1, AMPD1, AMPD3, CAPN3, CAV3, COL6A1, COL6A2, COL6A3, DES, DMD, DYSF, EMD, FKRP, FKTN, ITGA7, LAMA2, LARGE, LMNA, MYOT, NEB, PEX1, PEX12, PEX14, PEX2, PEX26, PEX3, PEX5, PEX6, PLEC, PMM2, POMGNT1, POMT1, POMT2, RYR1, RYR2, SEPN1, SGCA, SGCB, SGCD, SGCE, SGCG, SIL1, TCAP, TNNI2, TNNT1, TPM2, TPM3, TRIM32, TTN, ANO5)
    - Duchene Muscular Dystrophy (DMD)
    - Emery-Dreifuss Muscular Dystrophy (EDMD1, 2, and 3)(FGFR2)
    - Familial Myotonic Dystrophy, (DMPK, DM2, ZNF9, or CNBP)
    - Fascioscapulohumeral Muscular Dystrophy (FSHD, FSHMD1A, FGFR3)
    - Limb girdle Muscular Dystrophy (LGMD1, LGMD2) (FKRP (Fukutin related protein))
    - Ullrich Muscular Dystrophy (COL6A2)
- **Karyotype (cytogenetic analysis) (88289/88230)** is covered without preauthorization.
- **Fanconi Anemia** (**81242/88248)** genetic Testing for **1 or more** of the following:
  - Patient of Ashkenazi Jewish ancestry and of reproductive age
  - Patient with family history of Fanconi anemia, and prior identification of disease-causing mutations in relatives
  - Prior to gamete donation if gamete recipient is carrier
  - Reproductive partner of FANC gene mutation carrier
  - Equivocal or indeterminate cytogenetic testing for chromosomal breakage or rearrangement in presence of DNA interstrand cross-linking agent (eg, diepoxybutane or mitomycin C)
  - Identification of disease-causing mutation in patient with confirmed diagnosis
- **Retinoblastoma (RB1 gene)** testing may be indicated when **ALL** of the following are present:
  - Diagnosis or screening for hereditary retinoblastoma, as indicated by **1 or more** of the following:

- First-degree relative of patient with known RB1 mutation
- Patient with retinoblastoma, with or without family history of retinoblastoma
- Preimplantation genetic diagnosis for families in which disease-causing mutation has been identified
- Prenatal diagnosis for] pregnancies at increased risk when disease-causing allele of affected family member has been identified or linkage has been established in family

▪ Testing is accompanied by genetic counseling

- **Familial Hemophagocytic Lymphohistiocytosis** is covered if requested by name without criteria (there is **no specific code**).
- **Other Disorders** testing for **All** of the following**:**
  - Disorder is **1 or more** of the following**:**
    - Bloom syndrome, (BLM Gene)
    - Canavan disease, (ASPA Gene)
    - Deficiency, Familial hyperinsulinism,
    - Dihydrolipoamide dehydrogenase
    - Dysautonomia (Riley-Day syndrome),
    - Fanconi anemia (FANC Genes)
    - Gaucher's disease,
    - Glycogen storage disease type 1 (G6PC and SLC37A4 Genes
    - Huntington Disease (HTT gene)
    - Inheritest Universal screening
    - Maple syrup urine disease BCKDHA, BCKDHB, and DBT Genes)
    - Mucolipidosis IV, (MCOLN1 Gene)
    - Nemaline myopathy,
    - Nieman Pick Disease Type A, (SMPD1, NPC1, and NPC2 Genes)
    - Usher syndrome type 1F or Usher syndrome type 3
  - Criteria must be met for appropriateness with **1 or more** of the following:
    - Individual with positive family history or known mutation of the disease in the family
    - Reproductive partner of known gene mutation carrier
    - Equivocal or indeterminate diagnostic testing of a symptomatic individual
    - Need to establish disease-causing mutation in individual with confirmed diagnosis
- **Marfan syndrome (FBN1 gene testing)** for Marfan syndrome for **1 or more** of the following**:**
  - Individual does not fulfill Ghent diagnostic criteria but has one major feature of Marfan syndrome
  - Individual is a first-degree relative of an individual with known disease-causing variants
- **CGH Array or SNP Microarray (single nucleotide polymorphism)** is considered medically necessary for patients **under the age of 13 (under age 21 for EPSDT)** and **1 or more** of the following criteria below is met:
  - Individual has multiple anomalies not specific to a known genetic syndrome
  - Individual has apparently non-syndromic developmental delay or intellectual disability
  - Individual with Autism spectrum disorders.
- **Neurofibromatosis 1 and 2** for **1 or more** of the following:
  - NF1 (81408) gene testing for **1 or more** of the following**:**
    - Diagnosis of neurofibromatosis type 1 uncertain after clinical evaluation and conventional diagnostic testing
  - NF2 (81405) gene testing for **1 or more** of the following:
    - Diagnosis of neurofibromatosis type 2 uncertain after clinical evaluation and conventional diagnostic testing
    - Patient with bilateral vestibular schwannomas
    - Patient with multiple spinal tumors (schwannomas, meningiomas, gliomas)
- **Familial Hypercholesterolemia** is considered medically necessary for requests meeting **All** of the following:
  - Must be **1 or more** of the following:
    - Plasma cholesterol level in an adult over the age of 18 greater than or equal to 310 mg/dL
    - Plasma cholesterol level in a child (<18 y/o) greater than or equal to 230 mg/dL
  - Have any **1 or more** of the following:

- **Family history of premature coronary heart disease** (men < 55 years of age, women < 60 years of age) **or sudden cardiac death** (an unexpected death due to cardiac causes that occurs in a short time period [generally within 1 hour of symptom onset]);
- Presence of **xanthomas** on physical Exam
- Known family history (first or second degree relative) with familial hypercholesterolemia and/or any of the associated mutations.

- **Familial Mediterranean Fever (FMF)** (MEFV gene) testing may be indicated when clinical findings or diagnostic testing are suggestive of familial Mediterranean fever, as indicated by **1 or more** of the following:
  - Amyloidosis (senile systemic type)
  - Favorable response to colchicine therapy
  - Recurrent episodes of fever associated with **2 or more** of the following:
    - Acute abdominal pain with possible peritoneal signs
    - Acute arthritis of ankle, knee, or hip
    - Elevated erythrocyte sedimentation rate or C-reactive protein
    - Elevated serum fibrinogen
    - Erysipelas-like erythema of skin[C]
    - Leukocytosis
    - Pleuritis
  - First-degree relative of individual with confirmed diagnosis of familial Mediterranean fever
- **Ashkenazi Jewish genetic panel** testing may be indicated when **ALL** of the following are present:
  - Individual to be tested is of Ashkenazi Jewish ancestry and of reproductive age
  - Panel testing is being ordered to assess for mutations associated with **3 or more** of the following diseases:
    - Bloom syndrome
    - Canavan disease
    - Cystic fibrosis
    - Dihydrolipoamide dehydrogenase deficiency
    - Familial dysautonomia (Riley-Day syndrome)
    - Familial hyperinsulinism
    - Fanconi anemia group C
    - Gaucher disease
    - Glycogen storage disease type 1A
    - Joubert syndrome 2
    - Maple syrup urine disease
    - Mucolipidosis IV
    - Nemaline myopathy
    - Niemann-Pick disease type A
    - Spinal muscle atrophy
    - Tay-Sachs disease
    - Usher syndrome type 1F
    - Usher syndrome type 3
- **Spinal Muscular Atrophy genetic testing** of the SMN1 and SMN2 genes may be indicated when the appropriate clinical situation is present, as indicated by **1 or more** of the following:
  - Symmetric flaccid paralysis in infants
  - Poor muscle tone in infants
  - Lack of motor development in infants (i.e., the ability to sit without support was never achieved)
  - Diffuse symmetric proximal muscle weakness that is greater in the lower than upper limbs (this may be evident by frequent falls, abnormal gait, etc.)
  - Markedly decreased deep tendon reflexes
  - Progressive muscle weakness
  - Prospective parents who wish to reproduce
- **Hereditary Hypertrophic Cardiomyopathy (HCM)** individual mutation diagnostic or screening testing is covered for panels up to 20 mutations: (ACTC (ACTC1), CAV3, GLA, LAMP2, MTTG, MTTI, MTTK, MTTQ, MYBPC3, MYH7, MYL2, MYL3, PRKAG2, TNNC1, TNNI3, TNNT2, TPM1, TTR) may be indicated when **ALL** of the following are present:

        - Confirmation of diagnosis in individual with clinical manifestations suggestive of hypertrophic cardiomyopathy
        - The member is the first-degree relative of an individual with hypertrophic cardiomyopathy
        - Testing is accompanied by genetic counseling
    - **Mucopolysaccharidosis IVA (Morquio syndrome)** may be confirmed by **1 or more** the following criteria**:**
        - Documented clinical signs and symptoms of the disease (e.g., kyphoscoliosis, genu valgum, pectus carinatum, gait disturbance, growth deficiency, etc.)
        - Documented reduced fibroblast or leukocyte GALNS enzyme activity
        - Molecular genetic testing of GALNS
    - **CD40 Ligand Deficiency (also known as CD40LG or X-Linked Hyper IgM)** testing may be confirmed by genetic testing when **1 or more** the following criteria are met**:**
        - The individual has at least one first- or second- degree relative with X-Linked Hyper IgM syndrome
        - The individual has an absent or decreased expression of the CD40 ligand (CD40L) protein on flow cytometry
        - The individual has clinical characteristics indicative of X-linked hyper IgM syndrome (examples include, but are not limited to low serum concentrations of IgG and IgA and normal or elevated serum concentrations of IgM, neutropenia, thrombocytopenia, anemia, autoimmune and/or inflammatory disorders, or recurrent upper and lower respiratory tract bacterial infections, opportunistic infections, and recurrent or protracted diarrhea associated with failure to thrive)
    - **Hereditary Fructose Intolerance Testing (ALDOB Gene)** testing for specific mutation if known in a family or panel specific mutation is unknown, based on family history and clinical features requiring a specific diagnosis.
    - **Tay-Sach's disease** (**HEXA gene**) is approved for **1 or more** of the following:
        - Carrier testing for **1 or more** of the following:
            - Individual of Ashkenazi Jewish ancestry and of reproductive age
            - Individual with deficiency of beta-hexosaminidase A enzyme activity on carrier screening assay
            - Individual with family history of Tay-Sachs disease and of reproductive age, when both disease-causing mutations in HEXA gene have been identified in affected relative
            - Prior to gamete donation if gamete recipient is carrier
        - Confirmation of diagnosis of Tay-Sachs disease in symptomatic patient with inconclusive leukocyte or serum activity of beta-hexosaminidase A
        - Establishment of disease-causing mutation in patient with confirmed diagnosis of Tay-Sachs disease
        - Preimplantation genetic diagnosis when disease-causing mutation in HEXA gene has been identified in both parents
        - Prenatal diagnosis when disease-causing mutation in HEXA gene has been identified in both parents
    - **Wiskott-Aldrich syndrome (WAS)** gene mutation testing **1 or more** of the following:
        - Individual is male with **All** of the following:
            - Initial testing points to a WAS related disorder (Wiskott Aldrich Syndrome, X linked thrombytopenia, X-linked congenital neutropenia)
        - Individual is female with **All** of the following:
            - There is a known family history of WAS gene mutation (testing is to identify female carriers)
        - Testing is prenatal with **All** of the following indications:
            - Fetus is male. Testing is being done with chorionic villi sampling or cultured amniocytes.
            - There is known risk of WAS gene mutation (positive family history of WAS gene mutation and/or of known positive carrier females)
    - **Phenylalanine hydroxylase (PAH) Testing** is medically necessary to confirm phenylketonuria (PKU) diagnosis.
    - **Envisia Idiopathic Pulmonary Fibrosis Diagnostic** testing is considered medically necessary for **All** of the following:
        - Individual is healthy enough to undergo bronchoscopy with transbronchial biopsies

        - High-resolution CT scan of chest demonstrates **1 or more** of the following:
            - "Probable UIP" pattern, as defined by 2018 Fleischner Society white paper
            - "Indeterminate for UIP" pattern, as defined by 2018 Fleischner Society white paper
        - Clinical evaluation (including evaluation by rheumatologist when indicated) and serologic testing excludes autoimmune disease
        - Absence of definitive occupational, environmental, medication-related, or other cause of patient's lung disease
    - **McKusick-Kaufman Syndrome Single Gene Test** testing is considered medically necessary for **All** of the following:
        - Individual displays symptoms
        - Definitive diagnosis is uncertain
        - Test will influence treatments for disabilities and need for future care
        - Follow up laboratory testing will be required dependent on diagnosis
    - **CYP21A genetic testing for congenital adrenal hyperplasia** testing is considered medically necessary for **1 or more** of the following:
        - Completed baseline serum 17-hydroxyprogesterone (17OHP) level as borderline or elevated
        - Cosyntropin stimulation test completed (ACTH stimulation test)
    - **SERPINA1 gene** testing may be indicated when **ALL** of the following are present:
        - Diagnosis or screening for alpha-1 antitrypsin deficiency, as indicated by **1 or more** of the following:
            - Confirmation of diagnosis in individual with clinical manifestations suggestive of alpha-1 antitrypsin deficiency, as indicated by 1 or more of the following:
                - Bronchiectasis
                - Chronic obstructive pulmonary disease and low serum alpha-1 antitrypsin level
                - Infant with cholestatic liver disease
                - Panniculitis
                - Unexplained liver disease (eg, chronic hepatitis with or without cirrhosis, chronically elevated aminotransferase levels, portal hypertension, or primary liver cancer) and low serum alpha-1 antitrypsin level
            - Predictive testing for at-risk first-degree adult relative,[E] when both disease-causing mutations in SERPINA1 gene have been identified in affected relative
            - Predictive testing for at-risk asymptomatic first-degree pediatric relative,[E] when both disease-causing mutations in SERPINA1 gene have been identified in affected relative with childhood liver disease[F]
            - Preimplantation genetic diagnosis,[G] when disease-causing SERPINA1 gene mutations have been identified in relative with childhood liver disease
            - Prenatal testing,[H] when disease-causing SERPINA1 gene mutations have been identified in relative with childhood liver disease
    - **Friedreich Ataxia (FXN)** Diagnosis or carrier Gene testing may be indicated **1 or more** of the following:
        - Carrier testing in at-risk relative when disease-causing FXN gene mutation has been identified in family
        - Carrier testing in reproductive partner of known FXN mutation carrier
        - Confirmation of diagnosis in patient with clinical findings suggestive of Friedreich ataxia
        - Preimplantation genetic diagnosis, when disease-causing mutation in FXN gene has been identified in both parents
        - Prenatal diagnosis, when disease-causing mutation in FXN gene has been identified in both parents

The following tests and/or conditions are considered **not medically necessary** for any use other than those indicated in clinical criteria, to include but not limited to:

- Achilles Tendinopathy
- Adams-Oliver syndrome
- Adenylosuccinate Lyase Deficiency
- Aerobic Capacity
- Alagille Syndrome
- Alcohol flush
- Alpers-Huttenlocher syndrome
- Alpha and Beta Thalassemia (HBB)
- Alport gene testing
- Ambry EpiFirst – Focal

- Ambry's Cystic Fibrosis 508 First and reflex testing if negative to Cystic Fibrosis Gene Sequencing Analysis
- Amyotrophic lateral sclerosis (ALS, Lou Gehrig's disease)
- Angelman syndrome (AS)
- Angelman-Like Syndromes
- Antley-Bixler syndrome
- Apelin
- Arrhythmogenic right ventricular dysplasia/cardiomyopathy (ARVD/C)
- Autosomal Dominant Nocturnal Frontal Lobe Epilepsy
- Autosomal Dominant Partial Epilepsy with Auditory Features
- Baltic Myoclonus (Unverricht-Lundbord Disease)
- Beckwith Wiedemann Syndrome
- Benign Familial Neonatal Seizures
- Benign Familial Neonatal-Infantile Seizures (Bfnis)
- Bernard-Soulier Syndrome Gene
- Betaglobulin
- Biotinidase deficiency
- Birt-Hogg-Dubé syndrome
- Bitter Taste
- Blood Pressure Response to Exercise
- BMI Response to Exercise
- Brugada syndrome
- C3 Glomerulonephritis Sequencing Panel
- CardiaRisk AGT
- Carnitine SLC
- Catecholaminergic Polymorphic Ventricular Tachycardia
- Choroidal neovascularization
- Chronic progressive external ophthalmoparesis (CPEO)
- Citrullinemia
- Clarava™
- Coffin Lowry syndrome (RPS6KA3)
- Coffin Siris syndrome
- Combimatrx's CombiSNP reflex escalation testing
- Congenital Neutropenia Panel
- Connective Tissue Disorders: Sequencing Panels
- Coronary artery disease
- Courtagen genetic panels
- Craniosynostosis
- Creatine Deficiency Syndromes
- Cryopyrin-associated Period Syndrome (CAPS)
- Cytochrome P450 OxidoReductase (POR) Deficiency with Disordered Steriodogenesis
- Cytogenomic constitutional (genome-hyphenwide) microarray analysis; interrogation of genomic regions for copy number and single nucleotide polymorphism (SNP) variants for chromosomal abnormalities [not covered for cardiovascular disease risk]
- deCODE AF
- deCODE MI
- devACT neurodevelopmental panel
- devSEEK neurodevelopmental panel
- Diabetes type 2 genetic testing
- DiGeorge Syndrome (AKA - Velocardiofacia syndrome, Familial third and fourth pharyngeal pouch syndrome, Sedlackova syndrome, and Thymic aplasia syndrome)
- Dilated cardiomyopathy panels
- Dravet Syndrome
- Duane-Radial Ray syndrome / Acro-Renal-Ocular syndrome
- Eating disinhibition
- Ehlers-Danlos Syndrome can be diagnosed with a skin biopsy.
- Ellis-van Creveld syndrome
- Emory University's Epilepsy and Seizure Disorders: Sequencing Panel
- Epidermodysplasia Verruciformis
- Epidermolysis bullosa
- Epidermolytic hyperkatosis
- Epilepsy Advanced Sequencing Evaluation
- EpiNext
- epiSEEK Comprehensive epilepsy panel
- epiSEEK focus epilepsy panel
- Exome Sequence Analysis (CPT 81415, 81416, 81417)
- Familial cold urticaria/familial cold autoinflammatory syndrome
- Familial Congenital Cavernous Malformations (FCCM),
- Fascioscapulohumeral Muscular Dystrophy (FSHD)
- Fatty Acid Oxidation Panel for Glutaric Aciduria Type 2
- Fever Mutation Panel
- Gene Dx Comprehensive Cardiomyopathy Panel
- GeneDx Arrhythmia panel
- GeneDX Arthrogryposis Panel Test
- GeneDx Combined Cardiac panel
- Genetic risk due to decreased vitamin B2
- Genetic risk for decreased adiponectin
- Genetic risk for decreased folate
- Genetic risk for decreased HCL cholesterol
- Genetic risk for decreased omega-6 and omega-3
- Genetic risk for decreased vitamin A
- Genetic risk for decreased vitamin B12
- Genetic risk for decreased vitamin B6

- Genetic risk for decreased vitamin C
- Genetic risk for decreased vitamin D
- Genetic risk for elevated LDL cholesterol
- Genetic risk for elevated trigylcerides
- Genetic risk for increased vitamin E
- Genome Sequence Analysis (CPT 81425, 81426, 81427)
- Hemiplegic Migraine Panel
- Hepatocerebral mtDNA Depletion Panel
- Hereditary Hemorrhagic Telangectasias;
- Hereditary Hemorrhagic Telangiectasias
- Hereditary Multiple Exostoses
- Hereditary Multiple Osteochondromatosis
- Hereditary pancreatitis
- Hereditary Retinal Disorders Genetic Panel Lab Test
- Hereditary sensory and autonomic neuropathies genetic testing
- Hereditary Spastic Paraplegia
- Hereditary spherocytosis and elliptocytosis
- Hunter syndrome
- hyper IgE syndrome
- Hyperhomocysteinemia
- Hyperimmuneoglobulin D Syndrome
- Hypohidrotic Ectodermal Dysplasia Gene
- Hypokalemic Periodic Paralysis
- Idiopathic Progressive Polyneuropathy Gene
- Immunoassay for analyte other than infectious agent antibody or infectious agent antigen; quantitative, not otherwise specified [adiponectin] [leptin] [interleukin-hyphen6 (IL-6)] [tumor necrosis factor alpha (TNF-a)] [Oxidized phospholipids] [interleukin 17] [toll-like receptor 4 (TLR4)] [Interleukin-18 (IL-18)] [soluble cell adhesion molecules (e.g., intercellular adhesion molecule-1 [ICAM-1], vascular cell adhesion molecule-1 [VCAM-1], E-hyphenselectin, P-hyphenselectin)] [transforming growth factor beta]
- Impulse Control, ADHD, Oppositional Defiance Disorder
- Incontinentia Pigmenti
- Inherigen Plus
- Inheritest
- Invitae Alternating Hemiplegia of Childhood Panel
- Isovaleric Acidemia
- Jaundice Chip array
- Juvenile Myoclonic Epilepsy
- Klippel-Feil syndrome
- Klippel-Feil syndrome
- Lafora Disease
- Leber's hereditary optic neuropathy panel
- Legius Syndrome
- Leopard syndrome
- Lesch-Nyhan Syndrome
- Liddle syndrome
- Lissencephaly
- Loeys-Dietz syndrome
- Low Bone Mass Panel for Osteoporosis
- lysoSEEK lysosomal disorder panel
- McCune-Albright syndrome
- Medium Chain Acyl-coA Dehydrogenase Deficiency (MCADD)
- Metachromatic leukodystrophy (MLD)
- Microarray and multi-gene panels for nonsyndromic hereditary hearing loss
- Microcephaly with Early-Onset Intractable Seizures and Developmental Delay (MCSZ)
- Microdeletion Syndromes on Chromosome 1-11 including but not limited to the following:
    - TAR syndrome
    - Smith-Magenis syndrome
    - 2q37 Syndrome
    - Wolf-Hirschhorn Syndrome
    - Sotos Syndrome
    - Williams Syndrome
    - Nablus Mask-Like Facial Syndrome
    - Langer-Giedion Syndrome Or Trichorhinophalangeal Syndrome Type II
    - Digeorge Syndrome TypeII
    - Wagr Syndrome
    - Potocki-Shaffer Syndrome
    - Jacobsen Syndrome
- Migrainous vertigo
- Mitochondrial Disorder testing
- Mitochondrial encephalomyopathy with lactic acidosis and stroke-like episodes (MELAS)
- Mosaic Down Syndrome
- Mowat-Wilson Syndrome
- mtSEEK comprehenseive nuclear mitochondrial panel
- Muckle Wells syndrome
- Muckle Wells syndrome
- Mucopolysaccharidosis
- Myopathy/Rhabdomyolysis panel
- Nail-Patella Syndrome
- Natera Renasight Genetic Panel
- Neimann Pick Disease;
- Neonatal Onset Multisystemic Inflammatory Disorder
- Nephrotic Syndrome
- Neuronal Ceroid Lipofuscinoses
- Noonan syndrome
- Nuclear encoded mitochondrial genomic sequencing panels (eg, Nuclear-Mito NGS Panel)
- nucSEEK focus nuclear mitochondrial gene panel
- Oculocutaneous albinism
- Oculopharyngeal muscular dystrophy

- Ohtahara Syndrome
- Osteogenesis imperfecta
- Osteoprotegerin
- Parkinson's Disease
- Pendred syndrome
- Periodic fever syndrome panel
- Pfeiffer syndrome
- Polycystic kidney disease
- Pontocerebellar hypoplasia genetic testing
- Prader–Willi Syndrome gene testing
- PreDx Diabetes Risk Test;
- Primary dystonia;
- Progressive Myoclonic Epilepsy (PME)
- Pulmonary Alveolar Proteinosis next generation sequencing or mutation testing
- Pyridoxine Dependent Seizures
- Repeat/Duplicative genetic testing
- Retinitis Pigmentosa genetic testing
- Rett/Atypical Rett Syndrome
- Schizencephaly
- Scoliscore test
- Selective Serotonin Reuptake Inhibitors (SSRIs) - Cytochrome P450 Polymorphism Testing
- Septo-Optic Dysplasia (SOD)
- Short Stature Homeobox testing
- Shwachman-Diamond syndrome
- Skeletal Disorders Panel
- Sleep-walking
- Soto syndrome
- Stickler Syndrome
- Trismus Pseudocamptodactyly Syndrome
- Trismus-pseudocamptodactyly syndrome
- Tuberous Sclerosis testing
- Tumor Necrosis Factor Receptor-associated Periodic Syndrome
- Tuteva™
- Uniparental Disomy
- VICI Syndrome
- Waardenburg Syndrome
- West Syndrome
- Whole Exome Sequencing (WES)
- Whole Genome Sequencing (WGS)
- Wilson disease
- X chromosome activation status testing
- xTAG Gastrointestinal Pathogen Panel

The following genes are considered **not medically necessary** for any use other than those indicated in clinical criteria, to include but not limited to:

- ABCA1
- ABCA3
- ABCC8
- ABCC9
- ACTA2
- ACTG1
- ACTN2
- ACVR1
- ACVRL1 (ALK1)
- ADAMTS2
- ADIPOQ
- AGPAT2
- AGT
- AKT2
- ALDH2
- ALDH7A1
- ANGPTL4
- ANKK1
- ANKRD1
- APOA2
- APOE
- ARHGAP31
- ARHGEF9
- ARID1A
- ARID1B
- ARX
- ASS1
- ATN1
- ATP6AP2
- ATP6V0A2
- ATP7B
- BAG3
- BESC1
- BESC3
- BS
- BSCL2
- C3
- CAD
- CASK
- CASQ2
- CAV1
- CAV3
- CCDC50,
- CD151
- CD25 (IL2RA)
- CDH23,
- CDKAL1
- CDKL5
- CDKN1C
- CDKN2B
- CDSN
- CETP
- CFB
- CFH
- CFHR5
- CFI
- CFTR Full Gene Sequencing (**81223**)
- CHD7
- CHRNA2
- CHRNA4
- CHRNB2
- Chromosome 4 Deletion Gene
- Chromosome 9 polymorphism 9p21
- CHST14
- CHST8
- CIDEC
- CLDN14,
- CLN3
- CLN5
- CLN6
- CLN8
- CNTNAP2
- COCH
- COL11A1
- COL11A2
- COL1A1
- COL1A2
- COL2A1
- COL3A1
- COL5A1
- COL5A2
- COL7A
- COL7A1
- CPT11

- CRYAB
- CRYM
- CSF2RA
- CSF2RB
- CSRP3
- CSTB
- CTLA4
- CTSD
- DAX-1
- DES
- DFNA5
- DIAPH1
- DOCK6
- DOCK8
- DRD2
- DSG2
- DSP
- DSPP
- DST
- DTNA
- EDN1
- EGR2
- ELANE
- ELN
- EMD
- ENG
- EOGT
- EPM2A
- EPM2B
- ESPN
- ESR1
- ESRRB
- EVC
- EVC2
- EXOSC8
- EXPH5
- EXT1
- EXT2
- Factor H
- FBLN5
- FBN2
- FCAS
- FERMT1
- FGFR1
- FKBP14
- FKTN
- FLCN
- FMR2
- FOXF1
- FSGS
- FTO
- GABRG2
- GAMT
- GATAD1
- GATM
- GCK
- GDAP1
- GDF5
- GFI1
- GIPC3
- GJB1,
- GJB2
- GJB3
- GJB6 gene (Connexin 30)
- GLA
- GLIS2/NPHP7
- GLUD1
- GPR56 gene
- GPSM2,
- GRHL2,
- GRIN2A
- (ST2)
- HADH
- HAX1
- HBA1
- HBA2
- HBB
- HESX1
- HHEX
- HNF1A
- HNF1B
- HNF4A
- HPRT1
- HRAS
- IGF2BP2
- ILK
- INSIG2
- ITGA3
- ITGA6
- ITGB4
- JAG1
- JAZF1
- JPH2
- JUP
- KCNC2
- KCNC3
- KCNJ11
- KCNQ1
- KCNQ1OT1 (also known as LIT1)
- KCNQ2
- KCNQ3
- KCNQ4
- KCNT1
- KCTD10
- KLP6
- KRT14
- KRT5
- L1CAM
- LAMA3
- LAMA4
- LAMB2
- LAMB3
- LAMC2
- LAMP3
- LDB3 (ZASP)
- LEMD3
- Leptin
- LGI1
- LIPC
- LITAF
- LMNA
- LMX1B
- LOXHD1,
- LRTOMT
- MAP2K1
- MAP2K2
- MARVELD2
- MC4R
- MCP
- MECP2
- Menopause Karotype
- MFSD8
- MID1
- miR-182
- miR-183
- miR-96
- MMAB
- MMP3
- MPZ
- MTHFR
- MTND1
- MTND5
- MTND6
- MTNR1B
- MT-RNR1
- MTTD
- MTTG
- MTTH
- MTTI
- MTTK
- MTTL1
- MTTL2
- MTTM
- MTTQ
- MTTS1
- MT-TS1
- MTTS2
- MYBPC3
- MYH14,
- MYH7
- MYH8
- MYH9
- MYL3
- MYLK
- MYLK2
- MYO15A
- MYO1A
- MYO3A
- MYO6,
- MYO7A
- MYOZ2
- MYPN

- NEBL
- NEFL
- NEXN
- NHLRC1
- NKX2-1
- NLRP3
- NOMID
- NOTCH1
- NOTCH2
- NPHS2
- NRXN1
- NSD1
- OCA2
- OPA 1
- OPHN1
- OTOA
- OTOF
- PAX2
- PCDH15
- PCDH19
- PDGFR
- PDLIM3
- PEX6
- Phox2b
- PJVK,
- PKD2
- PKP1
- PKP2
- PLEC
- PLIN1
- PLOD1
- PLP
- PMP22,
- PNPO
- POLG
- POU4F3
- PPARD
- PPARG
- PPARGC1A
- PPT1
- PRDM5
- PRICKLE1
- PRPS1
- PRX
- PTGS2
- PTPN11
- PTRF
- RAF1
- RAI1
- RARS2
- RASA1
- RBM20
- RBPJ
- RBP4
- RNASEH2A
- RNASEH2B
- RNASEH2C
- RPS6KA3
- RYR2
- SALL4
- SAMHD1
- SBDS
- SCL9A6
- SCN1A
- SCN1B
- SCN2A
- SCN4A
- SCN8A
- SCN9A
- SCNN1B
- SCNN1G
- Spla2-IIA
- SFTPB
- SFTPC
- SGCD
- SHOX
- SLC16A1
- SLC25A13
- SLC25A20
- SLC25A22
- SLC2A10
- SLC2A2
- SLC30A8
- SLC39A13
- SLC7A7
- SMAD3
- SMAD4
- SMARCA4
- SMARCB1
- SMARCE1
- SOS1
- SPRED1
- SPTAN1
- STAT 3
- STAT5
- STRC
- STXBP1
- SYNGAP1
- TAS
- TAS2R38
- TBC1D4
- TCAP
- TCF4
- TCF7L2
- TECTA
- TGFBR1
- TGFBR2
- TGM5
- TMC1
- TMC6
- TMC8
- TMEM43
- TMIE
- TMPO
- TMPRSS3
- TNFR1TJP2
- TNFRSF1A
- TNNC1
- TNNI3
- TNNT2
- TPM1
- TPP1
- TPRN,
- TPRQ
- TREX1
- TRIOBP
- TSC1
- TSC2
- TSEN2
- TSEN34
- TSEN54
- TTN
- TTR
- UBE3A
- UCP2
- VCL
- VRK1
- WFS1
- ZEB2
- ZMPSTE24
- ZNF469

## Coding:

Medically necessary with criteria:

| Coding | Description |
|---|---|
| 81161 | DMD (dystrophin) (eg, Duchenne/Becker muscular dystrophy) deletion analysis, and duplication analysis, if performed |
| 81187 | CNBP (CCHC-type zinc finger nucleic acid binding protein) (eg, myotonic dystrophy type 2) gene analysis, evaluation to detect abnormal (eg, expanded) alleles |
| 81200 | ASPA (aspartoacylase) (eg, Canavan disease) gene analysis, common variants (eg, E285A, Y231X) |
| 81209 | BLM (Bloom syndrome, RecQ helicase-like) (eg, Bloom syndrome) gene analysis, 2281del6ins7 variant |
| 81220 | CFTR (cystic fibrosis transmembrane conductance regulator) (eg, cystic fibrosis) gene analysis; common variants (eg, ACMG/ACOG guidelines) |
| 81221 | CFTR (cystic fibrosis transmembrane conductance regulator) (eg, cystic fibrosis) gene analysis; known familial variants |
| 81222 | CFTR (cystic fibrosis transmembrane conductance regulator) (eg, cystic fibrosis) gene analysis; duplication/deletion variants |
| 81224 | CFTR (cystic fibrosis transmembrane conductance regulator) (eg, cystic fibrosis) gene analysis; intron 8 poly-T analysis (eg, male infertility) |
| 81228 | Cytogenomic constitutional (genome-wide) microarray analysis; interrogation of genomic regions for copy number variants (eg, Bacterial Artificial Chromosome [BAC] or oligo-based comparative genomic hybridization [CGH] microarray analysis) |
| 81229 | Cytogenomic constitutional (genome-wide) microarray analysis; interrogation of genomic regions for copy number and single nucleotide polymorphism (SNP) variants for chromosomal abnormalities; |
| 81234 | DMPK (DM1 protein kinase) (eg, myotonic dystrophy type 1) gene analysis; characterization of alleles (eg, expanded size) |
| 81239 | DMPK (DM1 protein kinase) (eg, myotonic dystrophy type 1) gene analysis; characterization of alleles (eg, expanded size) |
| 81242 | FANCC (Fanconi anemia, complementation group C) (eg, Fanconi anemia, type C) gene analysis, common variant |
| 81243 | FMR1 (Fragile X mental retardation 1) (eg, fragile X mental retardation) gene analysis; evaluation to detect abnormal (eg, expanded) alleles |
| 81244 | FMR1 (Fragile X mental retardation 1) (eg, fragile X mental retardation) gene analysis; characterization of alleles (eg, expanded size and methylation status) |
| 81250 | G6PC (glucose-6-phosphatase, catalytic subunit) (eg, Glycogen storage disease, type 1a, von Gierke disease) gene analysis, common variants (eg, R83C, Q347X) |
| 81255 | HEXA (hexosaminidase A [alpha polypeptide]) (eg, Tay-Sachs disease) gene analysis, common variants (eg, 1278insTATC, 1421+1G>C, G269S) |
| 81256 | FXN (frataxin) (eg, Friedreich ataxia) gene analysis; full gene sequence |
| 81260 | IKBKAP (inhibitor of kappa light polypeptide gene enhancer in B-cells, kinase complex-associated protein) (eg, familial dysautonomia) gene analysis, common variants (eg, 2507+6T>C, R696P) |
| 81271 | HTT (huntingtin) (eg, Huntington disease) gene analysis; evaluation to detect abnormal (eg, expanded) alleles |

| | |
|---|---|
| 81274 | HTT (huntingtin) (eg, Huntington disease) gene analysis; characterization of alleles (eg, expanded size) |
| 81280 | Long QT syndrome gene analyses (eg, KCNQ1, KCNH2, SCN5A, KCNE1, KCNE2, KCNJ2, CACNA1C, CAV3, SCN4B, AKAP, SNTA1, and ANK2); full sequence analysis |
| 81281 | Long QT syndrome gene analyses (eg, KCNQ1, KCNH2, SCN5A, KCNE1, KCNE2, KCNJ2, CACNA1C, CAV3, SCN4B, AKAP, SNTA1, and ANK2); known familial sequence variant |
| 81282 | Long QT syndrome gene analyses (eg, KCNQ1, KCNH2, SCN5A, KCNE1, KCNE2, KCNJ2, CACNA1C, CAV3, SCN4B, AKAP, SNTA1, and ANK2); duplication/deletion variants |
| 81284 | FXN (frataxin) (eg, Friedreich ataxia) gene analysis; evaluation to detect abnormal (expanded) alleles |
| 81285 | FXN (frataxin) (eg, Friedreich ataxia) gene analysis; characterization of alleles (eg, expanded size) |
| 81289 | FXN (frataxin) (eg, Friedreich ataxia) gene analysis; known familial variant(s) |
| 81290 | MCOLN1 (mucolipin 1) (eg, Mucolipidosis, type IV) gene analysis, common variants (eg, IVS3-2A>G, del6.4kb) |
| 81329 | SMN1 (survival of motor neuron 1, telomeric) (eg, spinal muscular atrophy) gene analysis; dosage/deletion analysis (eg, carrier testing), includes SMN2 (survival of motor neuron 2, centromeric) analysis, if performed |
| 81330 | SMPD1(sphingomyelin phosphodiesterase 1, acid lysosomal) (eg, Niemann-Pick disease, Type A) gene analysis, common variants (eg, R496L, L302P, fsP330) |
| 81332 | SERPINA1 (serpin peptidase inhibitor, clade A, alpha-1 antiproteinase, antitrypsin, member 1) (eg, alpha-1-antitrypsin deficiency), gene analysis, common variants (eg, *S and *Z) |
| 81336 | SMN1 (survival of motor neuron 1, telomeric) (eg, spinal muscular atrophy) gene analysis; full gene sequence |
| 81337 | SMN1 (survival of motor neuron 1, telomeric) (eg, spinal muscular atrophy) gene analysis; known familial sequence variant(s) |
| 81400 | Molecular pathology procedure, Level 1 (eg, identification of single germline variant [eg, SNP] by techniques such as restriction enzyme digestion or melt curve analysis) |
| 81401 | Molecular pathology procedure, Level 2 (eg, 2-10 SNPs, 1 methylated variant, or 1 somatic variant [typically using nonsequencing target variant analysis], or detection of a dynamic mutation disorder/triplet repeat) |
| 81402 | Molecular pathology procedure, Level 3 (eg, >10 SNPs, 2-10 methylated variants, or 2-10 somatic variants [typically using non-sequencing target variant analysis], immunoglobulin and T-cell receptor gene rearrangements, duplication/deletion variants of 1 exon, loss of heterozygosity [LOH], uniparental disomy [UPD]) |
| 81403 | Molecular pathology procedure, Level 4 (eg, analysis of single exon by DNA sequence analysis, analysis of >10 amplicons using multiplex PCR in 2 or more independent reactions, mutation scanning or duplication/deletion variants of 2-5 exons) |
| 81404 | Molecular pathology procedure, Level 5 (eg, analysis of 2-5 exons by DNA sequence analysis, mutation scanning or duplication/deletion variants of 6-10 exons, or characterization of a dynamic mutation disorder/triplet repeat by Southern blot analysis) |
| 81405 | Molecular pathology procedure, Level 6 (eg, analysis of 6-10 exons by DNA sequence analysis, mutation scanning or duplication/deletion variants of 11-25 exons, regionally targeted cytogenomic array analysis) |
| 81406 | Molecular pathology procedure, Level 7 (eg, analysis of 11-25 exons by DNA sequence analysis, mutation scanning or duplication/deletion variants of 26-50 exons) |

| | |
|---|---|
| 81407 | Molecular pathology procedure, Level 8 (eg, analysis of 26-50 exons by DNA sequence analysis, mutation scanning or duplication/deletion variants of >50 exons, sequence analysis of multiple genes on one platform) |
| 81408 | Molecular pathology procedure, Level 9 (eg, analysis of >50 exons in a single gene by DNA sequence analysis) |
| 81412 | Ashkenazi Jewish associated disorders (eg, Bloom syndrome, Canavan disease, cystic fibrosis, familial dysautonomia, Fanconi anemia group C, Gaucher disease, Tay-Sachs disease), genomic sequence analysis panel, must include sequencing of at least 9 genes, including ASPA, BLM, CFTR, FANCC, GBA, HEXA, IKBKAP, MCOLN1, and SMPD1 |
| 81439 | Hereditary cardiomyopathy (eg, hypertrophic cardiomyopathy, dilated cardiomyopathy, arrhythmogenic right ventricular cardiomyopathy), genomic sequence analysis panel, must include sequencing of at least 5 cardiomyopathy-related genes (eg, DSG2, MYBPC3, MYH7, PKP2, TTN) |
| 81443 | Genetic testing for severe inherited conditions (eg, cystic fibrosis, Ashkenazi Jewish-associated disorders [eg, Bloom syndrome, Canavan disease, Fanconi anemia type C, mucolipidosis type VI, Gaucher disease, Tay-Sachs disease], beta hemoglobinopathies, phenylketonuria, galactosemia), genomic sequence analysis panel, must include sequencing of at least 15 genes (eg, ACADM, ARSA, ASPA, ATP7B, BCKDHA, BCKDHB, BLM, CFTR, DHCR7, FANCC, G6PC, GAA, GALT, GBA, GBE1, HBB, HEXA, IKBKAP, MCOLN1, PAH) |
| 81479 | Unlisted molecular pathology procedure |
| 88230 | Tissue culture for non-neoplastic disorders; lymphocyte |
| 88248 | Chromosome analysis for breakage syndromes; baseline breakage, score 50-100 cells, count 20 cells, 2 karyotypes (eg, for ataxia telangiectasia, Fanconi anemia, fragile X) |
| 88289 | Chromosome analysis; additional high resolution study |
| 0233U | FXN (frataxin) (eg, Friedreich ataxia), gene analysis, including small sequence changes in exonic and intronic regions, deletions, duplications, short tandem repeat (STR) expansions, mobile element insertions, and variants in non-uniquely mappable regions |
| S3841 | Genetic testing for retinoblastoma |

Considered Not Medically Necessary:

| Coding | Description |
|---|---|
| 81177 | ATN1 (atrophin 1) (eg, dentatorubral-pallidoluysian atrophy) gene analysis, evaluation to detect abnormal (eg, expanded) alleles |
| 81223 | CFTR (cystic fibrosis transmembrane conductance regulator) (eg, cystic fibrosis) gene analysis; full gene sequence |
| 81252 | GJB2 (gap junction protein, beta 2, 26kDa, connexin 26) (eg, nonsyndromic hearing loss) gene analysis; full gene sequence |
| 81253 | GJB2 (gap junction protein, beta 2, 26kDa, connexin 26) (eg, nonsyndromic hearing loss) gene analysis; known familial variants |
| 81254 | GJB6 (gap junction protein, beta 6, 30kDa, connexin 30) (eg, nonsyndromic hearing loss) gene analysis, common variants (eg, 309kb [del(GJB6-D13S1830)] and 232kb [del(GJB6-D13S1854)]) |
| 81257 | HBA1/HBA2 (alpha globin 1 and alpha globin 2) (eg, alpha thalassemia, Hb Bart hydrops fetalis syndrome, HbH disease), gene analysis; common deletions or variant (eg, Southeast Asian, Thai, Filipino, Mediterranean, alpha3.7, alpha4.2, alpha20.5, Constant Spring) |

| | |
|---|---|
| 81258 | HBA1/HBA2 (alpha globin 1 and alpha globin 2) (eg, alpha thalassemia, Hb Bart hydrops fetalis syndrome, HbH disease), gene analysis; known familial variant |
| 81259 | HBA1/HBA2 (alpha globin 1 and alpha globin 2) (eg, alpha thalassemia, Hb Bart hydrops fetalis syndrome, HbH disease), gene analysis; full gene sequence |
| 81269 | HBA1/HBA2 (alpha globin 1 and alpha globin 2) (eg, alpha thalassemia, Hb Bart hydrops fetalis syndrome, HbH disease), gene analysis; duplication/deletion variants |
| 81302 | MECP2 (methyl CpG binding protein 2) (eg, Rett syndrome) gene analysis; full sequence analysis |
| 81303 | MECP2 (methyl CpG binding protein 2) (eg, Rett syndrome) gene analysis; known familial variant |
| 81304 | MECP2 (methyl CpG binding protein 2) (eg, Rett syndrome) gene analysis; duplication/deletion variants |
| 81324 | PMP22 (peripheral myelin protein 22) (eg, Charcot-Marie-Tooth, hereditary neuropathy with liability to pressure palsies) gene analysis; duplication/deletion analysis |
| 81325 | Genome (eg, unexplained constitutional or heritable disorder or syndrome); sequence analysis |
| 81326 | PMP22 (peripheral myelin protein 22) (eg, Charcot-Marie-Tooth, hereditary neuropathy with liability to pressure palsies) gene analysis; known familial variant |
| 81331 | SNRPN/UBE3A (small nuclear ribonucleoprotein polypeptide N and ubiquitin protein ligase E3A) (eg, Prader-Willi syndrome and/or Angelman syndrome), methylation analysis |
| 81333 | TGFBI (transforming growth factor beta-induced) (eg, corneal dystrophy) gene analysis, common variants (eg, R124H, R124C, R124L, R555W, R555Q) |
| 81361 | HBB (hemoglobin, subunit beta) (eg, sickle cell anemia, beta thalassemia, hemoglobinopathy); known familial variant(s) |
| 81363 | HBB (hemoglobin, subunit beta) (eg, sickle cell anemia, beta thalassemia, hemoglobinopathy); duplication/deletion variant(s) |
| 81364 | HBB (hemoglobin, subunit beta) (eg, sickle cell anemia, beta thalassemia, hemoglobinopathy); full gene sequence |
| 81410 | Aortic dysfunction or dilation (eg, Marfan syndrome, Loeys Dietz syndrome, Ehler Danlos syndrome type IV, arterial tortuosity syndrome); genomic sequence analysis panel, must include sequencing of at least 9 genes, including FBN1, TGFBR1, TGFBR2, COL3A1, MYH11, ACTA2, SLC2A10, SMAD3, and MYLK |
| 81411 | Aortic dysfunction or dilation (eg, Marfan syndrome, Loeys Dietz syndrome, Ehler Danlos syndrome type IV, arterial tortuosity syndrome); duplication/deletion analysis panel, must include analyses for TGFBR1, TGFBR2, MYH11, and COL3A1 |
| 81415 | Exome (eg, unexplained constitutional or heritable disorder or syndrome); sequence analysis |
| 81416 | Exome (eg, unexplained constitutional or heritable disorder or syndrome); sequence analysis, each comparator exome (eg, parents, siblings) (List separately in addition to code for primary procedure) |
| 81417 | Exome (eg, unexplained constitutional or heritable disorder or syndrome); re-evaluation of previously obtained exome sequence (eg, updated knowledge or unrelated condition/syndrome) |
| 81425 | Genome (eg, unexplained constitutional or heritable disorder or syndrome); sequence analysis |
| 81426 | Genome (eg, unexplained constitutional or heritable disorder or syndrome); sequence analysis, each comparator genome (eg, parents, siblings) (List separately in addition to code for primary procedure) |

| | |
|---|---|
| 81427 | Genome (eg, unexplained constitutional or heritable disorder or syndrome); re-evaluation of previously obtained genome sequence (eg, updated knowledge or unrelated condition/syndrome) |
| 81430 | Hearing loss (eg, nonsyndromic hearing loss, Usher syndrome, Pendred syndrome); genomic sequence analysis panel, must include sequencing of at least 60 genes, including CDH23, CLRN1, GJB2, GPR98, MTRNR1, MYO7A, MYO15A, PCDH15, OTOF, SLC26A4, TMC1, TMPRSS3, USH1C, USH1G, USH2A, and WFS1 |
| 81431 | Hearing loss (eg, nonsyndromic hearing loss, Usher syndrome, Pendred syndrome); duplication/deletion analysis panel, must include copy number analyses for STRC and DFNB1 deletions in GJB2 and GJB6 genes |
| 81554 | Pulmonary disease (idiopathic pulmonary fibrosis [IPF]), mRNA, gene expression analysis of 190 genes, utilizing transbronchial biopsies, diagnostic algorithm reported as categorical result (eg, positive or negative for high probability of usual interstitial pneumonia [UIP]) |
| 83006 | Growth stimulation expressed gene 2 (ST2, Interleukin 1 receptor like-1) |
| 83520 | Immunoassay for analyte other than infectious agent antibody or infectious agent antigen; quantitative, not otherwise specified |
| 83529 | Interleukin-6 (IL-6) |
| S3800 | Genetic testing for amyotrophic lateral sclerosis (ALS) |
| S3852 | DNA analysis for APOE epsilon 4 allele for susceptibility to Alzheimer's disease |
| S3861 | Genetic testing, sodium channel, voltage-gated, type V, alpha subunit (SCN5A) and variants for suspected Brugada Syndrome |

## Document History:

Revised Dates:

- 2023: October
- 2022: November
- 2022: August
- 2022: May
- 2022: March
- 2021: September
- 2021: May
- 2020: December
- 2020: October
- 2020: September
- 2020: June
- 2020: May
- 2020: March
- 2020: January
- 2019: December
- 2019: October
- 2018: March
- 2017: September
- 2016: August
- 2016: June
- 2016: May
- 2016: April
- 2016: February
- 2016: January
- 2015: December
- 2015: November
- 2015: October
- 2015: September
- 2015: August
- 2015: July
- 2015: June
- 2015: May
- 2015: April
- 2015: March
- 2015: February
- 2015: January
- 2014: December
- 2014: November
- 2014: October
- 2014: September
- 2014: August
- 2014: July
- 2014: June
- 2014: May
- 2014: April
- 2014: March
- 2014: February
- 2014: January
- 2013: December
- 2013: November
- 2013: October
- 2013: August
- 2013: July
- 2013: June
- 2013: May
- 2013: April
- 2013: March
- 2013: February
- 2013: January
- 2012: December
- 2012: November
- 2012: October
- 2012: September
- 2012: August
- 2012: July
- 2012: June
- 2012: May
- 2012: April
- 2012: March
- 2012: February
- 2012: January
- 2011: December

- 2011: November
- 2011: October
- 2011: September
- 2011: August
- 2011: July
- 2011: June
- 2011: May
- 2011: April
- 2011: March
- 2011: February
- 2011: January
- 2010: November
- 2010: April
- 2009: November

Reviewed Dates:

- 2019: October
- 2017: May
- 2015: November
- 2010: February

Effective Date:

- February 2009

## References:

Including but not limited to: Specialty Association Guidelines; Government Regulations; Winifred S. Hayes, Inc; UpToDate; Literature Review; Specialty Advisors; National Coverage Determination (NCD); Local Coverage Determination (LCD).


(2023, Jun 27). Retrieved Aug 24, 2023, from MCG: https://careweb.careguidelines.com/ed27/index.html

(2023). Retrieved Aug 24, 2023, from Hayes, Inc: https://evidence.hayesinc.com/search?q=%257B%2522text%2522:%2522Friedreich%2520Ataxia%2522,%2522title%2522:null,%2522termsource%2522:%2522searchbar%2522,%2522page%2522:%257B%2522page%2522:0,%2522size%2522:50%257D,%2522type%2522:%2522all%2522,%2522sources%

FXN gene. (2010, Feb 01). Retrieved Aug 24, 2022, from MedlinePlus - Genetics: https://medlineplus.gov/genetics/gene/fxn/#resources

Genetic Testing. (2023, Jul 01). Retrieved Aug 24, 2023, from Aetna: https://www.aetna.com/cpb/medical/data/100_199/0140.html

Genetic Testing for Hereditary and Multifactorial. (2022, Sep 15). Retrieved Aug 24, 2023, from Cigna: https://static.cigna.com/assets/chcp/pdf/coveragePolicies/medical/mm_0052_coveragepositioncriteria_genetic_testing.pdf

Genetic Testing for Inherited Conditions. (2023, Feb 12). Retrieved Aug 24, 2023, from Carelon Medical Benefits Management: https://guidelines.carelonmedicalbenefitsmanagement.com/genetic-testing-for-inherited-conditions-2023-02-12/?highlight=81284&hilite=81284

Genetic Testing for Inherited Diseases. (2023, May 25). Retrieved Aug 24, 2023, from Anthem: https://www.anthem.com/dam/medpolicies/abcbs_va/active/guidelines/gl_pw_e000232.html

Genetic Testing for Neuromuscular Disorders. (2023, Apr 01). Retrieved Aug 24, 2023, from United Healthcare: https://www.uhcprovider.com/content/dam/provider/docs/public/policies/comm-medical-drug/genetic-testing-neuromuscular-disorders.pdf

Genetic Testing Options for Ataxia. (2023). Retrieved Aug 24, 2023, from National Ataxia Foundation: https://www.ataxia.org/genetictesting/

LCD: MolDX: Molecular Diagnostic Tests (MDT) (L35025). (2023, May 04). Retrieved Aug 24, 2023, from Centers for Medicare and Medicaid Services: https://www.cms.gov/medicare-coverage-database/view/lcd.aspx?lcdId=35025&ver=96

LCD: MolDX: Repeat Germline Testing (L38274). (2021, Dec 30). Retrieved Aug 24, 2023, from Centers for Medicare and Medicaid Services: https://www.cms.gov/medicare-coverage-database/view/lcd.aspx?lcdId=38274&ver=6

MEDICAID MEMO. (2014, Apr 03). Retrieved Aug 24, 2023, from Department of Medical Assistance Services: https://vamedicaid.dmas.virginia.gov/sites/default/files/2022-09/Medicaid%20Memo%202014.04.03.pdf

Opal, P., & Zoghbi, H. (2023, Mar 01). Friedreich ataxia. Retrieved Aug 24, 2023, from UpToDate: https://www.uptodate.com/contents/friedreich-ataxia?search=Friedreich%20ataxia&source=search_result&selectedTitle=1~37&usage_type=default&display_rank=1#H10

Regulation of Genetic Tests. (2023). Retrieved Aug 24, 2023, from National Human Genome Research Institute: https://www.genome.gov/about-genomics/policy-issues/Regulation-of-Genetic-Tests

National Institute of Neurologic Disorders and Stroke. (2014, February 14). Friedreich Ataxia. *National Institutes of Health.* https://www.ninds.nih.gov/health-information/disorders/friedreich-ataxia

Local Coverage Determination (LCD) Molecular Pathology Procedures L35000, revised 8/6/2023. https://www.cms.gov/medicare-coverage-database/view/lcd.aspx?LCDId=35000&ContrId=275

Skyclarys. (2023) Retrieved from Reata Pharmaceuticals: https://www.skyclarys.com/?utm_source=aw_sbr_paidsearch&utm_medium=cpc&utm_campaign=rteskyc_dtc_sem_crs_aw_sbr_nat_awa_ext&utm_keyword=skyclarys&utm_id=rteskyc11106&gclid=CjwKCAjwo9unBhBTEiwAipC114w8e0Se4cLW-9xpIld-ta1DCgDWY4MfVKD5osKcDeeSdXB5-Ch7exoCcHMQAvD_BwE&gclsrc=aw.ds

(2022, Aug 31). Retrieved Mar 13, 2023, from MCG: https://careweb.careguidelines.com/ed26/index.html

(2023). Retrieved Mar 14, 2023, from Centers for Medicare and Medicaid Services: https://www.cms.gov/medicare-coverage-database/search-results.aspx?keyword=Alpha-1+Antitrypsin&keywordType=starts&areaId=s53&docType=NCA,CAL,NCD,MEDCAC,TA,MCD,6,3,5,1,F,P&contractOption=all

ACG Clinical Guideline: Evaluation of Abnormal Liver Chemistries. (2016, Dec 20). Retrieved Mar 14, 2023, from American College of Gastroenterology: https://acgcdn.gi.org/wp-content/uploads/2018/04/ACG-Abnormal-Liver-Chemistries-Guideline-Summary.pdf

FDA Approves Grifols' Genetic Alpha-1 Antitrypsin Deficiency Test. (2018, Jan). Retrieved Mar 14, 2023, from American Association for Clinical Chemistry: https://www.aacc.org/cln/articles/2018/janfeb/fda-approves-grifols-genetic-alpha-1-antitrypsin-deficiency-test

Genetic Testing for Alpha-1 Antitrypsin Deficiency Associated with Chronic Liver Disease. (2022, Jul 26). Retrieved Mar 14, 2023, from Hayes, Inc: https://evidence.hayesinc.com/report/gtu.serpina4466

Genetic Testing for Alpha-1 Antitrypsin Deficiency Associated with Lung Disease. (2022, Jul 26). Retrieved Mar 14, 2023, from Hayes, Inc: https://evidence.hayesinc.com/report/gtu.alphserpina2388

Genetic Testing for Inherited Conditions 2023-02-12. (2023, Feb 12). Retrieved Mar 14, 2023, from AIM Specialty Health (Carelon Medical Benefits Management): https://aimspecialtyhealth.com/resources/clinical-guidelines/

Molecular Pathology Codes No Longer Requiring a Service Authorization. (2014, May 01). Retrieved Mar 13, 2023, from Department of Medical Assistance Services: https://vamedicaid.dmas.virginia.gov/memo/molecular-pathology-codes-no-longer-requiring-service-authorization-effective-may-1-2014

SERPINA1 gene. (2021, Sep 15). Retrieved Mar 14, 2023, from MedlinePlus - Genetics: https://medlineplus.gov/genetics/gene/serpina1/

Stoller, J. (2022, Sep 13). Clinical manifestations, diagnosis, and natural history of alpha-1 antitrypsin deficiency. Retrieved Mar 14, 2023, from UpToDate: https://www.uptodate.com/contents/clinical-manifestations-diagnosis-and-natural-history-of-alpha-1-antitrypsin-deficiency?search=Alpha-1%20Antitrypsin%20Deficiency&source=search_result&selectedTitle=1~100&usage_type=default&display_rank=1#H1551012796

(2019). Retrieved Dec 30, 2019, from Centers for Medicare and Medicaid Services.

(2019, Feb 11). Retrieved Dec 31, 2019, from MCG.

(2019). Retrieved Dec 30, 2019, from National Comprehensive Cancer Network.

Beygo, J., Buitine, K., Ramsden, S., Ellis, R., Clayton-Smith, J., & Kanber, D. (2019, Jun 24). Update of the EMQN/ACGS best practice guidelines for molecular analysis of Prader-Willi and Angelman syndromes. Retrieved Dec 31, 2019, from European Hournal of Human Genetics: https://www.nature.com/articles/s41431-019-0435-0

Butler, M. G., Miller, J. L., & Forster, J. L. (2019, Jun 24). Pradar-Willi Syndrome - Clinical Genetics, Diagnosis and Treatment Approaches: An Update. Retrieved Dec 31, 2019.

Clinical Guidelines Genetic Testing. (2019). Retrieved Dec 30, 2019, from AIM Specialty Health: https://aimspecialtyhealth.com/resources/clinical-guidelines/genetic-testing/

Epidemiology and genetics of Pradar-Willi syndrome. (2019, Dec 03). Retrieved Dec 30, 2019, from UpToDate.

Pradar-Willi Syndrome. (2018, Nov 30). Retrieved Dec 30, 2019, from DynaMed: https://www.dynamed.com/condition/prader-willi-syndrome-27

Carrier Screening for Genetic Conditions, Number 691. (2017, March). Retrieved October 8, 2019, from American College of Obstetricians and Gynecologists.

Clinical Appropriateness Guidelines: Genetic Testing for Reproductive Carrier Screening and Prenatal Diagnosis. (2019, September 9). Retrieved Oct 8, 2019, from AIM Specialty Health.

HEXA Gene Analysis Coding and Billing Guidelines. (2019, Jan 01). Retrieved Oct 8, 2019, from Centers for Medicare and Medicaid Services.

HGNC Data for HEXA. (2019). Retrieved October 8, 2019, from HUGO Gene Nomenclature Committee: https://www.genenames.org/data/gene-symbol-report/#!/hgnc_id/HGNC:4878

Late-onset Tay–Sachs disease, Volume 17, Issue 5. (2017, October 17). doi:10.1136/practneurol-2017-001665

NCCN Guidelines. (2019). Retrieved Oct 8, 2019, from National Comprehensive Cancer Network: https://www.nccn.org/professionals/physician_gls/default.aspx

Preconception and Prenatal Carrier Screening for Genetic Disease More Common in the Ashkenazi Jewish Population and Others With A Family History Of These Disorders. (2019, Aug 1). Retrieved Oct 8, 2019, from UpToDate:

Prenatal Diagnosis of Tay-Sachs Disease, MIMB, volume 1885. (2018, December 1). doi:10.1007/978-1-4939-8889-1_16

Tay - Sachs Disease (TSD) Testing in Individuals of Non–Ashkenazi Jewish Origin. (2014, December 12). Retrieved Oct 8, 2019, from Hayes, Inc.

Tay-Sachs Disease. (2018, November 30). Retrieved Oct 8, 2019, from DynaMed Plus.

Tay - Sachs disease and Variants - HEXA Gene, ACG: A-0614 (AC). (2019, Feb 11). Retrieved Oct 8, 2019, from MCG: https://careweb.careguidelines.com/ed23/index.html

## Special Notes: *

This medical policy express Sentara Health Plan's determination of medically necessity of services, and they are based upon a review of currently available clinical information. These policies are used when no specific guidelines for coverage are provided by the Department of Medical Assistance Services of Virginia (DMAS). Medical Policies may be superseded by state Medicaid Plan guidelines. Medical policies are not a substitute for clinical judgment or for any prior authorization requirements of the health plan. These policies are not an explanation of benefits.

Medical policies can be highly technical and complex and are provided here for informational purposes. These medical policies are intended for use by health care professionals. The medical policies do not constitute medical advice or medical care. Treating health care professionals are solely responsible for diagnosis, treatment and medical advice. Sentara Health Plan members should discuss the information in the medical policies with their treating health care professionals. Medical technology is constantly evolving and these medical policies are subject to change without notice, although Sentara Health Plan will notify providers as required in advance of changes that could have a negative impact on benefits.

The Early and Periodic Screening, Diagnostic and Treatment (EPSDT) covers services, products, or procedures for children, if those items are determined to be medically necessary to "correct or ameliorate" (make better) a defect, physical or mental illness, or condition (health problem) identified through routine medical screening or examination, regardless of whether coverage for the same service or support is an optional or limited service under the state plan. Children enrolled in the FAMIS Program are not eligible for all EPSDT treatment services. All requests for authorization

for the services described by this medical policy will be reviewed per EPSDT guidelines. These services may be authorized under individual consideration for Medicaid members under the age of 21-years if the services are judged to by medically necessary to correct or ameliorate the member's condition. *Department of Medical Assistance Services (DMAS), Supplement B - EPSDT (Early and Periodic Screening, Diagnosis and Treatment) Manual.*

## Keywords:

Amyloidosis, Ashkenazi Jewish, Autosomal recessive, Bloom syndrome, CADASIL, Canavan disease, Carrier Testing, CD40 Ligand Deficiency, CD40LG, Cerebral autosomal dominant arteriopathy with subcortical infarcts and leukoencephalopathy, CFTR, CGH Array, Congenital adrenal hyperplasia, Congenital Muscular Dystrophy panel, CYP21A, Cystic Fibrosis, Deficiency, Dihydrolipoamide dehydrogenase, DMD, DNA testing, Duchene Muscular Dystrophy, Dysautonomia, EDMD1, 2, and 3, Emery-Dreifuss Muscular Dystrophy, Familial Hemophagocytic Lymphohistiocytosis, Familial Hypercholesterolemia, Familial hyperinsulinism, Familial Myotonic Dystrophy, Family history, Fanconi Anemia, Fascioscapulohumeral Muscular Dystrophy, FMR1, Fragile X syndrome, Friedreich Ataxia, Fructose Intolerance Testing, FSHD, FXN, Gaucher's disease, Glycogen storage disease type 1, HCM, Hereditary Hypertrophic Cardiomyopathy, HTT, Huntington Disease, Hyper IgM, Inheritest Universal screening, Karyotype, Limb girdle Muscular Dystrophy, Long QT, Maple syrup urine disease, Marfan syndrome, Mckusick-Kaufman Syndrome, Morquio syndrome, Mucolipidosis, Mucopolysaccharidosis, Muscular Dystrophy, Nemaline myopathy, Neurofibromatosis, Nieman Pick Disease, PAH, Phenylalanine hydroxylase, phenylketonuria, PKU, Preimplantation, Premature coronary heart disease, Retinoblastoma, Riley-Day syndrome, SERPINA1, Single nucleotide polymorphism, SNP Microarray, Spinal Muscular Atrophy, Tay-Sach's, Ullrich Muscular Dystrophy, Usher syndrome type 1F, WAS, Wiskott-Aldrich syndrome, Xanthomas, X-linked,