

Mitochondrial Disease CDE Highlight Summary Document

NIH Resources

The NINDS also strongly encourages researchers to use these NIH developed materials for NINDS-sponsored research, when appropriate. Utilization of these resources will enable greater consistency for NINDS-sponsored research studies. These tools are free of charge.

- National Institutes of Health (NIH) Toolbox
- Quality of Life in Neurological Disorders (Neuro-QOL)
- Patient-Reported Outcomes Measurement Information System (PROMIS)

Suicidal Ideation

Investigators should review the FDA's ["Guidance for Industry: Suicidal Ideation and Behavior: Prospective Assessment of Occurrence in Clinical Trials"](#) for the most up-to-date information about suicidal ideation and behavior. One scale that FDA suggests is the Columbia Suicide Severity Rating Scale (C-SSRS) (available at <http://www.cssrs.columbia.edu>)

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Disease/Domain	Recommendations
<p>Mitochondrial Disease</p>	<p>These instruments and elements are recommended for use in Mitochondrial Disease studies:</p> <p>Core elements: None</p> <p>See Start-Up Resources Listing document (Mitochondrial Disease Start-Up Resource Listing)</p> <p>Supplemental – Highly Recommended instruments (for specific disease conditions or types of study):</p> <p>Apathy Evaluation Scale, Apathy Scale, Automated Self-Administered 24-hour Dietary Recall (ASA 24), Barry Albright Dystonia Scale (BADs), Behavior Rating Inventory of Executive Function (BRIEF), Behavior Rating Inventory of Executive Function-Preschool Version (BRIEF-P), Conners Continuous Performance Test, 3rd Edition, Modified Hammersmith Functional Motor Scale (MHFMS-SMA, MHFMS), Newcastle Pediatric Mitochondrial Disease Scale (NPMDS), Peabody Development Motor Scale II, Pediatric Quality of Life Inventory (PEDIQL), Scale for the Assessment and Rating of Ataxia (SARA), Test of Variable Attention (TOVA), The Borg Scale of Perceived Exertion, Vineland Adaptive Behavior Scales, 2nd Ed., World Health Organization Quality of Life Assessment (WHOQOL-BREF)</p>
<p>Participant/Subject Characteristics; Demographics</p>	<p>Core: General Core</p> <p>Supplemental – Highly Recommended: General Core</p> <p>Supplemental: None</p> <p>Exploratory: None</p>

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Participant History and Family History; General Health History	<p>Core: None</p> <p>Supplemental – Highly Recommended: Diabetes-Related Medical History</p> <p>Supplemental: Dietary Supplements, Reproductive and Hormonal History</p> <p>Exploratory: Diabetes-Related Medical History</p>
Assessments and Examinations; Physical Examinations	<p>Core: None</p> <p>Supplemental – Highly Recommended: Automated Self-Administered 24-hour Dietary Recall (ASA 24)</p> <p>Supplemental: Mitochondrial and Gastrointestinal Diseases Assessment</p> <p>Exploratory: None</p>
Assessments and Examinations; Vital Signs and Other Body Measures	<p>Core: None</p> <p>Supplemental – Highly Recommended: Vital Signs</p> <p>Supplemental: None</p> <p>Exploratory: None</p>
Assessments and Examinations; Vision	<p>Core: None</p> <p>Supplemental – Highly Recommended: None</p> <p>Supplemental: Mitochondrial Disease OCT Guidelines, Mitochondrial Disease Test Guidelines, Mitochondrial Disease Visual Electrophysiology Guidelines, Mitochondrial Disease Visual Fields Guidelines</p> <p>Exploratory: None</p>

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Assessments and Examinations; Laboratory Tests and Biospecimens/Biomarkers	<p>Core: None</p> <p>Supplemental – Highly Recommended: Laboratory Tests and Non-Imaging Diagnostics (Diabetes); Genetic Testing Short Form, Genetics Testing Clinical Diagnostics</p> <p>Supplemental: Laboratory Tests and Non-Imaging Diagnostics (Diabetes), Biomarkers Guidelines Mitochondrial Disease, Biomarkers in Mitochondrial Disease, Genetic Testing Short Form, Genetics Testing Clinical Diagnostics</p> <p>Exploratory: Laboratory Tests and Non-Imaging Diagnostics (Diabetes)</p>
Assessments and Examinations; Imaging Diagnostics	<p>Core: None</p> <p>Supplemental – Highly Recommended: None</p> <p>Supplemental: Brain Magnetic Resonance Imaging (MRI), Brain Perfusion Magnetic Resonance Imaging, Cardiac Magnetic Resonance Imaging (MRI), Imaging – Mitochondrial Disease, Echocardiogram</p> <p>Exploratory: Phosphorus Magnetic Resonance Spectroscopy (31PMRS), Two-Dimensional Speckle Tracking Echocardiography Imaging</p>
Assessments and Examinations; Non-Imaging Diagnostics	<p>Core: None</p> <p>Supplemental – Highly Recommended: Electrocardiogram</p> <p>Supplemental: Holter Examination, Electrocardiogram</p> <p>Exploratory: None</p>
Outcomes and End Points; Academic Achievement	<p>Core: None</p> <p>Supplemental – Highly Recommended: None</p> <p>Supplemental: American National Adult Reading Test (AmNART)</p> <p>Exploratory: None</p>

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Outcomes and Endpoints; Adaptive	<p>Core: None</p> <p>Supplemental – Highly Recommended: Vineland Adaptive Behavior Scales, 2nd Edition (Vineland-II)</p> <p>Supplemental: Adaptive Behavior Assessment Scale (ABAS-II), Delis Kaplan Executive Functioning System (DKEFS), 2nd Ed.</p> <p>Exploratory: None</p>
Outcomes and End Points; Ataxia and Performance Measures	<p>Core: None</p> <p>Supplemental – Highly Recommended: Scale for the Assessment and Rating of Ataxia</p> <p>Supplemental: International Cooperative Ataxia Rating Scale (ICARS)</p> <p>Exploratory: None</p>
Outcomes and End Points; Attention	<p>Core: None</p> <p>Supplemental – Highly Recommended: Conners Continuous Performance Test, 3rd Edition (Conners CPT 3), Test of Variable Attention (TOVA)</p> <p>Supplemental: Delis Kaplan Executive Function System (DKEFS), National Institutes of Health (NIH) Toolbox</p> <p>Exploratory: None</p>
Outcomes and End Points; Cognitive	<p>Core: None</p> <p>Supplemental – Highly Recommended: None</p> <p>Supplemental: Automated Neuropsychological Assessment Metrics (ANAM), Axon Sports Computerized Cognitive Assessment, Brief Test of Adult Cognition by Telephone (BTACT), Cambridge Cognitive Assessment Revised (CAMCOG-R)</p> <p>Exploratory: None</p>

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<p>Outcomes and End Points; Dementia</p>	<p>Core: None</p> <p>Supplemental – Highly Recommended: None</p> <p>Supplemental: Informant Questionnaire on Cognitive Decline in the Elderly (IQCODE), Montreal Cognitive Assessment (MoCA)</p> <p>Exploratory: None</p>
<p>Outcomes and Endpoints; Emotional/Behavioral</p>	<p>Core: None</p> <p>Supplemental – Highly Recommended: Apathy Evaluation Scale, Apathy Scale</p> <p>Supplemental: ALS Depression Inventory (ADI-12), Autism Diagnostic Interview (ADI), Autism Diagnostic Observation Schedule (ADOS), Beck Anxiety Inventory (BAI), Brief Infant Toddler Social Emotional Assessment (BISTEA), Brief Psychiatric Rating Scale (BPRS), Cambridge Behavioral Inventory – Revised, Center for Epidemiological Studies – Depression Scale (CES-D), Child Behavior Checklist (CBCL), Child Depression Inventory (CDI), Children Depression Inventory – 2 (CDI-2), Columbia Suicide Severity Rating Scale (CSSRS), Diagnostic and Statistical Manual of Mental Disorders (DSM-5), Generalized Anxiety Disorder (GAD-7), Hamilton Anxiety Rating Scale (HAM-A), Hamilton Depression Rating Scale (HDRS), Irritability Scale, Modified Overt Aggression Scale (MOAS), Montgomery- Asberg Depression Scale (MADRS), Mood Disorder Questionnaire (MDQ), Problem Behaviours Assessment HD – Short Version (PBA-S), Social Responsiveness Scale (SRS)</p> <p>Exploratory: None</p>
<p>Outcomes and Endpoints; Executive Functioning</p>	<p>Core: None</p> <p>Supplemental – Highly Recommended: Behavior Rating Inventory of Executive Function (BRIEF), Behavior Rating Inventory of Executive Function – Preschool Version (BRIEF-P)</p> <p>Supplemental: None</p> <p>Exploratory: None</p>

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<p>Outcomes and Endpoints; Intellectual Functioning</p>	<p>Core: None</p> <p>Supplemental – Highly Recommended: None</p> <p>Supplemental: Kaufman Assessment Battery for Children, Leiter International Performance Scale-3 (Leiter-3), Reynolds Intellectual Assessment Scale (RIAS), Wechsler Abbreviated Scale of Intelligence (WASI), Wechsler Adult Intelligence Scale – Fourth Edition (WAIS-IV), Wechsler Intelligence Scale for Children-V (WISC-V), Wechsler Memory Scale IV (WMS-IV), Wechsler Preschool and Primary Scale of Intelligence (WPPSI-III)</p> <p>Exploratory: None</p>
<p>Outcomes and Endpoints; Language</p>	<p>Core: None</p> <p>Supplemental – Highly Recommended: None</p> <p>Supplemental: Boston Diagnostic Aphasia Exam (BDAE-III), Boston Naming Test (BNT) – 30-item version, Clinical Evaluation of Language Fundamentals (CLEF-5), Comprehensive Assessment of Spoken Language (CASL), Expressive One-Word Picture Vocabulary Test, New Reynell Developmental Language Scale (NRDLS), Peabody Picture Vocabulary Test 4th Edition (PPVT-4), Preschool Language Scales-Fifth Edition (PLS-5)</p> <p>Exploratory: None</p>
<p>Outcomes and Endpoints; Memory</p>	<p>Core: None</p> <p>Supplemental – Highly Recommended: None</p> <p>Supplemental: Memory Assessment Scale</p> <p>Exploratory: None</p>

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<p>Outcomes and Endpoints; Motor Function</p>	<p>Core: None</p> <p>Supplemental – Highly Recommended: Borg Rating of Perceived Exertion (RPE) Scale, Modified Hammersmith Functional Motor Scale for Children with Spinal Muscular Atrophy (MHFMS-SMA/MHFMS-Extend), Newcastle Pediatric Mitochondrial Disease Scale (NPMDS), Peabody Developmental Motor Scale II (PDMS-2), Barry Albright Dystonia Scale (BADS)</p> <p>Supplemental: 6 Minute Walk Test, Beery-Buktenica Developmental Test of Visual-Motor Integration (Beery VMI), Burke-Fahn-Marsden Movement Scale (BFMMS), Gross Motor Function Measure (GMFM-88, GMFM-66), Newcastle Mitochondrial Disease Adult Scale, Physical Activity Questionnaire for Adolescents (PAQ-A), Unified Dystonia Rating Scale (UDRS)</p> <p>Exploratory: 2 Minute Walk Test, Alberta Infant Motor Scale, Motor Function Measure (MFM), Physical and Neurological Examination for Subtle Signs (PANESS), International Pediatric Mitochondrial Disease Score (IPMDS)</p>
<p>Outcomes and Endpoints; Muscle Strength Testing</p>	<p>Core: None</p> <p>Supplemental – Highly Recommended: None</p> <p>Supplemental: Manual Muscle Testing-Using the Medical Research Council Muscle Grading Scale, Maximum Voluntary Isometric Contraction Testing (MVICT)</p> <p>Exploratory: None</p>
<p>Outcomes and Endpoints; Neuropsychological Testing</p>	<p>Core: None</p> <p>Supplemental – Highly Recommended: None</p> <p>Supplemental: Bayley Scales of Infant Development (Bayley III, BSID)</p> <p>Exploratory: None</p>

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<p>Outcomes and Endpoints; Pulmonary Function Testing/Respiratory Status</p>	<p>Core: None</p> <p>Supplemental – Highly Recommended: Pulmonary Function</p> <p>Supplemental: None</p> <p>Exploratory: None</p>
<p>Outcomes and Endpoints; Quality of Life/Patient Reported Outcomes</p>	<p>Core: None</p> <p>Supplemental – Highly Recommended: Pediatric Quality of Life Inventory (PEDIQL), World Health Organization Quality of Life Assessment (WHOQOL-BREF)</p> <p>Supplemental: Child and Adolescent Scale of Environment (CASE), Child and Adolescent Scale of Participation, Craig Handicap and Assessment Reporting Technique (CHART-SF) – Interview version, Craig Handicap and Assessment Reporting Technique (CHART-SF) Paper version, Patient Reported Outcomes Measurement Information System (PROMIS), Quality of Life in Neurological Disorders (Neuro-QOL), Short Form 36-Item Health Survey (SF-36)</p> <p>Exploratory: EuroQol-5 Dimension Questionnaire, Family Strain Questionnaire Assessment of Preschooled Children’s Participation), Pediatric Quality of Life Inventory Multidimensional Fatigue Scale</p>
<p>Outcomes and Endpoints; Visual-Spatial Processing</p>	<p>Core: None</p> <p>Supplemental – Highly Recommended: None</p> <p>Supplemental: Judgment of Line Orientation (Benton JLO)</p> <p>Exploratory: None</p>